



Zertifiziert nach
DIN EN ISO 9001
sicZert Zertifizierungen GmbH

Karnasch®

PROFESSIONAL TOOLS

GERMANY

GK32

HAUPTKATALOG · MAIN CATALOGUE

2019 / 2020

Gültig vom 01.08.2019 bis 31.07.2020
Valid from 01.08.2019 until 31.07.2020



**PRECISION.
PERFECTION.
PERFORMANCE.**

WWW.KARNASCH.TOOLS

Die wichtigsten Informationen auf einen Blick

The most important information at a glance

BESTELLUNGEN · ORDERS

Onlineshop: shop.karnasch.tools
Telefon / phone: +49 6203 4039 0
Fax: +49 6203 415 90
E-Mail: order@karnasch.tools

KUNDENSERVICE · CUSTOMER SERVICE

Telefon / phone: +49 6203 4039 0
E-Mail: info@karnasch.tools

FACHBERATUNG · TECHNICAL SUPPORT

CNC Tools Division: +49 6203 4039 117
Industrial Tools Division: +49 33675 7265 422
+49 33675 7265 423

IHRE KUNDENNUMMER YOUR CUSTOMER NUMBER



BESTELLUNGEN ORDERS

Sie können 24/7 in unserem Onlineshop bestellen. Zusätzlich erreichen Sie uns persönlich von Mo.-Fr. in der Zeit von 08:00-17:00 Uhr MEZ.

Orders can be placed 24/7 online at our onlineshop. You can reach us from Monday to Friday between 08:00-17:00 CET.



LIEFERKONDITIONEN AUSSERHALB DEUTSCHLANDS · DELIVERY CONDITIONS OUTSIDE GERMANY

Bei Auslandslieferungen werden Porto und Verpackung in Abhängigkeit vom Gewicht in Rechnung gestellt, unverzollt, unter 500 € netto unversichert.*

For orders outside Germany we will charge transport and packaging fees depending on weight, without customs duties and under 500 € net without insurance.*



VERSAND INNERHALB DEUTSCHLANDS

Bestellungen in unserem Onlineshop werden ab 150 € netto innerhalb Deutschlands frei Haus geliefert*. Über andere Bestellwege werden Ihre Bestellungen ab 1.000 € frei Haus geliefert.*

Verfügbare Ware, die werktags im Onlineshop bis 14:00 Uhr / über andere Bestellwege bis 13:00 Uhr bestellt wird, erhalten Sie am folgenden Werktag (Mo.-Fr.) bis 12:00 Uhr. Die Versandkostenpauschale hierfür beträgt 6,70 € (Stand 03/2017) pro Paket.*/**

Ein Versand am gleichen Tag nach 13:00 Uhr bzw. 14:00 Uhr ist zu einer Versandkostenpauschale von 12,00 € möglich.*/**



RÜCKSENDUNGEN / REKLAMATIONEN RETURN DELIVERIES / CLAIMS

Am Ende des Kataloges und auf unserer Homepage finden Sie die entsprechenden Formulare. Bitte verwenden Sie ausschließlich unsere Vorlagen. Bei Falschbestellungen berechnen wir 15% des Warenwertes. Sonderanfertigungen sind von der Rückgabe ausgeschlossen.

At the last pages of this catalogue and at our homepage you can find the appropriate forms. Please use only our forms. In case of wrong ordering we charge 15% handling fee. Special products can not be returned.

* Ggf. zzgl. Zuschläge für: Sperrgut, Expresszustellung, zusätzliche Handhabung, Außengebiete, schwer zugängliche Gebiete. Wir behalten uns vor die Kosten für Porto und Versandzuschläge eventl. Preiserhöhungen unserer Versanddienstleister anzupassen.

* Surcharge for bulky good, express delivery, add. handling, outside area, difficult to access areas. We reserve the right to adjust our costs for freight and surcharge to price increases of our shipping service provider.

**Bei Paketen mit einem Bruttogewicht über 32 kg kann es in Einzelfällen zu Verzögerungen von bis zu 24 Stunden kommen.

Angesichts der aktuellen Marktsituation gehen wir davon aus, dass wir im Zeitraum vom 01.08.2019 – 31.07.2020 keine Preiserhöhung auf die Preise in unserem GK32 Hauptkatalog vornehmen werden.

Ausgenommen sind plötzliche und unerwartet hohe Veränderungen unserer Einkaufskonditionen für Rohmaterialien. In diesem Fall behalten wir uns vor, notwendige Preisanpassungen vorzunehmen.

Considering the current market situation, we assume that in the period from 01.08.2019 – 31.07.2020 we will not increase the prices stated in our GK32 main catalogue.

Exceptions are sudden and unexpectedly high changes in our purchasing conditions for raw materials. In this case, we reserve the right to make necessary price adjustment.

• Lagerware / Stock tool

○ Keine Lagerware, Lieferzeit und Preis auf Anfrage
No stock tool. Price and delivery on request

Lieferzeit kurzfristig da Rohlinglager vorhanden
Short delivery deadline possible then blanks are on stock available

Sonderpreis. Solange Vorrat reicht. Rückgabe nicht möglich.
Special price. While stocks last. Return not possible.

2-3 Arbeitstage Lieferzeit / 2-3 work days delivery time



Qualitativ hochwertige Produkte zu einem attraktiven Preis:

Die Karnasch Valuetools bestechen durch ein hervorragendes Preis-Leistungs-Verhältnis. Dies wird ermöglicht durch eine automatisierte Großserienfertigung sowie optimierte Prozesse. Neuentwickelte Materialien und angepasste Fertigungstechniken sind Grundlage unserer neuen Qualitätslinie. Enge Fertigungstoleranzen, Zuverlässigkeit und Standzeit resultieren in unseren sehr effizienten Karnasch Valuetool Produkten.



High quality products with an attractive price:

The Karnasch Valuetools impress with an excellent price-performance ratio. This is made possible by automated serial production. Newly developed materials and adapted manufacturing process as well as optimized processes are the basis of our new quality line. Tight manufacturing tolerances, tool life and reliability result in our very efficient Karnasch Valuetool products.

VHM Schafffräser / Solid carbide end mills

| | | |
|-----------|---|------|
| > 30 8011 | VHM-Microschafffräser mit Eckenradius / Solid carbide miniature end mills with corner radius | Ø 48 |
| > 30 8012 | VHM-Micro-3D Mini-Radiusfräser / Solid carbide miniature ball nose mill | Ø 50 |
| > 30 6345 | VHM-HPC-Schafffräser ungleich geteilt, 35°/38° Spirale / Solid carbide HPC end mills with variable pitch, 35°/38° helix angle | Ø 84 |
| > 30 6346 | VHM-HPC-Schafffräser ungleich geteilt, 35°/38° Spirale / Solid carbide HPC end mills with variable pitch, 35°/38° helix angle | Ø 84 |
| > 30 6438 | VHM-Gesenkfräser / Solid carbide end mills | Ø 92 |
| > 30 6460 | VHM-Schafffräser für trochoidales Fräsen, mit Spanteiler / Solid carbide end mills for trochoidal milling, with chip breaker | Ø 96 |



Vollhartmetallbohrer / Solid carbide twist drill

| | | |
|-----------|--|-------|
| > 22 0802 | Vollhartmetallbohrer / Solid carbide twist drill | Ø 250 |
| > 22 0806 | Vollhartmetallbohrer mit Innenkühlung / Solid carbide twist drill with interior cooling supply | Ø 252 |



Frässtifte + Displays + Sets / Burrs + Displays + Sets neu new

| | | | |
|------------|-----|---|-------|
| > 11 3001 | ZYA | Frässtift Zylinder / Burr cylinder (diverse Abmessungen, various sizes) | Ø 692 |
| > 11 3011 | ZYB | Frässtift Zylinder + Stirnverzahnung / Burr cylinder + end cut (div. Abmessungen) | Ø 693 |
| > 11 3021 | WRC | Frässtift Walzenrundform / Burr ball nosed cylinder (div. Abmessungen, various sizes) | Ø 696 |
| > 11 3031 | KUD | Frässtift Kugel / Burr ball (diverse Abmessungen, various sizes) | Ø 697 |
| > 11 3041 | TRE | Frässtift Tropfen / Burr oval (diverse Abmessungen, various sizes) | Ø 698 |
| > 11 3051 | RBF | Frässtift Rundbogen / Burr ball nosed tree (diverse Abmessungen, various sizes) | Ø 699 |
| > 11 3061 | SPG | Frässtift Spitzbogen / Burr tree (diverse Abmessungen, various sizes) | Ø 700 |
| > 11 3071 | - | Frässtift Flamme / Burr flame (diverse Abmessungen, various sizes) | Ø 701 |
| > 11 3081 | KEL | Frässtift Rundkegel / Burr ball nosed cone (diverse Abmessungen, various sizes) | Ø 701 |
| > 11 3091 | SKM | Frässtift Spitzkegel / Burr cone (diverse Abmessungen, various sizes) | Ø 702 |
| > 11 4854U | | Display | Ø 810 |
| > 11 4856U | | Display | Ø 811 |
| > 11 4903U | | Set | Ø 814 |
| > 11 4838U | | Set | Ø 815 |
| > 11 4919U | | Set | Ø 816 |
| > 11 4927U | | Set | Ø 817 |
| > 11 4935U | | Set | Ø 818 |
| > 11 4943U | | Set | Ø 819 |



KARNASCH BESTSELLER

Ausgewählte Top-Produkte höchster Qualität, preisreduziert auf einen Blick.
Selected top products of highest quality, price-reduced at a glance.

**BEST
SELLER**

Vollhartmetall-Hochleistungsbohrer / Solid carbide high performance twist drill

| | | |
|-----------|---|-------|
| > 22 0402 | Vollhartmetall-Hochleistungsbohrer / Solid carbide high performance twist drill | 📄 254 |
| > 22 0405 | Vollhartmetall-Hochleistungsbohrer mit Innenkühlung, DIN 6535 HEK / Solid carbide high performance twist drill with interior cooling supply, DIN 6535 HEK | 📄 259 |
| > 22 0406 | Vollhartmetall-Hochleistungsbohrer mit Innenkühlung, DIN 6535 HAK / Solid carbide high performance twist drill with interior cooling supply, DIN 6535 HAK | 📄 262 |

CVD-3D-Radiusfräser / CVD-3D milling cutter

| | | |
|-----------|---|-------|
| > 29 6522 | CVD-3D-Radiusfräser mit Kugelstirn 3xD-5xD-7xD / CVD-3D-ball milling cutter 3xD-5xD-7xD | 📄 203 |
|-----------|---|-------|

CVD-Schaftfräser / CVD-end mill

| | | |
|-----------|--|-------|
| > 29 6523 | CVD-Schaftfräser mit Eckenradius / CVD-end mill with corner radius | 📄 204 |
| > 29 6524 | CVD-Schaftfräser 3xD-5xD-7xD / CVD-end mills 3xD-5xD-7xD | 📄 205 |
| > 29 6525 | CVD-Schaftfräser, extra kurz / CVD-end mills, extra short | 📄 205 |
| > 29 6526 | CVD-Schaftfräser / CVD-end mills | 📄 206 |

PKD-3D-Radiusfräser / PCD-3D milling cutter

| | | |
|-----------|---|-------|
| > 30 6522 | PKD-3D-Radiusfräser mit Kugelstirn, 3xD-5xD-7xD / PCD-3D-ball milling cutter, 3xD-5xD-7xD | 📄 219 |
|-----------|---|-------|

PKD-Schaftfräser / PCD milling cutter

| | | |
|-----------|--|-------|
| > 30 6523 | PKD-Schaftfräser mit Eckenradius, 3xD-5xD-7xD / PCD-end mill with corner radius, 3xD-5xD-7xD | 📄 220 |
| > 30 6524 | PKD-Schaftfräser, 3xD-5xD-7xD / PCD-end mills, 3xD-5xD-7xD | 📄 221 |



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Kernbohrer + Sets + Displays / Annular Cutter + Sets + Displays

| | | |
|------------|--|-------|
| > 20 1315 | HARD-LINE 40 Hartmetall-bestückter Kernbohrer HARD-LINE 40 Carbide-tipped annular cutter | 📦 366 |
| > 20 1316 | HARD-LINE 55 Hartmetall-bestückter Kernbohrer HARD-LINE 55 Carbide-tipped annular cutter | 📦 368 |
| > 20 1312 | BLUE-DRILL LINE 30 HSS-XE DURABLUE-beschichtete Kernbohrer BLUE-DRILL LINE 30 HSS-XE DURABLUE-coated annular cutter | 📦 396 |
| > 20 1313 | BLUE-DRILL LINE 55 HSS-XE DURABLUE-beschichtete Kernbohrer BLUE-DRILL LINE 55 HSS-XE DURABLUE-coated annular cutter | 📦 398 |
| > 20 1260U | GOLD-DRILL LINE 30 HSS-XE Kernbohrer / GOLD-DRILL LINE 30 HSS-XE annular cutter | 📦 406 |
| > 20 1270U | GOLD-DRILL LINE 55 HSS-XE Kernbohrer / GOLD-DRILL LINE 55 HSS-XE annular cutter | 📦 408 |
| > 20 1255 | SILVER-DRILL LINE 25 HSS-XE Kernbohrer / SILVER-DRILL LINE 25 HSS-XE annular cutter | 📦 422 |
| > 20 1265 | SILVER-DRILL LINE 50 HSS-XE Kernbohrer / SILVER-DRILL LINE 50 HSS-XE annular cutter | 📦 424 |



Lochsägen / Hole saws

| | | |
|---------------------|--|-------|
| > 20 1130 | POWER-MAX 30 Super Heavy-Duty HM-Lochsäge. KOMPLETT POWER-MAX 30 Super Heavy-Duty T.C.T. hole saw. COMPLETE | 📦 575 |
| > 20 1130A | POWER-MAX 30 Super Heavy-Duty HM-Lochsäge. SÄGENKÖRPER POWER-MAX 30 Super Heavy-Duty T.C.T. hole saw. SAW BODY ONLY | 📦 575 |
| > 20 1020 | EASY-CUT 5 HM-Lochsäge / EASY-CUT 5 T.C.T. hole saw | 📦 587 |
| > 20 1500 | Bi-Metall-Lochsäge / Bi-Metal hole saw | 📦 592 |
| > 20 1500 Sets/Sets | Bi-Metall-Lochsäge Sets / Bi-Metal hole saw sets | 📦 595 |
| > 20 1150 | ALLROUND 60 ECO Lochsäge / ALLROUND 60 ECO hole saw | 📦 596 |
| > 21 1500 | Diamant-bestreute Lochsäge / Diamond-grit hole saw | 📦 600 |



Stufenbohrer + Sets / Step drills + Sets

| | | |
|--|--|-----------|
| > 20 1447 / 20 1447U / 21 3001 / 21 3004 / 21 3033 / 21 3030 | Stufenbohrer 4-12 mm / Step drills 4-12 mm | 📦 610-612 |
| > 20 1448 / 20 1448U / 21 3002 / 21 3005 / 21 3034 / 21 3031 | Stufenbohrer 4-20 mm / Step drills 4-20 mm | 📦 610-612 |
| > 20 1449 / 20 1449U / 21 3003 / 21 3006 / 21 3035 / 21 3032 | Stufenbohrer 6-32 mm / Step drills 6-32 mm | 📦 610-612 |



Kegelsenker + Sets / Countersinks + Sets

| | | |
|-----------|--|-------|
| > 20 1740 | HSS-XE Kegelsenker 90° / HSS-XE countersinks 90° | 📦 646 |
|-----------|--|-------|



Frässtifte + Displays + Sets / Burrs + Displays + Sets

| | | |
|----------------------|--|-------|
| > 11 5001 / 11 3001 | ZYA Frässtift Zylinder / Burr cylinder | 📦 692 |
| > 11 5011 / 11 3011 | ZYB Frässtift Zylinder + Stirnverzahnung / Burr cylinder + end cut | 📦 693 |
| > 11 6010 / 11 4010 | ZYA Frässtift Zylinder-Radius / Burr cylinder-radius | 📦 695 |
| > 11 5021 / 11 3021 | WRC Frässtift Walzenrundform / Burr ball nosed cylinder | 📦 696 |
| > 11 5031 / 11 3031 | KUD Frässtift Kugel / Burr ball | 📦 697 |
| > 11 5041 / 11 3041 | TRE Frässtift Tropfen / Burr oval | 📦 698 |
| > 11 5051 / 11 3051 | RBF Frässtift Rundbogen / Burr ball nosed tree | 📦 699 |
| > 11 5061 / 11 3061 | SPG Frässtift Spitzbogen / Burr tree | 📦 700 |
| > 11 5071 / 11 3071 | - Frässtift Flamme / Burr flame | 📦 701 |
| > 11 5081 / 11 3081 | KEL Frässtift Rundkegel / Burr ball nosed cone | 📦 702 |
| > 11 5091 / 11 3091 | SKM Frässtift Spitzkegel / Burr cone | 📦 702 |
| > 11 5096 / 11 3096 | WKN Frässtift Winkel / Burr inverted cone | 📦 702 |
| > 11 5101 / 11 3101 | KSJ Frässtift Kegel 60° / Burr countersink 60° | 📦 703 |
| > 11 5111 / 11 3111 | KSK Frässtift Kegel 90° / Burr countersink 90° | 📦 703 |
| > 11 4853 / 11 4853U | Display | 📦 810 |
| > 11 4855 / 11 4855U | Display | 📦 811 |
| > 11 4904 / 11 4904U | Set | 📦 814 |
| > 11 4837 / 11 4837U | Set | 📦 815 |
| > 11 4918 / 11 4918U | Set | 📦 816 |
| > 11 4926 / 11 4926U | Set | 📦 817 |
| > 11 4934 / 11 4934U | Set | 📦 818 |
| > 11 4942 / 11 4942U | Set | 📦 819 |
| > 11 4907 / 11 4907U | Set | 📦 820 |
| > 11 4911 / 11 4911U | Set | 📦 821 |



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Kreissägeblätter / Circular saw blades

Stahlprofile, Bleche, Sandwich / Mild steel profiles, sheet metal, sandwich material

- | | | |
|-----------|--|-------|
| > 10 7130 | Dry-Cutter Baustähle "Einweg" / Dry-Cutter mild steel "Throw-away" | 📄 893 |
| > 10 7400 | Dry-Cutter Sandwich / Dry-cutter sandwich | 📄 897 |

Aluminium und weitere Ne-Metalle / Aluminum and other non ferrous materials

- | | | |
|-----------|---------------------------------------|-------|
| > 11 1100 | Aluminium Negativ / Aluminum negative | 📄 910 |
|-----------|---------------------------------------|-------|

Kunststoffe / Plastics

- | | | |
|-----------|---|-------|
| > 11 1425 | Dünnschnitt Wechselzahnblätter speziell für Kunststoffe, Profile, Furniere Thin-cut blades with alternative top bevel teeth especially for plastics, profiles, veneers | 📄 940 |
| > 11 1430 | Fertigschnitt-Dünnschnittblätter speziell für harte Kunststoffe (Plexiglas), Profile, abrasive Werkstoffe Finishing-cut, thin-cut blades especially for hard plastics (plexiglass), profiles, abrasive materials | 📄 942 |

Universal / Universal

- | | | |
|-----------|--|-------|
| > 10 8055 | Winkelschleifer + Brutal Einweg-Sägeblätter für nahezu alle Materialien Angle grinder + Brutal disposable saw blades for almost all materials | 📄 898 |
|-----------|--|-------|

Bausägen / Construction saws

- | | | |
|-----------|--|-------|
| > 11 1250 | Blätter für den harten Allroundeinsatz auf der Baustelle Blades for hard all-round application on the building site | 📄 964 |
|-----------|--|-------|

Holzwerkstoffe / Wood-based materials

- | | | |
|-----------|--|--------|
| > 11 1200 | Zuschnitt Kreissägeblätter / Rip sawblades | 📄 1018 |
| > 11 1300 | Universal-Kreissägeblätter, Formatieren, Massivholz Universal wood-cutting blades, panel-sizing, solid wood | 📄 1026 |
| > 11 1400 | Handkreissägeblätter / Blades for portable machines | 📄 1034 |
| > 11 1600 | Hohlzahn Kreissägeblätter, Formatieren / Hollow-tooth blades, panel-sizing | 📄 1004 |



Kernbohrmaschinen / Hole cutting machines

- | | | |
|---|--------------------|--------|
| > 20 8013 / 21 8013 / 22 8013 | KA 35 SILVER-MAG | 📄 1087 |
| > 20 8020 010 / 20 8020 020 / 20 8020 030 | KA 38 BLUE-MAG | 📄 1093 |
| > 20 8021 010 / 20 8021 020 / 20 8021 030 | KA 40 BLUE-MAG | 📄 1094 |
| > 20 8022 010 / 20 8022 020 / 20 8022 030 | KAS 40 BLUE-MAG | 📄 1095 |
| > 20 8023 010 / 20 8023 020 / 20 8023 030 | KA 50 BLUE-MAG | 📄 1096 |
| > 20 8024 010 / 20 8024 020 / 20 8024 030 | KAS 50 BLUE-MAG | 📄 1097 |
| > 20 8025 010 / 20 8025 020 / 20 8025 030 | KATV 55 BLUE-MAG | 📄 1098 |
| > 20 8026 010 / 20 8026 020 / 20 8026 030 | KATSV 55 BLUE-MAG | 📄 1099 |
| > 20 8027 010 / 20 8027 020 / 20 8027 030 | KA 100 BLUE-MAG | 📄 1100 |
| > 20 8028 010 / 20 8028 020 / 20 8028 030 | KAS 100 BLUE-MAG | 📄 1101 |
| > 20 8029 010 / 20 8029 020 / 20 8029 030 | KATV 100 BLUE-MAG | 📄 1102 |
| > 20 8030 010 / 20 8030 020 / 20 8030 030 | KATSV 100 BLUE-MAG | 📄 1103 |
| > 20 8031 010 / 20 8031 020 / 20 8031 030 | KALP 45 BLUE-MAG | 📄 1104 |
| > 20 8032 010 / 20 8032 020 / 20 8032 030 | KATV 140 BLUE-MAG | 📄 1105 |



Druckluftgeradschleifer / Pneumatic straight grinder

- | | | |
|-----------|-----------|--------|
| > 11 4705 | KA 1000 | 📄 1112 |
| > 11 4714 | KA 100R | 📄 1114 |
| > 11 4703 | KA 75R | 📄 1116 |
| > 11 4706 | KA 60R | 📄 1118 |
| > 11 4707 | KA 45R | 📄 1120 |
| > 11 4708 | KA 37LR | 📄 1122 |
| > 11 4709 | KA 30LR | 📄 1124 |
| > 11 4704 | K 25/2 | 📄 1126 |
| > 11 4710 | KAMD 25LR | 📄 1130 |
| > 11 4711 | KAM 25LR | 📄 1132 |
| > 11 4712 | KAM 16LR | 📄 1134 |
| > 11 4713 | KAM 10LR | 📄 1136 |



Alle neuen Werkzeuge auf einen Blick
All new tools at a glance

CNC-Fräsen / CNC milling

| | | |
|-----------|---|-----|
| > 30 6345 | VHM-HPC-Schaftfräser ungleich geteilt, 35°/38° Spirale / Solid carbide HPC end mills with variable pitch, 35°/38° helix angle | 84 |
| > 30 6346 | VHM-HPC-Schaftfräser ungleich geteilt, 35°/38° Spirale / Solid carbide HPC end mills with variable pitch, 35°/38° helix angle | 84 |
| > 30 6460 | VHM-Schaftfräser für trochoidales Fräsen, mit Spanteiler / Solid carbide end mills for trochoidal milling, with chip breaker | 96 |
| > 23 1800 | VHM-Gewindefräser mit Innenkühlung, Logarithmisch hinterschleifen / Solid carbide thread mill with interior cooling supply, logarithmical relief ground | 163 |



Kernbohrer + Zubehör / Annular cutter + accessories

| | | |
|-------------------|---|---------|
| > Sets / Displays | Große Auswahl an verschiedenen Sets und Displays. Für bis zu 6, 12, 39, 44, 50 Stück Kernbohrer / Large selection of different sets and displays. For up to 6, 12, 39, 44, 50 pieces annular cutter | 534-561 |
| > 20 1132 | Koffer leer für max. 12 Stück Kernbohrer / Empty case for max. 12 pieces annular cutter | 534-561 |



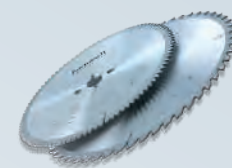
Frässtifte + Displays + Sets / Burrs + Displays + Sets

| | | |
|------------|--|-----|
| > 11 3001 | ZYA Frässtift Zylinder / Burr cylinder (diverse Abmessungen, various sizes) | 692 |
| > 11 3011 | ZYB Frässtift Zylinder + Stirnverzahnung / Burr cylinder + end cut (div. Abmessungen, various sizes) | 693 |
| > 11 3021 | WRC Frässtift Walzenrundform / Burr ball nosed cylinder (diverse Abmessungen, various sizes) | 696 |
| > 11 3031 | KUD Frässtift Kugel / Burr ball (diverse Abmessungen, various sizes) | 697 |
| > 11 3041 | TRE Frässtift Tropfen / Burr oval (diverse Abmessungen, various sizes) | 698 |
| > 11 3051 | RBF Frässtift Rundbogen / Burr ball nosed tree (diverse Abmessungen, various sizes) | 699 |
| > 11 3061 | SPG Frässtift Spitzbogen / Burr tree (diverse Abmessungen, various sizes) | 700 |
| > 11 3071 | - Frässtift Flamme / Burr flame (diverse Abmessungen, various sizes) | 701 |
| > 11 3081 | KEL Frässtift Rundkegel / Burr ball nosed cone (diverse Abmessungen, various sizes) | 701 |
| > 11 3091 | SKM Frässtift Spitzkegel / Burr cone (diverse Abmessungen, various sizes) | 702 |
| > 11 4854U | Display | 810 |
| > 11 4856U | Display | 811 |
| > 11 4903U | Set | 814 |
| > 11 4838U | Set | 815 |
| > 11 4919U | Set | 816 |
| > 11 4927U | Set | 817 |
| > 11 4935U | Set | 818 |
| > 11 4943U | Set | 819 |



Kreissägeblätter / Circular saw blades

| | | |
|-----------|--|-----------------------------|
| > 10 7002 | Hartmetall-bestückte Dünnschnitt Kreissägeblätter TiALN-beschichtet für Edelstahl Carbide tipped thin-cut steel circular saw blades TiALN-coated for stainless steel | 📄 888 |
| > 10 8055 | Winkelschleifer + Brutal Einweg Sägeblätter Angle grinder + Brutal disposable saw blades ART: 10 8055 120 003, 10 8055 120 005, 10 8055 120 007 | 📄 898-899 |
| > 11 1050 | Aluminium Positiv Dünnschnitt Aluminum positive thin-cut ART: diverse Abmessungen, various sizes | 📄 906-907 |
| > 11 1130 | Aluminium Negativ Dünnschnitt Aluminum negative thin-cut | 📄 914-915 |
| > 11 1130 | Harte Kunststoffe, Abrasive Werkstoffe, Fertigschnitt / Dünnschnitt, Negativ Hard plastics, abrasive materials, finishing-cut / thin-cut, negative | 📄 932-933, 962-963, 970-971 |
| > 11 1340 | Kreissägen für Straßenrandfreischneider Circular saws für roadside maintenance ART: 11 1340 390 020, 11 1340 590 020 | 📄 1040 |
| > 11 1350 | Diamant Universal Diamond Universal ART: diverse Abmessungen, various sizes | 📄 936-937, 966, 972-973 |
| > 11 1430 | Aluminium Positiv Dünnschnitt / Fertigschnitt Aluminum positive thin-cut / finishing-cut ART: diverse Abmessungen, various sizes | 📄 908-909 |
| > 11 1430 | Harte Kunststoffe, Abrasive Werkstoffe, Fertigschnitt / Dünnschnitt Hard plastics, abrasive materials, finishing-cut / thin-cut | 📄 942-943, 976-977, 998-999 |
| > 11 1460 | Formatieren, Harte + abrasive Plattenmaterialien / Trapez-Trapezzahn Panel-sizing, Hard + abrasive panel materials / triple-chip / triple-chip tooth ART: 11 1460 450 010, 11 1460 500 010 | 📄 1000-1001 |
| > 11 1470 | Formatieren Universal, Trapez-Flachzahn Panel-sizing universal, Triple chip / flat tooth ART: 11 1470 450 010, 11 1470 500 010 | 📄 1002-1003 |
| > 11 1610 | Formatieren, Wechselzahn extrem 35°, Positiv Panel-sizing, alternate top bevel extreme 35°, positive ART: 11 1610 400 010, 11 1610 450 010, 11 1610 500 010 | 📄 1010-1011 |



Orbitale Rohrkreissägeblätter / Orbital pipe cutting circular saw blades

| | | |
|----------|---|--------|
| > 5 3961 | Cermet Dünnschnitt Akku Cermet thin-cut battery | 📄 1078 |
| > 5 3951 | Hartmetall bestückt für Kunststoff Carbide tipped for plastic | 📄 1079 |
| > 5 3952 | Hartmetall bestückt für Aluminium, Kupfer Carbide tipped for aluminium, copper | 📄 1079 |



Maschinen / Machines

| | |
|--|-------------|
| > Magnet-Kernbohrmaschinen / Druckluft-Geradschleifer: Vorführgeräte auf Anfrage erhältlich Magnetic hole cutting machines / Pneumatic straight grinder: Demonstration model available on request | 📄 1081-1136 |
|--|-------------|



PRODUKTÜBERSICHT · PRODUCT OVERVIEW

| | | | | | |
|----------|---|--|--|--|---|
| <p>1</p> | <p>VHM-SCHAFTFRÄSER SOLID CARBIDE END MILLS</p> <p>☞ 13-156</p> <p>1.1</p>  | <p>VHM-GEWINDEWIRBLER · GEWINDEFÄSER SOLID CARBIDE WHIRLING THREAD CUTTERS · THREAD MILLS</p> <p>☞ 157-166</p> <p>1.2</p>  | | | |
| <p>2</p> | <p>VHM-BOHRER SOLID CARBIDE TWIST DRILL</p> <p>☞ 227-296</p> <p>2.1</p>  | <p>VHM-REIBAHLEN SOLID CARBIDE REAMERS</p> <p>☞ 297-302</p> <p>2.2</p>  | <p>SPATEN-BOHRER SPADE DRILLS</p> <p>☞ 303-356</p> <p>2.3</p>  | <p>KERNBOHRER ANNULAR CUTTERS</p> <p>☞ 357-562</p> <p>2.4</p>  | <p>LOCHSÄGEN HOLE SAWS</p> <p>☞ 563-604</p> <p>2.5</p>  |
| <p>3</p> | <p>KEGELSENKER COUNTERSINKS</p> <p>☞ 633-664</p> <p>3.1</p>  | <p>FLACHSENKER COUNTERBORES</p> <p>☞ 665-668</p> <p>3.2</p>  | | | |
| <p>4</p> | <p>FRÄSSTIFTE BURRS</p> <p>☞ 679-768</p> <p>4.1</p>  | <p>FRÄSSTIFTE · LOCHSÄGEN FÜR SCHLÜSSELDIENSTE BURRS · HOLESAWS FOR LOCKSMITH</p> <p>☞ 775-778</p> <p>4.2</p>  | | | |
| <p>5</p> | <p>HM-BESTÜCKTE SÄGEN T.C.T CIRCULAR SAW BLADES</p> <p>☞ 825-1044</p> <p>5.1</p>  | <p>HSS-SÄGEN HSS-SAW BLADES</p> <p>☞ 1045-1060</p> <p>5.2</p>  | <p>DIN-VHM-SÄGEN DIN-SOLID CARBIDE-SAW BLADES</p> <p>☞ 1061-1068</p> <p>5.3</p>  | <p>DIN-HSS-SÄGEN DIN-HSS-SAW BLADES</p> <p>☞ 1069-1074</p> <p>5.4</p>  | |
| <p>6</p> | <p>MAGNET-KERNBOHRMASCHINEN MAGNETIC HOLE CUTTING MACHINES</p> <p>☞ 1083-1106</p> <p>6.1</p>  | | | | |
| <p>7</p> | <p>SCHMIERSTOFFE · SCHNEIDÖL · UNIVERSALREINIGER · ENTFETTER LUBRICANTS · CUTTING OIL · BIO-UNIVERSAL CLEANER · DEGREASER</p> <p>☞ 1143-1150</p> <p>7.1</p>  | | | | |
| <p>8</p> | <p>SCHNITTDATEN · TECHNISCHE INFORMATIONEN CUTTING DATA · TECHNICAL INFORMATION</p> <p>☞ 1153-1324</p> <p>8.1</p>  | | | | |
| <p>9</p> | <p>SUCHE ARTIKEL NACH ARTIKELNUMMER AUFSTIEGEND (INDEX) SEARCH PRODUCTS BY ARTICLE NUMBER ASCENDING (INDEX)</p> <p>☞ 1327-1334</p> <p>9.1</p>  | | | | |

- Lagerware
Stock tool
- Keine Lagerware, Lieferzeit und Preis auf Anfrage
No stock tool. Price and delivery on request
- ▲ Lieferbar solange Vorrat oder auf Anfrage
Article be discontinued. Delivery possible until sold out.
After sold out delivery possible on request

WERKZEUGE FÜR COMPOSITES – CFK / GFK – TITAN – KUNSTSTOFF
TOOLS FOR COMPOSITES – CFRP / GFRP – TITANIUM – PLASTICS

☞ 167-224

1.3



FRÄSEN
MILLING

1



STUFEN-,
BLECHSCHÄL-
BOHRER



☞ 605-620

2.6

STEP DRILLS,
TUBE AND
SHEET DRILLS

HSS SPIRAL-,
GEWINDE-
BOHRER



☞ 621-626

2.7

HSS TWIST
DRILLS · TAPS

VHM-GEWINDE-
BOHRER-
AUSBOHRER



☞ 627-630

2.8

SOLID CARBIDE
DRILLS TO REMOVE
JAMMED TAPS

BOHREN
DRILLING

2



MEHRFASEN-STUFENBOHRER / KURZSTUFENBOHRER
SUBLAND DRILLS / STUB SUBLAND DRILLS

☞ 669-676

3.3



SENKEN
SINKING

3



SPEZIAL FRÄSSTIFTE
SPECIAL BURRS



☞ 779-808

4.3

SETS · ZUBEHÖR
SETS · ACCESSORIES

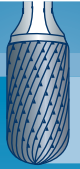


☞ 809-822

4.4

SCHLEIFEN
GRINDING

4



ORBITALE ROHRKREISSÄGEN
ORBITAL PIPE CUTTING
CIRCULAR SAW BLADES



☞ 1075-1079

5.5

AUFNAHMEHALTER FÜR
KREISSÄGEBLÄTTER
CIRCULAR SAW BLADE RETAINER

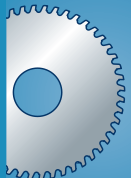


☞ 1080

5.6

SÄGEN
SAWING

5



DRUCKLUFT-GERADSCHLEIFER
PNEUMATIC STRAIGHT GRINDER

☞ 1107-1140

6.2



MASCHINEN
MACHINES

6



KÜHLMITTEL
LUBRICANTS

7



SCHNITTDATEN
CUTTING DATA

8



INDEX

9

Index

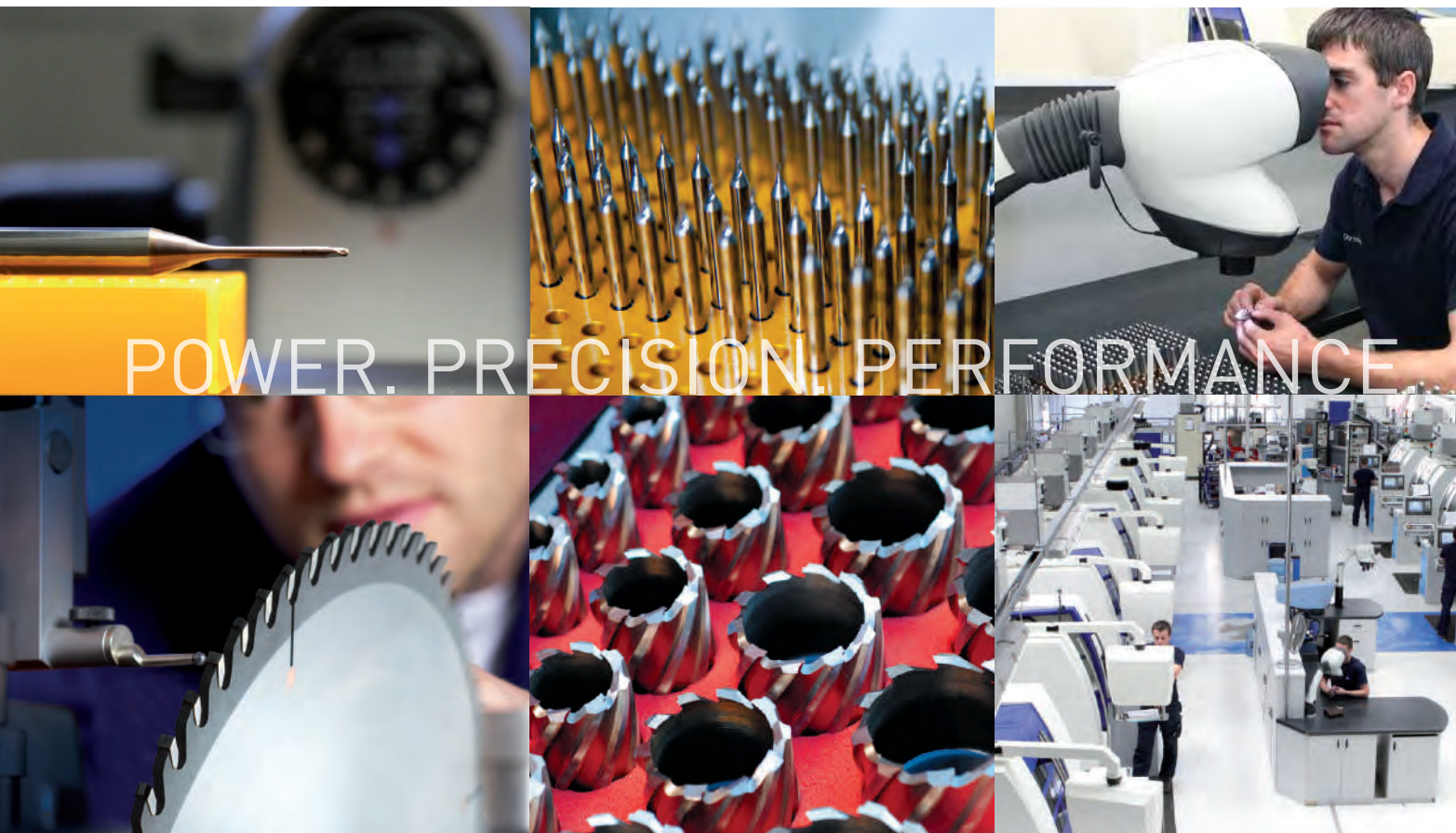


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- 100% quality control
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1 FRÄSEN MILLING

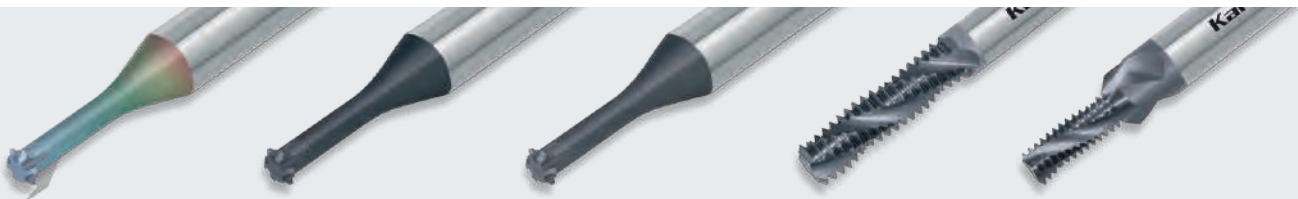
VOLLHARTMETALL SCHAFTFRÄSER
SOLID CARBIDE END MILLS



1.1

13-156

VOLLHARTMETALL-GEWINDEWIRBLER · GEWINDEFÄSER · GEWINDEBOHRER
SOLID CARBIDE WHIRLING THREAD CUTTERS · THREAD MILLS · TAPS



1.2

157-166

WERKZEUGE FÜR COMPOSITES – CFK / GFK – TITAN – KUNSTSTOFF
TOOLS FOR COMPOSITES – CFRP / GFRP – TITANIUM – PLASTICS



1.3

167-224

1



2



3



4



5



6



7



8



9



Index

VOLLHARTMETALL SCHAFTFRÄSER · MICROFRÄSER DIAMANT-CBN
SOLID CARBIDE END MILLS · MICRO END MILLS DIAMOND-CBN



Weltweit einmalige MICROTOOL-Qualität
Worldwide unique MICROTOOL quality

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

1.1

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INHALTSVERZEICHNIS · TABLE OF CONTENTS

Art. Schaftfräser · End mills

Material

| | | | | | | | | | | | | | | | |
|-------------------|------------------|-----|-------|-----------------|-----------|-------------|----------|------------|------|--------------------|-----------------------|----------------|------|-------|-------|
| | | | | | | | | | | | | | | | |
| HSC | HHC | HPC | STAHL | INOX | GG/G | NE METALLE | GRAPHIT | Kunststoff | HOLZ | INCONEL | MIT INNEN-KÜHLUNG | HART-METALL | PEEK | PA-66 | PE-HD |
| highspeed cutting | highhard cutting | | steel | Stainless steel | cast iron | non-ferrous | graphite | plastic | wood | HASTELLOY TITANIUM | with internal cooling | carbide coated | | | |

Zylindrisch / cylindrical Z = 1 Einzahnfräser / teeth = 1 one tooth end mill

| | | | | | | | | | | | | | | | | | |
|---------|--|-------------|-----|---|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 29 1652 | | MICRO GRAIN | 142 | ✓ | | | | | | | | | | | | | |
| 29 1654 | | MICRO GRAIN | 143 | ✓ | | | | | | | | | | | | | |
| 29 1658 | | MICRO GRAIN | 145 | ✓ | | | | | | | | | | | | | |
| 29 1661 | | MICRO GRAIN | 144 | ✓ | | | | | | | | | | | | | |
| 30 7320 | | MICRO GRAIN | 26 | ✓ | | | | | | | | | | | | | |

Zylindrisch / cylindrical Z = 2 Schaftfräser / teeth = 2 end mills

| | | | | | | | | | | | | | | | | | |
|---------|--|--|-------------|---------|---|---|--|---|---|---|--|--|--|--|--|--|--|
| 30 6202 | | | MICRO GRAIN | 28-29 | ✓ | | | | | | | | | | | | |
| 30 6209 | | | MICRO GRAIN | 35 | ✓ | | | | | | | | | | | | |
| 30 6255 | | | MICRO GRAIN | 52-53 | ✓ | ✓ | | ✓ | ✓ | ✓ | | | | | | | |
| 30 6542 | | | MICRO GRAIN | 114-115 | ✓ | | | | | | | | | | | | |

Zylindrisch / cylindrical Z = 3 Schaftfräser / teeth = 3 end mills (Z = 2/3 - t = 2/3)

| | | | | | | | | | | | | | | | | | |
|---------|--|-------------|-------------|----|---|--|--|--|--|--|--|--|--|--|--|--|--|
| 30 6223 | | MICRO GRAIN | 44 | ✓ | | | | | | | | | | | | | |
| 30 6228 | | MICRO GRAIN | 43 | ✓ | | | | | | | | | | | | | |
| 30 6233 | | MICRO GRAIN | 47 | ✓ | | | | | | | | | | | | | |
| 30 6234 | | MICRO GRAIN | 47 | ✓ | | | | | | | | | | | | | |
| 30 6284 | | | MICRO GRAIN | 78 | ✓ | | | | | | | | | | | | |
| 30 6296 | | MICRO GRAIN | 79 | ✓ | | | | | | | | | | | | | |
| 30 6297 | | MICRO GRAIN | 79 | ✓ | | | | | | | | | | | | | |
| 30 6331 | | MICRO GRAIN | 82 | ✓ | | | | | | | | | | | | | |
| 30 6332 | | MICRO GRAIN | 82 | ✓ | | | | | | | | | | | | | |
| 30 6572 | | MICRO GRAIN | 134 | | | | | | | | | | | | | | |
| 30 7415 | | MICRO GRAIN | 146 | | | | | | | | | | | | | | |

Z = 4-16 Schaftfräser zylindrisch / teeth = 4-16 end mills cylindrical

| | | | | | | | | | | | | | | | | | |
|---------|--|-------------|-----|---|---|--|--|--|--|--|--|--|--|--|--|--|--|
| 30 6224 | | MICRO GRAIN | 45 | ✓ | | | | | | | | | | | | | |
| 30 6269 | | MICRO GRAIN | 71 | ✓ | ✓ | | | | | | | | | | | | |
| 29 0305 | | MICRO GRAIN | 134 | ✓ | | | | | | | | | | | | | |
| 30 6341 | | MICRO GRAIN | 83 | ✓ | | | | | | | | | | | | | |

1

2

3

4

5

6

7

8

9

Index

INHALTSVERZEICHNIS · TABLE OF CONTENTS

Art. Schaftfräser · End mills

Material

| | | | | | | | | | | | | | | | |
|------------------------------|-----------------------------|-----|----------------|--------------------------------------|-------------------|------------------------------|---------------------|-----------------------|--------------|---------------------------------|--|-----------------------------------|------|-------|-------|
| HSC high speed cutting | HHC high hard cutting | HPC | STAHL steel | INOX Edelstahl Stainless steel | GG/G cast iron | NE METALLE non ferrous | GRAPHIT graphite | Kunststoff plastic | HOLZ wood | NICHEL HASTELLOY TITANIUM | MIT INNEN KÜHLUNG with internal cooling | HART- METALL coated carbide | PEEK | PA-66 | PE-HD |
|------------------------------|-----------------------------|-----|----------------|--------------------------------------|-------------------|------------------------------|---------------------|-----------------------|--------------|---------------------------------|--|-----------------------------------|------|-------|-------|

Z = 4-16 Schaftfräser zylindrisch / teeth = 4-16 end mills cylindrical

| | | | | | | | | | | | | | | | | |
|---------|--|---|----|---|---|---|---|---|---|--|---|--|--|--|--|--|
| 30 6342 | | MICRO GRAIN | 83 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | |
| 30 6345 | | new new VALUE TOOL MICRO GRAIN | 84 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | | |
| 30 6346 | | new new VALUE TOOL MICRO GRAIN | 84 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | | |
| 30 6446 | | MICRO GRAIN | 94 | ✓ | | ✓ | ✓ | | | | ✓ | | | | | |
| 30 6447 | | MICRO GRAIN | 94 | ✓ | | ✓ | ✓ | | | | ✓ | | | | | |
| 30 6456 | | MICRO GRAIN | 95 | ✓ | ✓ | ✓ | | ✓ | | | | | | | | |
| 30 6460 | | new new VALUE TOOL MICRO GRAIN | 96 | | | ✓ | ✓ | ✓ | | | ✓ | | | | | |

Z = 2/3/4 Schruppfräser / teeth = 2/3/4 roughing end mills

| | | | | | | | | | | | | | | | | |
|---------|--|----------------|-----|---|---|---|---|---|---|---|--|---|---|---|---|--|
| 29 1751 | | MICRO GRAIN | 40 | ✓ | | | | ✓ | ✓ | | | | ✓ | ✓ | ✓ | |
| 29 1752 | | MICRO GRAIN | 40 | ✓ | | | | ✓ | ✓ | | | | ✓ | ✓ | ✓ | |
| 29 1753 | | MICRO GRAIN | 41 | ✓ | | | | ✓ | ✓ | | | | ✓ | ✓ | ✓ | |
| 30 6222 | | MICRO GRAIN | 44 | ✓ | | | | ✓ | ✓ | | | | | | | |
| 30 6232 | | MICRO GRAIN | 45 | ✓ | | | | ✓ | ✓ | ✓ | | | | | | |
| 30 6353 | | MICRO GRAIN | 86 | ✓ | | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | |
| 30 6355 | | MICRO GRAIN | 86 | ✓ | | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | |
| 30 6356 | | MICRO GRAIN | 87 | ✓ | | ✓ | ✓ | | | | | ✓ | | | | |
| 30 6358 | | MICRO GRAIN | 87 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ | | | |
| 30 6591 | | MICRO GRAIN | 136 | ✓ | | | | | ✓ | | | | | | | |
| 30 6593 | | MICRO GRAIN | 137 | ✓ | | | | | ✓ | | | | | | | |
| 30 7431 | | MICRO GRAIN | 148 | | | ✓ | | ✓ | | | | ✓ | | | | |
| 30 7432 | | MICRO GRAIN | 148 | | | ✓ | | ✓ | | | | ✓ | | | | |

Z = 2-6 Schaftfräser mit Eckenradius / teeth = 2-6 end mills with corner radius

| | | | | | | | | | | | | | | | | |
|---------|--|---------------------------------|-------|---|---|---|---|---|---|---|--|---|--|--|--|--|
| 30 6203 | | MICRO GRAIN VALUE TOOL | 30-31 | ✓ | | | | | ✓ | ✓ | | | | | | |
| 30 6212 | | MICRO GRAIN VALUE TOOL | 36-37 | ✓ | | | | | ✓ | | | | | | | |
| 30 6215 | | MICRO GRAIN | 42 | ✓ | | | | | ✓ | ✓ | | | | | | |
| 30 8011 | | MICRO GRAIN VALUE TOOL | 48-49 | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | | | | |
| 30 6256 | | MICRO GRAIN VALUE TOOL | 54-55 | ✓ | ✓ | | ✓ | ✓ | ✓ | | | ✓ | | | | |

INHALTSVERZEICHNIS · TABLE OF CONTENTS

Art. Schaftfräser · End mills

Material

| | | | | | | | | | | | | | | | |
|------------------------------|-----------------------------|-----|----------------|--------------------------------------|-------------------|------------------------------|---------------------|-----------------------|--------------|---------------------------------|--|-----------------------------------|------|-------|-------|
| HSC high-speed cutting | HHC high-hard cutting | HPC | STAHL steel | INOX Edelstahl Stainless steel | GG/G cast iron | NE METALLE non-ferrous | GRAPHIT graphite | Kunststoff plastic | HOLZ wood | NICHEL HASTELLOY TITANIUM | MIT INNEN KÜHLUNG with internal cooling | HART- METALL carbide coated | PEEK | PA-66 | PE-HD |
|------------------------------|-----------------------------|-----|----------------|--------------------------------------|-------------------|------------------------------|---------------------|-----------------------|--------------|---------------------------------|--|-----------------------------------|------|-------|-------|

Z = 2 Radiusfräser / teeth = 2 ball nose end mills

| Art. | Image | Material | Length | HSC | HHC | HPC | STAHL | INOX | GG/G | NE METALLE | GRAPHIT | Kunststoff | HOLZ | NICHEL HASTELLOY TITANIUM | MIT INNEN KÜHLUNG | HART-METALL | PEEK | PA-66 | PE-HD | |
|---------|-------|-------------|---------|-----|-----|-----|-------|------|------|------------|---------|------------|------|---------------------------|-------------------|-------------|------|-------|-------|--|
| 30 6204 | | MICRO GRAIN | 32-33 | ✓ | | | | | | ✓ | | ✓ | | ✓ | | | | | | |
| 30 6213 | | MICRO GRAIN | 38-39 | ✓ | | | | | | ✓ | | | | | | | | | | |
| 30 6217 | | MICRO GRAIN | 42 | ✓ | | | | | | ✓ | | ✓ | | | | | | | | |
| 30 8012 | | MICRO GRAIN | 50-51 | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | | | | | | | | |
| 30 6257 | | MICRO GRAIN | 56-57 | ✓ | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | | | |
| 30 6264 | | MICRO GRAIN | 62-63 | ✓ | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | | | |
| 30 6266 | | MICRO GRAIN | 68-69 | ✓ | ✓ | | ✓ | ✓ | ✓ | | | | | ✓ | | | | | | |
| 30 6274 | | MICRO GRAIN | 76-77 | ✓ | ✓ | | | | | | | | | | | ✓ | | | | |
| 30 6276 | | MICRO GRAIN | 64 | ✓ | ✓ | ✓ | | ✓ | ✓ | | | | | ✓ | | | | | | |
| 30 6286 | | MICRO GRAIN | 78 | ✓ | ✓ | | ✓ | ✓ | ✓ | | | | | ✓ | | | | | | |
| 30 6474 | | MICRO GRAIN | 99 | ✓ | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | | | |
| 30 6475 | | MICRO GRAIN | 99 | ✓ | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | | | |
| 30 6476 | | MICRO GRAIN | 100 | ✓ | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | | | |
| 30 6477 | | MICRO GRAIN | 100 | ✓ | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | | | |
| 30 6478 | | MICRO GRAIN | 101 | ✓ | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | | | |
| 30 6479 | | MICRO GRAIN | 101 | ✓ | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | | | |
| 30 6485 | | MICRO GRAIN | 103 | ✓ | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | | | |
| 30 6551 | | MICRO GRAIN | 124-125 | ✓ | | | | | | | ✓ | | | | | | | | | |
| 30 6552 | | MICRO GRAIN | 126 | ✓ | | | | | | | ✓ | | | | | | | | | |
| 30 6553 | | MICRO GRAIN | 128-129 | ✓ | | | | | | | ✓ | | | | | | | | | |
| 30 6592 | | MICRO GRAIN | 136 | ✓ | | | | | | | ✓ | | | | | | | | | |
| 30 6633 | | CBN | 140-141 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | | | | | |
| 30 6554 | | MICRO GRAIN | 130-131 | ✓ | | | | | | | ✓ | | | | | | | | | |
| 30 6557 | | MICRO GRAIN | 132 | ✓ | | ✓ | | | | | ✓ | | | | | | | | | |
| 31 6840 | | MICRO GRAIN | 149 | ✓ | | | | ✓ | | | | | | ✓ | | | | | | |
| 31 6868 | | MICRO GRAIN | 149 | ✓ | | | | ✓ | | | | | | ✓ | | | | | | |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9






INHALTSVERZEICHNIS · TABLE OF CONTENTS

Art. Schaftfräser · End mills

Material

| | | | | | | | | | | | | | | | |
|---|--|---|--|--|---|--|---|---|--|--|---|---|--|---|---|
|  HSC high speed cutting |  HHC high hard cutting |  HPC |  STAHL steel |  INOX Edelstahl Stainless steel |  GG/G cast iron |  NE METALLE non-ferrous |  GRAPHIT graphite |  Kunststoff plastic |  HOLZ wood |  INCONEL HASTELLOY TITANIUM |  MIT INNEN- KÜHLUNG with internal cooling |  HART- METALL coated carbide |  PEEK |  PA-66 |  PE-HD |
|---|--|---|--|--|---|--|---|---|--|--|---|---|--|---|---|


Z = 3-4 Radiusfräser / teeth = 4 ball nose end mills

| | | | | | | | | | | | | | | | | |
|---------|---|-------------|-----|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--|-------------------------------------|-------------------------------------|--|--|--|--|--|--|
| 30 7485 |  | MICRO GRAIN | 150 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | <input checked="" type="checkbox"/> | | | | | | |
| 30 6486 |  | MICRO GRAIN | 102 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | <input checked="" type="checkbox"/> | | | | | | |
| 30 7486 |  | MICRO GRAIN | 150 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | <input checked="" type="checkbox"/> | | | <input checked="" type="checkbox"/> | | | | | | |
| 30 7487 |  | MICRO GRAIN | 151 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | <input checked="" type="checkbox"/> | | | | | | | | | |
| 30 6574 |  | MICRO GRAIN | 135 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | <input checked="" type="checkbox"/> | | | | | | | |



Z = 3-6/≈ Entgrad-Senk- und Sonderfräser / teeth = 3-6/≈ deburring- corner rounding- countersinker – special tools

| | | | | | | | | | | | | | | | | |
|---------|---|---|-----|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--|--|--|--|--|
| 30 6200 |  | MICRO GRAIN | 25 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | |
| 30 6489 |  | MICRO GRAIN | 103 | <input checked="" type="checkbox"/> | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | | |
| 30 6490 |  | MICRO GRAIN | 104 | <input checked="" type="checkbox"/> | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | | |
| 30 6491 |  | MICRO GRAIN | 104 | <input checked="" type="checkbox"/> | | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | | |
| 30 6492 |  | MICRO GRAIN | 105 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | <input checked="" type="checkbox"/> | | | | | |
| 30 6493 |  | MICRO GRAIN | 105 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | <input checked="" type="checkbox"/> | | | | | |
| 30 6494 |  | MICRO GRAIN | 106 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | <input checked="" type="checkbox"/> | | | | | |
| 30 6495 |  |  MICRO GRAIN | 106 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | <input checked="" type="checkbox"/> | | | | | |
| 30 6497 |  | MICRO GRAIN | 107 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | <input checked="" type="checkbox"/> | | | | | |
| 30 6539 |  | MICRO GRAIN | 109 | <input checked="" type="checkbox"/> | | | | | <input checked="" type="checkbox"/> | | <input checked="" type="checkbox"/> | | | | | |
| 30 6540 |  | MICRO GRAIN | 109 | <input checked="" type="checkbox"/> | | | | | <input checked="" type="checkbox"/> | | | | | | | |


Vollhartmetalkreissägeblätter / slitting saws solid carbide

| | | | | | | | | | | | | | | | | |
|--------|---|-------------|-----|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--|--|--|--|--|
| 5 6000 |  | MICRO GRAIN | 153 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | |
| 5 6001 |  | MICRO GRAIN | 153 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | |

Kreissägeblätter Aufnahmehalter / Circular saws blades retainer














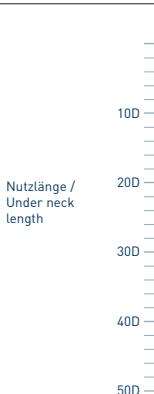

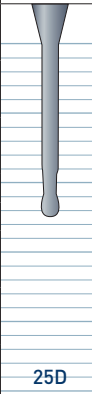

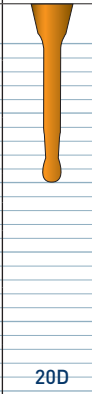
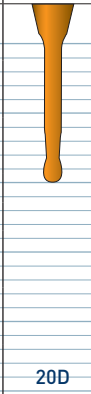
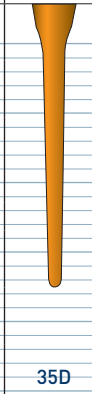

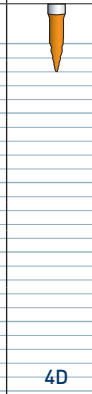

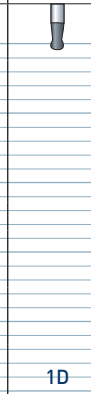
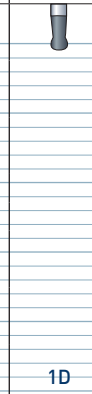
| | | | | | | | | | | | | | | | | |
|--------|---|-----|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|
| 5 6100 |  | HSS | 154 | | | | | | | | | | | | | |
| 5 6101 |  | HSS | 154 | | | | | | | | | | | | | |

- Lagerware / Stock tool
- Keine Lagerware, Lieferzeit und Preis auf Anfrage
No stock tool. Price and delivery on request
- ☑ Lieferzeit kurzfristig da Rohlinglager vorhanden
Short delivery deadline possible then blanks are on stock available














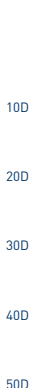











 Sonderpreis. Solange Vorrat reicht. Rückgabe nicht möglich.
Special price. While stocks last. Return not possible.

 2-3 Arbeitstage Lieferzeit / 2-3 work days delivery time



| Geometrie / Geometry | KUGELFRÄSER / BALL NOSE END MILL | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|--|---|---|---|---|
| |  |  |  |  |  |  |  |  |  |  |  |  |
| Art. | 30 6204 | 30 6213 | 30 8012 | 30 6257 | 30 6264 | 30 6266 | 30 6274 | 30 6276 | 30 6476 | 30 6477 | 30 6478 | 30 6479 |
|  | 32-33 | 38-39 | 50-51 | 56-57 | 62-63 | 68-69 | 76-77 | 64 | 100 | 100 | 101 | 101 |
| Form / Neck shape | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight | Konischer Hals / conical neck | Gerade / straight | Gerade / straight | - | - | - | - |
| Winkel / Neck angle | - | - | - | - | - | 0,4° / 0,9° / 1,4° / 1,9° | - | - | - | - | - | - |
| Beschichtung / Coating | NHC 7000 | Poliert / Polished | WRC ² | HXC-NANO ³ | HXC-NANO ³ | HXC-NANO ³ | D-CC | HXC-NANO ³ | UFX-24 | UFX-24 | UFX-3 | UFX-3 |
| Anzahl der Artikel / No. of items | 81 | 65 | 76 | 70 | 95 | 78 | 57 | 8 | 26 | 11 | 11 | 8 |
| Werkzeugdurchmesser / Tool diameter | 0,1-6,0 | 0,2-6,0 | 0,2-6,0 | 0,1-2,0 | 0,2-6,0 | 0,2-3,0 | 0,2-6,0 | 1-4 | 0,1-12 | 1,0-12,0 | 1,0-12,0 | 1,5-12,0 |
| Anzahl der Schneiden / No. of flutes | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 2 | 2 | 2 | 2 |
| Konische Schneide / Backdraft | - | - | - | - | - | ✓ | - | - | - | - | - | - |
| R Genauigkeit / R accuracy | ±0,002 | ±0,002 | ±0,004 | ±0,002 | ±0,002 | ±0,003 | ±0,002 | ±0,010 | ±0,005 | ±0,005 | ±0,005 | ±0,005 |
| Schaftdurchmesser / Shank diameter | 4-6 | 4-6 | 4-6 | 4 | 6 | 6 | 4-6 | 4-12 | 3-12 | 6-12 | 6-12 | 6-12 |
| Kantenverrundung / Edge preparation | - | - | ✓ | ✓ | ✓ | ✓ | - | - | - | - | - | - |
| Anwendung / Application | Schruppen / Roughing | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | ✓ | ✓ | ✓ | ✓ |
| | Schruppschicht / Semi-finishing | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | - | ✓ | ✓ | ✓ | ✓ |
| | Schlichten / Finishing | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Werkstoff / Work material | HRC < 55 | - | - | ✓ | - | - | - | - | - | - | ✓ | ✓ |
| | HRC < 70 | - | - | - | ✓ | ✓ | ✓ | - | ✓ | ✓ | ✓ | - |
| | HART-METALL <small>cermet coated</small> | - | - | - | - | - | - | ✓ | - | - | - | - |
| | INOX <small>Edelstahl</small> <small>Stainless steel</small> | - | - | - | ✓ | ✓ | ✓ | - | ✓ | - | - | - |
| | TITAN <small>Titanium</small> | ✓ | - | - | ✓ | ✓ | ✓ | - | ✓ | - | - | - |
| | NE METALLE <small>non-ferrous</small> | ✓ | ✓ | - | - | - | - | - | - | - | - | - |
| | GRAPHIT <small>graphite</small> | - | - | - | - | - | - | ✓ | - | - | - | - |
| | ZIRKON OXID <small>Zirconium oxide</small> | - | - | - | - | - | - | ✓ | - | - | - | - |
| Maximale Schnitttiefe / Maximum cutting depth |  |  |  |  |  |  |  |  |  |  |  |  |
| | Nutzlänge / Under neck length | 20D | 25D | 20D | 20D | 20D | 35D | 5D | 4D | 1D | 1D | 1D |

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| Geometrie / Geometry | KUGELFRÄSER / BALL NOSE END MILL | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| |  |  |  |  |  |  |  |  |  |  |  |  |
| Art. | 30 6486 | 30 6485 | 30 6551 | 30 6552 | 30 6553 | 30 6554 | 30 6557 | 30 6633 | 31 6840 | 31 6868 | 30 7485 | 30 7487 |
|  | 102 | 103 | 124-125 | 126 | 128-129 | 130-131 | 132 | 140-141 | 149 | 149 | 150 | 151 |
| Form / Neck shape | Gerade / straight | Konischer Hals conical neck | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight |
| Winkel / Neck angle | - | 1° / 1,5° / 3° | - | - | - | - | - | - | - | - | - | - |
| Beschichtung / Coating | UFX-24 | UFX-3 | DCC 0318 | DCC 0318 | DCC 0318 | DCC 0318 | DCC 0318 | CBN | Tcx ³ | Tcx ³ | TI-X ² | INOX HP |
| Anzahl der Artikel / No. of items | 32 | 7 | 62 | 36 | 59 | 59 | 8 | 121 | 9 | 10 | 24 | 16 |
| Werkzeuggestrichmesser / Tool diameter | 2,0-12,0 | 1,0-8,0 | 0,2-12,0 | 1,0-3,0 | 0,1-2,0 | 0,1-3,0 | 1-4 | 0,2-6,0 | 1,0-3,0 | 1,0-4,0 | 1,5-12,0 | 2,0-12,0 |
| Anzahl der Schneiden / No. of flutes | 4 | 2 | 2 | 2 | 2 | 2 | 4 | 2 | 2 | 4 | 4 | 4 |
| Konische Schneide / Backdraft | - | - | - | - | - | - | - | - | - | - | - | - |
| R Genauigkeit / R accuracy | ±0,004 | - | ±0,002 | ±0,003 | ±0,002 | ±0,002 | ±0,010 | ±0,004 | ±0,005 | ±0,005 | ±0,004 | ±0,004 |
| Schaftdurchmesser / Shank diameter | 6-12 | 6-8 | 3-12 | 3-6 | 4 | 6 | 4-12 | 4-6 | 3-6 | 3-6 | 6-12 | 6-12 |
| Kantenverrundung / Edge preparation | - | - | - | - | - | - | - | - | - | - | - | - |
| Anwendung / Application | Schruppen / Roughing | ✓ | ✓ | ✓ | ✓ | ✓ | - | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Schruppschicht / Semi-finishing | ✓ | ✓ | ✓ | ✓ | ✓ | - | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Schlichten / Finishing | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Werkstoff / Work material | HRC < 55 | - | - | - | - | - | - | - | - | - | - | - |
| | HRC < 70 | ✓ | ✓ | - | - | - | - | ✓ | - | - | - | - |
| | HART-METALL <small>cermet coated carbide</small> | - | - | - | - | - | - | - | - | - | - | - |
| | INOX <small>Edelstahl stainless steel</small> | - | ✓ | - | - | - | - | - | ✓ | ✓ | - | ✓ |
| | TITAN <small>titanium</small> | - | ✓ | - | - | - | - | - | ✓ | ✓ | ✓ | - |
| | NE METALLE <small>non-ferrous</small> | - | - | - | - | - | - | - | - | - | - | - |
| | GRAPHIT <small>graphite</small> | - | - | ✓ | ✓ | ✓ | ✓ | ✓ | - | - | - | - |
| ZIRKON OXID <small>zirconium</small> | - | - | ✓ | ✓ | ✓ | ✓ | ✓ | - | - | - | - | |
| Maximale Schnitttiefe / Maximum cutting depth |  |  |  |  |  |  |  |  |  |  |  |  |
| | Nutzlänge / Under neck length | 10D | 20D | 30D | 20D | 25D | 25D | 16D | 4D | 8D | 8D | 6D |

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9 

Index

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

| | Geometrie / Geometry | SCHARFKANTIGE FRÄSER UND FRÄSER MIT ECKENRADIUS / SHARP EDGED END MILLS AND END MILLS WITH CORNER RADIUS | | | | | | | | | |
|---|---|--|-------------------|--------------------|-------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------------------|-----|
| | | | | | | | | | | | |
| Werkzeugspezifikationen / Tool specifications | Art. | 30 6202 | 30 6203 | 30 6212 | 30 8011 | 30 6255 | 30 6256 | 30 6261 | 30 6262 | 30 6265 | |
| | | 28-29 | 30-31 | 36-37 | 48-49 | 52-53 | 54-55 | 58-59 | 60 | 66-67 | |
| | Form / Neck shape | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight | Konischer Hals / conical neck | |
| | Winkel / Neck angle | - | - | - | - | - | - | - | - | 0,4° / 0,9° / 1,4° / 1,9° | |
| | Beschichtung / Coating | NHC 7000 | NHC 7000 | Poliert / Polished | WRC ² | HXC-NANO ³ | HXC-NANO ³ | HXC-NANO ³ | HXC-NANO ³ | HXC-NANO ³ | |
| | Anzahl der Artikel / No. of items | 88 | 124 | 82 | 86 | 60 | 71 | 97 | 43 | 76 | |
| | Werkzeugdurchmesser / Tool diameter | 0,05-6,0 | 0,1-6,0 | 0,2-6,0 | 0,2-6,0 | 0,1-2,0 | 0,1-2,0 | 0,2-6,0 | 0,5-10,0 | 0,2-3,0 | |
| | Anzahl der Schneiden / No. of flutes | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | |
| | Konische Schneide / Backdraft | - | - | - | - | - | - | - | - | - | |
| | R Genauigkeit / R accuracy | - | -0,004 | -0,004 | -0,005 | - | -0,004 | -0,004 | -0,004 | -0,004 | |
| Anwendung / Application | Schruppen / Roughing | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | Schruppschicht / Semi-finishing | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | Schlichten / Finishing | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | HRC < 55 | - | - | - | ✓ | - | - | - | ✓ | - | |
| | HRC < 70 | - | - | - | - | ✓ | ✓ | ✓ | - | ✓ | |
| | HART-METALL cermet coated | - | - | - | - | - | - | - | - | - | |
| | INOX Edelstahl stainless steel | - | - | - | - | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | TITAN titanium | ✓ | ✓ | - | - | ✓ | ✓ | ✓ | - | ✓ | |
| | NE METALLE non-ferrous | ✓ | ✓ | ✓ | - | - | - | - | - | - | |
| | GRAPHIT graphite | - | - | - | - | - | - | - | - | - | |
| Werkstoff / Work material | ZIRKON OXID zirconium oxide | - | - | - | - | - | - | - | - | - | |
| | Maximale Schnitttiefe / Maximum cutting depth | Nutzlänge / Under neck length | | | | | | | | | |
| | | | 20D | 20D | 25D | 20D | 15D | 15D | 20D | 15D | 30D |

| Geometrie / Geometry | | SCHARFKANTIGE FRÄSER UND FRÄSER MIT ECKENRADIUS / SHARP EDGED END MILLS AND END MILLS WITH CORNER RADIUS | | | | | | | | |
|---|---|--|-----------------------|-------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | | | | | | | | | | |
| Werkzeugspezifikationen / Tool specifications | Art. | 30 6269 | 30 6267 | 30 6268 | 30 6271 | 30 6542 | 30 6544 | 30 6545 | 30 6546 | 30 6632 |
| | | 71 | 72-73 | 74 | 75 | 114-115 | 116-117 | 118-119 | 120-121 | 138-139 |
| | Form / Neck shape | Gerade / straight | Gerade / straight | Konischer Hals / conical neck | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight | Gerade / straight |
| | Winkel / Neck angle | - | - | 0,9° | - | - | - | - | - | - |
| | Beschichtung / Coating | HXC-NANO ³ | HXC-NANO ³ | HXC-NANO ³ | D-CC | DCC 0318 | DCC 0318 | DCC 0318 | DCC 0318 | CBN |
| | Anzahl der Artikel / No. of items | 21 | 66 | 50 | 30 | 57 | 73 | 116 | 71 | 81 |
| | Werkzeugdiameter / Tool diameter | 1,0-6,0 | 1,0-4,0 | 1,0-3,0 | 0,3-2,0 | 0,1-3,0 | 0,2-12,0 | 0,1-2,0 | 0,1-3,0 | 0,3-6,0 |
| | Anzahl der Schneiden / No. of flutes | 4 | 4 | 4 | 2 | 2 | 2 | 2 | 2 | 2 |
| | Konische Schneide / Backdraft | - | ✓ | ✓ | - | - | - | - | - | - |
| | R Genauigkeit / R accuracy | - | -0,004 | -0,004 | -0,004 | - | -0,004 | -0,004 | -0,004 | ±0,004 |
| | Schaftdurchmesser / Shank diameter | 4-6 | 4-6 | 6 | 4 | 4 | 3-12 | 4 | 6 | 4-6 |
| Kantenverrundung / Edge preparation | ✓ | ✓ | ✓ | - | - | - | - | - | - | |
| Anwendung / Application | Schruppen / Roughing | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Schruppschicht / Semi-finishing | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Schlichten / Finishing | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Werkstoff / Work material | HRC < 55 | - | - | - | - | - | - | - | - | - |
| | HRC < 70 | ✓ | ✓ | ✓ | - | - | - | - | - | ✓ |
| | HART-METALL <small>cermeted carbide</small> | - | - | - | ✓ | - | - | - | - | - |
| | INOX <small>Edelstahl</small> <small>stainless steel</small> | ✓ | ✓ | ✓ | - | - | - | - | - | - |
| | TITAN <small>titanium</small> | ✓ | ✓ | ✓ | - | - | - | - | - | - |
| | NE METALLE <small>non-ferrous</small> | - | - | - | - | - | - | - | - | - |
| | GRAPHIT <small>graphite</small> | - | - | - | ✓ | ✓ | ✓ | ✓ | ✓ | - |
| | ZIRKON OXID <small>zirconium</small> | - | - | - | ✓ | ✓ | ✓ | ✓ | ✓ | - |
| Maximale Schnitttiefe / Maximum cutting depth | | | | | | | | | | |
| | Nutzlänge / Under neck length | 12D | 20D | 50D | 2D | 20D | 25D | 20D | 20D | 10D |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

Qualitätsprodukte für die Metallbearbeitung.
Quality products for metalworking.

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

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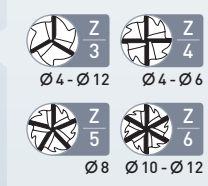
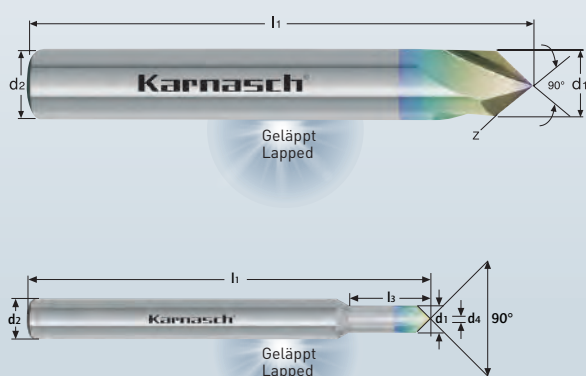
 <https://shop.karnasch.tools>

VHM-Entgrater, lang, 90°, geläppte Schneiden
Solid carbide deburr, long, 90°, lapped flutes



30 6200

| | |
|-----------------------------------|-----------------------|
| Alu- minium | GFK-CFK GFRP-CFRP |
| Aluminium < 6% Si | Kunststoff plastic |
| Aluminium < 12% Si | MAKROLON |
| MESSING brass | UHMW PE |
| Kupfer copper | PMMA |
| Ampco | Wachs Wax |
| TITAN titanium | |
| NICKEL < 500 N/mm ² | |
| Bronze bronze | |



| | |
|----------------|---------------------|
| MICRO GRAIN | KARNASCH NORM |
| W | DIN 6535 Form HA |
| | |
| | HSC ALU-NE |
| | NHC 7000 |
| | |

| Art. | d1 | l3 | l1 | d4 | d2 h6 | Z | € |
|-----------------|--------|------|----|-----|-------|---|--------|
| 30 6200 0050 | • 0,5 | • 3 | 40 | 0,1 | 4 | 3 | 34,00 |
| 30 6200 0100 | • 1,0 | • 4 | 40 | 0,1 | 4 | 3 | 34,00 |
| 30 6200 0150 | • 1,5 | • 5 | 40 | 0,1 | 4 | 3 | 34,00 |
| 30 6200 0200 | • 2,0 | • 6 | 40 | 0,1 | 4 | 3 | 34,00 |
| 30 6200 0250 | • 2,5 | • 8 | 40 | 0,1 | 4 | 3 | 34,00 |
| 30 6200 0300 | • 3,0 | • 10 | 40 | 0,1 | 4 | 3 | 35,00 |
| 30 6200 0400 | • 4,0 | - | 54 | - | 4 | 3 | 37,00 |
| 30 6200 0400 04 | • 4,0 | - | 54 | - | 4 | 4 | 38,00 |
| 30 6200 0600 | • 6,0 | - | 57 | - | 6 | 3 | 47,00 |
| 30 6200 0600 04 | • 6,0 | - | 57 | - | 6 | 4 | 48,00 |
| 30 6200 0800 | • 8,0 | - | 63 | - | 8 | 3 | 54,00 |
| 30 6200 0800 05 | • 8,0 | - | 63 | - | 8 | 5 | 55,00 |
| 30 6200 1000 | • 10,0 | - | 72 | - | 10 | 3 | 74,00 |
| 30 6200 1000 06 | • 10,0 | - | 72 | - | 10 | 6 | 75,00 |
| 30 6200 1200 | • 12,0 | - | 83 | - | 12 | 3 | 111,00 |
| 30 6200 1200 06 | • 12,0 | - | 83 | - | 12 | 6 | 113,00 |

Schnittdaten
Cutting data

Zeichnungen
Drawings

1215

DXF/STEP

Qualitätsprodukte für die Metallbearbeitung.
Quality products for metalworking.

Karnasch®
PROFESSIONAL TOOLS



**PRÄZISIONSWERKZEUGE
FÜR DIE CNC
METALLBEARBEITUNG**

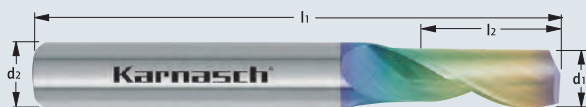
High precision tools for CNC metalworking

DAS KARNASCH PRODUKTSORTIMENT ONLINE!
THE KARNASCH PRODUCT RANGE ONLINE!

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30 7320

Vollhartmetall Einzahn-Schaftfräser, rechtsspirale, rechtsschneidend
Solid carbide one-tooth end mill, right spiral – right cutting



| | |
|----------------------|---------------------|
| d1* = Ø 3,0 | tol -0,000 / -0,040 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| d1* = Ø 12,0 | tol -0,000 / -0,070 |

| Art. | d1* | l2 | d2 | l3 | l1 | Z | € |
|------------------------|--------|------|----|----|----|---|-------|
| 30 7320 0010 003 03 | • 0,1 | 0,3 | 3 | - | 38 | 1 | 54,00 |
| 30 7320 0020 006 03 | • 0,2 | 0,6 | 3 | - | 38 | 1 | 42,00 |
| 30 7320 0030 010 03 | • 0,3 | 1,0 | 3 | - | 38 | 1 | 42,00 |
| 30 7320 0040 010 03 | • 0,4 | 1,0 | 3 | - | 38 | 1 | 42,00 |
| 30 7320 0050 015 03 | • 0,5 | 1,5 | 3 | - | 38 | 1 | 36,00 |
| 30 7320 0060 025 | % 0,6 | 2,5 | 3 | - | 38 | 1 | 13,80 |
| 30 7320 0060 030 03 | • 0,6 | 3,0 | 3 | - | 38 | 1 | 29,00 |
| 30 7320 0080 050 03 | • 0,8 | 5,0 | 3 | - | 38 | 1 | 29,00 |
| 30 7320 0100 050 06 | • 1,0 | 5,0 | 6 | - | 40 | 1 | 34,00 |
| 30 7320 0120 050 03 | • 1,2 | 5,0 | 3 | - | 38 | 1 | 29,00 |
| 30 7320 0150 050 03 | • 1,5 | 5,0 | 3 | - | 38 | 1 | 29,00 |
| 30 7320 0150 050 06 | • 1,5 | 5,0 | 6 | - | 40 | 1 | 34,00 |
| 30 7320 0160 060 03 | • 1,6 | 6,0 | 3 | - | 38 | 1 | 29,00 |
| 30 7320 0180 070 03 | • 1,8 | 7,0 | 3 | - | 38 | 1 | 29,00 |
| 30 7320 0200 050 06 | • 2,0 | 5,0 | 6 | - | 40 | 1 | 33,00 |
| 30 7320 0200 050 06 12 | • 2,0 | 5,0 | 6 | 12 | 50 | 1 | 41,00 |
| 30 7320 0200 070 04 | • 2,0 | 7,0 | 4 | - | 40 | 1 | 32,00 |
| 30 7320 0200 080 03 | • 2,0 | 8,0 | 3 | - | 40 | 1 | 29,00 |
| 30 7320 0200 100 03 | • 2,0 | 10,0 | 3 | - | 38 | 1 | 29,00 |
| 30 7320 0300 050 03 | • 3,0 | 5,0 | 3 | - | 40 | 1 | 25,00 |
| 30 7320 0300 050 03 22 | • 3,0 | 5,0 | 3 | 22 | 50 | 1 | 36,00 |
| 30 7320 0300 050 06 | • 3,0 | 5,0 | 6 | - | 40 | 1 | 33,00 |
| 30 7320 0300 050 06 22 | • 3,0 | 5,0 | 6 | 22 | 50 | 1 | 41,00 |
| 30 7320 0300 080 06 | • 3,0 | 8,0 | 6 | - | 40 | 1 | 33,00 |
| 30 7320 0300 100 03 | • 3,0 | 10,0 | 3 | - | 38 | 1 | 26,00 |
| 30 7320 0300 100 04 | • 3,0 | 10,0 | 4 | - | 40 | 1 | 31,00 |
| 30 7320 0300 100 06 | • 3,0 | 10,0 | 6 | - | 50 | 1 | 34,00 |
| 30 7320 0300 120 06 | • 3,0 | 12,0 | 6 | - | 50 | 1 | 35,00 |
| 30 7320 0400 060 04 | • 4,0 | 6,0 | 4 | - | 40 | 1 | 27,00 |
| 30 7320 0400 060 06 | • 4,0 | 6,0 | 6 | - | 40 | 1 | 33,00 |
| 30 7320 0400 080 04 22 | • 4,0 | 8,0 | 4 | 22 | 50 | 1 | 34,00 |
| 30 7320 0400 080 06 22 | • 4,0 | 8,0 | 6 | 22 | 50 | 1 | 41,00 |
| 30 7320 0400 100 04 | • 4,0 | 10,0 | 4 | - | 40 | 1 | 29,00 |
| 30 7320 0400 120 06 | • 4,0 | 12,0 | 6 | - | 60 | 1 | 37,00 |
| 30 7320 0400 140 04 | • 4,0 | 14,0 | 4 | - | 50 | 1 | 29,00 |
| 30 7320 0500 070 06 | • 5,0 | 7,0 | 6 | - | 40 | 1 | 33,00 |
| 30 7320 0500 140 06 22 | • 5,0 | 14,0 | 6 | 22 | 50 | 1 | 41,00 |
| 30 7320 0500 140 06 32 | • 5,0 | 14,0 | 6 | 32 | 60 | 1 | 42,00 |
| 30 7320 0500 160 05 | • 5,0 | 16,0 | 5 | - | 60 | 1 | 33,00 |
| 30 7320 0600 080 06 | • 6,0 | 8,0 | 6 | - | 40 | 1 | 32,00 |
| 30 7320 0600 140 06 22 | • 6,0 | 14,0 | 6 | 22 | 50 | 1 | 40,00 |
| 30 7320 0600 140 06 32 | • 6,0 | 14,0 | 6 | 32 | 60 | 1 | 41,00 |
| 30 7320 0600 140 06 42 | • 6,0 | 14,0 | 6 | 42 | 70 | 1 | 42,00 |
| 30 7320 0600 160 06 | • 6,0 | 16,0 | 6 | - | 60 | 1 | 34,00 |
| 30 7320 0600 200 06 | • 6,0 | 20,0 | 6 | - | 60 | 1 | 34,00 |
| 30 7320 0600 250 06 | • 6,0 | 25,0 | 6 | - | 60 | 1 | 36,00 |
| 30 7320 0800 140 08 32 | • 8,0 | 14,0 | 8 | 32 | 60 | 1 | 49,00 |
| 30 7320 0800 140 08 42 | • 8,0 | 14,0 | 8 | 42 | 75 | 1 | 55,00 |
| 30 7320 0800 200 08 | • 8,0 | 20,0 | 8 | - | 60 | 1 | 41,00 |
| 30 7320 0800 250 08 | • 8,0 | 25,0 | 8 | - | 75 | 1 | 44,00 |
| 30 7320 0800 300 08 | • 8,0 | 30,0 | 8 | - | 75 | 1 | 46,00 |
| 30 7320 1000 250 10 | • 10,0 | 25,0 | 10 | - | 75 | 1 | 60,00 |
| 30 7320 1200 250 12 | • 12,0 | 25,0 | 12 | - | 75 | 1 | 74,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Auslaufartikel werden unbeschichtet geliefert.
Special price / sale article. While stocks last.
Discontinued articles will be delivered without coating.

| | |
|---------------------------|----------------------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | 30° |
| | HSC High-Speed-Cutting |
| | NHC 7000 |
| | |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1240 | DXF/STEP |



Qualitätslinien
Quality lines



PROFESSIONAL
★ ★ ★

Für den professionellen Einsatz bei höchsten Zerspanungsansprüchen.

For professional use and highest performance.



EXPERT
★ ★ ★

Für den Experten in der Klein- und Großserienfertigung.

For experts in small and large production.

TOP
★ ★ ★

TOP für die Schruppbearbeitung

TOP for roughing

**WELTWEIT einmalige MICROTOOL-Qualität
WORLDWIDE unique MICROTOOL-quality**

r ± 0,002 mm Formgenauigkeit Radius
Shape accuracy

↻ 0,003 mm Rundlaufgenauigkeit
Concentricity

d1 0/-0,010 mm Durchmesser-toleranz
Diameter tolerance

r ± 0,005 mm Formgenauigkeit Radius
Shape accuracy

↻ 0,010 mm Rundlaufgenauigkeit
Concentricity

d1 0/-0,010 mm Durchmesser-toleranz
Diameter tolerance

r ± 0,007 mm Formgenauigkeit Radius
Shape accuracy

↻ 0,015 mm Rundlaufgenauigkeit
Concentricity

d1 0/-0,036 mm Durchmesser-toleranz
Diameter tolerance

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30 6202

PROFESSIONAL

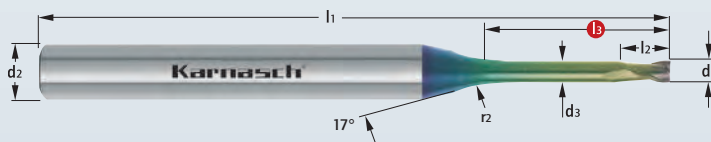
VHM-Micro Schaftfräser, < 20xD Schnitttiefe, Schaft 4 mm

Solid carbide miniature end mills, < 20xD diameter cutting depth, shank 4 mm



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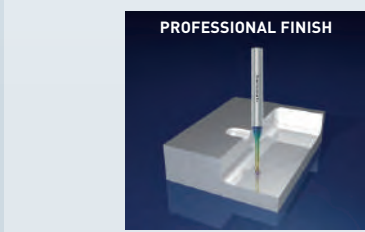
| | |
|-----------------------|-----------------------|
| Aluminium | GFK-CFK GFRP-CFRP |
| Aluminium < 6% Si | Kunststoff plastic |
| Aluminium < 12% Si | MAKROLON |
| MESSING brass | UHMW PE |
| Kupfer copper | PMMA |
| Ampco | Wachs Wax |
| TITAN titanium | |
| NICKEL < 500 N/mm² | |
| Bronze bronze | |



| | |
|--------------------|---------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | |

| TOLERANZ / TOLERANCE | |
|---------------------------|---------------------|
| scharfkantig / sharp edge | |
| | |
| d1* = Ø 0,1 - Ø 5,0 | tol 0,000 / -0,008 |
| d1* = Ø 6,0 | tol -0,006 / -0,014 |

Karnasch Micro Norm.
Standard in der Serie.
Karnasch Micro Norm.
Standard in serial production.

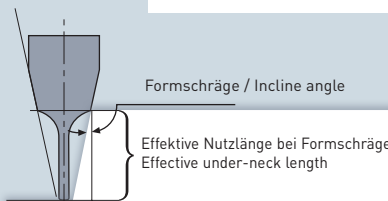


Schnittdaten
Cutting data

Zeichnungen
Drawings

1161

DXF/STEP



| Art. | d1* | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | Formschräge / Incline angle | | | |
|------------------|------|-----|-------|------|----|----|------|--------|-----------------------------|------|------|------|
| | | | | | | | | | 0,5° | 1° | 2° | 3° |
| 30 6202 0005 | 0,05 | - | 4 | - | 1 | 45 | 0,08 | 128,00 | - | - | - | - |
| 30 6202 0006 | 0,06 | - | 4 | - | 1 | 45 | 0,09 | 128,00 | - | - | - | - |
| 30 6202 0008 | 0,08 | - | 4 | - | 1 | 45 | 0,12 | 128,00 | - | - | - | - |
| 30 6202 0010 002 | 0,1 | 0,2 | 4 | 0,08 | 1 | 45 | 0,15 | 63,00 | 0,36 | 0,38 | 0,42 | 0,46 |
| 30 6202 0010 003 | 0,1 | 0,3 | 4 | 0,08 | 1 | 45 | 0,15 | 63,00 | 0,47 | 0,49 | 0,54 | 0,58 |
| 30 6202 0010 004 | 0,1 | 0,4 | 4 | 0,08 | 1 | 45 | 0,15 | 63,00 | 0,57 | 0,60 | 0,65 | 0,70 |
| 30 6202 0010 005 | 0,1 | 0,5 | 4 | 0,08 | 1 | 45 | 0,15 | 63,00 | 0,68 | 0,71 | 0,77 | 0,82 |
| 30 6202 0020 005 | 0,2 | 0,5 | 4 | 0,17 | 1 | 50 | 0,30 | 60,00 | 0,70 | 0,73 | 0,79 | 0,84 |
| 30 6202 0020 010 | 0,2 | 1 | 4 | 0,17 | 1 | 50 | 0,30 | 60,00 | 1,23 | 1,27 | 1,35 | 1,45 |
| 30 6202 0020 015 | 0,2 | 1,5 | 4 | 0,17 | 1 | 50 | 0,30 | 60,00 | 1,74 | 1,80 | 1,92 | 2,05 |
| 30 6202 0020 020 | 0,2 | 2 | 4 | 0,17 | 1 | 50 | 0,30 | 60,00 | 2,26 | 2,33 | 2,48 | 2,65 |
| 30 6202 0030 010 | 0,3 | 1 | 4 | 0,27 | 2 | 50 | 0,45 | 50,00 | 1,32 | 1,39 | 1,52 | 1,63 |
| 30 6202 0030 015 | 0,3 | 1,5 | 4 | 0,27 | 2 | 50 | 0,45 | 50,00 | 1,85 | 1,94 | 2,09 | 2,23 |
| 30 6202 0030 020 | 0,3 | 2 | 4 | 0,27 | 2 | 50 | 0,45 | 50,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6202 0030 025 | 0,3 | 2,5 | 4 | 0,27 | 2 | 50 | 0,45 | 50,00 | 2,90 | 3,02 | 3,22 | 3,44 |
| 30 6202 0030 030 | 0,3 | 3 | 4 | 0,27 | 2 | 50 | 0,45 | 50,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6202 0040 010 | 0,4 | 1 | 4 | 0,37 | 2 | 50 | 0,60 | 50,00 | 1,32 | 1,39 | 1,52 | 1,63 |
| 30 6202 0040 015 | 0,4 | 1,5 | 4 | 0,37 | 2 | 50 | 0,60 | 50,00 | 1,85 | 1,94 | 2,09 | 2,23 |
| 30 6202 0040 020 | 0,4 | 2 | 4 | 0,37 | 2 | 50 | 0,60 | 50,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6202 0040 030 | 0,4 | 3 | 4 | 0,37 | 2 | 50 | 0,60 | 50,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6202 0040 040 | 0,4 | 4 | 4 | 0,37 | 2 | 50 | 0,60 | 50,00 | 4,46 | 4,61 | 4,91 | 5,25 |
| 30 6202 0050 010 | 0,5 | 1 | 4 | 0,47 | 2 | 50 | 0,75 | 42,00 | 1,32 | 1,39 | 1,52 | 1,63 |
| 30 6202 0050 020 | 0,5 | 2 | 4 | 0,47 | 2 | 50 | 0,75 | 42,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6202 0050 030 | 0,5 | 3 | 4 | 0,47 | 2 | 50 | 0,75 | 42,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6202 0050 040 | 0,5 | 4 | 4 | 0,47 | 2 | 50 | 0,75 | 42,00 | 4,46 | 4,61 | 4,91 | 5,25 |
| 30 6202 0050 050 | 0,5 | 5 | 4 | 0,47 | 2 | 50 | 0,75 | 42,00 | 5,50 | 5,67 | 6,04 | 6,45 |
| 30 6202 0050 060 | 0,5 | 6 | 4 | 0,47 | 2 | 50 | 0,75 | 42,00 | 6,53 | 6,73 | 7,17 | 7,66 |



| Art. | d1* | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|-------|----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6202 0060 020 | • 0,6 | 2 | 4 | 0,57 | 4 | 50 | 0,90 | 38,00 | 2,54 | 2,70 | 2,97 | 3,19 |
| 30 6202 0060 030 | • 0,6 | 3 | 4 | 0,57 | 4 | 50 | 0,90 | 38,00 | 3,61 | 3,80 | 4,12 | 4,40 |
| 30 6202 0060 040 | • 0,6 | 4 | 4 | 0,57 | 4 | 50 | 0,90 | 38,00 | 4,67 | 4,89 | 5,25 | 5,61 |
| 30 6202 0060 050 | • 0,6 | 5 | 4 | 0,57 | 4 | 50 | 0,90 | 38,00 | 5,72 | 5,97 | 6,38 | 6,82 |
| 30 6202 0060 060 | • 0,6 | 6 | 4 | 0,57 | 4 | 50 | 0,90 | 38,00 | 6,77 | 7,04 | 7,50 | 8,02 |
| 30 6202 0060 080 | • 0,6 | 8 | 4 | 0,57 | 4 | 50 | 0,90 | 38,00 | 8,85 | 9,17 | 9,76 | 10,44 |
| 30 6202 0080 020 | • 0,8 | 2 | 4 | 0,77 | 4 | 50 | 1,20 | 38,00 | 2,54 | 2,70 | 2,97 | 3,19 |
| 30 6202 0080 040 | • 0,8 | 4 | 4 | 0,77 | 4 | 50 | 1,20 | 38,00 | 4,67 | 4,89 | 5,25 | 5,61 |
| 30 6202 0080 050 | • 0,8 | 5 | 4 | 0,77 | 4 | 50 | 1,20 | 38,00 | 5,72 | 5,97 | 6,38 | 6,82 |
| 30 6202 0080 060 | • 0,8 | 6 | 4 | 0,77 | 4 | 50 | 1,20 | 38,00 | 6,77 | 7,04 | 7,50 | 8,02 |
| 30 6202 0080 080 | • 0,8 | 8 | 4 | 0,77 | 4 | 50 | 1,20 | 38,00 | 8,85 | 9,18 | 9,76 | 10,44 |
| 30 6202 0080 100 | • 0,8 | 10 | 4 | 0,77 | 4 | 50 | 1,20 | 38,00 | 10,93 | 11,29 | 12,02 | 12,85 |
| 30 6202 0100 020 | • 1,0 | 2 | 4 | 0,96 | 4 | 50 | 1,50 | 38,00 | 2,58 | 2,73 | 2,99 | 3,21 |
| 30 6202 0100 030 | • 1,0 | 3 | 4 | 0,96 | 4 | 50 | 1,50 | 38,00 | 3,64 | 3,83 | 4,13 | 4,42 |
| 30 6202 0100 040 | • 1,0 | 4 | 4 | 0,96 | 4 | 50 | 1,50 | 38,00 | 4,70 | 4,91 | 5,26 | 5,63 |
| 30 6202 0100 050 | • 1,0 | 5 | 4 | 0,96 | 4 | 50 | 1,50 | 38,00 | 5,75 | 5,99 | 6,39 | 6,83 |
| 30 6202 0100 060 | • 1,0 | 6 | 4 | 0,96 | 4 | 50 | 1,50 | 38,00 | 6,79 | 7,06 | 7,52 | 8,04 |
| 30 6202 0100 070 | • 1,0 | 7 | 4 | 0,96 | 4 | 50 | 1,50 | 38,00 | 7,84 | 8,13 | 8,65 | 9,25 |
| 30 6202 0100 080 | • 1,0 | 8 | 4 | 0,96 | 4 | 50 | 1,50 | 38,00 | 8,88 | 9,19 | 9,78 | 10,46 |
| 30 6202 0100 090 | • 1,0 | 9 | 4 | 0,96 | 4 | 50 | 1,50 | 38,00 | 9,92 | 10,25 | 10,91 | 11,66 |
| 30 6202 0100 100 | • 1,0 | 10 | 4 | 0,96 | 4 | 50 | 1,50 | 38,00 | 10,95 | 11,31 | 12,04 | 12,87 |
| 30 6202 0100 120 | • 1,0 | 12 | 4 | 0,96 | 4 | 55 | 1,50 | 38,00 | 13,03 | 13,43 | 14,30 | 15,28 |
| 30 6202 0100 150 | • 1,0 | 15 | 4 | 0,96 | 4 | 55 | 1,50 | 38,00 | 16,12 | 16,61 | 17,68 | 18,90 |
| 30 6202 0100 200 | • 1,0 | 20 | 4 | 0,96 | 4 | 60 | 1,50 | 38,00 | 21,27 | 21,91 | 23,33 | 24,94 |
| 30 6202 0120 060 | • 1,2 | 6 | 4 | 1,15 | 4 | 50 | 1,80 | 38,00 | 6,82 | 7,08 | 7,54 | 8,06 |
| 30 6202 0120 120 | • 1,2 | 12 | 4 | 1,15 | 4 | 55 | 1,80 | 38,00 | 13,04 | 13,45 | 14,21 | 15,30 |
| 30 6202 0150 040 | • 1,5 | 4 | 4 | 1,44 | 4 | 50 | 2,25 | 38,00 | 4,38 | 4,70 | 5,12 | 5,47 |
| 30 6202 0150 060 | • 1,5 | 6 | 4 | 1,44 | 4 | 50 | 2,25 | 38,00 | 6,54 | 6,89 | 7,37 | 7,88 |
| 30 6202 0150 080 | • 1,5 | 8 | 4 | 1,44 | 4 | 50 | 2,25 | 38,00 | 8,66 | 9,04 | 9,63 | 10,30 |
| 30 6202 0150 100 | • 1,5 | 10 | 4 | 1,44 | 4 | 50 | 2,25 | 38,00 | 10,77 | 11,17 | 11,89 | 12,71 |
| 30 6202 0150 120 | • 1,5 | 12 | 4 | 1,44 | 4 | 55 | 2,25 | 38,00 | 12,85 | 13,29 | 14,15 | 15,13 |
| 30 6202 0150 140 | • 1,5 | 14 | 4 | 1,44 | 4 | 55 | 2,25 | 38,00 | 14,93 | 15,41 | 16,41 | 17,54 |
| 30 6202 0150 160 | • 1,5 | 16 | 4 | 1,44 | 4 | 55 | 2,25 | 38,00 | 17,01 | 17,53 | 18,66 | 19,95 |
| 30 6202 0150 180 | • 1,5 | 18 | 4 | 1,44 | 4 | 60 | 2,25 | 39,00 | 19,07 | 19,65 | 20,92 | 22,37 |
| 30 6202 0150 200 | • 1,5 | 20 | 4 | 1,44 | 4 | 60 | 2,25 | 39,00 | 21,14 | 21,78 | 23,18 | - |
| 30 6202 0200 040 | • 2,0 | 4 | 4 | 1,92 | 4 | 50 | 3,00 | 38,00 | 4,81 | 5,00 | 5,34 | 5,71 |
| 30 6202 0200 060 | • 2,0 | 6 | 4 | 1,92 | 4 | 50 | 3,00 | 38,00 | 6,89 | 7,14 | 7,60 | 8,12 |
| 30 6202 0200 080 | • 2,0 | 8 | 4 | 1,92 | 4 | 50 | 3,00 | 38,00 | 8,97 | 9,26 | 9,85 | 10,53 |
| 30 6202 0200 100 | • 2,0 | 10 | 4 | 1,92 | 4 | 50 | 3,00 | 38,00 | 11,04 | 11,38 | 12,11 | 12,95 |
| 30 6202 0200 120 | • 2,0 | 12 | 4 | 1,92 | 4 | 55 | 3,00 | 38,00 | 13,10 | 13,50 | 14,37 | 15,36 |
| 30 6202 0200 150 | • 2,0 | 15 | 4 | 1,92 | 4 | 55 | 3,00 | 38,00 | 16,19 | 16,68 | 17,76 | 18,98 |
| 30 6202 0200 200 | • 2,0 | 20 | 4 | 1,92 | 4 | 60 | 3,00 | 39,00 | 21,34 | 21,98 | 23,40 | - |
| 30 6202 0200 250 | • 2,0 | 25 | 4 | 1,92 | 4 | 65 | 3,00 | 39,00 | 26,48 | 27,29 | - | - |
| 30 6202 0200 300 | • 2,0 | 30 | 4 | 1,92 | 4 | 65 | 3,00 | 39,00 | 31,63 | 32,59 | - | - |
| 30 6202 0300 100 | • 3,0 | 10 | 4 | 2,90 | 4 | 65 | 4,50 | 40,00 | 11,41 | 11,93 | 12,15 | - |
| 30 6202 0300 150 | • 3,0 | 15 | 4 | 2,90 | 4 | 65 | 4,50 | 40,00 | 16,22 | 16,72 | - | - |
| 30 6202 0300 200 | • 3,0 | 20 | 4 | 2,90 | 4 | 65 | 4,50 | 40,00 | 21,37 | 22,02 | - | - |
| 30 6202 0300 250 | • 3,0 | 25 | 4 | 2,90 | 4 | 75 | 4,50 | 45,00 | 26,52 | 27,32 | - | - |
| 30 6202 0300 300 | • 3,0 | 30 | 4 | 2,90 | 4 | 75 | 4,50 | 45,00 | 31,61 | - | - | - |
| 30 6202 0400 100 | • 4,0 | 10 | 6 | 3,90 | 4 | 65 | 6,00 | 42,00 | 11,07 | 11,41 | 12,15 | 12,99 |
| 30 6202 0400 150 | • 4,0 | 15 | 6 | 3,90 | 4 | 65 | 6,00 | 42,00 | 16,22 | 16,72 | 17,79 | 19,02 |
| 30 6202 0400 200 | • 4,0 | 20 | 6 | 3,90 | 4 | 65 | 6,00 | 42,00 | 21,37 | 23,44 | - | - |
| 30 6202 0400 250 | • 4,0 | 25 | 6 | 3,90 | 4 | 75 | 6,00 | 43,00 | 26,52 | 27,32 | - | - |
| 30 6202 0400 300 | • 4,0 | 30 | 6 | 3,90 | 4 | 75 | 6,00 | 43,00 | 31,67 | 32,63 | - | - |
| 30 6202 0500 200 | • 5,0 | 20 | 6 | 4,90 | 4 | 65 | 7,50 | 42,00 | 21,37 | 22,02 | - | - |
| 30 6202 0500 300 | • 5,0 | 30 | 6 | 4,90 | 4 | 75 | 7,50 | 43,00 | 31,67 | - | - | - |
| 30 6202 0500 400 | • 5,0 | 40 | 6 | 4,90 | 4 | 90 | 7,50 | 46,00 | 41,96 | - | - | - |
| 30 6202 0600 200 | • 6,0 | 20 | 6 | 5,90 | 4 | 65 | 9,00 | 42,00 | - | - | - | - |
| 30 6202 0600 300 | • 6,0 | 30 | 6 | 5,90 | 4 | 75 | 9,00 | 46,00 | - | - | - | - |
| 30 6202 0600 400 | • 6,0 | 40 | 6 | 5,90 | 4 | 90 | 9,00 | 46,00 | - | - | - | - |
| 30 6202 0600 500 | • 6,0 | 50 | 6 | 5,90 | 4 | 90 | 9,00 | 43,00 | - | - | - | - |



30 6203

PROFESSIONAL

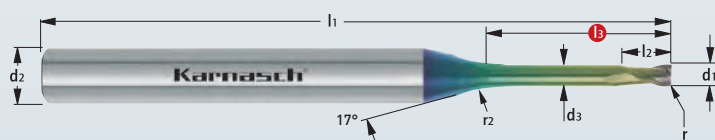
VHM-Micro Schaftfräser mit Eckenradius, < 15×D Schnitttiefe, Schaft 4 mm

Solid carbide miniature end mills with corner radius, < 15×D diameter cutting depth, shank 4 mm



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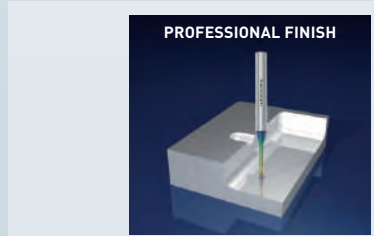
| | |
|-----------------------|-----------------------|
| Aluminium | GFK-CFK GFRP-CFRP |
| Aluminium < 6% Si | Kunststoff plastic |
| Aluminium < 12% Si | MAKROLON |
| MESSING brass | UHMW PE |
| Kupfer copper | PMMA |
| Ampco | Wachs Wax |
| TITAN titanium | |
| NICKEL < 500 N/mm² | |
| Bronze bronze | |



| | |
|-----------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | |
| | |

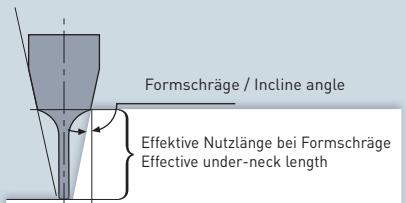
| TOLERANZ / TOLERANCE | |
|----------------------|---------------------|
| tol. r = -0,004 | |
| d1* = Ø 0,1 - Ø 5,9 | tol 0,000 / -0,008 |
| d1* = Ø 6,0 | tol -0,006 / -0,014 |

Karnasch Micro Norm. Standard in der Serie.
Karnasch Micro Norm. Standard in serial production.



Schnittdaten Cutting data | Zeichnungen Drawings

1162 |



| Art. | d1* | r -0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|--------------------------|-------|----------|-----|-------|------|----|----|------|-------|------|------|------|-------|
| 30 6203 0010 002 002 | • 0,1 | 0,02 | 0,2 | 4 | 0,08 | 1 | 45 | 0,10 | 63,00 | 0,36 | 0,38 | 0,42 | 0,46 |
| 30 6203 0010 002 003 | • 0,1 | 0,02 | 0,3 | 4 | 0,08 | 1 | 45 | 0,10 | 63,00 | 0,47 | 0,49 | 0,54 | 0,58 |
| 30 6203 0010 002 004 | • 0,1 | 0,02 | 0,4 | 4 | 0,08 | 1 | 45 | 0,10 | 63,00 | 0,57 | 0,60 | 0,65 | 0,70 |
| 30 6203 0020 005 005 | • 0,2 | 0,05 | 0,5 | 4 | 0,17 | 1 | 50 | 0,15 | 60,00 | 0,70 | 0,73 | 0,79 | 0,84 |
| 30 6203 0020 005 010 | • 0,2 | 0,05 | 1 | 4 | 0,17 | 1 | 50 | 0,15 | 60,00 | 1,23 | 1,27 | 1,35 | 1,45 |
| 30 6203 0020 005 015 | • 0,2 | 0,05 | 1,5 | 4 | 0,17 | 1 | 50 | 0,15 | 60,00 | 1,74 | 1,80 | 1,92 | 2,05 |
| 30 6203 0020 005 020 | • 0,2 | 0,05 | 2 | 4 | 0,17 | 1 | 50 | 0,15 | 60,00 | 2,26 | 2,33 | 2,48 | 2,65 |
| 30 6203 0030 005 010 | • 0,3 | 0,05 | 1 | 4 | 0,27 | 2 | 50 | 0,25 | 50,00 | 1,32 | 1,39 | 1,52 | 1,63 |
| 30 6203 0030 005 015 | • 0,3 | 0,05 | 1,5 | 4 | 0,27 | 2 | 50 | 0,25 | 50,00 | 1,85 | 1,94 | 2,09 | 2,23 |
| 30 6203 0030 005 020 | • 0,3 | 0,05 | 2 | 4 | 0,27 | 2 | 50 | 0,25 | 50,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6203 0030 005 025 | • 0,3 | 0,05 | 2,5 | 4 | 0,27 | 2 | 50 | 0,25 | 50,00 | 2,90 | 3,02 | 3,22 | 3,44 |
| 30 6203 0030 005 030 | • 0,3 | 0,05 | 3 | 4 | 0,27 | 2 | 50 | 0,25 | 50,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6203 0040 005 020 | • 0,4 | 0,05 | 2 | 4 | 0,37 | 2 | 50 | 0,30 | 50,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6203 0040 005 040 | • 0,4 | 0,05 | 4 | 4 | 0,37 | 2 | 50 | 0,30 | 50,00 | 4,46 | 4,61 | 4,91 | 5,25 |
| 30 6203 0040 010 010 | • 0,4 | 0,10 | 1 | 4 | 0,37 | 2 | 50 | 0,30 | 50,00 | 1,32 | 1,39 | 1,52 | 1,63 |
| 30 6203 0040 010 015 | • 0,4 | 0,10 | 1,5 | 4 | 0,37 | 2 | 50 | 0,30 | 50,00 | 1,85 | 1,94 | 2,09 | 2,23 |
| 30 6203 0040 010 020 | • 0,4 | 0,10 | 2 | 4 | 0,37 | 2 | 50 | 0,30 | 50,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6203 0040 010 030 | • 0,4 | 0,10 | 3 | 4 | 0,37 | 2 | 50 | 0,30 | 50,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6203 0040 010 040 | • 0,4 | 0,10 | 4 | 4 | 0,37 | 2 | 50 | 0,30 | 50,00 | 4,46 | 4,61 | 4,91 | 5,25 |
| NEW 30 6203 0050 005 020 | • 0,5 | 0,05 | 2 | 4 | 0,47 | 2 | 50 | 0,35 | 42,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6203 0050 005 030 | • 0,5 | 0,05 | 3 | 4 | 0,47 | 2 | 50 | 0,35 | 42,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6203 0050 005 040 | • 0,5 | 0,05 | 4 | 4 | 0,47 | 2 | 50 | 0,35 | 42,00 | 4,46 | 4,61 | 4,91 | 5,25 |
| 30 6203 0050 005 050 | • 0,5 | 0,05 | 5 | 4 | 0,47 | 2 | 50 | 0,35 | 42,00 | 5,50 | 5,67 | 6,04 | 6,45 |
| 30 6203 0050 010 010 | • 0,5 | 0,10 | 1 | 4 | 0,47 | 2 | 50 | 0,35 | 42,00 | 1,32 | 1,39 | 1,52 | 1,63 |
| 30 6203 0050 010 020 | • 0,5 | 0,10 | 2 | 4 | 0,47 | 2 | 50 | 0,35 | 42,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6203 0050 010 030 | • 0,5 | 0,10 | 3 | 4 | 0,47 | 2 | 50 | 0,35 | 42,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6203 0050 010 040 | • 0,5 | 0,10 | 4 | 4 | 0,47 | 2 | 50 | 0,35 | 42,00 | 4,46 | 4,61 | 4,91 | 5,25 |
| 30 6203 0050 010 050 | • 0,5 | 0,10 | 5 | 4 | 0,47 | 2 | 50 | 0,35 | 42,00 | 5,50 | 5,67 | 6,04 | 6,45 |
| 30 6203 0050 010 060 | • 0,5 | 0,10 | 6 | 4 | 0,47 | 2 | 50 | 0,35 | 42,00 | 6,53 | 6,73 | 7,17 | 7,66 |
| 30 6203 0060 006 020 | • 0,6 | 0,06 | 2 | 4 | 0,57 | 4 | 50 | 0,40 | 38,00 | 2,54 | 2,70 | 2,97 | 3,19 |
| 30 6203 0060 006 040 | • 0,6 | 0,06 | 4 | 4 | 0,57 | 4 | 50 | 0,40 | 38,00 | 4,67 | 4,89 | 5,25 | 5,61 |
| 30 6203 0060 006 060 | • 0,6 | 0,06 | 6 | 4 | 0,57 | 4 | 50 | 0,40 | 38,00 | 6,77 | 7,04 | 7,50 | 8,02 |
| 30 6203 0060 006 080 | • 0,6 | 0,06 | 8 | 4 | 0,57 | 4 | 50 | 0,40 | 38,00 | 8,85 | 9,17 | 9,76 | 10,44 |
| 30 6203 0060 010 020 | • 0,6 | 0,10 | 2 | 4 | 0,57 | 4 | 50 | 0,40 | 38,00 | 2,54 | 2,70 | 2,97 | 3,19 |
| 30 6203 0060 010 030 | • 0,6 | 0,10 | 3 | 4 | 0,57 | 4 | 50 | 0,40 | 38,00 | 3,61 | 3,80 | 4,12 | 4,40 |
| 30 6203 0060 010 040 | • 0,6 | 0,10 | 4 | 4 | 0,57 | 4 | 50 | 0,40 | 38,00 | 4,67 | 4,89 | 5,25 | 5,61 |
| 30 6203 0060 010 050 | • 0,6 | 0,10 | 5 | 4 | 0,57 | 4 | 50 | 0,40 | 38,00 | 5,72 | 5,97 | 6,38 | 6,82 |
| 30 6203 0060 010 060 | • 0,6 | 0,10 | 6 | 4 | 0,57 | 4 | 50 | 0,40 | 38,00 | 6,77 | 7,04 | 7,50 | 8,02 |
| 30 6203 0060 010 080 | • 0,6 | 0,10 | 8 | 4 | 0,57 | 4 | 50 | 0,40 | 38,00 | 8,85 | 9,17 | 9,76 | 10,44 |



PROFESSIONAL



30 6203

| Art. | d1* | r -0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|----------------------|-------|----------|----|-------|------|----|----|------|--------------|-------|-------|-------|-------|
| 30 6203 0080 008 040 | • 0,8 | 0,08 | 4 | 4 | 0,77 | 4 | 50 | 0,50 | 38,00 | 4,67 | 4,89 | 5,25 | 5,61 |
| 30 6203 0080 008 060 | • 0,8 | 0,08 | 6 | 4 | 0,77 | 4 | 50 | 0,50 | 38,00 | 6,77 | 7,04 | 7,50 | 8,02 |
| 30 6203 0080 008 080 | • 0,8 | 0,08 | 8 | 4 | 0,77 | 4 | 50 | 0,50 | 38,00 | 8,85 | 9,17 | 9,76 | 10,44 |
| 30 6203 0080 008 100 | • 0,8 | 0,08 | 10 | 4 | 0,77 | 4 | 50 | 0,50 | 38,00 | 10,93 | 11,29 | 12,02 | 12,85 |
| 30 6203 0080 020 020 | • 0,8 | 0,20 | 2 | 4 | 0,77 | 4 | 50 | 0,50 | 38,00 | 2,54 | 2,70 | 2,91 | 3,19 |
| 30 6203 0080 020 040 | • 0,8 | 0,20 | 4 | 4 | 0,77 | 4 | 50 | 0,50 | 38,00 | 4,67 | 4,89 | 5,25 | 5,61 |
| 30 6203 0080 020 050 | • 0,8 | 0,20 | 5 | 4 | 0,77 | 4 | 50 | 0,50 | 38,00 | 5,72 | 5,97 | 6,38 | 6,82 |
| 30 6203 0080 020 060 | • 0,8 | 0,20 | 6 | 4 | 0,77 | 4 | 50 | 0,50 | 38,00 | 6,77 | 7,04 | 7,50 | 8,02 |
| 30 6203 0080 020 080 | • 0,8 | 0,20 | 8 | 4 | 0,77 | 4 | 50 | 0,50 | 38,00 | 8,85 | 9,17 | 9,76 | 10,44 |
| 30 6203 0080 020 100 | • 0,8 | 0,20 | 10 | 4 | 0,77 | 4 | 50 | 0,50 | 38,00 | 10,93 | 11,29 | 12,02 | 12,85 |
| 30 6203 0100 010 030 | • 1,0 | 0,10 | 3 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 3,64 | 3,83 | 4,13 | 4,42 |
| 30 6203 0100 010 050 | • 1,0 | 0,10 | 5 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 5,75 | 5,99 | 6,39 | 6,83 |
| 30 6203 0100 010 070 | • 1,0 | 0,10 | 7 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 7,84 | 8,13 | 8,65 | 9,25 |
| 30 6203 0100 010 100 | • 1,0 | 0,10 | 10 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 10,95 | 11,31 | 12,04 | 12,87 |
| 30 6203 0100 010 120 | • 1,0 | 0,10 | 12 | 4 | 0,96 | 4 | 55 | 0,80 | 38,00 | 13,03 | 13,43 | 14,30 | 15,28 |
| 30 6203 0100 010 150 | • 1,0 | 0,10 | 15 | 4 | 0,96 | 4 | 55 | 0,80 | 38,00 | 16,12 | 16,61 | 17,68 | 18,90 |
| 30 6203 0100 010 200 | • 1,0 | 0,10 | 20 | 4 | 0,96 | 4 | 60 | 0,80 | 38,00 | 21,27 | 21,91 | 23,33 | 24,94 |
| 30 6203 0100 020 020 | • 1,0 | 0,20 | 2 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 2,58 | 2,73 | 2,99 | 3,21 |
| 30 6203 0100 020 030 | • 1,0 | 0,20 | 3 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 3,64 | 3,83 | 4,13 | 4,42 |
| 30 6203 0100 020 040 | • 1,0 | 0,20 | 4 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 4,70 | 4,91 | 5,26 | 5,63 |
| 30 6203 0100 020 050 | • 1,0 | 0,20 | 5 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 5,75 | 5,99 | 6,39 | 6,83 |
| 30 6203 0100 020 060 | • 1,0 | 0,20 | 6 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 6,79 | 7,06 | 7,52 | 8,04 |
| 30 6203 0100 020 070 | • 1,0 | 0,20 | 7 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 7,84 | 8,13 | 8,65 | 9,25 |
| 30 6203 0100 020 080 | • 1,0 | 0,20 | 8 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 8,88 | 9,19 | 9,78 | 10,46 |
| 30 6203 0100 020 090 | • 1,0 | 0,20 | 9 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 9,92 | 10,25 | 10,91 | 11,66 |
| 30 6203 0100 020 100 | • 1,0 | 0,20 | 10 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 10,95 | 11,31 | 12,04 | 12,87 |
| 30 6203 0100 020 120 | • 1,0 | 0,20 | 12 | 4 | 0,96 | 4 | 55 | 0,80 | 38,00 | 13,03 | 13,43 | 14,30 | 15,28 |
| 30 6203 0100 020 150 | • 1,0 | 0,20 | 15 | 4 | 0,96 | 4 | 55 | 0,80 | 38,00 | 16,12 | 16,61 | 17,68 | 18,90 |
| 30 6203 0120 020 060 | • 1,2 | 0,20 | 6 | 4 | 1,15 | 4 | 50 | 1,00 | 38,00 | 6,82 | 7,08 | 7,54 | 8,06 |
| 30 6203 0120 020 120 | • 1,2 | 0,20 | 12 | 4 | 1,15 | 4 | 55 | 1,00 | 38,00 | 13,04 | 13,45 | 14,21 | 15,30 |
| 30 6203 0150 015 040 | • 1,5 | 0,15 | 4 | 4 | 1,44 | 4 | 50 | 1,35 | 38,00 | 4,38 | 4,70 | 5,12 | 5,47 |
| 30 6203 0150 015 060 | • 1,5 | 0,15 | 6 | 4 | 1,44 | 4 | 50 | 1,35 | 38,00 | 6,54 | 6,89 | 7,37 | 7,88 |
| 30 6203 0150 015 080 | • 1,5 | 0,15 | 8 | 4 | 1,44 | 4 | 50 | 1,35 | 38,00 | 8,66 | 9,04 | 9,63 | 10,30 |
| 30 6203 0150 015 100 | • 1,5 | 0,15 | 10 | 4 | 1,44 | 4 | 50 | 1,35 | 38,00 | 10,77 | 11,17 | 11,89 | 12,71 |
| 30 6203 0150 015 120 | • 1,5 | 0,15 | 12 | 4 | 1,44 | 4 | 55 | 1,35 | 38,00 | 12,85 | 13,29 | 14,15 | 15,13 |
| 30 6203 0150 015 160 | • 1,5 | 0,15 | 16 | 4 | 1,44 | 4 | 55 | 1,35 | 38,00 | 17,01 | 17,53 | 18,66 | 19,95 |
| 30 6203 0150 015 200 | • 1,5 | 0,15 | 20 | 4 | 1,44 | 4 | 60 | 1,35 | 39,00 | 21,14 | 21,78 | 23,18 | - |
| 30 6203 0150 020 040 | • 1,5 | 0,20 | 4 | 4 | 1,44 | 4 | 50 | 1,35 | 38,00 | 4,38 | 4,70 | 5,12 | 5,47 |
| 30 6203 0150 020 060 | • 1,5 | 0,20 | 6 | 4 | 1,44 | 4 | 50 | 1,35 | 38,00 | 6,54 | 6,89 | 7,37 | 7,88 |
| 30 6203 0150 020 080 | • 1,5 | 0,20 | 8 | 4 | 1,44 | 4 | 50 | 1,35 | 38,00 | 8,66 | 9,04 | 9,63 | 10,30 |
| 30 6203 0150 020 100 | • 1,5 | 0,20 | 10 | 4 | 1,44 | 4 | 50 | 1,35 | 38,00 | 10,77 | 11,17 | 11,89 | 12,71 |
| 30 6203 0150 020 120 | • 1,5 | 0,20 | 12 | 4 | 1,44 | 4 | 55 | 1,35 | 38,00 | 12,85 | 13,29 | 14,15 | 15,13 |
| 30 6203 0150 020 140 | • 1,5 | 0,20 | 14 | 4 | 1,44 | 4 | 55 | 1,35 | 38,00 | 14,93 | 15,41 | 16,41 | 17,54 |
| 30 6203 0150 020 160 | • 1,5 | 0,20 | 16 | 4 | 1,44 | 4 | 55 | 1,35 | 38,00 | 17,01 | 17,53 | 18,66 | 19,95 |
| 30 6203 0150 020 180 | • 1,5 | 0,20 | 18 | 4 | 1,44 | 4 | 60 | 1,35 | 39,00 | 19,07 | 19,65 | 20,92 | 22,37 |
| 30 6203 0150 020 200 | • 1,5 | 0,20 | 20 | 4 | 1,44 | 4 | 60 | 1,35 | 39,00 | 21,14 | 21,78 | 23,18 | - |
| 30 6203 0200 020 040 | • 2,0 | 0,20 | 4 | 4 | 1,92 | 4 | 50 | 1,70 | 38,00 | 4,81 | 5,00 | 5,34 | 5,71 |
| 30 6203 0200 020 060 | • 2,0 | 0,20 | 6 | 4 | 1,92 | 4 | 50 | 1,70 | 38,00 | 6,89 | 7,14 | 7,60 | 8,12 |
| 30 6203 0200 020 080 | • 2,0 | 0,20 | 8 | 4 | 1,92 | 4 | 50 | 1,70 | 38,00 | 8,97 | 9,26 | 9,85 | 10,53 |
| 30 6203 0200 020 100 | • 2,0 | 0,20 | 10 | 4 | 1,92 | 4 | 50 | 1,70 | 38,00 | 11,04 | 11,38 | 12,11 | 12,95 |
| 30 6203 0200 020 120 | • 2,0 | 0,20 | 12 | 4 | 1,92 | 4 | 55 | 1,70 | 38,00 | 13,10 | 13,50 | 14,37 | 15,36 |
| 30 6203 0200 020 150 | • 2,0 | 0,20 | 15 | 4 | 1,92 | 4 | 55 | 1,70 | 38,00 | 16,19 | 16,68 | 17,76 | 18,98 |
| 30 6203 0200 020 200 | • 2,0 | 0,20 | 20 | 4 | 1,92 | 4 | 60 | 1,70 | 39,00 | 21,34 | 21,98 | 23,40 | - |
| 30 6203 0200 020 250 | • 2,0 | 0,20 | 25 | 4 | 1,92 | 4 | 65 | 1,70 | 39,00 | 26,48 | 27,29 | - | - |
| 30 6203 0200 020 300 | • 2,0 | 0,20 | 30 | 4 | 1,92 | 4 | 65 | 1,70 | 39,00 | 31,63 | 32,59 | - | - |
| 30 6203 0200 050 040 | • 2,0 | 0,50 | 4 | 4 | 1,92 | 4 | 50 | 1,70 | 38,00 | 4,81 | 5,00 | 5,34 | 5,71 |
| 30 6203 0200 050 060 | • 2,0 | 0,50 | 6 | 4 | 1,92 | 4 | 50 | 1,70 | 38,00 | 6,89 | 7,14 | 7,60 | 8,12 |
| 30 6203 0200 050 080 | • 2,0 | 0,50 | 8 | 4 | 1,92 | 4 | 50 | 1,70 | 38,00 | 8,97 | 9,26 | 9,85 | 10,53 |
| 30 6203 0200 050 100 | • 2,0 | 0,50 | 10 | 4 | 1,92 | 4 | 50 | 1,70 | 38,00 | 11,04 | 11,38 | 12,11 | 12,95 |
| 30 6203 0200 050 120 | • 2,0 | 0,50 | 12 | 4 | 1,92 | 4 | 55 | 1,70 | 38,00 | 13,10 | 13,50 | 14,37 | 15,36 |
| 30 6203 0200 050 150 | • 2,0 | 0,50 | 15 | 4 | 1,92 | 4 | 55 | 1,70 | 38,00 | 16,19 | 16,68 | 17,76 | 18,98 |
| 30 6203 0200 050 200 | • 2,0 | 0,50 | 20 | 4 | 1,92 | 4 | 60 | 1,70 | 39,00 | 21,34 | 21,98 | 23,40 | - |
| 30 6203 0300 030 100 | • 3,0 | 0,30 | 10 | 4 | 2,90 | 4 | 65 | 3,00 | 40,00 | 11,41 | 11,39 | 12,15 | - |
| 30 6203 0300 030 150 | • 3,0 | 0,30 | 15 | 4 | 2,90 | 4 | 65 | 3,00 | 40,00 | 16,22 | 16,72 | - | - |
| 30 6203 0300 030 200 | • 3,0 | 0,30 | 20 | 4 | 2,90 | 4 | 65 | 3,00 | 40,00 | 21,37 | 22,02 | - | - |
| 30 6203 0300 030 250 | • 3,0 | 0,30 | 25 | 4 | 2,90 | 4 | 75 | 3,00 | 45,00 | 26,52 | 27,32 | - | - |
| 30 6203 0300 030 300 | • 3,0 | 0,30 | 30 | 4 | 2,90 | 4 | 75 | 3,00 | 45,00 | 32,40 | - | - | - |
| 30 6203 0300 050 150 | • 3,0 | 0,50 | 15 | 4 | 2,90 | 4 | 65 | 3,00 | 40,00 | 16,22 | 16,72 | - | - |
| 30 6203 0300 050 200 | • 3,0 | 0,50 | 20 | 4 | 2,90 | 4 | 65 | 3,00 | 40,00 | 21,37 | 22,02 | - | - |
| 30 6203 0400 030 100 | • 4,0 | 0,30 | 10 | 6 | 3,90 | 4 | 65 | 4,00 | 42,00 | 11,07 | 11,41 | 12,15 | 12,99 |
| 30 6203 0400 030 150 | • 4,0 | 0,30 | 15 | 6 | 3,90 | 4 | 65 | 4,00 | 42,00 | 16,22 | 16,72 | 17,79 | 19,02 |
| 30 6203 0400 030 200 | • 4,0 | 0,30 | 20 | 6 | 3,90 | 4 | 65 | 4,00 | 42,00 | 21,37 | 23,44 | - | - |
| 30 6203 0400 030 250 | • 4,0 | 0,30 | 25 | 6 | 3,90 | 4 | 75 | 4,00 | 43,00 | 26,52 | 27,32 | - | - |
| 30 6203 0400 030 300 | • 4,0 | 0,30 | 30 | 6 | 3,90 | 4 | 75 | 4,00 | 43,00 | 31,67 | 32,63 | - | - |
| 30 6203 0400 050 200 | • 4,0 | 0,50 | 20 | 6 | 3,90 | 4 | 65 | 4,00 | 42,00 | 21,37 | 23,44 | - | - |
| 30 6203 0400 050 300 | • 4,0 | 0,50 | 30 | 6 | 3,90 | 4 | 75 | 4,00 | 43,00 | 31,67 | 32,63 | - | - |
| 30 6203 0500 030 200 | • 5,0 | 0,30 | 20 | 6 | 4,90 | 4 | 65 | 5,00 | 42,00 | 21,37 | 22,02 | - | - |
| 30 6203 0500 030 300 | • 5,0 | 0,30 | 30 | 6 | 4,90 | 4 | 75 | 5,00 | 43,00 | 31,67 | - | - | - |
| 30 6203 0500 030 400 | • 5,0 | 0,30 | 40 | 6 | 4,90 | 4 | 90 | 5,00 | 46,00 | 41,96 | - | - | - |
| 30 6203 0600 030 200 | • 6,0 | 0,30 | 20 | 6 | 5,90 | 4 | 65 | 6,00 | 42,00 | - | - | - | - |
| 30 6203 0600 030 300 | • 6,0 | 0,30 | 30 | 6 | 5,90 | 4 | 75 | 6,00 | 43,00 | - | - | - | - |
| 30 6203 0600 030 400 | • 6,0 | 0,30 | 40 | 6 | 5,90 | 4 | 90 | 6,00 | 46,00 | - | - | - | - |
| 30 6203 0600 030 500 | • 6,0 | 0,30 | 50 | 6 | 5,90 | 4 | 90 | 6,00 | 46,00 | - | - | - | - |
| 30 6203 0600 050 200 | • 6,0 | 0,50 | 20 | 6 | 5,90 | 4 | 65 | 6,00 | 42,00 | - | - | - | - |
| 30 6203 0600 050 300 | • 6,0 | 0,50 | 30 | 6 | 5,90 | 4 | 75 | 6,00 | | | | | |

30 6204

PROFESSIONAL

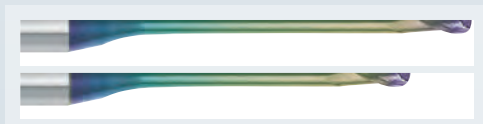
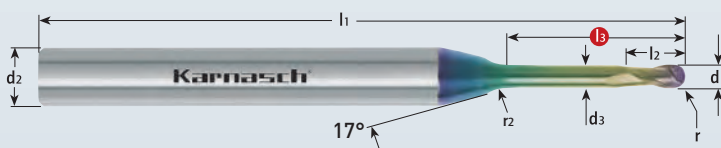
VHM-Micro-3D Mini-Radiusfräser, < 20xD Schnitttiefe, Schaft 4 mm

Solid carbide miniature ball nose end mill, < 20xD diameter cutting depth, shank 4 mm



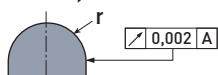
- 1
- 2
- 3
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- 7
- 8
- 9

| | |
|-----------------------|-----------------------|
| Aluminium | GFK-CFK GFRP-CFRP |
| Aluminium < 6% Si | Kunststoff plastic |
| Aluminium < 12% Si | MAKROLON |
| MESSING brass | UHMW PE |
| Kupfer copper | PMMA |
| Ampco | Wachs Wax |
| TITAN titanium | |
| NICKEL < 500 N/mm² | |
| Bronze bronze | |



TOLERANZ / TOLERANCE

tol. r = ± 0,002



d1* = Ø 0,1 - Ø 5,9 tol 0,000 / -0,008

d1* = Ø 6,0 tol -0,006 / -0,014



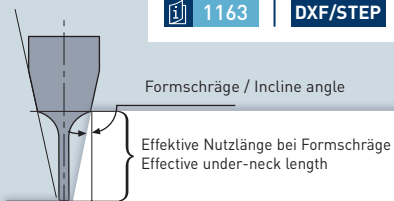
Karnasch Micro Norm.
Standard in der Serie.
Karnasch Micro Norm.
Standard in serial production.



| | |
|-----------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HSC HPC |
| | NHC 7000 |
| | |

Schnittdaten
Cutting data

Zeichnungen
Drawings



| Art. | d1* | r ± 0,002 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|-------|-----------|-----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6204 0010 002 | • 0,1 | 0,05 | 0,2 | 4 | 0,08 | 1 | 45 | 0,08 | 63,00 | 0,36 | 0,38 | 0,42 | 0,46 |
| 30 6204 0010 003 | • 0,1 | 0,05 | 0,3 | 4 | 0,08 | 1 | 45 | 0,08 | 63,00 | 0,47 | 0,49 | 0,54 | 0,58 |
| 30 6204 0010 004 | • 0,1 | 0,05 | 0,4 | 4 | 0,08 | 1 | 45 | 0,08 | 63,00 | 0,57 | 0,60 | 0,65 | 0,70 |
| 30 6204 0010 005 | • 0,1 | 0,05 | 0,5 | 4 | 0,08 | 1 | 45 | 0,08 | 63,00 | 0,68 | 0,71 | 0,77 | 0,82 |
| 30 6204 0020 005 | • 0,2 | 0,10 | 0,5 | 4 | 0,17 | 1 | 50 | 0,20 | 60,00 | 0,70 | 0,73 | 0,79 | 1,45 |
| 30 6204 0020 010 | • 0,2 | 0,10 | 1 | 4 | 0,17 | 1 | 50 | 0,20 | 60,00 | 1,23 | 1,27 | 1,35 | 2,11 |
| 30 6204 0020 015 | • 0,2 | 0,10 | 1,5 | 4 | 0,17 | 1 | 50 | 0,20 | 60,00 | 1,74 | 1,92 | 2,05 | 2,75 |
| 30 6204 0020 020 | • 0,2 | 0,10 | 2 | 4 | 0,17 | 1 | 50 | 0,20 | 60,00 | 2,26 | 2,33 | 2,48 | 2,65 |
| 30 6204 0030 010 | • 0,3 | 0,15 | 1 | 4 | 0,27 | 2 | 50 | 0,25 | 50,00 | 1,32 | 1,39 | 1,52 | 1,63 |
| 30 6204 0030 015 | • 0,3 | 0,15 | 1,5 | 4 | 0,27 | 2 | 50 | 0,25 | 50,00 | 1,85 | 1,94 | 2,09 | 2,23 |
| 30 6204 0030 020 | • 0,3 | 0,15 | 2 | 4 | 0,27 | 2 | 50 | 0,25 | 50,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6204 0030 025 | • 0,3 | 0,15 | 2,5 | 4 | 0,27 | 2 | 50 | 0,25 | 50,00 | 2,90 | 3,02 | 3,22 | 3,44 |
| 30 6204 0030 030 | • 0,3 | 0,15 | 3 | 4 | 0,27 | 2 | 50 | 0,25 | 50,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6204 0040 010 | • 0,4 | 0,20 | 1 | 4 | 0,37 | 2 | 50 | 0,30 | 50,00 | 1,32 | 1,39 | 1,52 | 1,63 |
| 30 6204 0040 020 | • 0,4 | 0,20 | 2 | 4 | 0,37 | 2 | 50 | 0,30 | 50,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6204 0040 030 | • 0,4 | 0,20 | 3 | 4 | 0,37 | 2 | 50 | 0,30 | 50,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6204 0040 040 | • 0,4 | 0,20 | 4 | 4 | 0,37 | 2 | 50 | 0,30 | 50,00 | 4,46 | 4,61 | 4,91 | 5,25 |
| 30 6204 0050 010 | • 0,5 | 0,25 | 1 | 4 | 0,47 | 2 | 50 | 0,40 | 42,00 | 1,32 | 1,39 | 1,52 | 1,63 |
| 30 6204 0050 020 | • 0,5 | 0,25 | 2 | 4 | 0,47 | 2 | 50 | 0,40 | 42,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6204 0050 030 | • 0,5 | 0,25 | 3 | 4 | 0,47 | 2 | 50 | 0,40 | 42,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6204 0050 040 | • 0,5 | 0,25 | 4 | 4 | 0,47 | 2 | 50 | 0,40 | 42,00 | 4,46 | 4,61 | 4,91 | 5,25 |
| 30 6204 0050 050 | • 0,5 | 0,25 | 5 | 4 | 0,47 | 2 | 50 | 0,40 | 42,00 | 5,50 | 5,67 | 6,04 | 6,45 |
| 30 6204 0050 060 | • 0,5 | 0,25 | 6 | 4 | 0,47 | 2 | 50 | 0,40 | 42,00 | 6,53 | 6,73 | 7,17 | 7,66 |
| 30 6204 0060 020 | • 0,6 | 0,30 | 2 | 4 | 0,57 | 4 | 50 | 0,50 | 38,00 | 2,54 | 2,70 | 2,97 | 3,19 |
| 30 6204 0060 030 | • 0,6 | 0,30 | 3 | 4 | 0,57 | 4 | 50 | 0,50 | 38,00 | 3,61 | 3,80 | 4,12 | 4,40 |
| 30 6204 0060 040 | • 0,6 | 0,30 | 4 | 4 | 0,57 | 4 | 50 | 0,50 | 38,00 | 4,67 | 4,89 | 5,25 | 5,61 |
| 30 6204 0060 050 | • 0,6 | 0,30 | 5 | 4 | 0,57 | 4 | 50 | 0,50 | 38,00 | 5,72 | 5,97 | 6,38 | 6,82 |
| 30 6204 0060 060 | • 0,6 | 0,30 | 6 | 4 | 0,57 | 4 | 50 | 0,50 | 38,00 | 6,77 | 7,04 | 7,50 | 8,02 |
| 30 6204 0060 080 | • 0,6 | 0,30 | 8 | 4 | 0,57 | 4 | 50 | 0,50 | 38,00 | 8,85 | 9,17 | 9,76 | 10,44 |
| 30 6204 0080 020 | • 0,8 | 0,40 | 2 | 4 | 0,77 | 4 | 50 | 0,60 | 38,00 | 2,54 | 2,70 | 2,97 | 3,19 |
| 30 6204 0080 040 | • 0,8 | 0,40 | 4 | 4 | 0,77 | 4 | 50 | 0,60 | 38,00 | 4,67 | 4,89 | 5,25 | 5,61 |
| 30 6204 0080 060 | • 0,8 | 0,40 | 6 | 4 | 0,77 | 4 | 50 | 0,60 | 38,00 | 6,77 | 7,04 | 7,50 | 8,02 |
| 30 6204 0080 080 | • 0,8 | 0,40 | 8 | 4 | 0,77 | 4 | 50 | 0,60 | 38,00 | 8,85 | 9,17 | 9,76 | 10,44 |
| 30 6204 0080 100 | • 0,8 | 0,40 | 10 | 4 | 0,77 | 4 | 50 | 0,60 | 38,00 | 10,93 | 11,29 | 12,02 | 12,85 |
| 30 6204 0100 020 | • 1,0 | 0,50 | 2 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 2,58 | 2,73 | 2,99 | 3,21 |
| 30 6204 0100 030 | • 1,0 | 0,50 | 3 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 3,64 | 3,83 | 4,13 | 4,42 |
| 30 6204 0100 040 | • 1,0 | 0,50 | 4 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 4,70 | 4,91 | 5,26 | 5,63 |
| 30 6204 0100 050 | • 1,0 | 0,50 | 5 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 5,75 | 5,99 | 6,39 | 6,83 |
| 30 6204 0100 060 | • 1,0 | 0,50 | 6 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 6,79 | 7,06 | 7,52 | 8,04 |
| 30 6204 0100 080 | • 1,0 | 0,50 | 8 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 8,88 | 9,19 | 9,78 | 10,46 |
| 30 6204 0100 100 | • 1,0 | 0,50 | 10 | 4 | 0,96 | 4 | 50 | 0,80 | 38,00 | 10,95 | 11,31 | 12,04 | 12,87 |
| 30 6204 0100 120 | • 1,0 | 0,50 | 12 | 4 | 0,96 | 4 | 55 | 0,80 | 38,00 | 13,03 | 13,43 | 14,30 | 15,28 |



PROFESSIONAL



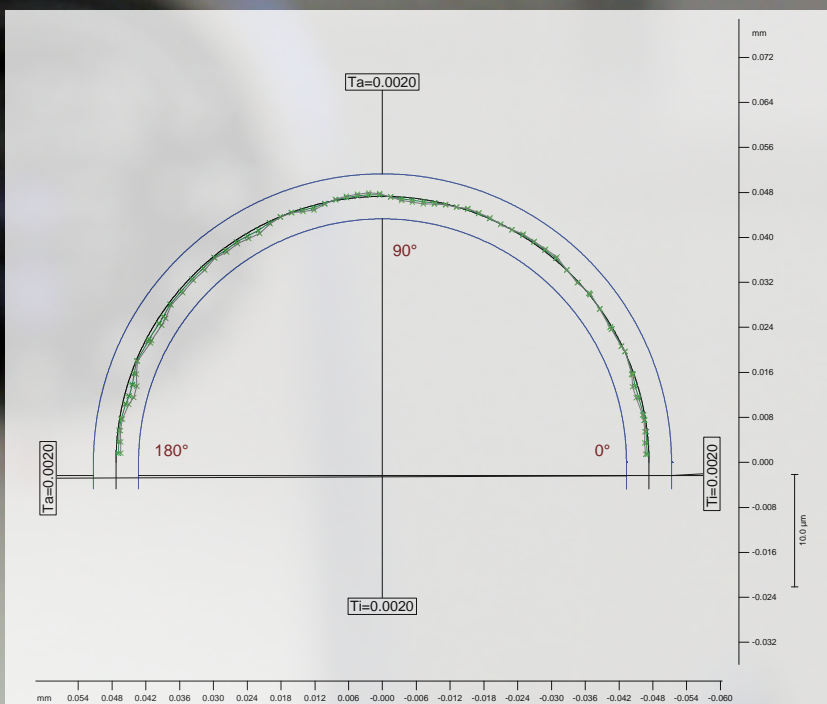
30 6204

| Art. | d1* | r ± 0,002 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|-------|-----------|----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6204 0100 150 | • 1,0 | 0,50 | 15 | 4 | 0,96 | 4 | 55 | 0,80 | 38,00 | 16,12 | 16,61 | 17,68 | 18,90 |
| 30 6204 0100 180 | • 1,0 | 0,50 | 18 | 4 | 0,96 | 4 | 60 | 0,80 | 39,00 | 19,21 | 19,79 | 21,07 | 22,52 |
| 30 6204 0100 200 | • 1,0 | 0,50 | 20 | 4 | 0,96 | 4 | 60 | 0,80 | 39,00 | 21,27 | 21,91 | 23,33 | 24,94 |
| 30 6204 0120 060 | • 1,2 | 0,60 | 6 | 4 | 1,15 | 4 | 50 | 1,00 | 38,00 | 6,82 | 7,08 | 7,54 | 8,06 |
| 30 6204 0120 120 | • 1,2 | 0,60 | 12 | 4 | 1,15 | 4 | 55 | 1,00 | 38,00 | 13,04 | 13,45 | 14,31 | 15,30 |
| 30 6204 0150 040 | • 1,5 | 0,75 | 4 | 4 | 1,44 | 4 | 50 | 1,20 | 38,00 | 4,75 | 4,96 | 5,30 | 5,67 |
| 30 6204 0150 060 | • 1,5 | 0,75 | 6 | 4 | 1,44 | 4 | 50 | 1,20 | 38,00 | 6,84 | 7,10 | 7,56 | 8,08 |
| 30 6204 0150 080 | • 1,5 | 0,75 | 8 | 4 | 1,44 | 4 | 50 | 1,20 | 38,00 | 8,92 | 9,22 | 9,82 | 10,49 |
| 30 6204 0150 100 | • 1,5 | 0,75 | 10 | 4 | 1,44 | 4 | 50 | 1,20 | 38,00 | 11,00 | 11,34 | 12,08 | 12,91 |
| 30 6204 0150 120 | • 1,5 | 0,75 | 12 | 4 | 1,44 | 4 | 55 | 1,20 | 38,00 | 13,06 | 13,46 | 14,33 | 15,32 |
| 30 6204 0150 140 | • 1,5 | 0,75 | 14 | 4 | 1,44 | 4 | 55 | 1,20 | 38,00 | 15,13 | 15,59 | 16,59 | 17,74 |
| 30 6204 0150 160 | • 1,5 | 0,75 | 16 | 4 | 1,44 | 4 | 55 | 1,20 | 38,00 | 17,19 | 17,71 | 18,85 | 20,15 |
| 30 6204 0150 180 | • 1,5 | 0,75 | 18 | 4 | 1,44 | 4 | 60 | 1,20 | 39,00 | 19,24 | 19,83 | 21,11 | 22,56 |
| 30 6204 0150 200 | • 1,5 | 0,75 | 20 | 4 | 1,44 | 4 | 60 | 1,20 | 39,00 | 21,30 | 21,95 | 23,36 | - |
| 30 6204 0200 040 | • 2,0 | 1,00 | 4 | 4 | 1,92 | 4 | 50 | 1,50 | 38,00 | 4,81 | 5,00 | 5,34 | 5,71 |
| 30 6204 0200 060 | • 2,0 | 1,00 | 6 | 4 | 1,92 | 4 | 50 | 1,50 | 38,00 | 6,89 | 7,14 | 7,60 | 8,12 |
| 30 6204 0200 080 | • 2,0 | 1,00 | 8 | 4 | 1,92 | 4 | 50 | 1,50 | 38,00 | 8,97 | 9,26 | 9,85 | 10,53 |
| 30 6204 0200 100 | • 2,0 | 1,00 | 10 | 4 | 1,92 | 4 | 50 | 1,50 | 38,00 | 11,04 | 11,38 | 12,11 | 12,95 |
| 30 6204 0200 120 | • 2,0 | 1,00 | 12 | 4 | 1,92 | 4 | 55 | 1,50 | 38,00 | 13,10 | 13,50 | 14,37 | 15,36 |
| 30 6204 0200 150 | • 2,0 | 1,00 | 15 | 4 | 1,92 | 4 | 55 | 1,50 | 38,00 | 16,19 | 16,68 | 17,16 | 18,98 |
| 30 6204 0200 200 | • 2,0 | 1,00 | 20 | 4 | 1,92 | 4 | 60 | 1,50 | 39,00 | 21,34 | 21,98 | 23,40 | - |
| 30 6204 0300 050 | • 3,0 | 1,50 | 5 | 4 | 2,90 | 4 | 65 | 3,00 | 40,00 | 5,90 | 6,11 | 6,50 | 6,95 |
| 30 6204 0300 100 | • 3,0 | 1,50 | 10 | 4 | 2,90 | 4 | 65 | 3,00 | 40,00 | 11,07 | 11,41 | 12,15 | - |
| 30 6204 0300 150 | • 3,0 | 1,50 | 15 | 4 | 2,90 | 4 | 65 | 3,00 | 40,00 | 16,22 | 16,72 | - | - |
| 30 6204 0300 200 | • 3,0 | 1,50 | 20 | 4 | 2,90 | 4 | 65 | 3,00 | 40,00 | 21,37 | 22,02 | - | - |
| 30 6204 0300 250 | • 3,0 | 1,50 | 25 | 4 | 2,90 | 4 | 75 | 3,00 | 45,00 | 26,52 | 27,32 | - | - |
| 30 6204 0300 300 | • 3,0 | 1,50 | 30 | 4 | 2,90 | 4 | 75 | 3,00 | 45,00 | 31,67 | - | - | - |
| 30 6204 0400 100 | • 4,0 | 2,00 | 10 | 6 | 3,90 | 4 | 65 | 4,00 | 42,00 | 11,08 | 11,41 | 12,15 | 12,99 |
| 30 6204 0400 150 | • 4,0 | 2,00 | 15 | 6 | 3,90 | 4 | 65 | 4,00 | 42,00 | 16,22 | 16,72 | 17,79 | 19,02 |
| 30 6204 0400 200 | • 4,0 | 2,00 | 20 | 6 | 3,90 | 4 | 65 | 4,00 | 42,00 | 21,37 | 22,02 | 23,44 | - |
| 30 6204 0400 250 | • 4,0 | 2,00 | 25 | 6 | 3,90 | 4 | 75 | 4,00 | 43,00 | 26,52 | 27,32 | - | - |
| 30 6204 0400 300 | • 4,0 | 2,00 | 30 | 6 | 3,90 | 4 | 75 | 4,00 | 43,00 | 31,67 | 32,62 | - | - |
| 30 6204 0500 200 | • 5,0 | 2,50 | 20 | 6 | 4,90 | 4 | 65 | 5,00 | 42,00 | 21,37 | 22,02 | - | - |
| 30 6204 0500 300 | • 5,0 | 2,50 | 30 | 6 | 4,90 | 4 | 75 | 5,00 | 43,00 | 31,67 | - | - | - |
| 30 6204 0500 400 | • 5,0 | 2,50 | 40 | 6 | 4,90 | 4 | 90 | 5,00 | 46,00 | 41,96 | - | - | - |
| 30 6204 0600 200 | • 6,0 | 3,00 | 20 | 6 | 5,90 | 4 | 65 | 6,00 | 42,00 | - | - | - | - |
| 30 6204 0600 300 | • 6,0 | 3,00 | 30 | 6 | 5,90 | 4 | 75 | 6,00 | 43,00 | - | - | - | - |
| 30 6204 0600 400 | • 6,0 | 3,00 | 40 | 6 | 5,90 | 4 | 90 | 6,00 | 46,00 | - | - | - | - |
| 30 6204 0600 500 | • 6,0 | 3,00 | 50 | 6 | 5,90 | 4 | 90 | 6,00 | 46,00 | - | - | - | - |



Darstellung der Radiuskontur eines Karnasch-Fräser

Picture of the radius shape accuracy from a Karnasch ball nose end mill



| | | | |
|---------------------------------|-------------------------------------|---|----------------------------------|
| max. Abweichung innen 0,8 µm | Toleranzüberschr. innen -1,2 µm | Firmenname : Basistest Drehachse mit HKS | Kunde : 12-00062 Werth |
| max. Abweichung außen 0,4 µm | Toleranzüberschr. außen -1,6 µm | Soll-Datei : TEMP.S | Benutzer : Meder |
| Rotation 0,0000° | Anzahl Istteil-Punkte 67 | Ist-Datei : 306553_0_1x0.4x0.05_LineForm.asc | Datum : 30.03.2016 - 16:16:20 |
| Versch.-X 0,0 µm | Fläche 0,003 mm² | Fi-Datei : | Zeichn. Nr. : 2D-Scan 10mm |
| Versch.-Y 0,0 µm | Durchm. flächengl. Kreis 65,2 µm | Bemerkung 1 : Kugelradius | Teile-Nr. : MAG 9 |
| Einpass-Strategie BestFit | Spiegeln + | Bemerkung 2 : | Bemerkung 3 : +y oben |

Karnasch®
PROFESSIONAL TOOLS



High-Precision-Werkzeuge aus dem Hause Karnasch

High-Precision-Tools from Karnasch



1



2



3



4



5



6



7



8



9

Index



Metallverarbeitende Unternehmen brauchen die absolute Gewissheit, mit hochwertigen, leistungsstarken und prozesssicheren Werkzeugen zu arbeiten. Karnasch Professional Tools bietet das, worauf es ankommt!

Wir sind ein weltweit agierendes Unternehmen mit Hauptsitz im badischen Heddeshheim sowie in Görsdorf (Brandenburg), das

- Hochleistungswerkzeuge zur Metallverarbeitung von herausragender Qualität produziert und vertreibt,
- seit 1961 auf dem Markt tätig ist und dementsprechend über große Erfahrung, umfassendes Know-how sowie überdurchschnittliche Kundenorientierung verfügt,
- durch intelligente Lagerhaltung jederzeit die sofortige Lieferbarkeit seiner Produkte garantiert,
- in vielen Regionen der Welt Vertriebspartner hat, damit auch für Ihre Auslandsniederlassungen eine permanente Versorgung und begleitender Service gewährleistet ist,
- Support groß schreibt und diesen Anspruch u.a. durch eine Service-Hotline auch erfüllt,
- mit der Eröffnung einer Niederlassung in Görsdorf (Brandenburg) bereits im Jahr 1992 auf gesamtdeutsche Präsenz gesetzt hat.

Weltweit zählen Kunden aus folgenden Bereichen auf Karnasch Professional Tools:

- Werkzeug- und Formenbau,
- Luft- und Raumfahrt,
- Automobilindustrie,
- Schiff- und Eisenbahnbau,
- Hoch-, Stahl- und Brückenbau,
- Dental.

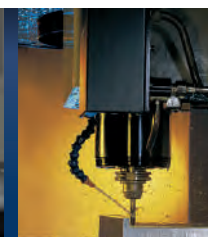
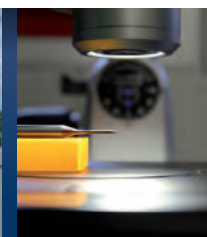
Metal working companies require absolute certainty to work with high-quality, high-performance and reliable tools. Karnasch Professional Tools offers all that matters!

We are a family-run business that is actively involved on a worldwide scale, with our head office in Heddeshheim in Baden and Görsdorf (Brandenburg), which

- produces and distributes excellent quality, high performance tools for metal working,
- has been active in the market since 1961 and has accordingly obtained invaluable experience, comprehensive know-how and above average customer orientation,
- guarantees immediate availability of our products at any time thanks to intelligent stock-keeping,
- has sales partners in many regions of the world, and can thus also ensure a continuous and accompanying service for your overseas branches.
- places an emphasis on support and fulfils this claim via, amongst other things, a service hotline.
- cemented our presence throughout Germany with the opening of a branch in Görsdorf (Brandenburg) in 1992.

Our customers predominantly come from the following sectors:

- Tool and mould making,
- Aviation and astronautics,
- The automotive industry,
- Shipbuilding and railway construction,
- Structural engineering, steel construction and bridge building,
- Dental.



Weitere Informationen zu unserer kompletten Produktpalette erhalten Sie auch im Internet unter:

WWW.KARNASCH.TOOLS

VHM-Micro-Schaftfräser, ohne Eckenradius, polierte Schneiden < 12xD
 Solid carbide-micro-end mill, without corner radius, polished cutting edge < 12xD

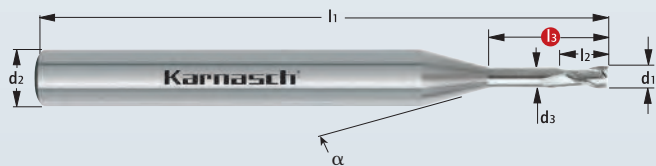


PROFESSIONAL



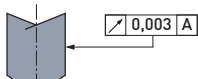
30 6209

- Kupfer
copper
- MESSING
brass
- Alu-
minium
- Ampco
- Gold
gold
- Kunststoff
plastic
- MAKROLON
- Wachs
Wax



TOLERANZ / TOLERANCE

scharfkantig / sharp edge



d1* = Ø 0,05 - Ø 0,12 tol ± 0,005

d1* = Ø 0,15 - Ø 2,0 tol - 0,01

| | |
|-----------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HSC HPC |
| | POLIERT POLISHED |
| | MMKS |

Schnittdaten
Cutting data

1161



| Art. | d1* | l3 | d2 h6 | d3 | α | l1 | l2 | € |
|-------------------|------|------|-------|------|-----|----|------|-------|
| 30 6209 0080 0600 | 0,80 | 6,00 | 3 | 0,77 | 10° | 40 | 1,20 | 31,20 |
| 30 6209 0080 0900 | 0,80 | 9,00 | 3 | 0,77 | 10° | 60 | 1,20 | 37,80 |
| 30 6209 0085 0200 | 0,85 | 2,00 | 3 | - | 10° | 40 | 2,00 | 15,60 |
| 30 6209 0090 0600 | 0,90 | 6,00 | 3 | 0,87 | 10° | 40 | 1,30 | 31,20 |
| 30 6209 0120 0900 | 1,20 | 9,00 | 3 | 1,15 | 10° | 40 | 1,80 | 31,20 |
| 30 6209 0140 0400 | 1,40 | 4,00 | 3 | - | 10° | 40 | 4,00 | 16,80 |
| 30 6209 0150 0600 | 1,50 | 6,00 | 3 | 1,44 | 10° | 40 | 2,20 | 24,60 |

| Art. | d1* | l3 | d2 h6 | d3 | α | l1 | l2 | € |
|-------------------|------|-------|-------|------|-----|----|------|-------|
| 30 6209 0180 0900 | 1,80 | 9,00 | 3 | 1,74 | 10° | 40 | 2,70 | 31,20 |
| 30 6209 0180 1200 | 1,80 | 12,00 | 3 | 1,74 | 10° | 40 | 2,70 | 32,40 |

⚠ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
 Nachfolgewerkzeug 30 6202 auf Seite 28.
 Special price / sale article. While stocks last.
 Replacement article 30 6202 on page 28.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

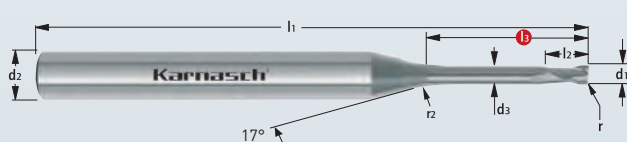
30 6212

PROFESSIONAL
★ ★ ★

VHM-Micro-Schaftfräser mit Eckenradius, polierte Schneiden < 25×D
Solid carbide end mills, with corner radius, with highly polished flutes < 25×D



- 1 Kupfer copper
- MESSING brass
- Aluminium
- Ampco
- Gold gold
- Kunststoff plastic
- MAKROLON
- Wachs Wax



TOLERANZ / TOLERANCE

tol. r = -0,004

d1* = Ø 0,2 - Ø 5,9 tol -0,001 / -0,010

d1* = Ø 6,0 tol -0,005 / -0,020

Karnasch Micro Norm.
Standard in der Serie.
Karnasch Micro Norm.
Standard in serial production.



MICRO GRAIN KARNASCH NORM

SPEZIAL SPECIAL DIN 6535 Form HA

30°

HSC HPC

POLIERT POLISHED

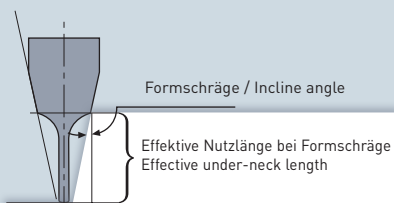
MMKS

Schnittdaten Cutting data

Zeichnungen Drawings

1162

DXF/STEP



| Art. | d1* | r - 0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|---------------------|-------|-----------|-----|-------|------|----|----|-----|-------|-------|-------|-------|-------|
| 30 6212 0020 005 00 | • 0,2 | 0,05 | 0,5 | * 4 | 0,18 | 1 | 55 | 0,3 | 58,50 | 0,68 | 0,71 | 0,77 | 0,82 |
| 30 6212 0020 005 01 | • 0,2 | 0,05 | 1 | * 4 | 0,18 | 1 | 55 | 0,3 | 58,50 | 1,20 | 1,25 | 1,33 | 1,43 |
| 30 6212 0030 005 01 | • 0,3 | 0,05 | 1 | * 4 | 0,28 | 2 | 55 | 0,4 | 48,50 | 1,29 | 1,37 | 1,49 | 1,61 |
| 30 6212 0030 005 02 | • 0,3 | 0,05 | 2 | * 4 | 0,28 | 2 | 55 | 0,4 | 48,50 | 2,35 | 2,46 | 2,63 | 2,81 |
| 30 6212 0030 005 03 | • 0,3 | 0,05 | 3 | * 4 | 0,28 | 2 | 55 | 0,4 | 48,50 | 3,40 | 3,53 | 3,76 | 4,02 |
| 30 6212 0030 005 05 | • 0,3 | 0,05 | 5 | * 4 | 0,28 | 2 | 55 | 0,4 | 48,50 | 5,48 | 5,65 | 6,02 | 6,43 |
| 30 6212 0040 005 02 | • 0,4 | 0,05 | 2 | * 4 | 0,38 | 2 | 55 | 0,5 | 48,50 | 2,35 | 2,46 | 2,63 | 2,81 |
| 30 6212 0040 005 04 | • 0,4 | 0,05 | 4 | * 4 | 0,38 | 2 | 55 | 0,5 | 48,50 | 4,44 | 4,59 | 4,89 | 5,23 |
| 30 6212 0050 005 03 | • 0,5 | 0,05 | 3 | * 4 | 0,48 | 2 | 55 | 0,6 | 40,50 | 3,40 | 3,53 | 3,76 | 4,02 |
| 30 6212 0050 005 04 | • 0,5 | 0,05 | 4 | * 4 | 0,48 | 2 | 55 | 0,6 | 40,50 | 4,44 | 4,59 | 4,89 | 5,23 |
| 30 6212 0050 005 05 | • 0,5 | 0,05 | 5 | * 4 | 0,48 | 2 | 55 | 0,6 | 40,50 | 5,48 | 5,65 | 6,02 | 6,43 |
| 30 6212 0060 006 02 | • 0,6 | 0,06 | 2 | 4 | 0,58 | 4 | 55 | 0,8 | 35,50 | 2,50 | 2,67 | 2,94 | 3,17 |
| 30 6212 0060 006 04 | • 0,6 | 0,06 | 4 | 4 | 0,58 | 4 | 55 | 0,8 | 35,50 | 4,63 | 4,87 | 5,23 | 5,59 |
| 30 6212 0060 006 06 | • 0,6 | 0,06 | 6 | 4 | 0,58 | 4 | 55 | 0,8 | 35,50 | 6,74 | 7,02 | 7,49 | 8,00 |
| 30 6212 0060 006 08 | • 0,6 | 0,06 | 8 | 4 | 0,58 | 4 | 55 | 0,8 | 35,50 | 8,83 | 9,15 | 9,74 | 10,42 |
| 30 6212 0080 008 04 | • 0,8 | 0,08 | 4 | 4 | 0,77 | 4 | 55 | 1,0 | 35,50 | 4,67 | 4,89 | 5,25 | 5,61 |
| 30 6212 0080 008 06 | • 0,8 | 0,08 | 6 | 4 | 0,77 | 4 | 55 | 1,0 | 35,50 | 6,77 | 7,05 | 7,50 | 8,02 |
| 30 6212 0080 008 08 | • 0,8 | 0,08 | 8 | 4 | 0,77 | 4 | 55 | 1,0 | 35,50 | 8,85 | 9,17 | 9,76 | 10,44 |
| 30 6212 0080 008 10 | • 0,8 | 0,08 | 10 | 4 | 0,77 | 4 | 55 | 1,0 | 35,50 | 10,93 | 11,29 | 12,02 | 12,85 |
| 30 6212 0090 009 06 | • 0,9 | 0,09 | 6 | 4 | 0,87 | 10 | 55 | 1,1 | 20,40 | 7,24 | 7,71 | 8,46 | 9,08 |
| 30 6212 0090 009 12 | • 0,9 | 0,09 | 12 | 4 | 0,87 | 10 | 55 | 1,1 | 20,40 | 13,63 | 14,28 | 15,25 | 16,04 |
| 30 6212 0100 010 03 | • 1,0 | 0,10 | 3 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 3,67 | 3,85 | 4,15 | 4,44 |
| 30 6212 0100 010 05 | • 1,0 | 0,10 | 5 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 5,77 | 6,01 | 6,41 | 6,85 |
| 30 6212 0100 010 07 | • 1,0 | 0,10 | 7 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 7,86 | 8,14 | 8,67 | 9,27 |
| 30 6212 0100 010 10 | • 1,0 | 0,10 | 10 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 10,98 | 11,33 | 12,06 | 12,89 |
| 30 6212 0100 010 12 | • 1,0 | 0,10 | 12 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 13,04 | 13,45 | 14,31 | 15,30 |
| 30 6212 0100 010 15 | • 1,0 | 0,10 | 15 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 16,14 | 16,63 | 17,70 | 18,92 |
| 30 6212 0100 010 20 | • 1,0 | 0,10 | 20 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 21,29 | 21,93 | 23,35 | 24,96 |
| 30 6212 0100 010 25 | • 1,0 | 0,10 | 25 | 4 | 0,95 | 4 | 60 | 1,2 | 35,50 | 26,43 | 27,23 | 28,99 | - |
| 30 6212 0100 030 05 | • 1,0 | 0,30 | 5 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 5,77 | 6,01 | 6,41 | 6,85 |
| 30 6212 0100 030 10 | • 1,0 | 0,30 | 10 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 10,98 | 11,33 | 12,06 | 12,89 |
| 30 6212 0100 030 15 | • 1,0 | 0,30 | 15 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 16,14 | 16,63 | 17,70 | 18,92 |

* Ø 0,2 - Ø 0,5 - Laufende Produktion wird geändert von Schaft d2 Ø 3 mm auf Schaft d2 Ø 4 mm
* Ø 0,2 - Ø 0,5 - Running production changed from shank d2 Ø 3 mm to shank d2 Ø 4 mm



PROFESSIONAL



30 6212

| Art. | d1* | r - 0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|---------------------|-------|-----------|----|-------|------|----|----|-----|-------|-------|-------|-------|-------|
| 30 6212 0120 012 06 | • 1,2 | 0,12 | 6 | 4 | 1,15 | 4 | 55 | 1,4 | 35,50 | 6,82 | 7,08 | 7,54 | 8,06 |
| 30 6212 0120 012 08 | • 1,2 | 0,12 | 8 | 4 | 1,15 | 4 | 55 | 1,4 | 35,50 | 8,90 | 9,21 | 9,80 | 10,48 |
| 30 6212 0120 012 10 | • 1,2 | 0,12 | 10 | 4 | 1,15 | 4 | 55 | 1,4 | 35,50 | 10,98 | 11,33 | 12,06 | 12,89 |
| 30 6212 0120 012 12 | • 1,2 | 0,12 | 12 | 4 | 1,15 | 4 | 55 | 1,4 | 35,50 | 13,04 | 13,45 | 14,31 | 15,30 |
| 30 6212 0120 012 18 | • 1,2 | 0,12 | 18 | 4 | 1,15 | 4 | 55 | 1,4 | 35,50 | 19,23 | 19,81 | 21,09 | 22,54 |
| 30 6212 0120 012 25 | % 1,2 | 0,12 | 25 | 4 | 1,15 | 10 | 60 | 1,4 | 20,40 | 27,27 | 28,17 | 29,46 | - |
| 30 6212 0150 015 04 | • 1,5 | 0,15 | 4 | 4 | 1,44 | 4 | 55 | 1,8 | 35,50 | 4,75 | 4,96 | 5,30 | 5,67 |
| 30 6212 0150 015 06 | • 1,5 | 0,15 | 6 | 4 | 1,44 | 4 | 55 | 1,8 | 35,50 | 6,84 | 7,10 | 7,56 | 8,08 |
| 30 6212 0150 015 08 | • 1,5 | 0,15 | 8 | 4 | 1,44 | 4 | 55 | 1,8 | 35,50 | 8,92 | 9,22 | 9,82 | 10,49 |
| 30 6212 0150 015 10 | • 1,5 | 0,15 | 10 | 4 | 1,44 | 4 | 55 | 1,8 | 35,50 | 11,00 | 11,34 | 12,08 | 12,91 |
| 30 6212 0150 015 12 | • 1,5 | 0,15 | 12 | 4 | 1,44 | 4 | 55 | 1,8 | 35,50 | 13,06 | 13,46 | 14,33 | 15,32 |
| 30 6212 0150 015 16 | • 1,5 | 0,15 | 16 | 4 | 1,44 | 4 | 55 | 1,8 | 35,50 | 17,19 | 17,71 | 18,85 | 20,15 |
| 30 6212 0150 015 20 | • 1,5 | 0,15 | 20 | 4 | 1,44 | 4 | 55 | 1,8 | 35,50 | 21,30 | 21,95 | 23,36 | - |
| 30 6212 0150 030 12 | % 1,5 | 0,30 | 12 | 4 | 1,44 | 10 | 55 | 1,8 | 20,40 | 13,71 | 14,33 | 15,28 | 16,05 |
| 30 6212 0160 016 16 | % 1,6 | 0,16 | 16 | 4 | 1,54 | 10 | 55 | 1,9 | 20,40 | 17,91 | 18,63 | 19,71 | 20,56 |
| 30 6212 0200 020 05 | • 2,0 | 0,20 | 5 | 4 | 1,92 | 4 | 65 | 2,0 | 35,50 | 5,85 | 6,07 | 6,47 | 6,91 |
| 30 6212 0200 020 08 | • 2,0 | 0,20 | 8 | 4 | 1,92 | 4 | 65 | 2,0 | 35,50 | 8,97 | 9,26 | 9,85 | 10,53 |
| 30 6212 0200 020 10 | • 2,0 | 0,20 | 10 | 4 | 1,92 | 4 | 65 | 2,0 | 35,50 | 11,04 | 11,38 | 12,11 | 12,95 |
| 30 6212 0200 020 12 | • 2,0 | 0,20 | 12 | 4 | 1,92 | 4 | 65 | 2,0 | 35,50 | 13,10 | 13,50 | 14,37 | 15,36 |
| 30 6212 0200 020 15 | • 2,0 | 0,20 | 15 | 4 | 1,92 | 4 | 65 | 2,0 | 35,50 | 16,19 | 16,68 | 17,76 | 18,98 |
| 30 6212 0200 020 20 | • 2,0 | 0,20 | 20 | 4 | 1,92 | 4 | 65 | 2,0 | 35,50 | 21,34 | 21,98 | 23,40 | - |
| 30 6212 0200 020 25 | • 2,0 | 0,20 | 25 | 4 | 1,92 | 4 | 75 | 2,0 | 36,50 | 26,48 | 27,29 | - | - |
| 30 6212 0200 020 30 | • 2,0 | 0,20 | 30 | 4 | 1,92 | 4 | 75 | 2,0 | 36,50 | 31,63 | 32,59 | - | - |
| 30 6212 0200 030 10 | % 2,0 | 0,30 | 10 | 4 | 1,92 | 10 | 65 | 2,0 | 20,40 | 11,66 | 12,21 | 13,08 | 13,79 |
| 30 6212 0200 050 10 | • 2,0 | 0,50 | 10 | 4 | 1,92 | 4 | 65 | 2,0 | 35,50 | 11,04 | 11,38 | 12,11 | 12,95 |
| 30 6212 0200 050 15 | • 2,0 | 0,50 | 15 | 4 | 1,92 | 4 | 65 | 2,0 | 35,50 | 16,19 | 16,68 | 17,76 | 18,98 |
| 30 6212 0200 050 20 | • 2,0 | 0,50 | 20 | 4 | 1,92 | 4 | 65 | 2,0 | 35,50 | 21,32 | 21,98 | 23,40 | - |
| 30 6212 0300 030 10 | • 3,0 | 0,30 | 10 | 4 | 2,90 | 4 | 65 | 3,0 | 36,50 | 11,07 | 11,41 | 12,15 | - |
| 30 6212 0300 030 15 | • 3,0 | 0,30 | 15 | 4 | 2,90 | 4 | 65 | 3,0 | 36,50 | 16,22 | 16,72 | - | - |
| 30 6212 0300 030 20 | • 3,0 | 0,30 | 20 | 4 | 2,90 | 4 | 65 | 3,0 | 36,50 | 21,37 | 22,02 | - | - |
| 30 6212 0300 030 25 | • 3,0 | 0,30 | 25 | 4 | 2,90 | 4 | 75 | 3,0 | 41,50 | 26,52 | 27,32 | - | - |
| 30 6212 0300 030 30 | • 3,0 | 0,30 | 30 | 4 | 2,90 | 4 | 75 | 3,0 | 41,50 | 31,67 | - | - | - |
| 30 6212 0400 030 10 | • 4,0 | 0,30 | 10 | 6 | 3,90 | 4 | 65 | 4,0 | 38,50 | 11,07 | 11,41 | 12,15 | 12,99 |
| 30 6212 0400 030 15 | • 4,0 | 0,30 | 15 | 6 | 3,90 | 4 | 65 | 4,0 | 38,50 | 16,22 | 16,72 | 17,79 | 19,02 |
| 30 6212 0400 030 20 | • 4,0 | 0,30 | 20 | 6 | 3,90 | 4 | 65 | 4,0 | 38,50 | 21,37 | 22,02 | 23,44 | - |
| 30 6212 0400 030 25 | • 4,0 | 0,30 | 25 | 6 | 3,90 | 4 | 75 | 4,0 | 39,50 | 26,52 | 27,32 | - | - |
| 30 6212 0400 030 30 | • 4,0 | 0,30 | 30 | 6 | 3,90 | 4 | 75 | 4,0 | 39,50 | 31,67 | 32,62 | - | - |
| 30 6212 0400 050 20 | • 4,0 | 0,50 | 20 | 6 | 3,90 | 4 | 65 | 4,0 | 38,50 | 21,37 | 22,02 | 23,44 | - |
| 30 6212 0400 050 30 | • 4,0 | 0,50 | 30 | 6 | 3,90 | 4 | 75 | 4,0 | 39,50 | 31,67 | 32,62 | - | - |
| 30 6212 0500 030 20 | • 5,0 | 0,30 | 20 | 6 | 4,90 | 4 | 65 | 5,0 | 38,50 | 21,37 | 22,02 | - | - |
| 30 6212 0500 030 30 | • 5,0 | 0,30 | 30 | 6 | 4,90 | 4 | 75 | 5,0 | 39,50 | 31,67 | - | - | - |
| 30 6212 0600 030 20 | • 6,0 | 0,30 | 20 | 6 | 5,90 | 4 | 65 | 6,0 | 38,50 | - | - | - | - |
| 30 6212 0600 030 30 | • 6,0 | 0,30 | 30 | 6 | 5,90 | 4 | 75 | 6,0 | 39,50 | - | - | - | - |
| 30 6212 0600 050 30 | • 6,0 | 0,50 | 30 | 6 | 5,90 | 4 | 75 | 6,0 | 39,50 | - | - | - | - |
| 30 6212 0600 060 30 | % 6,0 | 0,60 | 30 | 6 | 5,90 | 10 | 75 | 6,0 | 22,80 | - | - | - | - |

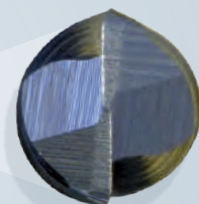
% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

30 6212 0100 010 15



20-fache Vergrößerung
20-times magnification

Stirnseitig
Front side



100-fache Vergrößerung
100-times magnification



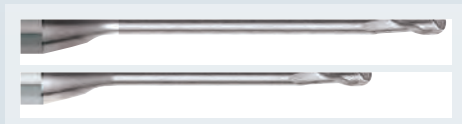
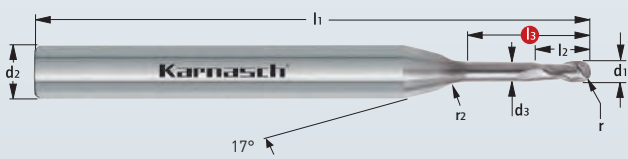
30 6213

PROFESSIONAL
★ ★ ★

VHM-Micro-3D-Radiusfräser mit Kugelstirn, polierte Schneiden < 25xD
Solid carbide ball nose end mills with highly polished flutes < 25xD



- 1 Kupfer copper
- MESSING brass
- Aluminium
- Ampco
- Gold gold
- Kunststoff plastic
- MAKROLON
- Wachs Wax



TOLERANZ / TOLERANCE

tol. r = ± 0,002

d1* = Ø 0,1 - Ø 5,9 tol -0,001 / -0,010
d1* = Ø 6,0 tol -0,005 / -0,020

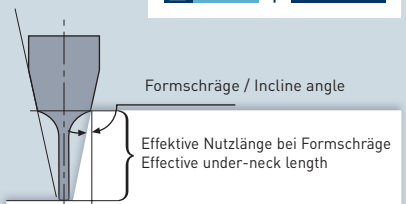
Karnasch Micro Norm. Standard in der Serie.
Karnasch Micro Norm. Standard in serial production.



| | |
|------------------------|-------------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HSC HPC |
| | POLIERT POLISHED |
| | MMKS |

Schnittdaten Cutting data | Zeichnungen Drawings

1163 | DXF/STEP



| Art. | d1* | r ± 0,002 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|-------|-----------|-----|-------|------|----|----|-----|-------|-------|-------|-------|-------|
| 30 6213 0020 005 | • 0,2 | 0,10 | 0,5 | * 4 | 0,18 | 1 | 55 | 0,3 | 58,50 | 0,68 | 0,71 | 0,77 | 0,82 |
| 30 6213 0020 01 | • 0,2 | 0,10 | 1 | * 4 | 0,18 | 1 | 55 | 0,3 | 58,50 | 1,20 | 1,25 | 1,33 | 1,43 |
| 30 6213 0030 01 | • 0,3 | 0,15 | 1 | * 4 | 0,28 | 2 | 55 | 0,4 | 48,50 | 1,29 | 1,37 | 1,49 | 1,61 |
| 30 6213 0030 02 | • 0,3 | 0,15 | 2 | * 4 | 0,28 | 2 | 55 | 0,4 | 48,50 | 2,35 | 2,46 | 2,63 | 2,81 |
| 30 6213 0030 03 | • 0,3 | 0,15 | 3 | * 4 | 0,28 | 2 | 55 | 0,4 | 48,50 | 3,40 | 3,53 | 3,76 | 4,02 |
| 30 6213 0030 05 | • 0,3 | 0,15 | 5 | * 4 | 0,28 | 2 | 55 | 0,5 | 48,50 | 5,48 | 5,65 | 6,02 | 6,43 |
| 30 6213 0040 02 | • 0,4 | 0,20 | 2 | * 4 | 0,38 | 2 | 55 | 0,5 | 48,50 | 2,35 | 2,46 | 2,63 | 2,81 |
| 30 6213 0040 04 | • 0,4 | 0,20 | 4 | * 4 | 0,38 | 2 | 55 | 0,5 | 48,50 | 4,44 | 4,59 | 4,89 | 5,23 |
| 30 6213 0040 06 | • 0,4 | 0,20 | 6 | * 4 | 0,38 | 2 | 55 | 0,5 | 48,50 | 6,51 | 6,71 | 7,15 | 7,64 |
| 30 6213 0050 03 | • 0,5 | 0,25 | 3 | * 4 | 0,48 | 2 | 55 | 0,6 | 40,50 | 3,40 | 3,53 | 3,76 | 4,02 |
| 30 6213 0050 04 | • 0,5 | 0,25 | 4 | * 4 | 0,48 | 2 | 55 | 0,6 | 40,50 | 4,44 | 4,59 | 4,89 | 5,23 |
| 30 6213 0050 05 | • 0,5 | 0,25 | 5 | * 4 | 0,48 | 2 | 55 | 0,6 | 40,50 | 5,48 | 5,65 | 6,02 | 6,43 |
| 30 6213 0060 02 | • 0,6 | 0,30 | 2 | 4 | 0,58 | 4 | 55 | 0,8 | 35,50 | 2,50 | 2,67 | 2,94 | 3,17 |
| 30 6213 0060 04 | • 0,6 | 0,30 | 4 | 4 | 0,58 | 4 | 55 | 0,8 | 35,50 | 4,63 | 4,87 | 5,23 | 5,59 |
| 30 6213 0060 06 | • 0,6 | 0,30 | 6 | 4 | 0,58 | 4 | 55 | 0,8 | 35,50 | 6,74 | 7,02 | 7,49 | 8,00 |
| 30 6213 0060 08 | • 0,6 | 0,30 | 8 | 4 | 0,58 | 4 | 55 | 0,8 | 35,50 | 8,83 | 9,15 | 9,74 | 10,42 |
| 30 6213 0080 04 | • 0,8 | 0,40 | 4 | 4 | 0,77 | 4 | 55 | 1,0 | 35,50 | 4,67 | 4,89 | 5,25 | 5,61 |
| 30 6213 0080 06 | • 0,8 | 0,40 | 6 | 4 | 0,77 | 4 | 55 | 1,0 | 35,50 | 6,77 | 7,05 | 7,50 | 8,02 |
| 30 6213 0080 08 | • 0,8 | 0,40 | 8 | 4 | 0,77 | 4 | 55 | 1,0 | 35,50 | 8,85 | 9,17 | 9,76 | 10,44 |
| 30 6213 0080 10 | • 0,8 | 0,40 | 10 | 4 | 0,77 | 4 | 55 | 1,0 | 35,50 | 10,93 | 11,29 | 12,02 | 12,85 |
| 30 6213 0100 03 | • 1,0 | 0,50 | 3 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 3,67 | 3,85 | 4,15 | 4,44 |
| 30 6213 0100 05 | • 1,0 | 0,50 | 5 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 5,77 | 6,01 | 6,41 | 6,85 |
| 30 6213 0100 07 | • 1,0 | 0,50 | 7 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 7,86 | 8,14 | 8,67 | 9,27 |
| 30 6213 0100 10 | • 1,0 | 0,50 | 10 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 10,98 | 11,33 | 12,06 | 12,89 |
| 30 6213 0100 12 | • 1,0 | 0,50 | 12 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 13,04 | 13,45 | 14,31 | 15,30 |
| 30 6213 0100 15 | • 1,0 | 0,50 | 15 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 16,14 | 16,63 | 17,70 | 18,92 |
| 30 6213 0100 20 | • 1,0 | 0,50 | 20 | 4 | 0,95 | 4 | 55 | 1,2 | 35,50 | 21,29 | 21,93 | 23,35 | 24,96 |
| 30 6213 0100 25 | • 1,0 | 0,50 | 25 | 4 | 0,95 | 4 | 60 | 1,2 | 35,50 | 26,43 | 27,23 | 28,99 | - |
| 30 6213 0120 08 | • 1,2 | 0,60 | 8 | 4 | 1,15 | 4 | 55 | 1,4 | 35,50 | 8,90 | 9,21 | 9,80 | 10,48 |
| 30 6213 0120 10 | • 1,2 | 0,60 | 10 | 4 | 1,15 | 4 | 55 | 1,4 | 35,50 | 10,98 | 11,33 | 12,06 | 12,89 |
| 30 6213 0120 12 | • 1,2 | 0,60 | 12 | 4 | 1,15 | 4 | 55 | 1,4 | 35,50 | 13,04 | 13,45 | 14,31 | 15,30 |
| 30 6213 0150 04 | • 1,5 | 0,75 | 4 | 4 | 1,44 | 4 | 55 | 1,8 | 35,50 | 4,75 | 4,96 | 5,30 | 5,67 |
| 30 6213 0150 06 | • 1,5 | 0,75 | 6 | 4 | 1,44 | 4 | 55 | 1,8 | 35,50 | 6,84 | 7,10 | 7,56 | 8,08 |
| 30 6213 0150 08 | • 1,5 | 0,75 | 8 | 4 | 1,44 | 4 | 55 | 1,8 | 35,50 | 8,92 | 9,22 | 9,82 | 10,49 |

* Ø 0,2 - Ø 0,5 - Laufende Produktion wird geändert von Schaft d2 Ø 3 mm auf Schaft d2 Ø 4 mm
* Ø 0,2 - Ø 0,5 - Running production changed from shank d2 Ø 3 mm to shank d2 Ø 4 mm



PROFESSIONAL



30 6213

| Art. | d1* | r ± 0,002 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|-----------------|-------|-----------|----|-------|------|----|----|-----|-------|-------|-------|-------|-------|
| 30 6213 0150 10 | • 1,5 | 0,75 | 10 | 4 | 1,44 | 4 | 55 | 1,8 | 35,50 | 11,00 | 11,34 | 12,08 | 12,91 |
| 30 6213 0150 12 | • 1,5 | 0,75 | 12 | 4 | 1,44 | 4 | 55 | 1,8 | 35,50 | 13,06 | 13,46 | 14,33 | 15,32 |
| 30 6213 0150 16 | • 1,5 | 0,75 | 16 | 4 | 1,44 | 4 | 55 | 1,8 | 35,50 | 17,19 | 17,71 | 18,85 | 20,15 |
| 30 6213 0150 20 | • 1,5 | 0,75 | 20 | 4 | 1,44 | 4 | 55 | 1,8 | 35,50 | 21,30 | 21,95 | 23,36 | - |
| 30 6213 0150 25 | • 1,5 | 0,75 | 25 | 4 | 1,44 | 4 | 60 | 1,8 | 35,50 | 26,45 | 27,25 | 29,01 | - |
| 30 6213 0160 16 | % 1,6 | 0,80 | 16 | 4 | 1,54 | 10 | 55 | 1,9 | 20,40 | 17,88 | 18,59 | 19,65 | 20,48 |
| 30 6213 0200 05 | • 2,0 | 1,00 | 5 | 4 | 1,92 | 4 | 65 | 2,0 | 35,50 | 5,85 | 6,07 | 6,47 | 6,91 |
| 30 6213 0200 08 | • 2,0 | 1,00 | 8 | 4 | 1,92 | 4 | 65 | 2,0 | 35,50 | 8,97 | 9,26 | 9,85 | 10,53 |
| 30 6213 0200 10 | • 2,0 | 1,00 | 10 | 4 | 1,92 | 4 | 65 | 2,0 | 35,50 | 11,04 | 11,38 | 12,11 | 12,95 |
| 30 6213 0200 12 | • 2,0 | 1,00 | 12 | 4 | 1,92 | 4 | 65 | 2,0 | 35,50 | 13,10 | 13,50 | 14,37 | 15,36 |
| 30 6213 0200 15 | • 2,0 | 1,00 | 15 | 4 | 1,92 | 4 | 65 | 2,0 | 35,50 | 16,19 | 16,68 | 17,76 | 18,98 |
| 30 6213 0200 20 | • 2,0 | 1,00 | 20 | 4 | 1,92 | 4 | 65 | 2,0 | 35,50 | 21,34 | 21,98 | 23,40 | - |
| 30 6213 0200 25 | • 2,0 | 1,00 | 25 | 4 | 1,92 | 4 | 75 | 2,0 | 36,50 | 26,48 | 27,29 | - | - |
| 30 6213 0200 30 | • 2,0 | 1,00 | 30 | 4 | 1,92 | 4 | 75 | 2,0 | 36,50 | 31,63 | 32,59 | - | - |
| 30 6213 0300 05 | • 3,0 | 1,50 | 5 | 4 | 2,90 | 4 | 65 | 3,0 | 36,50 | 5,90 | 6,11 | 6,50 | 6,95 |
| 30 6213 0300 10 | • 3,0 | 1,50 | 10 | 4 | 2,90 | 4 | 65 | 3,0 | 36,50 | 11,07 | 11,41 | 12,15 | - |
| 30 6213 0300 15 | • 3,0 | 1,50 | 15 | 4 | 2,90 | 4 | 65 | 3,0 | 36,50 | 16,22 | 16,72 | - | - |
| 30 6213 0300 20 | • 3,0 | 1,50 | 20 | 4 | 2,90 | 4 | 65 | 3,0 | 36,50 | 21,37 | 22,02 | - | - |
| 30 6213 0300 25 | • 3,0 | 1,50 | 25 | 4 | 2,90 | 4 | 75 | 3,0 | 41,50 | 26,52 | 27,32 | - | - |
| 30 6213 0300 30 | • 3,0 | 1,50 | 30 | 4 | 2,90 | 4 | 75 | 3,0 | 41,50 | 31,67 | - | - | - |
| 30 6213 0400 15 | • 4,0 | 2,00 | 15 | 6 | 3,90 | 4 | 65 | 4,0 | 38,50 | 16,22 | 16,72 | 17,79 | 19,02 |
| 30 6213 0400 20 | • 4,0 | 2,00 | 20 | 6 | 3,90 | 4 | 65 | 4,0 | 38,50 | 21,37 | 22,02 | 23,44 | - |
| 30 6213 0500 10 | % 5,0 | 2,50 | 10 | 6 | 4,90 | 10 | 65 | 5,0 | 22,20 | 11,60 | 12,07 | 12,84 | - |
| 30 6213 0600 20 | • 6,0 | 3,00 | 20 | 6 | 5,90 | 4 | 65 | 6,0 | 38,50 | - | - | - | - |
| 30 6213 0600 30 | • 6,0 | 3,00 | 30 | 6 | 5,90 | 4 | 75 | 6,0 | 39,50 | - | - | - | - |
| 30 6213 0600 40 | • 6,0 | 3,00 | 40 | 6 | 5,90 | 4 | 90 | 6,0 | 42,50 | - | - | - | - |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

1



2



3



4



5



6



7



8



9



Index

Das Karnasch Technologie- und Schulungszentrum.
The Karnasch technology and training facility.

Karnasch®
PROFESSIONAL TOOLS

KOMPETENZ
FÜR EINE FUNDIERTE
KUNDENBETREUUNG

Expertise for dependable customer service

29 1751

Vollhartmetall-Schrupp- und Schlichtfräser, 8 Frässhneiden / gerade Verzahnung
Solid carbide roughing and finishing cutter for CFRP / GFRP, 8 milling blades / straight teeth

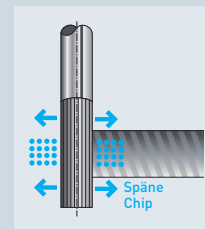


| | |
|--------------------------|-------------------------|
| ALUMINIUM non-ferrous | SAN |
| Kupfer copper | Honey comb |
| COMPO-SITES | PA PE PI |
| PTFE FEP PVDF | |
| PA | |
| PA-66 | |
| PE PP | |
| PMMA GS | |
| PMMA XT | |



| | |
|-----------------------|---------------------|
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| d1* = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,070 |
| d1* = Ø 20,0 | tol -0,000 / -0,084 |

| Art. | d1* | l2 | d2 h6 | l1 | Z | € |
|-----------------|------|----|-------|-----|---|--------|
| 29 1751 0400 16 | • 4 | 16 | 6 | 60 | 8 | 98,00 |
| 29 1751 0500 18 | • 5 | 18 | 6 | 60 | 8 | 102,00 |
| 29 1751 0600 20 | • 6 | 20 | 6 | 60 | 8 | 106,00 |
| 29 1751 0600 25 | • 6 | 25 | 6 | 65 | 8 | 113,00 |
| 29 1751 0600 30 | • 6 | 30 | 6 | 75 | 8 | 118,00 |
| 29 1751 0600 50 | • 6 | 50 | 6 | 100 | 8 | 135,00 |
| 29 1751 0800 22 | • 8 | 22 | 8 | 63 | 8 | 116,00 |
| 29 1751 0800 32 | • 8 | 32 | 8 | 75 | 8 | 135,00 |
| 29 1751 0800 50 | • 8 | 50 | 8 | 100 | 8 | 155,00 |
| 29 1751 1000 32 | • 10 | 32 | 10 | 72 | 8 | 181,00 |
| 29 1751 1000 60 | • 10 | 60 | 10 | 120 | 8 | 210,00 |
| 29 1751 1200 32 | • 12 | 32 | 12 | 82 | 8 | 192,00 |
| 29 1751 1200 70 | • 12 | 70 | 12 | 120 | 8 | 264,00 |
| 29 1751 1600 36 | % 16 | 36 | 16 | 92 | 8 | 127,20 |
| 29 1751 1600 80 | % 16 | 80 | 16 | 150 | 8 | 199,80 |
| 29 1751 2000 45 | % 20 | 45 | 20 | 104 | 8 | 168,60 |
| 29 1751 2000 80 | % 20 | 80 | 20 | 150 | 8 | 262,80 |



| | |
|--------------------|-------------------------|
| MICRO GRAIN | KARNASCH NORM |
| | DIN 6535 Form HA |
| | |
| | HPC |
| | NHC 7000 |
| | |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1269 | DXF/STEP |

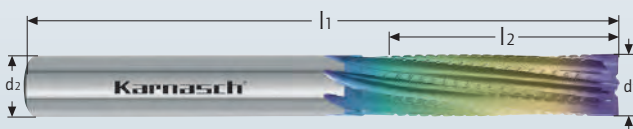
% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

29 1752

Vollhartmetall-Schrupp- und Schlichtfräser, 8 Frässhneiden / ziehender Schnitt
Solid carbide roughing and finishing cutter for CFRP/GFRP, 8 milling blades / drawing cut

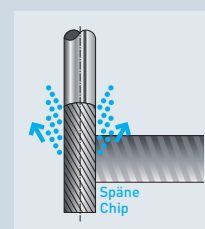


| | |
|--------------------------|-------------------------|
| ALUMINIUM non-ferrous | SAN |
| Kupfer copper | Honey comb |
| COMPO-SITES | PA PE PI |
| PTFE FEP PVDF | |
| PA | |
| PA-66 | |
| PE PP | |
| PMMA GS | |
| PMMA XT | |



| | |
|-----------------------|---------------------|
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| d1* = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,070 |
| d1* = Ø 20,0 | tol -0,000 / -0,084 |

| Art. | d1* | l2 | d2 h6 | l1 | Z | € |
|-----------------|------|----|-------|-----|---|--------|
| 29 1752 0400 16 | • 4 | 16 | 6 | 60 | 8 | 98,00 |
| 29 1752 0500 18 | • 5 | 18 | 6 | 60 | 8 | 102,00 |
| 29 1752 0600 20 | • 6 | 20 | 6 | 60 | 8 | 106,00 |
| 29 1752 0600 25 | • 6 | 25 | 6 | 65 | 8 | 113,00 |
| 29 1752 0600 30 | • 6 | 30 | 6 | 75 | 8 | 118,00 |
| 29 1752 0600 50 | • 6 | 50 | 6 | 100 | 8 | 135,00 |
| 29 1752 0800 22 | • 8 | 22 | 8 | 63 | 8 | 116,00 |
| 29 1752 0800 32 | • 8 | 32 | 8 | 75 | 8 | 135,00 |
| 29 1752 0800 50 | • 8 | 50 | 8 | 100 | 8 | 155,00 |
| 29 1752 1000 32 | • 10 | 32 | 10 | 72 | 8 | 181,00 |
| 29 1752 1000 60 | • 10 | 60 | 10 | 120 | 8 | 210,00 |
| 29 1752 1200 32 | • 12 | 32 | 12 | 82 | 8 | 192,00 |
| 29 1752 1200 70 | • 12 | 70 | 12 | 120 | 8 | 264,00 |
| 29 1752 1600 36 | % 16 | 36 | 16 | 92 | 8 | 127,20 |
| 29 1752 1600 80 | % 16 | 80 | 16 | 150 | 8 | 199,80 |
| 29 1752 2000 45 | % 20 | 45 | 20 | 104 | 8 | 168,60 |
| 29 1752 2000 80 | % 20 | 80 | 20 | 150 | 8 | 262,80 |



| | |
|--------------------|-------------------------|
| MICRO GRAIN | KARNASCH NORM |
| | DIN 6535 Form HA |
| | |
| | HPC |
| | NHC 7000 |
| | |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1269 | DXF/STEP |

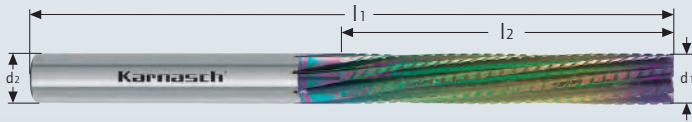
% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Vollhartmetall-Schrupp- und Schlichtfräser, 8 Frässchnitten / **schiebender Schnitt**
 Solid carbide roughing and finishing cutter for CFRP/GFRP, 8 milling blades / **pushing cut**



29 1753

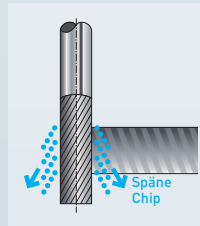
- ALUMINIUM non-ferrous **SAN**
- Kupfer copper **Honey comb**
- COMPO-SITES **PA PE PI**
- PTFE FEP PVDF
- PA
- PA-66
- PE PP
- PMMA GS
- PMMA XT



| | |
|-----------------------|---------------------|
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| d1* = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,070 |
| d1* = Ø 20,0 | tol -0,000 / -0,084 |

| Art. | d1* | l2 | d2 h6 | l1 | Z | € |
|-----------------|------|----|-------|-----|---|--------|
| 29 1753 0400 16 | • 4 | 16 | 6 | 60 | 8 | 98,00 |
| 29 1753 0500 18 | • 5 | 18 | 6 | 60 | 8 | 102,00 |
| 29 1753 0600 20 | • 6 | 20 | 6 | 60 | 8 | 106,00 |
| 29 1753 0600 25 | • 6 | 25 | 6 | 65 | 8 | 113,00 |
| 29 1753 0600 30 | • 6 | 30 | 6 | 75 | 8 | 118,00 |
| 29 1753 0600 50 | • 6 | 50 | 6 | 100 | 8 | 135,00 |
| 29 1753 0800 22 | • 8 | 22 | 8 | 63 | 8 | 116,00 |
| 29 1753 0800 32 | • 8 | 32 | 8 | 75 | 8 | 135,00 |
| 29 1753 0800 50 | • 8 | 50 | 8 | 100 | 8 | 155,00 |
| 29 1753 1000 32 | • 10 | 32 | 10 | 72 | 8 | 181,00 |
| 29 1753 1000 60 | • 10 | 60 | 10 | 120 | 8 | 210,00 |
| 29 1753 1200 32 | • 12 | 32 | 12 | 82 | 8 | 192,00 |
| 29 1753 1200 70 | • 12 | 70 | 12 | 120 | 8 | 264,00 |
| 29 1753 1600 36 | • 16 | 36 | 16 | 92 | 8 | 127,20 |
| 29 1753 2000 45 | • 20 | 45 | 20 | 104 | 8 | 168,60 |
| 29 1753 2000 80 | • 20 | 80 | 20 | 150 | 8 | 262,80 |

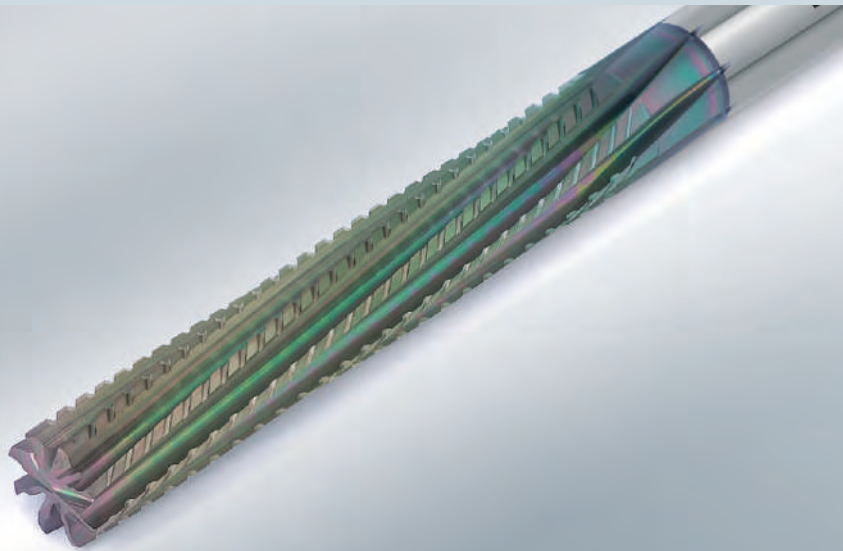
🔴 Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
 Special price / sale article. While stocks last.



| | |
|--------------------|-------------------------|
| MICRO GRAIN | KARNASCH NORM |
| | DIN 6535 Form HA |
| | |
| | HPC |
| | NHC 7000 |
| | Air |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1269 | |

- 1
- 2
- 3
- 4
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- 7
- 8
- 9



29 1751
Gerade genutet
Straight flute



29 1752
Rechtsspirale, rechtsschneidend
Rightspiral, rightcutting



29 1753
Linksspirale, rechtsschneidend
Leftspiral, rightcutting

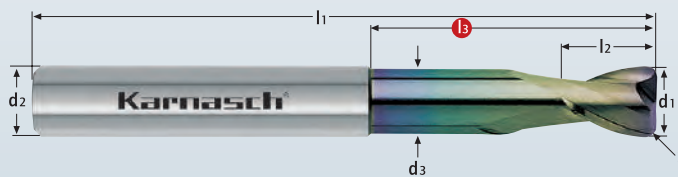
30 6215

VHM-Schaftfräser mit Eckenradius, lang
Solid carbide end mills with corner radius, long



- 1
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- 7
- 8
- 9

| | |
|-----------------------------------|-----------------------|
| Aluminium | GFK-CFK GFRP-CFRP |
| Aluminium < 6% Si | Kunststoff plastic |
| Aluminium < 12% Si | MAKROLON |
| MESSING brass | UHMW PE |
| Kupfer copper | Wachs Wax |
| Ampco | |
| TITAN titanium | |
| NICKEL < 500 N/mm ² | |
| Bronze bronze | |



| | |
|-----------------------|---------------------|
| d1* = Ø ≤ 3,0 | tol -0,014 / -0,028 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,020 / -0,038 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,025 / -0,047 |
| d1* = Ø 12,0 - Ø 16,0 | tol -0,032 / -0,059 |

| Art. | d1* | r ± 0,01 | l3 | d2 h5 | d3 | l1 | l2 | € |
|-----------------|------|----------|----|-------|------|----|----|--------|
| 30 6215 0100 01 | • 1 | 0,1 | 15 | 4 | 0,9 | 60 | 2 | 59,00 |
| 30 6215 0200 02 | • 2 | 0,2 | 20 | 4 | 1,8 | 60 | 3 | 59,00 |
| 30 6215 0300 03 | • 3 | 0,3 | 20 | 4 | 2,7 | 60 | 5 | 54,00 |
| 30 6215 0400 04 | • 4 | 0,4 | 20 | 4 | 3,7 | 60 | 5 | 52,00 |
| 30 6215 0500 05 | • 5 | 0,5 | 20 | 5 | 4,6 | 60 | 6 | 52,00 |
| 30 6215 0600 03 | • 6 | 0,3 | 25 | 6 | 5,5 | 65 | 7 | 54,00 |
| 30 6215 0600 10 | • 6 | 1,0 | 25 | 6 | 5,5 | 65 | 7 | 54,00 |
| 30 6215 0800 03 | • 8 | 0,3 | 30 | 8 | 7,4 | 70 | 9 | 70,00 |
| 30 6215 0800 10 | • 8 | 1,0 | 30 | 8 | 7,4 | 70 | 9 | 70,00 |
| 30 6215 1000 03 | • 10 | 0,3 | 40 | 10 | 9,2 | 85 | 11 | 95,00 |
| 30 6215 1000 15 | • 10 | 1,5 | 40 | 10 | 9,2 | 85 | 11 | 95,00 |
| 30 6215 1200 05 | • 12 | 0,5 | 45 | 12 | 11,0 | 92 | 12 | 121,00 |
| 30 6215 1200 15 | • 12 | 1,5 | 45 | 12 | 11,0 | 92 | 12 | 121,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| | |
|-------------|---------------------|
| MICRO GRAIN | KARNASCH NORM |
| W | DIN 6535 Form HA |
| | |
| | HSC HPC |
| | NHC 7000 |
| | |

Schnittdaten
Cutting data

Zeichnungen
Drawings



1240

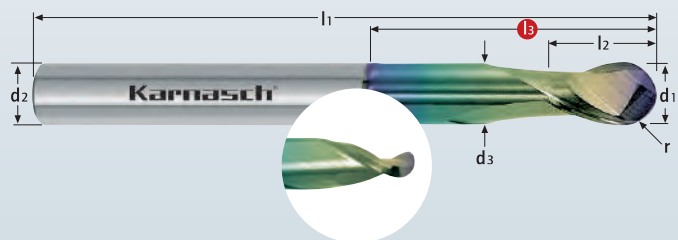
DXF/STEP

30 6217

EXPERT
VHM-3D-Radiusfräser mit Kugelstirn, lang
Solid carbide ball nose end mills, long



| | |
|-----------------------------------|-----------------------|
| Aluminium | GFK-CFK GFRP-CFRP |
| Aluminium < 6% Si | Kunststoff plastic |
| Aluminium < 12% Si | MAKROLON |
| MESSING brass | UHMW PE |
| Kupfer copper | Wachs Wax |
| Ampco | |
| TITAN titanium | |
| NICKEL < 500 N/mm ² | |
| Bronze bronze | |



d1* = Ø 1,0 - Ø 12,0 tol -0,004 / -0,012

| Art. | d1* | r ± 0,004 | l3 | d2 h5 | d3 | l1 | l2 | α | € |
|-----------------|--------|-----------|----|-------|-------|-----|-----|-----|--------|
| 30 6217 0100 05 | % 1,0 | 0,5 | 5 | 6 | 0,95 | 60 | 1 | 12° | 29,40 |
| 30 6217 0100 10 | % 1,0 | 0,5 | 10 | 6 | 0,95 | 60 | 1 | 12° | 29,40 |
| 30 6217 0100 14 | % 1,0 | 0,5 | 14 | 4 | 0,95 | 45 | 0,7 | 12° | 25,80 |
| 30 6217 0100 18 | % 1,0 | 0,5 | 18 | 4 | 0,95 | 45 | 0,7 | 12° | 25,80 |
| 30 6217 0200 05 | % 2,0 | 1,0 | 5 | 6 | 1,95 | 60 | 2 | 12° | 29,40 |
| 30 6217 0200 10 | % 2,0 | 1,0 | 10 | 6 | 1,95 | 60 | 2 | 12° | 29,40 |
| 30 6217 0200 14 | % 2,0 | 1,0 | 14 | 4 | 1,95 | 45 | 1,2 | 12° | 25,80 |
| 30 6217 0200 15 | % 2,0 | 1,0 | 15 | 6 | 1,95 | 60 | 2 | 12° | 29,40 |
| 30 6217 0200 18 | % 2,0 | 1,0 | 18 | 4 | 1,95 | 45 | 1,2 | 12° | 25,80 |
| 30 6217 0300 14 | % 3,0 | 1,5 | 14 | 4 | 2,90 | 45 | 1,7 | 12° | 26,40 |
| 30 6217 0300 18 | % 3,0 | 1,5 | 18 | 4 | 2,90 | 45 | 1,7 | 12° | 26,40 |
| 30 6217 0400 14 | % 4,0 | 2,0 | 14 | 6 | 3,90 | 45 | 2,2 | 12° | 29,40 |
| 30 6217 0400 18 | % 4,0 | 2,0 | 18 | 6 | 3,90 | 45 | 2,2 | 12° | 29,40 |
| 30 6217 0400 25 | • 4,0 | 2,0 | 25 | 6 | 3,90 | 70 | 4 | 12° | 53,00 |
| 30 6217 0600 30 | • 6,0 | 3,0 | 30 | 6 | 5,80 | 80 | 6 | 12° | 57,00 |
| 30 6217 0800 35 | • 8,0 | 4,0 | 35 | 8 | 7,80 | 80 | 8 | 12° | 73,00 |
| 30 6217 1000 40 | • 10,0 | 5,0 | 40 | 10 | 9,70 | 100 | 10 | 12° | 102,00 |
| 30 6217 1200 45 | • 12,0 | 6,0 | 45 | 12 | 11,60 | 100 | 12 | 12° | 118,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Nachfolgewerkzeug <4,0 mm 30 6204 auf Seite 32.
Special price / sale article. While stocks last.
Replacement article <4,0 mm 30 6204 on page 32.

| | |
|-------------|---------------------|
| MICRO GRAIN | KARNASCH NORM |
| W | DIN 6535 Form HA |
| | |
| | HSC HPC |
| | NHC 7000 |
| | |

Schnittdaten
Cutting data

Zeichnungen
Drawings



1236

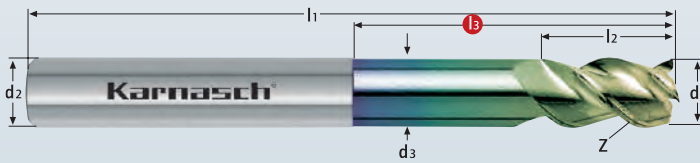
DXF/STEP

VHM-Schaftfräser, lang
Solid carbide end mills, long



30 6228

- Alu-
minium
- Aluminium
< 6% Si
- MESSING
brass
- Kupfer
copper
- Ampco
- Kunststoff
plastic
- MAKROLON
- UHMW
PE
- Wachs
Wax



| | |
|----------------------|---------------------|
| d1* = Ø ≤ 3,0 | tol -0,014 / -0,028 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,020 / -0,038 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,025 / -0,047 |
| d1* = Ø 12,0 | tol -0,032 / -0,059 |

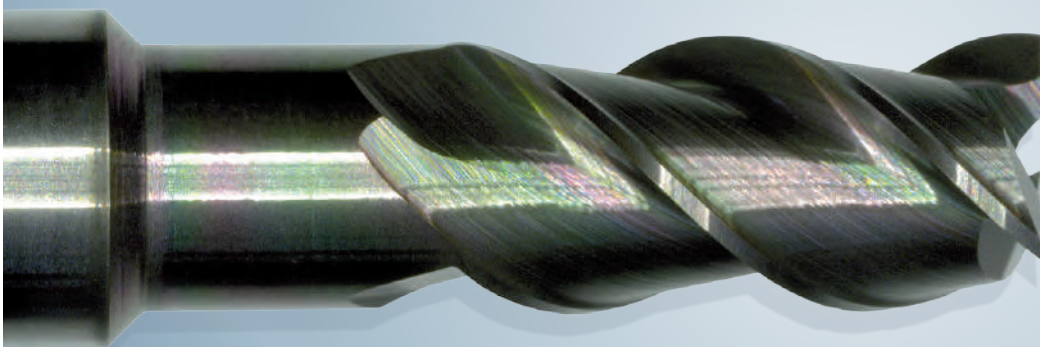
| Art. | d1* | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|-----------------|------|----|-------|------|-----|----|---|--------|
| 30 6228 0200 06 | • 2 | 6 | 6 | 1,8 | 57 | 4 | 3 | 64,00 |
| 30 6228 0300 10 | • 3 | 10 | 6 | 2,7 | 57 | 6 | 3 | 64,00 |
| 30 6228 0400 14 | • 4 | 14 | 6 | 3,7 | 57 | 8 | 3 | 64,00 |
| 30 6228 0500 16 | • 5 | 16 | 6 | 4,7 | 57 | 10 | 3 | 64,00 |
| 30 6228 0600 20 | • 6 | 20 | 6 | 5,7 | 57 | 12 | 3 | 64,00 |
| 30 6228 0600 30 | • 6 | 30 | 6 | 5,7 | 70 | 12 | 3 | 66,00 |
| 30 6228 0600 40 | • 6 | 40 | 6 | 5,7 | 80 | 12 | 3 | 71,00 |
| 30 6228 0800 35 | • 8 | 35 | 8 | 7,7 | 80 | 16 | 3 | 98,00 |
| 30 6228 0800 45 | • 8 | 45 | 8 | 7,7 | 90 | 16 | 3 | 98,00 |
| 30 6228 0800 55 | • 8 | 55 | 8 | 7,7 | 100 | 16 | 3 | 98,00 |
| 30 6228 1000 35 | • 10 | 35 | 10 | 9,7 | 80 | 20 | 3 | 127,00 |
| 30 6228 1000 45 | • 10 | 45 | 10 | 9,7 | 90 | 20 | 3 | 127,00 |
| 30 6228 1000 55 | • 10 | 55 | 10 | 9,7 | 100 | 20 | 3 | 129,00 |
| 30 6228 1200 35 | • 12 | 35 | 12 | 11,5 | 80 | 24 | 4 | 154,00 |
| 30 6228 1200 55 | • 12 | 55 | 12 | 11,5 | 100 | 24 | 4 | 157,00 |
| 30 6228 1200 70 | • 12 | 70 | 12 | 11,5 | 120 | 24 | 4 | 169,00 |

| | |
|----------------|---------------------|
| MICRO GRAIN | KARNASCH NORM |
| W | DIN 6535 Form HA |
| | |
| | HSC HPC |
| | NHC 7000 |
| | |

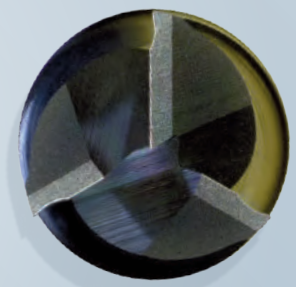
| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1229 | DXF/STEP |

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- 2
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30 6228 0500 16



Stirnseitig
Front side



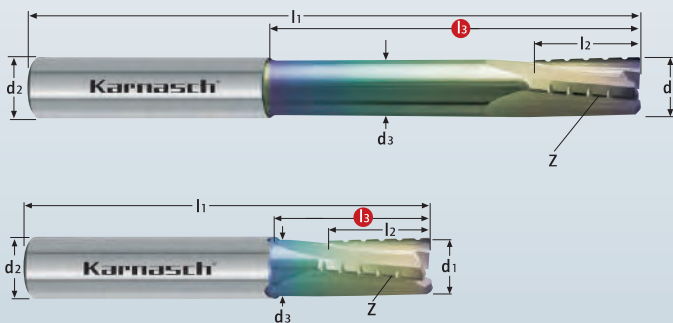
Z 20 x 30
Vergrößerung
Magnification

30 6222

VHM-Schrupfräser, lang
Solid carbide roughing end mills, long



- Aluminium** GFK-CFK
GFRP-CFRP
- Aluminium < 6% Si Kunststoff
plastic
- Aluminium < 12% Si MAKROLON
- MESSING** UHMW
brass PE
- Kupfer copper
- Ampco**
- TITAN titanium
- NICKEL < 500 N/mm²
- Bronze bronze



| | |
|----------------------|---------------------|
| d1* = Ø 5,0 - Ø 6,0 | tol -0,020 / -0,038 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,025 / -0,047 |
| d1* = Ø 12,0 | tol -0,032 / -0,059 |

| Art. | d1* | r ±0,02 | l3 | d2 h5 | d3 | l1 | l2 | Z | € |
|------------------|------|---------|----|-------|------|-----|----|---|--------|
| 30 6222 0500 018 | • 5 | 0,15 | 18 | 6 | 4,7 | 57 | 13 | 3 | 69,00 |
| 30 6222 0500 030 | • 5 | 0,15 | 30 | 6 | 4,7 | 80 | 8 | 3 | 80,00 |
| 30 6222 0600 018 | • 6 | 0,20 | 18 | 6 | 5,7 | 57 | 13 | 3 | 79,00 |
| 30 6222 0600 042 | • 6 | 0,20 | 42 | 6 | 5,7 | 80 | 10 | 3 | 88,00 |
| 30 6222 0800 025 | • 8 | 0,25 | 25 | 8 | 7,4 | 63 | 21 | 3 | 92,00 |
| 30 6222 0800 062 | • 8 | 0,25 | 62 | 8 | 7,4 | 100 | 13 | 3 | 106,00 |
| 30 6222 1000 030 | • 10 | 0,30 | 30 | 10 | 9,2 | 72 | 22 | 3 | 112,00 |
| 30 6222 1000 058 | • 10 | 0,30 | 58 | 10 | 9,2 | 100 | 16 | 3 | 137,00 |
| 30 6222 1200 036 | • 12 | 0,35 | 36 | 12 | 11,0 | 83 | 26 | 3 | 154,00 |

Schnittdaten Cutting data 1160

Film Movie

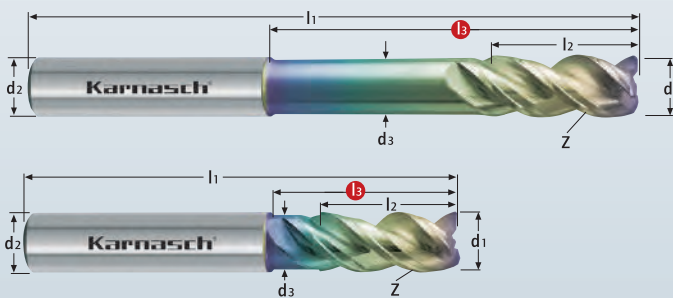
Zeichnungen Drawings DXF/STEP

30 6223

VHM-HPC-Schaftfräser, lang
Solid carbide HPC end mills, long



- Aluminium** GFK-CFK
GFRP-CFRP
- Aluminium < 6% Si Kunststoff
plastic
- Aluminium < 12% Si MAKROLON
- MESSING** UHMW
brass PE
- Kupfer copper
- Ampco**
- TITAN titanium
- NICKEL < 500 N/mm²
- Bronze bronze



≤ 5 0,1 f 45°

≥ 6 0,2 f 45°

≤ 5 0,1 f 45°

≥ 6 0,2 f 45°

Werkzeug ist gewuchtet! / Tool is balanced!
Wuchtgüte G 2,5 / Balancing quality G 2,5

| Ød1 | Drehzahl n max. |
|-----|-----------------|
| 3-5 | 45.000 |
| 6-8 | 35.000 |
| 10 | 25.000 |
| 12 | 16.000 |

| | | | |
|---------------------|---------------------|----------------------|---------------------|
| d1* = Ø 3,0 | tol -0,006 / -0,020 | d1* = Ø 8,0 - Ø 10,0 | tol -0,013 / -0,035 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,010 / -0,028 | d1* = Ø 12,0 | tol -0,016 / -0,043 |

Hinweis: Voraussetzung für das Erreichen einer Gesamtwuchtgüte von ≤ G 2,5 ist eine gewuchtete Werkzeugaufnahme mit Wuchtgüte G 2,5.

Please note: Requirement to achieve a balancing quality of ≤ G 2,5 is a balanced tool holder with a balancing quality of G 2,5.

| Art. | d1* | f | l3 | d2 h5 | d3 | l1 | l2 | Z | € |
|------------------|------|-----|----|-------|------|-----|----|---|--------|
| 30 6223 0300 012 | • 3 | 0,1 | 12 | 6 | 2,7 | 57 | 8 | 3 | 53,00 |
| 30 6223 0300 018 | • 3 | 0,1 | 18 | 6 | 2,7 | 80 | 5 | 3 | 66,00 |
| 30 6223 0400 018 | • 4 | 0,1 | 18 | 6 | 3,7 | 57 | 11 | 3 | 53,00 |
| 30 6223 0400 024 | • 4 | 0,1 | 24 | 6 | 3,7 | 80 | 6 | 3 | 66,00 |
| 30 6223 0500 018 | • 5 | 0,1 | 18 | 6 | 4,7 | 57 | 13 | 3 | 53,00 |
| 30 6223 0500 030 | • 5 | 0,1 | 30 | 6 | 4,7 | 80 | 8 | 3 | 66,00 |
| 30 6223 0600 018 | • 6 | 0,2 | 18 | 6 | 5,7 | 57 | 13 | 3 | 54,00 |
| 30 6223 0600 042 | • 6 | 0,2 | 42 | 6 | 5,7 | 80 | 13 | 3 | 69,00 |
| 30 6223 0800 025 | • 8 | 0,2 | 25 | 8 | 7,4 | 63 | 21 | 3 | 63,00 |
| 30 6223 0800 062 | • 8 | 0,2 | 62 | 8 | 7,4 | 100 | 21 | 3 | 88,00 |
| 30 6223 1000 030 | • 10 | 0,2 | 30 | 10 | 9,2 | 72 | 22 | 3 | 101,00 |
| 30 6223 1000 058 | • 10 | 0,2 | 58 | 10 | 9,2 | 100 | 22 | 3 | 128,00 |
| 30 6223 1200 036 | • 12 | 0,2 | 36 | 12 | 11,0 | 83 | 26 | 3 | 134,00 |
| 30 6223 1200 073 | • 12 | 0,2 | 73 | 12 | 11,0 | 120 | 26 | 3 | 183,00 |

Schnittdaten Cutting data 1160

Film Movie

Zeichnungen Drawings DXF/STEP

MICRO GRAIN KARNASCH NORM

W DIN 6535 Form HA

DIFF. f 45°

HSC HPC

NHC 7000

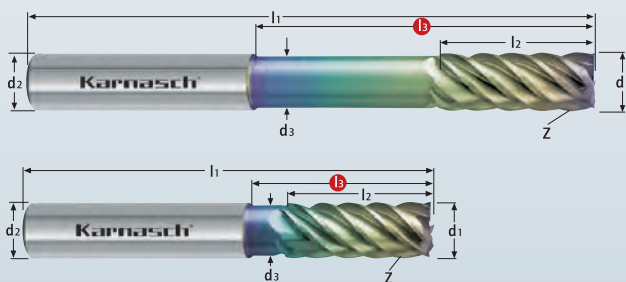
UGT G 2,5

VHM-Schaftfräser, lang, Superfinish
Solid carbide end mills, long, superfinish



30 6224

- Alu-minium** GFK-CFK
GFRP-CFRP
- Aluminium < 6% Si Kunststoff
plastic
- Aluminium < 12% Si MAKROLON
- MESSING brass UHMW
PE
- Kupfer copper
- Ampco
- TITAN titanium
- NICKEL < 500 N/mm²
- Bronze bronze



| | |
|----------------------|---------------------|
| d1* = Ø 6,0 | tol -0,010 / -0,028 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,013 / -0,035 |
| d1* = Ø 12,0 | tol -0,016 / -0,043 |

Werkzeug ist gewuchtet! / Tool is balanced!
Wuchtgüte G 2,5 / Balancing quality G 2,5

| Ø d1 | Drehzahl n max. |
|------|-----------------|
| 6-8 | 35.000 |
| 10 | 25.000 |
| 12 | 16.000 |

Hinweis: Voraussetzung für das Erreichen einer Gesamtwuchtgüte von ≤ G 2,5 ist eine gewuchtete Werkzeugaufnahme mit Wuchtgüte G 2,5.

Please note: Requirement to achieve a balancing quality of ≤ G 2,5 is a balanced tool holder with a balancing quality of G 2,5.

| Art. | d1* | l3 | d2 h5 | d3 | l1 | l2 | Z | € |
|------------------|------|----|-------|------|-----|----|---|--------|
| 30 6224 0600 020 | • 6 | 20 | 6 | 5,7 | 58 | 16 | 6 | 52,00 |
| 30 6224 0600 042 | • 6 | 42 | 6 | 5,7 | 80 | 16 | 6 | 69,00 |
| 30 6224 0800 026 | • 8 | 26 | 8 | 7,4 | 64 | 19 | 6 | 60,00 |
| 30 6224 0800 062 | • 8 | 62 | 8 | 7,4 | 100 | 19 | 6 | 84,00 |
| 30 6224 1000 032 | • 10 | 32 | 10 | 9,2 | 74 | 25 | 6 | 99,00 |
| 30 6224 1000 058 | • 10 | 58 | 10 | 9,2 | 100 | 25 | 6 | 123,00 |
| 30 6224 1200 037 | • 12 | 37 | 12 | 11,0 | 84 | 30 | 6 | 132,00 |
| 30 6224 1200 073 | • 12 | 73 | 12 | 11,0 | 120 | 30 | 6 | 187,00 |

Schnittdaten
Cutting data

1160

Film
Movie

Zeichnungen
Drawings

DXF/STEP

MICRO GRAIN KARNASCH NORM

W DIN 6535 Form HA

43°/45°

HSC HPC

NHC 7000

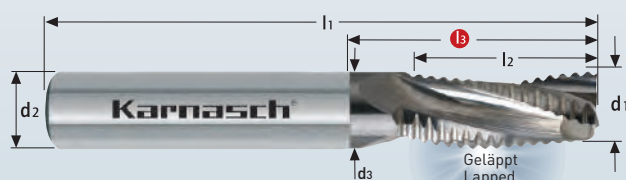
UGT G 2,5

VHM-Schrupfräser, lang
Solid carbide roughing end mills, long



30 6232

- Alu-minium
- Kunststoff plastic
- HOLZ wood
- KUPFER weich COPPER soft



| | |
|-----------------------|---------------------|
| d1* = Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| d1* = Ø 12,0 - Ø 18,0 | tol -0,000 / -0,070 |
| d1* = Ø 20,0 | tol -0,000 / -0,084 |

| Art. | d1* | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|--------------|------|----|-------|------|-----|----|---|--------|
| 30 6232 0600 | • 6 | 21 | 6 | 5,8 | 65 | 16 | 2 | 67,00 |
| 30 6232 0800 | • 8 | 27 | 8 | 7,8 | 70 | 22 | 2 | 78,00 |
| 30 6232 1000 | • 10 | 32 | 10 | 9,8 | 72 | 25 | 2 | 102,00 |
| 30 6232 1200 | • 12 | 38 | 12 | 11,8 | 83 | 28 | 3 | 136,00 |
| 30 6232 1800 | • 18 | 50 | 18 | 17,8 | 92 | 36 | 3 | 144,00 |
| 30 6232 2000 | • 20 | 54 | 20 | 19,8 | 104 | 41 | 3 | 216,60 |

Ⓜ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Schnittdaten
Cutting data

1156

Zeichnungen
Drawings

DXF/STEP

MICRO GRAIN KARNASCH NORM

W/MR DIN 6535 Form HA

20° f 45°

HSC HPC

GELÄPFT LAPPED

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

Qualitätsprodukte für die Spiegelglanzbearbeitung.
Quality products for mirror finish.

SPIEGEL- BEARBEITUNG

Mirror finish tools



→ ND – MCD Tools

SIEHE SEITE 211-218
SEE PAGE 211-218



1



2



3



4



5



6



7



8



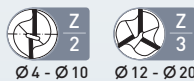
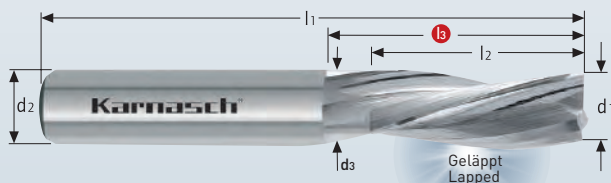
9

VHM-Schlichtfräser, linksspirale – rechtsschneidend, lang
Solid carbide end mills, left spiral – right hand cutting, long



30 6233

- Alu-
minium
- Kunststoff
plastic
- HOLZ
wood
- KUPFER
weich
COPPER
soft



| | |
|-----------------------|---------------------|
| d1* = Ø 4,0 - Ø 6,0 | tol -0,020 / -0,038 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,025 / -0,047 |
| d1* = Ø 12,0 - Ø 16,0 | tol -0,032 / -0,059 |
| d1* = Ø 20,0 | tol -0,040 / -0,073 |

| | |
|-------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| W/M | DIN 6535 Form HA |
| 20° | |
| | HSC HPC |
| | GELÄPPT LAPPED |
| | |

| Art. | d1* | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|--------------|------|----|-------|------|-----|----|---|--------|
| 30 6233 0400 | • 4 | 20 | 6 | 3,8 | 65 | 11 | 2 | 54,00 |
| 30 6233 0500 | • 5 | 20 | 6 | 4,8 | 65 | 13 | 2 | 54,00 |
| 30 6233 0600 | • 6 | 21 | 6 | 5,8 | 65 | 16 | 2 | 54,00 |
| 30 6233 0800 | • 8 | 27 | 8 | 7,8 | 70 | 22 | 2 | 61,00 |
| 30 6233 1000 | • 10 | 32 | 10 | 9,8 | 72 | 25 | 2 | 85,00 |
| 30 6233 1200 | • 12 | 38 | 12 | 11,8 | 83 | 28 | 3 | 106,00 |
| 30 6233 2000 | % 20 | 54 | 20 | 19,8 | 104 | 41 | 3 | 183,60 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

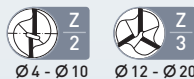
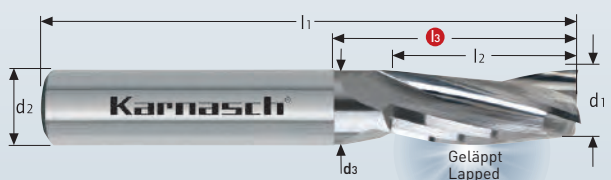
| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1157-1159 | DXF/STEP |

VHM-Schlichtfräser, lang, rechtsspirale – rechtsschneidend
Solid carbide end mills, long, right spiral – right hand cutting



30 6234

- Alu-
minium
- Kunststoff
plastic
- HOLZ
wood
- KUPFER
weich
COPPER
soft



| | |
|-----------------------|---------------------|
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| d1* = Ø 12,0 - Ø 18,0 | tol -0,000 / -0,070 |
| d1* = Ø 20,0 | tol -0,000 / -0,084 |

| | |
|-------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| W/M | DIN 6535 Form HA |
| 20° | |
| | HSC HPC |
| | GELÄPPT LAPPED |
| | |

| Art. | d1* | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|--------------|------|----|-------|------|----|----|---|--------|
| 30 6234 0400 | • 4 | 20 | 6 | 3,8 | 65 | 11 | 2 | 51,00 |
| 30 6234 0500 | • 5 | 20 | 6 | 4,8 | 65 | 13 | 2 | 51,00 |
| 30 6234 0600 | • 6 | 21 | 6 | 5,8 | 65 | 16 | 2 | 51,00 |
| 30 6234 0800 | • 8 | 27 | 8 | 7,8 | 70 | 22 | 2 | 58,00 |
| 30 6234 1000 | • 10 | 32 | 10 | 9,8 | 72 | 25 | 2 | 81,00 |
| 30 6234 1200 | • 12 | 38 | 12 | 11,8 | 83 | 28 | 3 | 103,00 |
| 30 6234 1800 | % 18 | 50 | 18 | 17,8 | 92 | 36 | 3 | 117,60 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1157-1159 | DXF/STEP |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

30 8011

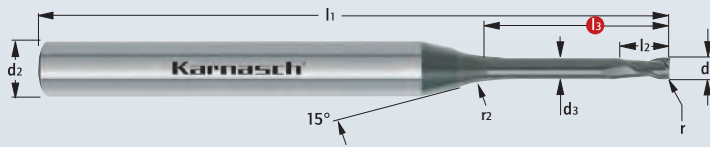
VALUETOOL

EXPERT
★ ★ ★

VHM-Micro Schaftfräser mit Eckenradius, < 20×D Schnitttiefe, < 55 HRC
Solid carbide miniature end mills with corner radius, < 20×D cutting depth, < 55 HRC



HRC < 55

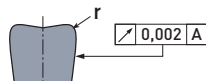


| | |
|-------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| N/M | DIN 6535 Form HA |
| | |
| | HSC HPC |
| | WRC ² |
| | |



TOLERANZ / TOLERANCE

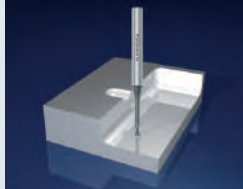
tol. r = -0,005



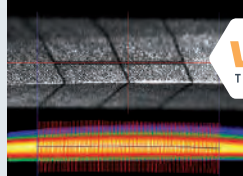
Karnasch Micro Norm.
Standard in der Serie.
Karnasch Micro Norm.
Standard in serial production.

d1* = Ø 0,2 - Ø 6,0 tol 0,000 / -0,012

PROFESSIONAL FINISH



Mit definierter Kantenverrundung
With a defined edge preparation



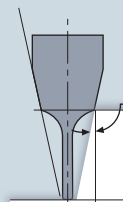
Schnittdaten
Cutting data



Zeichnungen
Drawings



Formschräge / Incline angle



Effektive Nutzlänge bei Formschräge
Effective under-neck length



| Art. | d1* | r - 0,005 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|----------------------|-------|-----------|-----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 8011 0020 005 005 | • 0,2 | 0,05 | 0,5 | 4 | 0,18 | 1 | 45 | 0,30 | 21,00 | 0,68 | 0,71 | 0,77 | 0,83 |
| 30 8011 0020 005 01 | • 0,2 | 0,05 | 1 | 4 | 0,18 | 1 | 45 | 0,30 | 21,00 | 1,20 | 1,25 | 1,34 | 1,45 |
| 30 8011 0030 005 01 | • 0,3 | 0,05 | 1 | 4 | 0,28 | 2 | 45 | 0,45 | 21,00 | 1,29 | 1,37 | 1,49 | 1,62 |
| 30 8011 0030 005 02 | • 0,3 | 0,05 | 2 | 4 | 0,28 | 2 | 45 | 0,45 | 21,00 | 2,35 | 2,46 | 2,65 | 2,86 |
| 30 8011 0030 005 03 | • 0,3 | 0,05 | 3 | 4 | 0,28 | 2 | 45 | 0,45 | 21,00 | 3,40 | 3,53 | 3,80 | 4,10 |
| 30 8011 0040 005 02 | • 0,4 | 0,05 | 2 | 4 | 0,38 | 2 | 45 | 0,60 | 19,00 | 2,35 | 2,46 | 2,65 | 2,86 |
| 30 8011 0040 005 03 | • 0,4 | 0,05 | 3 | 4 | 0,38 | 2 | 45 | 0,60 | 19,00 | 3,40 | 3,53 | 3,80 | 4,10 |
| 30 8011 0040 005 04 | • 0,4 | 0,05 | 4 | 4 | 0,38 | 2 | 45 | 0,60 | 19,00 | 4,44 | 4,60 | 4,95 | 5,35 |
| 30 8011 0050 005 02 | • 0,5 | 0,05 | 2 | 4 | 0,48 | 2 | 45 | 0,70 | 19,00 | 2,35 | 2,46 | 2,65 | 2,86 |
| 30 8011 0050 005 03 | • 0,5 | 0,05 | 3 | 4 | 0,48 | 2 | 45 | 0,70 | 19,00 | 3,40 | 3,53 | 3,80 | 4,10 |
| 30 8011 0050 005 04 | • 0,5 | 0,05 | 4 | 4 | 0,48 | 2 | 45 | 0,70 | 19,00 | 4,44 | 4,60 | 4,95 | 5,35 |
| 30 8011 0060 006 02 | • 0,6 | 0,06 | 2 | 4 | 0,58 | 4 | 45 | 0,90 | 19,00 | 2,50 | 2,67 | 2,94 | 3,19 |
| 30 8011 0060 006 03 | • 0,6 | 0,06 | 3 | 4 | 0,58 | 4 | 45 | 0,90 | 19,00 | 3,57 | 3,78 | 4,10 | 4,43 |
| 30 8011 0060 006 04 | • 0,6 | 0,06 | 4 | 4 | 0,58 | 4 | 45 | 0,90 | 19,00 | 4,63 | 4,87 | 5,25 | 5,67 |
| 30 8011 0060 006 06 | • 0,6 | 0,06 | 6 | 4 | 0,58 | 4 | 45 | 0,90 | 19,00 | 6,74 | 7,02 | 7,55 | 8,16 |
| 30 8011 0080 008 02 | • 0,8 | 0,08 | 2 | 4 | 0,77 | 4 | 45 | 1,20 | 19,00 | 2,54 | 2,70 | 2,97 | 3,21 |
| 30 8011 0080 008 04 | • 0,8 | 0,08 | 4 | 4 | 0,77 | 4 | 45 | 1,20 | 19,00 | 4,67 | 4,89 | 5,27 | 5,70 |
| 30 8011 0080 008 05 | • 0,8 | 0,08 | 5 | 4 | 0,77 | 4 | 45 | 1,20 | 19,00 | 5,72 | 5,97 | 6,42 | 6,94 |
| 30 8011 0080 008 06 | • 0,8 | 0,08 | 6 | 4 | 0,77 | 4 | 45 | 1,20 | 19,00 | 6,77 | 7,04 | 7,57 | 8,18 |
| 30 8011 0080 008 08 | • 0,8 | 0,08 | 8 | 4 | 0,77 | 4 | 50 | 1,20 | 19,00 | 8,85 | 9,18 | 9,87 | 10,67 |
| 30 8011 0080 008 10 | • 0,8 | 0,08 | 10 | 4 | 0,77 | 4 | 50 | 1,20 | 19,00 | 10,93 | 11,32 | 12,17 | 13,16 |
| 30 8011 0100 010 03 | • 1,0 | 0,10 | 3 | 4 | 0,95 | 4 | 50 | 1,60 | 19,00 | 3,67 | 3,85 | 4,16 | 4,50 |
| 30 8011 0100 010 04 | • 1,0 | 0,10 | 4 | 4 | 0,95 | 4 | 50 | 1,60 | 19,00 | 4,72 | 4,94 | 5,31 | 5,74 |
| 30 8011 0100 010 05 | • 1,0 | 0,10 | 5 | 4 | 0,95 | 4 | 50 | 1,60 | 19,00 | 5,77 | 6,01 | 6,46 | 6,99 |
| 30 8011 0100 010 06 | • 1,0 | 0,10 | 6 | 4 | 0,95 | 4 | 50 | 1,60 | 19,00 | 6,82 | 7,08 | 7,61 | 8,23 |
| 30 8011 0100 010 07 | • 1,0 | 0,10 | 7 | 4 | 0,95 | 4 | 50 | 1,60 | 19,00 | 7,86 | 8,15 | 8,76 | 9,47 |
| 30 8011 0100 010 08 | • 1,0 | 0,10 | 8 | 4 | 0,95 | 4 | 50 | 1,60 | 19,00 | 8,90 | 9,22 | 9,91 | 10,72 |
| 30 8011 0100 010 10 | • 1,0 | 0,10 | 10 | 4 | 0,95 | 4 | 50 | 1,60 | 19,00 | 10,98 | 11,36 | 12,21 | 13,20 |
| 30 8011 0100 010 12 | • 1,0 | 0,10 | 12 | 4 | 0,95 | 4 | 50 | 1,60 | 19,00 | 13,04 | 13,50 | 14,51 | 15,69 |
| 30 8011 0100 010 15 | • 1,0 | 0,10 | 15 | 4 | 0,95 | 4 | 60 | 1,60 | 20,00 | 16,15 | 16,71 | 17,96 | 19,42 |
| 30 8011 0100 010 20 | • 1,0 | 0,10 | 20 | 4 | 0,95 | 4 | 60 | 1,60 | 20,00 | 21,31 | 22,06 | 23,71 | 25,63 |



EXPERT



VALUETOOL

30 8011

| Art. | d1* | r - 0,005 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|---------------------|-------|-----------|----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 8011 0100 030 04 | • 1,0 | 0,30 | 4 | 4 | 0,95 | 4 | 50 | 1,60 | 19,00 | 4,72 | 4,94 | 5,31 | 5,74 |
| 30 8011 0100 030 08 | • 1,0 | 0,30 | 8 | 4 | 0,95 | 4 | 50 | 1,60 | 19,00 | 8,90 | 9,22 | 9,91 | 10,72 |
| 30 8011 0100 030 12 | • 1,0 | 0,30 | 12 | 4 | 0,95 | 4 | 50 | 1,60 | 19,00 | 13,04 | 13,50 | 14,51 | 15,69 |
| 30 8011 0120 012 06 | • 1,2 | 0,12 | 6 | 4 | 1,15 | 4 | 50 | 1,90 | 19,00 | 6,82 | 7,08 | 7,61 | 8,23 |
| 30 8011 0120 012 08 | • 1,2 | 0,12 | 8 | 4 | 1,15 | 4 | 50 | 1,90 | 19,00 | 8,90 | 9,22 | 9,91 | 10,72 |
| 30 8011 0120 012 10 | • 1,2 | 0,12 | 10 | 4 | 1,15 | 4 | 50 | 1,90 | 19,00 | 10,98 | 11,36 | 12,21 | 13,20 |
| 30 8011 0120 012 12 | • 1,2 | 0,12 | 12 | 4 | 1,15 | 4 | 50 | 1,90 | 19,00 | 13,04 | 13,50 | 14,51 | 15,69 |
| 30 8011 0140 014 08 | • 1,4 | 0,14 | 8 | 4 | 1,35 | 4 | 50 | 2,20 | 19,00 | 8,90 | 9,22 | 9,91 | 10,72 |
| 30 8011 0150 015 06 | • 1,5 | 0,15 | 6 | 4 | 1,44 | 4 | 50 | 2,40 | 19,00 | 6,84 | 7,10 | 7,63 | 8,25 |
| 30 8011 0150 015 08 | • 1,5 | 0,15 | 8 | 4 | 1,44 | 4 | 50 | 2,40 | 19,00 | 8,92 | 9,24 | 9,93 | 10,74 |
| 30 8011 0150 015 10 | • 1,5 | 0,15 | 10 | 4 | 1,44 | 4 | 50 | 2,40 | 19,00 | 11,00 | 11,38 | 12,23 | 13,23 |
| 30 8011 0150 015 12 | • 1,5 | 0,15 | 12 | 4 | 1,44 | 4 | 50 | 2,40 | 19,00 | 13,06 | 13,52 | 14,53 | 15,71 |
| 30 8011 0150 015 15 | • 1,5 | 0,15 | 15 | 4 | 1,44 | 4 | 60 | 2,40 | 20,00 | 16,17 | 16,73 | 17,98 | 19,44 |
| 30 8011 0150 015 20 | • 1,5 | 0,15 | 20 | 4 | 1,44 | 4 | 60 | 2,40 | 20,00 | 21,33 | 22,08 | 23,73 | - |
| 30 8011 0150 030 06 | • 1,5 | 0,30 | 6 | 4 | 1,44 | 4 | 50 | 2,40 | 19,00 | 6,84 | 7,10 | 7,63 | 8,25 |
| 30 8011 0150 030 12 | • 1,5 | 0,30 | 12 | 4 | 1,44 | 4 | 50 | 2,40 | 19,00 | 13,06 | 13,52 | 14,53 | 15,71 |
| 30 8011 0180 018 10 | • 1,8 | 0,18 | 10 | 4 | 1,74 | 4 | 50 | 2,60 | 19,00 | 11,00 | 11,38 | 12,23 | 13,23 |
| 30 8011 0180 018 20 | • 1,8 | 0,18 | 20 | 4 | 1,74 | 4 | 60 | 2,60 | 20,00 | 21,33 | 22,08 | 23,73 | - |
| 30 8011 0200 020 06 | • 2,0 | 0,20 | 6 | 4 | 1,92 | 4 | 50 | 2,80 | 19,00 | 6,89 | 7,14 | 7,68 | 8,30 |
| 30 8011 0200 020 08 | • 2,0 | 0,20 | 8 | 4 | 1,92 | 4 | 50 | 2,80 | 19,00 | 8,97 | 9,28 | 9,98 | 10,79 |
| 30 8011 0200 020 10 | • 2,0 | 0,20 | 10 | 4 | 1,92 | 4 | 50 | 2,80 | 19,00 | 11,04 | 11,42 | 12,28 | 13,27 |
| 30 8011 0200 020 12 | • 2,0 | 0,20 | 12 | 4 | 1,92 | 4 | 50 | 2,80 | 19,00 | 13,10 | 13,56 | 14,58 | 15,76 |
| 30 8011 0200 020 15 | • 2,0 | 0,20 | 15 | 4 | 1,92 | 4 | 60 | 2,80 | 20,00 | 16,20 | 16,77 | 18,03 | - |
| 30 8011 0200 020 20 | • 2,0 | 0,20 | 20 | 4 | 1,92 | 4 | 60 | 2,80 | 20,00 | 21,37 | 22,12 | 23,77 | - |
| 30 8011 0200 020 25 | • 2,0 | 0,20 | 25 | 4 | 1,92 | 4 | 70 | 2,80 | 20,00 | 26,54 | 27,47 | - | - |
| 30 8011 0200 020 30 | • 2,0 | 0,20 | 30 | 4 | 1,92 | 4 | 70 | 2,80 | 20,00 | 31,71 | 32,81 | - | - |
| 30 8011 0200 050 08 | • 2,0 | 0,50 | 8 | 4 | 1,92 | 4 | 50 | 2,80 | 19,00 | 8,97 | 9,28 | 9,98 | 10,79 |
| 30 8011 0200 050 15 | • 2,0 | 0,50 | 15 | 4 | 1,92 | 4 | 60 | 2,80 | 20,00 | 16,20 | 16,77 | 18,03 | - |
| 30 8011 0200 050 25 | • 2,0 | 0,50 | 25 | 4 | 1,92 | 4 | 70 | 2,80 | 20,00 | 26,54 | 27,47 | - | - |
| 30 8011 0250 025 10 | • 2,5 | 0,25 | 10 | 4 | 2,40 | 4 | 50 | 2,50 | 19,00 | 11,07 | 11,46 | 12,32 | 13,32 |
| 30 8011 0250 025 15 | • 2,5 | 0,25 | 15 | 4 | 2,40 | 4 | 60 | 2,50 | 20,00 | 16,24 | 16,81 | 18,07 | - |
| 30 8011 0250 025 20 | • 2,5 | 0,25 | 20 | 4 | 2,40 | 4 | 60 | 2,50 | 20,00 | 21,41 | 22,16 | - | - |
| 30 8011 0250 025 25 | • 2,5 | 0,25 | 25 | 4 | 2,40 | 4 | 70 | 2,50 | 20,00 | 26,58 | 27,50 | - | - |
| 30 8011 0300 030 10 | • 3,0 | 0,30 | 10 | 6 | 2,90 | 4 | 50 | 3,00 | 22,00 | 11,27 | 11,66 | 12,53 | 13,55 |
| 30 8011 0300 030 20 | • 3,0 | 0,30 | 20 | 6 | 2,90 | 4 | 60 | 3,00 | 24,00 | 21,60 | 22,36 | 24,03 | 25,98 |
| 30 8011 0300 030 30 | • 3,0 | 0,30 | 30 | 6 | 2,90 | 4 | 70 | 3,00 | 25,00 | 31,94 | 33,05 | 35,53 | - |
| 30 8011 0300 050 10 | • 3,0 | 0,50 | 10 | 6 | 2,90 | 4 | 50 | 3,00 | 22,00 | 11,27 | 11,66 | 12,53 | 13,55 |
| 30 8011 0300 050 15 | • 3,0 | 0,50 | 15 | 6 | 2,90 | 4 | 60 | 3,00 | 24,00 | 16,44 | 17,01 | 18,28 | 19,77 |
| 30 8011 0300 050 20 | • 3,0 | 0,50 | 20 | 6 | 2,90 | 4 | 60 | 3,00 | 24,00 | 21,60 | 22,36 | 24,03 | 25,98 |
| 30 8011 0300 050 25 | • 3,0 | 0,50 | 25 | 6 | 2,90 | 4 | 70 | 3,00 | 25,00 | 26,77 | 27,70 | 29,78 | - |
| 30 8011 0300 050 30 | • 3,0 | 0,50 | 30 | 6 | 2,90 | 4 | 70 | 3,00 | 25,00 | 31,94 | 33,05 | 35,53 | - |
| 30 8011 0400 050 10 | • 4,0 | 0,50 | 10 | 6 | 3,90 | 4 | 50 | 4,00 | 23,00 | 11,07 | 11,46 | 12,32 | 13,32 |
| 30 8011 0400 050 15 | • 4,0 | 0,50 | 15 | 6 | 3,90 | 4 | 60 | 4,00 | 24,00 | 16,24 | 16,81 | 18,07 | - |
| 30 8011 0400 050 20 | • 4,0 | 0,50 | 20 | 6 | 3,90 | 4 | 60 | 4,00 | 24,00 | 21,41 | 22,16 | 23,82 | - |
| 30 8011 0400 050 25 | • 4,0 | 0,50 | 25 | 6 | 3,90 | 4 | 70 | 4,00 | 26,00 | 26,58 | 27,50 | - | - |
| 30 8011 0400 050 30 | • 4,0 | 0,50 | 30 | 6 | 3,90 | 4 | 70 | 4,00 | 26,00 | 31,75 | 32,85 | - | - |
| 30 8011 0500 050 15 | • 5,0 | 0,50 | 15 | 6 | 4,90 | 4 | 60 | 5,00 | 24,00 | 16,44 | 17,01 | - | - |
| 30 8011 0500 050 20 | • 5,0 | 0,50 | 20 | 6 | 4,90 | 4 | 60 | 5,00 | 24,00 | 21,60 | 22,36 | - | - |
| 30 8011 0500 050 30 | • 5,0 | 0,50 | 30 | 6 | 4,90 | 4 | 70 | 5,00 | 26,00 | 31,94 | - | - | - |
| 30 8011 0500 050 40 | • 5,0 | 0,50 | 40 | 6 | 4,90 | 4 | 80 | 5,00 | 27,00 | 42,28 | - | - | - |
| 30 8011 0600 050 10 | • 6,0 | 0,50 | 10 | 6 | 5,90 | 4 | 50 | 6,00 | 23,00 | - | - | - | - |
| 30 8011 0600 050 15 | • 6,0 | 0,50 | 15 | 6 | 5,90 | 4 | 60 | 6,00 | 24,00 | - | - | - | - |
| 30 8011 0600 050 20 | • 6,0 | 0,50 | 20 | 6 | 5,90 | 4 | 60 | 6,00 | 24,00 | - | - | - | - |
| 30 8011 0600 050 30 | • 6,0 | 0,50 | 30 | 6 | 5,90 | 4 | 70 | 6,00 | 26,00 | - | - | - | - |
| 30 8011 0600 050 40 | • 6,0 | 0,50 | 40 | 6 | 5,90 | 4 | 80 | 6,00 | 27,00 | - | - | - | - |

1



2



3



4



5



6



7



8



9



Index

30 8012

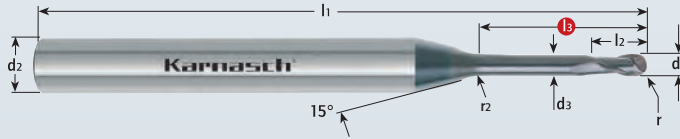
VALUETOOL

EXPERT
★ ★ ★

VHM-Micro-3D Mini-Radiusfräser, < 20xD Schnitttiefe, < 55 HRC
Solid carbide miniature ball nose mill, < 20xD cutting depth, < 55 HRC



HRC < 55

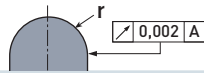


| | |
|------------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| N/M | DIN 6535 Form HA |
| 30° | |
| HSC HPC | |
| WRC ² | |



TOLERANZ / TOLERANCE

tol. r max = ± 0,004



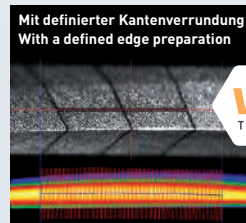
d1* = Ø 0,2 - Ø 6,0 tol 0,000 / -0,012

Karnasch Micro Norm.
Standard in der Serie.

Karnasch Micro Norm.
Standard in serial production.



PROFESSIONAL FINISH



Mit definierter Kantenverrundung
With a defined edge preparation



Schnittdaten
Cutting data

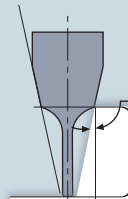


Zeichnungen
Drawings



Formschräge / Incline angle

Effektive Nutzlänge bei Formschräge
Effective under-neck length



| Art. | d1* | r ± 0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|-------|-----------|-----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 8012 0020 005 | • 0,2 | 0,10 | 0,5 | 4 | 0,18 | 1 | 45 | 0,20 | 21,00 | 0,68 | 0,71 | 0,77 | 0,83 |
| 30 8012 0020 01 | • 0,2 | 0,10 | 1 | 4 | 0,18 | 1 | 45 | 0,20 | 21,00 | 1,20 | 1,25 | 1,34 | 1,45 |
| 30 8012 0030 01 | • 0,3 | 0,15 | 1 | 4 | 0,28 | 2 | 45 | 0,25 | 21,00 | 1,29 | 1,37 | 1,49 | 1,62 |
| 30 8012 0030 02 | • 0,3 | 0,15 | 2 | 4 | 0,28 | 2 | 45 | 0,25 | 21,00 | 2,35 | 2,46 | 2,65 | 2,86 |
| 30 8012 0030 03 | • 0,3 | 0,15 | 3 | 4 | 0,28 | 2 | 45 | 0,25 | 21,00 | 3,40 | 3,53 | 3,80 | 4,10 |
| 30 8012 0040 02 | • 0,4 | 0,20 | 2 | 4 | 0,38 | 2 | 45 | 0,30 | 19,00 | 2,35 | 2,46 | 2,65 | 2,86 |
| 30 8012 0040 03 | • 0,4 | 0,20 | 3 | 4 | 0,38 | 2 | 45 | 0,30 | 19,00 | 3,40 | 3,53 | 3,80 | 4,10 |
| 30 8012 0040 04 | • 0,4 | 0,20 | 4 | 4 | 0,38 | 2 | 45 | 0,30 | 19,00 | 4,44 | 4,60 | 4,95 | 5,35 |
| 30 8012 0050 02 | • 0,5 | 0,25 | 2 | 4 | 0,48 | 2 | 45 | 0,40 | 19,00 | 2,35 | 2,46 | 2,65 | 2,86 |
| 30 8012 0050 03 | • 0,5 | 0,25 | 3 | 4 | 0,48 | 2 | 45 | 0,40 | 19,00 | 3,40 | 3,53 | 3,80 | 4,10 |
| 30 8012 0050 04 | • 0,5 | 0,25 | 4 | 4 | 0,48 | 2 | 45 | 0,40 | 19,00 | 4,44 | 4,60 | 4,95 | 5,35 |
| 30 8012 0060 02 | • 0,6 | 0,30 | 2 | 4 | 0,58 | 4 | 45 | 0,50 | 19,00 | 2,50 | 2,67 | 2,94 | 3,19 |
| 30 8012 0060 03 | • 0,6 | 0,30 | 3 | 4 | 0,58 | 4 | 45 | 0,50 | 19,00 | 3,57 | 3,78 | 4,10 | 4,43 |
| 30 8012 0060 04 | • 0,6 | 0,30 | 4 | 4 | 0,58 | 4 | 45 | 0,50 | 19,00 | 4,63 | 4,87 | 5,25 | 5,67 |
| 30 8012 0060 06 | • 0,6 | 0,30 | 6 | 4 | 0,58 | 4 | 45 | 0,50 | 19,00 | 6,74 | 7,02 | 7,55 | 8,16 |
| 30 8012 0060 08 | • 0,6 | 0,30 | 8 | 4 | 0,58 | 4 | 50 | 0,50 | 19,00 | 8,83 | 9,16 | 9,85 | 10,65 |
| 30 8012 0080 02 | • 0,8 | 0,40 | 2 | 4 | 0,77 | 4 | 45 | 0,60 | 19,00 | 2,54 | 2,70 | 2,97 | 3,21 |
| 30 8012 0080 04 | • 0,8 | 0,40 | 4 | 4 | 0,77 | 4 | 45 | 0,60 | 19,00 | 4,67 | 4,89 | 5,27 | 5,70 |
| 30 8012 0080 05 | • 0,8 | 0,40 | 5 | 4 | 0,77 | 4 | 45 | 0,60 | 19,00 | 5,72 | 5,97 | 6,42 | 6,94 |
| 30 8012 0080 06 | • 0,8 | 0,40 | 6 | 4 | 0,77 | 4 | 45 | 0,60 | 19,00 | 6,77 | 7,04 | 7,57 | 8,18 |
| 30 8012 0080 08 | • 0,8 | 0,40 | 8 | 4 | 0,77 | 4 | 50 | 0,60 | 19,00 | 8,85 | 9,18 | 9,87 | 10,67 |
| 30 8012 0080 10 | • 0,8 | 0,40 | 10 | 4 | 0,77 | 4 | 50 | 0,60 | 19,00 | 10,93 | 11,32 | 12,17 | 13,16 |
| 30 8012 0100 03 | • 1,0 | 0,50 | 3 | 4 | 0,95 | 4 | 50 | 0,80 | 19,00 | 3,67 | 3,85 | 4,16 | 4,50 |
| 30 8012 0100 04 | • 1,0 | 0,50 | 4 | 4 | 0,95 | 4 | 50 | 0,80 | 19,00 | 4,72 | 4,94 | 5,31 | 5,74 |
| 30 8012 0100 05 | • 1,0 | 0,50 | 5 | 4 | 0,95 | 4 | 50 | 0,80 | 19,00 | 5,77 | 6,01 | 6,46 | 6,99 |
| 30 8012 0100 06 | • 1,0 | 0,50 | 6 | 4 | 0,95 | 4 | 50 | 0,80 | 19,00 | 6,82 | 7,08 | 7,61 | 8,23 |
| 30 8012 0100 07 | • 1,0 | 0,50 | 7 | 4 | 0,95 | 4 | 50 | 0,80 | 19,00 | 7,86 | 8,15 | 8,76 | 9,47 |
| 30 8012 0100 08 | • 1,0 | 0,50 | 8 | 4 | 0,95 | 4 | 50 | 0,80 | 19,00 | 8,90 | 9,22 | 9,91 | 10,72 |
| 30 8012 0100 10 | • 1,0 | 0,50 | 10 | 4 | 0,95 | 4 | 50 | 0,80 | 19,00 | 10,98 | 11,36 | 12,21 | 13,20 |
| 30 8012 0100 12 | • 1,0 | 0,50 | 12 | 4 | 0,95 | 4 | 50 | 0,80 | 19,00 | 13,04 | 13,50 | 14,51 | 15,69 |
| 30 8012 0100 15 | • 1,0 | 0,50 | 15 | 4 | 0,95 | 4 | 60 | 0,80 | 20,00 | 16,15 | 16,71 | 17,96 | 19,42 |
| 30 8012 0100 20 | • 1,0 | 0,50 | 20 | 4 | 0,95 | 4 | 60 | 0,80 | 20,00 | 21,31 | 22,06 | 23,71 | 25,63 |



EXPERT



VALUETOOL

30 8012

| Art. | d1* | r ± 0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|-----------------|-------|-----------|----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 8012 0120 05 | • 1,2 | 0,60 | 5 | 4 | 1,15 | 4 | 50 | 1,00 | 19,00 | 5,77 | 6,01 | 6,46 | 6,99 |
| 30 8012 0120 06 | • 1,2 | 0,60 | 6 | 4 | 1,15 | 4 | 50 | 1,00 | 19,00 | 6,82 | 7,08 | 7,61 | 8,23 |
| 30 8012 0120 08 | • 1,2 | 0,60 | 8 | 4 | 1,15 | 4 | 50 | 1,00 | 19,00 | 8,90 | 9,22 | 9,91 | 10,72 |
| 30 8012 0120 10 | • 1,2 | 0,60 | 10 | 4 | 1,15 | 4 | 50 | 1,00 | 19,00 | 10,98 | 11,36 | 12,21 | 13,20 |
| 30 8012 0120 12 | • 1,2 | 0,60 | 12 | 4 | 1,15 | 4 | 50 | 1,00 | 19,00 | 13,04 | 13,50 | 14,51 | 15,69 |
| 30 8012 0150 06 | • 1,5 | 0,75 | 6 | 4 | 1,44 | 4 | 50 | 1,20 | 19,00 | 6,84 | 7,10 | 7,63 | 8,25 |
| 30 8012 0150 08 | • 1,5 | 0,75 | 8 | 4 | 1,44 | 4 | 50 | 1,20 | 19,00 | 8,92 | 9,24 | 9,93 | 10,74 |
| 30 8012 0150 10 | • 1,5 | 0,75 | 10 | 4 | 1,44 | 4 | 50 | 1,20 | 19,00 | 11,00 | 11,38 | 12,23 | 13,23 |
| 30 8012 0150 12 | • 1,5 | 0,75 | 12 | 4 | 1,44 | 4 | 50 | 1,20 | 19,00 | 13,06 | 13,52 | 14,53 | 15,71 |
| 30 8012 0150 15 | • 1,5 | 0,75 | 15 | 4 | 1,44 | 4 | 60 | 1,20 | 20,00 | 16,17 | 16,73 | 17,98 | 19,44 |
| 30 8012 0150 20 | • 1,5 | 0,75 | 20 | 4 | 1,44 | 4 | 60 | 1,20 | 20,00 | 21,33 | 22,08 | 23,73 | - |
| 30 8012 0200 06 | • 2,0 | 1,00 | 6 | 4 | 1,92 | 4 | 50 | 1,50 | 19,00 | 6,89 | 7,14 | 7,68 | 8,30 |
| 30 8012 0200 08 | • 2,0 | 1,00 | 8 | 4 | 1,92 | 4 | 50 | 1,50 | 19,00 | 8,97 | 9,28 | 9,98 | 10,79 |
| 30 8012 0200 10 | • 2,0 | 1,00 | 10 | 4 | 1,92 | 4 | 50 | 1,50 | 19,00 | 11,04 | 11,42 | 12,28 | 13,27 |
| 30 8012 0200 12 | • 2,0 | 1,00 | 12 | 4 | 1,92 | 4 | 50 | 1,50 | 19,00 | 13,10 | 13,56 | 14,58 | 15,76 |
| 30 8012 0200 15 | • 2,0 | 1,00 | 15 | 4 | 1,92 | 4 | 60 | 1,50 | 20,00 | 16,20 | 16,77 | 18,03 | - |
| 30 8012 0200 20 | • 2,0 | 1,00 | 20 | 4 | 1,92 | 4 | 60 | 1,50 | 20,00 | 21,37 | 22,12 | 23,77 | - |
| 30 8012 0200 25 | • 2,0 | 1,00 | 25 | 4 | 1,92 | 4 | 70 | 1,50 | 20,00 | 26,54 | 27,47 | - | - |
| 30 8012 0200 30 | • 2,0 | 1,00 | 30 | 4 | 1,92 | 4 | 70 | 1,50 | 20,00 | 31,71 | 32,81 | - | - |
| 30 8012 0250 10 | • 2,5 | 1,25 | 10 | 4 | 2,40 | 4 | 50 | 2,50 | 19,00 | 11,07 | 11,46 | 12,32 | 13,32 |
| 30 8012 0250 15 | • 2,5 | 1,25 | 15 | 4 | 2,40 | 4 | 60 | 2,50 | 20,00 | 16,24 | 16,81 | 18,07 | - |
| 30 8012 0300 05 | • 3,0 | 1,50 | 5 | 6 | 2,90 | 4 | 50 | 2,50 | 22,00 | 6,10 | 6,31 | 6,78 | 7,33 |
| 30 8012 0300 10 | • 3,0 | 1,50 | 10 | 6 | 2,90 | 4 | 50 | 2,50 | 22,00 | 11,27 | 11,66 | 12,53 | 13,55 |
| 30 8012 0300 15 | • 3,0 | 1,50 | 15 | 6 | 2,90 | 4 | 60 | 2,50 | 24,00 | 16,44 | 17,01 | 18,28 | 19,77 |
| 30 8012 0300 20 | • 3,0 | 1,50 | 20 | 6 | 2,90 | 4 | 60 | 2,50 | 24,00 | 21,60 | 22,36 | 24,03 | 25,98 |
| 30 8012 0300 25 | • 3,0 | 1,50 | 25 | 6 | 2,90 | 4 | 70 | 2,50 | 25,00 | 26,77 | 27,70 | 29,78 | - |
| 30 8012 0300 30 | • 3,0 | 1,50 | 30 | 6 | 2,90 | 4 | 70 | 2,50 | 25,00 | 31,94 | 33,05 | 35,53 | - |
| 30 8012 0400 10 | • 4,0 | 2,00 | 10 | 6 | 3,90 | 4 | 50 | 3,20 | 23,00 | 11,07 | 11,46 | 12,32 | 13,32 |
| 30 8012 0400 15 | • 4,0 | 2,00 | 15 | 6 | 3,90 | 4 | 60 | 3,20 | 24,00 | 16,24 | 16,81 | 18,07 | - |
| 30 8012 0400 20 | • 4,0 | 2,00 | 20 | 6 | 3,90 | 4 | 60 | 3,20 | 24,00 | 21,41 | 22,16 | 23,82 | - |
| 30 8012 0400 25 | • 4,0 | 2,00 | 25 | 6 | 3,90 | 4 | 70 | 3,20 | 26,00 | 26,58 | 27,50 | - | - |
| 30 8012 0400 30 | • 4,0 | 2,00 | 30 | 6 | 3,90 | 4 | 70 | 3,20 | 26,00 | 31,75 | 32,85 | - | - |
| 30 8012 0500 10 | • 5,0 | 2,50 | 10 | 6 | 4,90 | 4 | 50 | 4,00 | 23,00 | 11,27 | 11,66 | 12,53 | - |
| 30 8012 0500 15 | • 5,0 | 2,50 | 15 | 6 | 4,90 | 4 | 60 | 4,00 | 24,00 | 16,44 | 17,01 | - | - |
| 30 8012 0500 20 | • 5,0 | 2,50 | 20 | 6 | 4,90 | 4 | 60 | 4,00 | 24,00 | 21,60 | 22,36 | - | - |
| 30 8012 0500 25 | • 5,0 | 2,50 | 25 | 6 | 4,90 | 4 | 70 | 4,00 | 26,00 | 26,77 | 27,70 | - | - |
| 30 8012 0500 30 | • 5,0 | 2,50 | 30 | 6 | 4,90 | 4 | 70 | 4,00 | 26,00 | 31,94 | - | - | - |
| 30 8012 0500 40 | • 5,0 | 2,50 | 40 | 6 | 4,90 | 4 | 80 | 4,00 | 27,00 | 42,28 | - | - | - |
| 30 8012 0600 10 | • 6,0 | 3,00 | 10 | 6 | 5,90 | 4 | 50 | 5,00 | 23,00 | - | - | - | - |
| 30 8012 0600 15 | • 6,0 | 3,00 | 15 | 6 | 5,90 | 4 | 60 | 5,00 | 24,00 | - | - | - | - |
| 30 8012 0600 20 | • 6,0 | 3,00 | 20 | 6 | 5,90 | 4 | 60 | 5,00 | 24,00 | - | - | - | - |
| 30 8012 0600 25 | • 6,0 | 3,00 | 25 | 6 | 5,90 | 4 | 70 | 5,00 | 26,00 | - | - | - | - |
| 30 8012 0600 30 | • 6,0 | 3,00 | 30 | 6 | 5,90 | 4 | 70 | 5,00 | 26,00 | - | - | - | - |
| 30 8012 0600 40 | • 6,0 | 3,00 | 40 | 6 | 5,90 | 4 | 80 | 5,00 | 27,00 | - | - | - | - |



30 6255

PROFESSIONAL

VHM-Micro Schaftfräser, < 15xD Schnitttiefe, Schaft 4 mm

Solid carbide miniature end mills, < 15xD diameter cutting depth, shank 4 mm



HRC < 70

STAHL
steel
< 1400 N/mm²

INOX
stainless steel
< 900 N/mm²
ferritic

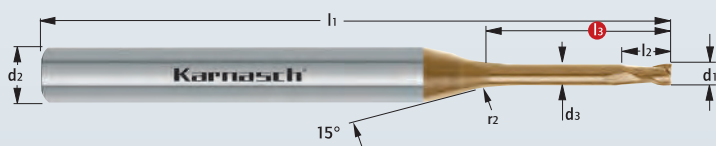
INOX
stainless steel
> 900 N/mm²
martensitic

INOX
stainless steel
< 900 N/mm²
austenitic

NI-ALLOYS
< 900 N/mm²

GG/G
cast iron

TITAN
titanium



MICRO GRAIN

KARNASCH NORM

N/M

DIN 6535 Form HA



HHC HSC HPC

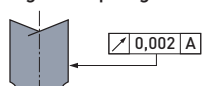


HXC-NANO³



TOLERANZ / TOLERANCE

scharfkantig / sharp edge

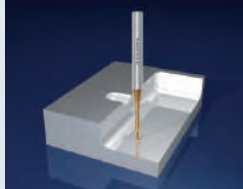


Karnasch Micro Norm. Standard in der Serie.

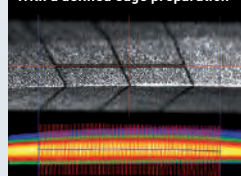
Karnasch Micro Norm. Standard in serial production.

d1* = Ø 0,1 - Ø 2,0 tol 0,000 / -0,008

PROFESSIONAL FINISH



Mit definierter Kantenverrundung
With a defined edge preparation



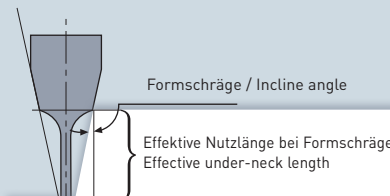
Schnittdaten
Cutting data

Zeichnungen
Drawings



1170-1173

DXF/STEP



| Art. | d1* | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|----------------------|-------|-----|-------|------|----|----|------|-------|------|------|------|-------|
| 30 6255 0010 002 | • 0,1 | 0,2 | 4 | 0,08 | 1 | 45 | 0,15 | 60,00 | 0,36 | 0,38 | 0,42 | 0,46 |
| 30 6255 0010 003 | • 0,1 | 0,3 | 4 | 0,08 | 1 | 45 | 0,15 | 60,00 | 0,47 | 0,49 | 0,54 | 0,58 |
| 30 6255 0010 004 | • 0,1 | 0,4 | 4 | 0,08 | 1 | 45 | 0,15 | 60,00 | 0,57 | 0,60 | 0,65 | 0,70 |
| 30 6255 0010 005 | • 0,1 | 0,5 | 4 | 0,08 | 1 | 45 | 0,15 | 60,00 | 0,68 | 0,71 | 0,77 | 0,82 |
| 30 6255 0020 005 | • 0,2 | 0,5 | 4 | 0,17 | 1 | 50 | 0,30 | 51,00 | 0,70 | 0,73 | 0,79 | 0,84 |
| 30 6255 0020 010 | • 0,2 | 1 | 4 | 0,17 | 1 | 50 | 0,30 | 51,00 | 1,23 | 1,27 | 1,35 | 1,45 |
| 30 6255 0020 015 | • 0,2 | 1,5 | 4 | 0,17 | 1 | 50 | 0,30 | 51,00 | 1,74 | 1,80 | 1,92 | 2,05 |
| 30 6255 0020 020 | • 0,2 | 2 | 4 | 0,17 | 1 | 50 | 0,30 | 51,00 | 2,26 | 2,33 | 2,48 | 2,65 |
| 30 6255 0030 010 | • 0,3 | 1 | 4 | 0,27 | 2 | 50 | 0,45 | 47,00 | 1,33 | 1,40 | 1,52 | 1,63 |
| 30 6255 0030 015 | • 0,3 | 1,5 | 4 | 0,27 | 2 | 50 | 0,45 | 47,00 | 1,85 | 1,94 | 2,09 | 2,23 |
| 30 6255 0030 020 | • 0,3 | 2 | 4 | 0,27 | 2 | 50 | 0,45 | 47,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6255 0030 025 | • 0,3 | 2,5 | 4 | 0,27 | 2 | 50 | 0,45 | 47,00 | 2,90 | 3,02 | 3,22 | 3,44 |
| 30 6255 0030 030 | • 0,3 | 3 | 4 | 0,27 | 2 | 50 | 0,45 | 47,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6255 0040 010 | • 0,4 | 1 | 4 | 0,37 | 2 | 50 | 0,60 | 42,00 | 1,33 | 1,40 | 1,52 | 1,63 |
| 30 6255 0040 015 | • 0,4 | 1,5 | 4 | 0,37 | 2 | 50 | 0,60 | 42,00 | 1,85 | 1,94 | 2,09 | 2,23 |
| 30 6255 0040 020 | • 0,4 | 2 | 4 | 0,37 | 2 | 50 | 0,60 | 42,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6255 0040 030 | • 0,4 | 3 | 4 | 0,37 | 2 | 50 | 0,60 | 42,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6255 0040 040 | • 0,4 | 4 | 4 | 0,37 | 2 | 50 | 0,60 | 42,00 | 4,46 | 4,61 | 4,91 | 5,25 |
| 30 6255 0050 010 | • 0,5 | 1 | 4 | 0,47 | 2 | 50 | 0,75 | 42,00 | 1,33 | 1,40 | 1,52 | 1,63 |
| 30 6255 0050 020 | • 0,5 | 2 | 4 | 0,47 | 2 | 50 | 0,75 | 42,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6255 0050 030 | • 0,5 | 3 | 4 | 0,47 | 2 | 50 | 0,75 | 42,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6255 0050 040 | • 0,5 | 4 | 4 | 0,47 | 2 | 50 | 0,75 | 42,00 | 4,46 | 4,61 | 4,91 | 5,25 |
| 30 6255 0050 050 | • 0,5 | 5 | 4 | 0,47 | 2 | 50 | 0,75 | 42,00 | 5,50 | 5,67 | 6,04 | 6,45 |
| 30 6255 0050 060 | • 0,5 | 6 | 4 | 0,47 | 2 | 50 | 0,75 | 42,00 | 6,53 | 6,73 | 7,17 | 7,66 |
| 30 6255 0060 020 | • 0,6 | 2 | 4 | 0,57 | 4 | 50 | 0,90 | 41,00 | 2,54 | 2,70 | 2,97 | 3,19 |
| 30 6255 0060 030 | • 0,6 | 3 | 4 | 0,57 | 4 | 50 | 0,90 | 41,00 | 3,61 | 3,80 | 4,12 | 4,40 |
| 30 6255 0060 040 | • 0,6 | 4 | 4 | 0,57 | 4 | 50 | 0,90 | 41,00 | 4,67 | 4,89 | 5,25 | 5,61 |
| 30 6255 0060 050 | • 0,6 | 5 | 4 | 0,57 | 4 | 50 | 0,90 | 41,00 | 5,72 | 5,97 | 6,38 | 6,82 |
| 30 6255 0060 060 | • 0,6 | 6 | 4 | 0,57 | 4 | 50 | 0,90 | 41,00 | 6,77 | 7,04 | 7,50 | 8,02 |
| 30 6255 0060 080 | • 0,6 | 8 | 4 | 0,57 | 4 | 50 | 0,90 | 41,00 | 8,85 | 9,17 | 9,76 | 10,44 |
| NEW 30 6255 0080 020 | • 0,8 | 2 | 4 | 0,77 | 4 | 50 | 1,20 | 41,00 | 2,54 | 2,70 | 2,97 | 3,19 |
| 30 6255 0080 040 | • 0,8 | 4 | 4 | 0,77 | 4 | 50 | 1,20 | 41,00 | 4,67 | 4,89 | 5,25 | 5,61 |
| 30 6255 0080 060 | • 0,8 | 6 | 4 | 0,77 | 4 | 50 | 1,20 | 41,00 | 6,77 | 7,04 | 7,50 | 8,02 |
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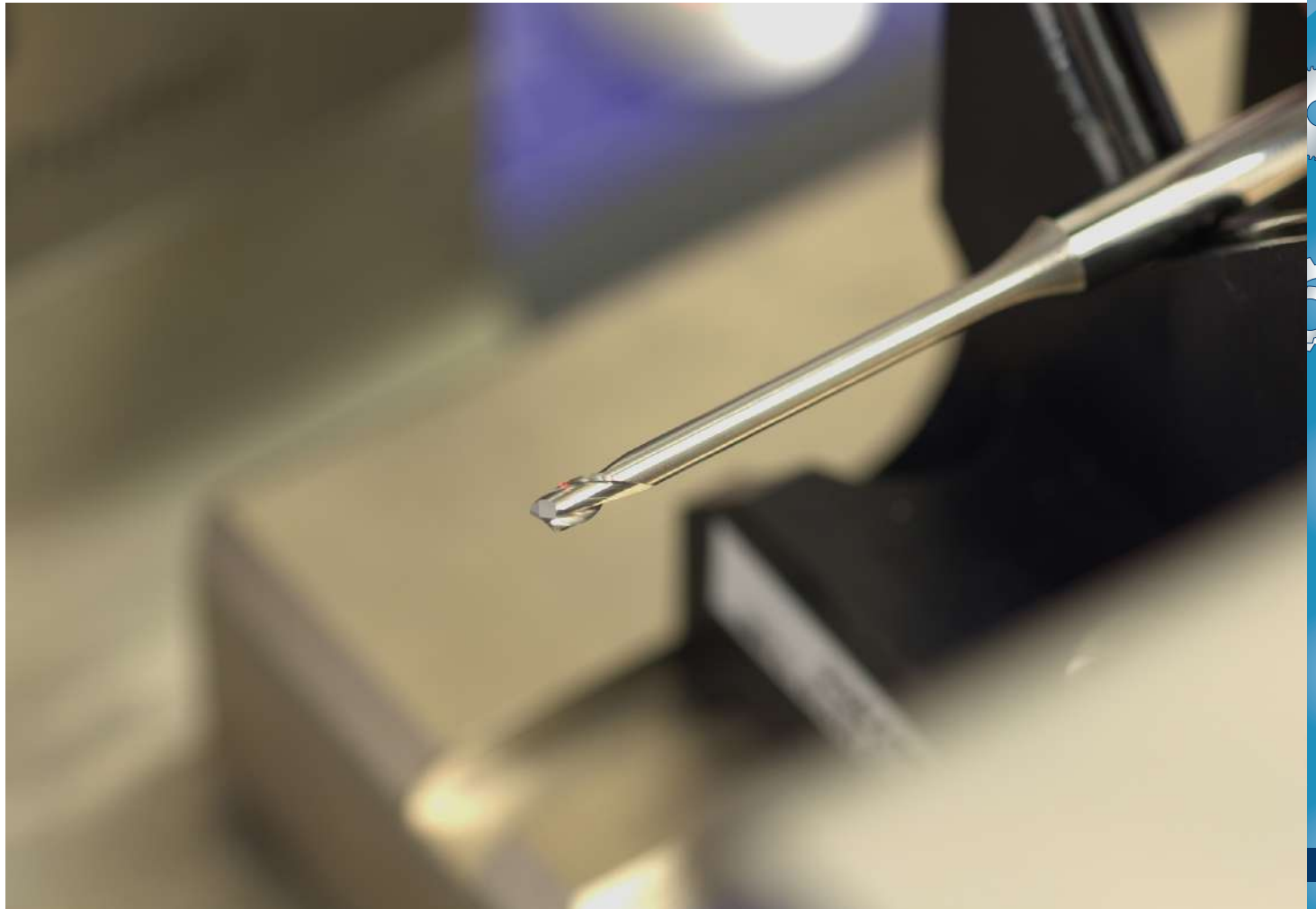
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30 6255

| Art. | d1* | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|-------|----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6255 0100 020 | • 1,0 | 2 | 4 | 0,96 | 4 | 50 | 1,50 | 41,00 | 2,58 | 2,73 | 2,99 | 3,21 |
| 30 6255 0100 030 | • 1,0 | 3 | 4 | 0,96 | 4 | 50 | 1,50 | 41,00 | 3,64 | 3,83 | 4,14 | 4,42 |
| 30 6255 0100 040 | • 1,0 | 4 | 4 | 0,96 | 4 | 50 | 1,50 | 41,00 | 4,70 | 4,91 | 5,27 | 5,63 |
| 30 6255 0100 050 | • 1,0 | 5 | 4 | 0,96 | 4 | 50 | 1,50 | 41,00 | 5,75 | 5,99 | 6,39 | 6,84 |
| 30 6255 0100 060 | • 1,0 | 6 | 4 | 0,96 | 4 | 50 | 1,50 | 41,00 | 6,79 | 7,06 | 7,52 | 8,04 |
| 30 6255 0100 080 | • 1,0 | 8 | 4 | 0,96 | 4 | 50 | 1,50 | 41,00 | 8,88 | 9,19 | 9,78 | 10,46 |
| 30 6255 0100 100 | • 1,0 | 10 | 4 | 0,96 | 4 | 50 | 1,50 | 41,00 | 10,96 | 11,31 | 12,04 | 12,87 |
| 30 6255 0100 120 | • 1,0 | 12 | 4 | 0,96 | 4 | 55 | 1,50 | 42,00 | 13,03 | 13,43 | 14,30 | 15,28 |
| 30 6255 0100 150 | • 1,0 | 15 | 4 | 0,96 | 4 | 55 | 1,50 | 42,00 | 16,12 | 16,61 | 17,68 | 18,90 |
| 30 6255 0120 060 | • 1,2 | 6 | 4 | 1,15 | 4 | 50 | 1,80 | 41,00 | 6,82 | 7,08 | 7,54 | 8,06 |
| 30 6255 0120 120 | • 1,2 | 12 | 4 | 1,15 | 4 | 55 | 1,80 | 41,00 | 13,05 | 13,45 | 14,32 | 15,30 |
| 30 6255 0150 040 | • 1,5 | 4 | 4 | 1,44 | 4 | 50 | 2,25 | 41,00 | 4,75 | 4,96 | 5,30 | 5,71 |
| 30 6255 0150 060 | • 1,5 | 6 | 4 | 1,44 | 4 | 50 | 2,25 | 41,00 | 6,84 | 7,10 | 7,56 | 8,14 |
| 30 6255 0150 080 | • 1,5 | 8 | 4 | 1,44 | 4 | 50 | 2,25 | 41,00 | 8,92 | 9,22 | 9,82 | 10,57 |
| 30 6255 0150 100 | • 1,5 | 10 | 4 | 1,44 | 4 | 50 | 2,25 | 41,00 | 11,00 | 11,34 | 12,08 | 13,00 |
| 30 6255 0150 120 | • 1,5 | 12 | 4 | 1,44 | 4 | 55 | 2,25 | 41,00 | 13,06 | 13,47 | 14,33 | 15,43 |
| 30 6255 0150 140 | • 1,5 | 14 | 4 | 1,44 | 4 | 55 | 2,25 | 41,00 | 15,13 | 15,59 | 16,59 | 17,74 |
| 30 6255 0150 160 | • 1,5 | 16 | 4 | 1,44 | 4 | 55 | 2,25 | 41,00 | 17,19 | 17,71 | 18,85 | 20,15 |
| 30 6255 0150 180 | • 1,5 | 18 | 4 | 1,44 | 4 | 60 | 2,25 | 42,00 | 19,24 | 19,83 | 21,11 | 22,56 |
| 30 6255 0150 200 | • 1,5 | 20 | 4 | 1,44 | 4 | 60 | 2,25 | 42,00 | 21,30 | 21,95 | 23,37 | - |
| 30 6255 0200 040 | • 2,0 | 4 | 4 | 1,92 | 4 | 50 | 3,00 | 41,00 | 4,81 | 5,00 | 5,34 | 5,71 |
| 30 6255 0200 060 | • 2,0 | 6 | 4 | 1,92 | 4 | 50 | 3,00 | 41,00 | 6,89 | 7,14 | 7,60 | 8,12 |
| 30 6255 0200 080 | • 2,0 | 8 | 4 | 1,92 | 4 | 50 | 3,00 | 41,00 | 8,97 | 9,26 | 9,85 | 10,53 |
| 30 6255 0200 100 | • 2,0 | 10 | 4 | 1,92 | 4 | 50 | 3,00 | 41,00 | 11,04 | 11,38 | 12,11 | 12,95 |
| 30 6255 0200 120 | • 2,0 | 12 | 4 | 1,92 | 4 | 55 | 3,00 | 41,00 | 13,10 | 13,50 | 14,37 | 15,36 |
| 30 6255 0200 150 | • 2,0 | 15 | 4 | 1,92 | 4 | 55 | 3,00 | 41,00 | 16,19 | 16,68 | 17,76 | 18,98 |
| 30 6255 0200 200 | • 2,0 | 20 | 4 | 1,92 | 4 | 60 | 3,00 | 42,00 | 21,34 | 21,98 | 23,40 | - |

>Ø2,0 Art. 30 6269 auf Seite 71 · >Ø2,0 Art. 30 6269 on page 71



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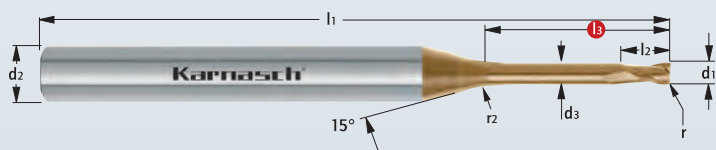
Index

30 6256

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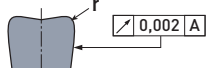
VHM-Micro Schaftfräser mit Eckenradius, < 15xD Schnitttiefe, Schaft 4 mm

Solid carbide miniature end mills with corner radius, < 15xD diameter cutting depth, shank 4 mm



TOLERANZ / TOLERANCE

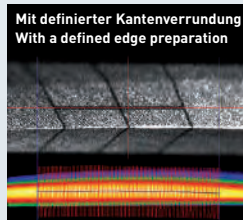
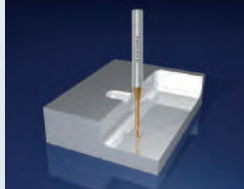
tol. r = -0,004



Karnasch Micro Norm.
Standard in der Serie.
Karnasch Micro Norm.
Standard in serial production.

d1* = Ø 0,1 - Ø 2,0 tol -0,000 / -0,008

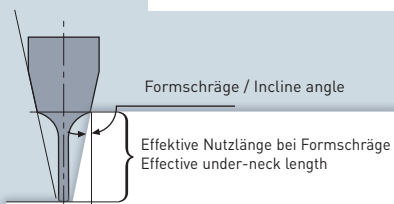
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| | |
|-------------|-----------------------|
| MICRO GRAIN | KARNASCH NORM |
| N/M | DIN 6535 Form HA |
| 20° | |
| | HHC HSC HPC |
| | HXC-NANO ³ |
| | |

Schnittdaten
Cutting data

Zeichnungen
Drawings



| Art. | d1* | r -0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|----------------------|-----|----------|-----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6256 0010 002 002 | 0,1 | 0,02 | 0,2 | 4 | 0,08 | 1 | 45 | 0,10 | 60,00 | 0,36 | 0,38 | 0,42 | 0,45 |
| 30 6256 0010 002 003 | 0,1 | 0,02 | 0,3 | 4 | 0,08 | 1 | 45 | 0,10 | 60,00 | 0,47 | 0,49 | 0,54 | 0,58 |
| 30 6256 0010 002 004 | 0,1 | 0,02 | 0,4 | 4 | 0,08 | 1 | 45 | 0,10 | 60,00 | 0,57 | 0,60 | 0,65 | 0,70 |
| 30 6256 0020 005 005 | 0,2 | 0,05 | 0,5 | 4 | 0,17 | 1 | 50 | 0,15 | 51,00 | 0,70 | 0,73 | 0,78 | 0,83 |
| 30 6256 0020 005 010 | 0,2 | 0,05 | 1 | 4 | 0,17 | 1 | 50 | 0,15 | 51,00 | 1,22 | 1,27 | 1,35 | 1,44 |
| 30 6256 0020 005 015 | 0,2 | 0,05 | 1,5 | 4 | 0,17 | 1 | 50 | 0,15 | 51,00 | 1,74 | 1,80 | 1,91 | 2,04 |
| 30 6256 0020 005 020 | 0,2 | 0,05 | 2 | 4 | 0,17 | 1 | 50 | 0,15 | 51,00 | 2,26 | 2,33 | 2,48 | 2,64 |
| 30 6256 0030 005 010 | 0,3 | 0,05 | 1 | 4 | 0,27 | 2 | 50 | 0,25 | 47,00 | 1,32 | 1,39 | 1,51 | 1,62 |
| 30 6256 0030 005 015 | 0,3 | 0,05 | 1,5 | 4 | 0,27 | 2 | 50 | 0,25 | 47,00 | 1,85 | 1,94 | 2,08 | 2,22 |
| 30 6256 0030 005 020 | 0,3 | 0,05 | 2 | 4 | 0,27 | 2 | 50 | 0,25 | 47,00 | 2,37 | 2,48 | 2,64 | 2,82 |
| 30 6256 0030 005 025 | 0,3 | 0,05 | 2,5 | 4 | 0,27 | 2 | 50 | 0,25 | 47,00 | 2,90 | 3,01 | 3,21 | 3,43 |
| 30 6256 0030 005 030 | 0,3 | 0,05 | 3 | 4 | 0,27 | 2 | 50 | 0,25 | 47,00 | 3,42 | 3,55 | 3,77 | 4,03 |
| 30 6256 0040 010 010 | 0,4 | 0,10 | 1 | 4 | 0,37 | 2 | 50 | 0,30 | 42,00 | 1,32 | 1,39 | 1,50 | 1,61 |
| 30 6256 0040 010 015 | 0,4 | 0,10 | 1,5 | 4 | 0,37 | 2 | 50 | 0,30 | 42,00 | 1,85 | 1,93 | 2,07 | 2,21 |
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| 30 6256 0040 010 040 | 0,4 | 0,10 | 4 | 4 | 0,37 | 2 | 50 | 0,30 | 42,00 | 4,46 | 4,61 | 4,90 | 5,23 |
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| 30 6256 0050 010 020 | 0,5 | 0,10 | 2 | 4 | 0,47 | 2 | 50 | 0,35 | 42,00 | 2,37 | 2,47 | 2,64 | 2,81 |
| 30 6256 0050 010 030 | 0,5 | 0,10 | 3 | 4 | 0,47 | 2 | 50 | 0,35 | 42,00 | 3,42 | 3,54 | 3,77 | 4,02 |
| 30 6256 0050 010 040 | 0,5 | 0,10 | 4 | 4 | 0,47 | 2 | 50 | 0,35 | 42,00 | 4,46 | 4,61 | 4,90 | 5,23 |
| 30 6256 0050 010 050 | 0,5 | 0,10 | 5 | 4 | 0,47 | 2 | 50 | 0,35 | 42,00 | 5,49 | 5,67 | 6,03 | 6,43 |
| 30 6256 0050 010 060 | 0,5 | 0,10 | 6 | 4 | 0,47 | 2 | 50 | 0,35 | 42,00 | 6,53 | 6,73 | 7,15 | 7,64 |
| 30 6256 0060 010 020 | 0,6 | 0,10 | 2 | 4 | 0,57 | 4 | 50 | 0,40 | 41,00 | 2,54 | 2,69 | 2,95 | 3,17 |
| 30 6256 0060 010 030 | 0,6 | 0,10 | 3 | 4 | 0,57 | 4 | 50 | 0,40 | 41,00 | 3,60 | 3,79 | 4,10 | 4,38 |
| 30 6256 0060 010 040 | 0,6 | 0,10 | 4 | 4 | 0,57 | 4 | 50 | 0,40 | 41,00 | 4,66 | 4,88 | 5,23 | 5,59 |
| 30 6256 0060 010 050 | 0,6 | 0,10 | 5 | 4 | 0,57 | 4 | 50 | 0,40 | 41,00 | 5,71 | 5,96 | 6,36 | 6,80 |
| 30 6256 0060 010 060 | 0,6 | 0,10 | 6 | 4 | 0,57 | 4 | 50 | 0,40 | 41,00 | 6,76 | 7,03 | 7,49 | 8,00 |
| 30 6256 0060 010 080 | 0,6 | 0,10 | 8 | 4 | 0,57 | 4 | 50 | 0,40 | 41,00 | 8,85 | 9,16 | 9,75 | 10,42 |
| 30 6256 0080 020 020 | 0,8 | 0,20 | 2 | 4 | 0,77 | 4 | 50 | 0,50 | 41,00 | 2,53 | 2,68 | 2,93 | 3,15 |
| 30 6256 0080 020 040 | 0,8 | 0,20 | 4 | 4 | 0,77 | 4 | 50 | 0,50 | 41,00 | 4,65 | 4,87 | 5,22 | 5,57 |
| 30 6256 0080 020 050 | 0,8 | 0,20 | 5 | 4 | 0,77 | 4 | 50 | 0,50 | 41,00 | 5,71 | 5,95 | 6,35 | 6,78 |
| 30 6256 0080 020 060 | 0,8 | 0,20 | 6 | 4 | 0,77 | 4 | 50 | 0,50 | 41,00 | 6,76 | 7,03 | 7,48 | 7,98 |
| 30 6256 0080 020 080 | 0,8 | 0,20 | 8 | 4 | 0,77 | 4 | 50 | 0,50 | 41,00 | 8,85 | 9,16 | 9,74 | 10,40 |
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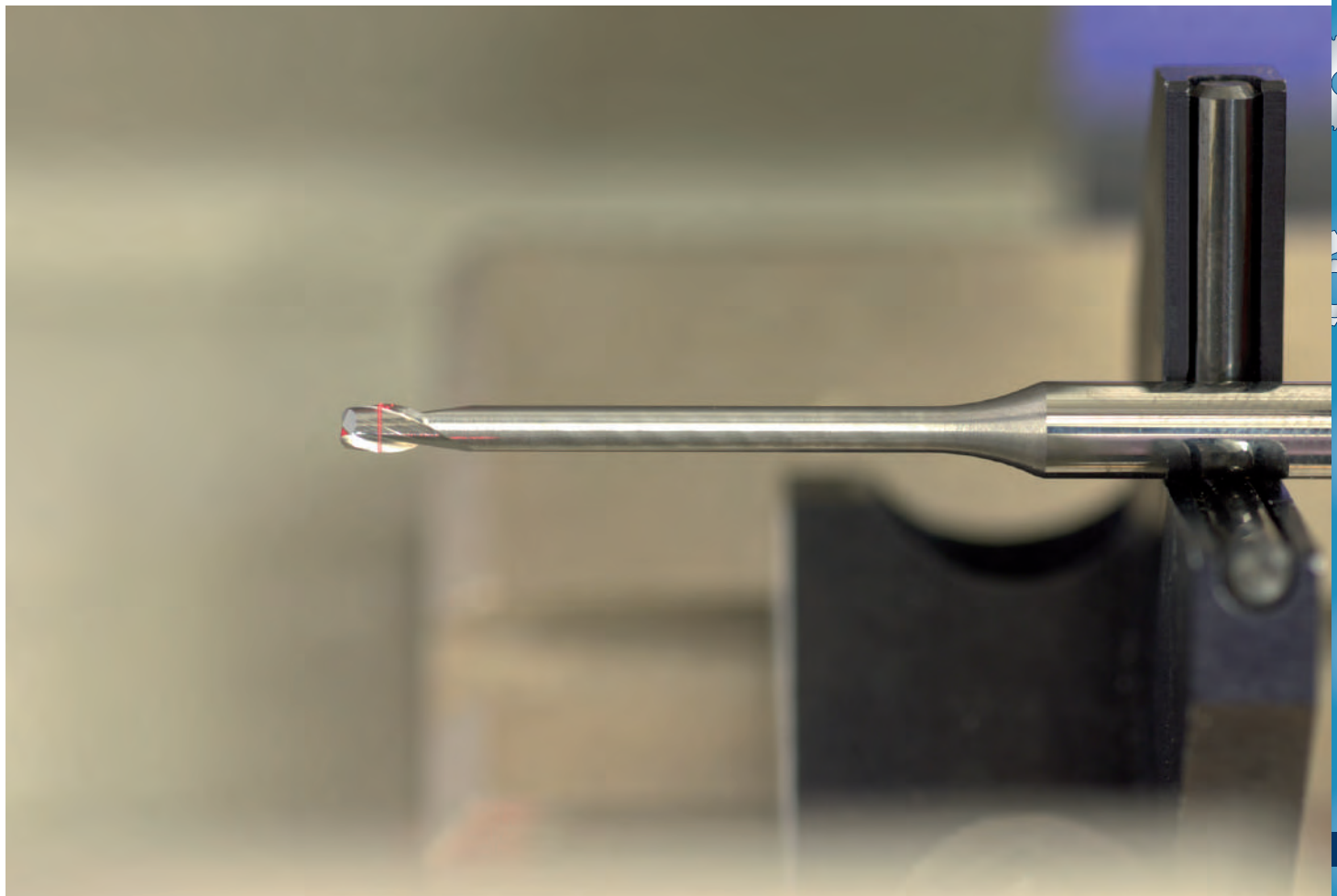
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30 6256

| Art. | d1* | r -0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|----------------------|-------|----------|----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6256 0100 020 020 | • 1,0 | 0,20 | 2 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 2,57 | 2,71 | 2,96 | 3,17 |
| 30 6256 0100 020 030 | • 1,0 | 0,20 | 3 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 3,63 | 3,81 | 4,11 | 4,38 |
| 30 6256 0100 020 040 | • 1,0 | 0,20 | 4 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 4,69 | 4,90 | 5,24 | 5,59 |
| 30 6256 0100 020 050 | • 1,0 | 0,20 | 5 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 5,74 | 5,98 | 6,37 | 6,80 |
| 30 6256 0100 020 060 | • 1,0 | 0,20 | 6 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 6,78 | 7,05 | 7,50 | 8,00 |
| 30 6256 0100 020 070 | • 1,0 | 0,20 | 7 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 7,83 | 8,11 | 8,63 | 9,21 |
| 30 6256 0100 020 080 | • 1,0 | 0,20 | 8 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 8,87 | 9,18 | 9,76 | 10,42 |
| 30 6256 0100 020 090 | • 1,0 | 0,20 | 9 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 9,91 | 10,24 | 10,88 | 11,62 |
| 30 6256 0100 020 100 | • 1,0 | 0,20 | 10 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 10,95 | 11,30 | 12,01 | 12,83 |
| 30 6256 0100 020 120 | • 1,0 | 0,20 | 12 | 4 | 0,96 | 4 | 55 | 0,80 | 42,00 | 13,02 | 13,42 | 14,27 | 15,24 |
| 30 6256 0100 020 150 | • 1,0 | 0,20 | 15 | 4 | 0,96 | 4 | 55 | 0,80 | 42,00 | 16,12 | 16,60 | 17,66 | 18,86 |
| 30 6256 0120 020 060 | • 1,2 | 0,20 | 6 | 4 | 1,15 | 4 | 50 | 1,00 | 41,00 | 6,81 | 7,07 | 7,52 | 8,02 |
| 30 6256 0120 020 120 | • 1,2 | 0,20 | 12 | 4 | 1,15 | 4 | 55 | 1,00 | 41,00 | 13,04 | 13,44 | 14,29 | 15,26 |
| 30 6256 0150 020 040 | • 1,5 | 0,20 | 4 | 4 | 1,44 | 4 | 50 | 1,35 | 41,00 | 4,74 | 4,94 | 5,28 | 5,63 |
| 30 6256 0150 020 060 | • 1,5 | 0,20 | 6 | 4 | 1,44 | 4 | 50 | 1,35 | 41,00 | 6,83 | 7,09 | 7,53 | 8,04 |
| 30 6256 0150 020 080 | • 1,5 | 0,20 | 8 | 4 | 1,44 | 4 | 50 | 1,35 | 41,00 | 8,92 | 9,21 | 9,79 | 10,46 |
| 30 6256 0150 020 100 | • 1,5 | 0,20 | 10 | 4 | 1,44 | 4 | 50 | 1,35 | 41,00 | 10,99 | 11,33 | 12,05 | 12,87 |
| 30 6256 0150 020 120 | • 1,5 | 0,20 | 12 | 4 | 1,44 | 4 | 55 | 1,35 | 41,00 | 13,06 | 13,45 | 14,31 | 15,28 |
| 30 6256 0150 020 140 | • 1,5 | 0,20 | 14 | 4 | 1,44 | 4 | 55 | 1,35 | 41,00 | 15,12 | 15,57 | 16,57 | 17,70 |
| 30 6256 0150 020 160 | • 1,5 | 0,20 | 16 | 4 | 1,44 | 4 | 55 | 1,35 | 41,00 | 17,18 | 17,70 | 18,82 | 20,11 |
| 30 6256 0150 020 180 | • 1,5 | 0,20 | 18 | 4 | 1,44 | 4 | 60 | 1,35 | 42,00 | 19,24 | 19,82 | 21,08 | 22,52 |
| 30 6256 0150 020 200 | • 1,5 | 0,20 | 20 | 4 | 1,44 | 4 | 60 | 1,35 | 42,00 | 21,29 | 21,94 | 23,34 | - |
| 30 6256 0200 020 040 | • 2,0 | 0,20 | 4 | 4 | 1,92 | 4 | 50 | 1,70 | 41,00 | 4,80 | 4,99 | 5,31 | 5,67 |
| 30 6256 0200 020 060 | • 2,0 | 0,20 | 6 | 4 | 1,92 | 4 | 50 | 1,70 | 41,00 | 6,88 | 7,12 | 7,57 | 8,08 |
| 30 6256 0200 020 080 | • 2,0 | 0,20 | 8 | 4 | 1,92 | 4 | 50 | 1,70 | 41,00 | 8,96 | 9,25 | 9,83 | 10,49 |
| 30 6256 0200 020 100 | • 2,0 | 0,20 | 10 | 4 | 1,92 | 4 | 50 | 1,70 | 41,00 | 11,03 | 11,37 | 12,09 | 12,91 |
| 30 6256 0200 020 120 | • 2,0 | 0,20 | 12 | 4 | 1,92 | 4 | 55 | 1,70 | 41,00 | 13,09 | 13,49 | 14,35 | 15,32 |
| 30 6256 0200 020 150 | • 2,0 | 0,20 | 15 | 4 | 1,92 | 4 | 55 | 1,70 | 41,00 | 16,19 | 16,67 | 17,73 | 18,94 |
| 30 6256 0200 020 200 | • 2,0 | 0,20 | 20 | 4 | 1,92 | 4 | 60 | 1,70 | 42,00 | 21,33 | 21,97 | 23,38 | - |
| 30 6256 0200 050 040 | • 2,0 | 0,50 | 4 | 4 | 1,92 | 4 | 50 | 1,70 | 41,00 | 4,78 | 4,96 | 5,28 | 5,61 |
| 30 6256 0200 050 060 | • 2,0 | 0,50 | 6 | 4 | 1,92 | 4 | 50 | 1,70 | 41,00 | 6,87 | 7,10 | 7,53 | 8,02 |
| 30 6256 0200 050 080 | • 2,0 | 0,50 | 8 | 4 | 1,92 | 4 | 50 | 1,70 | 41,00 | 8,95 | 9,23 | 9,79 | 10,43 |
| 30 6256 0200 050 100 | • 2,0 | 0,50 | 10 | 4 | 1,92 | 4 | 50 | 1,70 | 41,00 | 11,02 | 11,35 | 12,05 | 12,85 |
| 30 6256 0200 050 120 | • 2,0 | 0,50 | 12 | 4 | 1,92 | 4 | 55 | 1,70 | 41,00 | 13,09 | 13,47 | 14,31 | 15,26 |
| 30 6256 0200 050 150 | • 2,0 | 0,50 | 15 | 4 | 1,92 | 4 | 55 | 1,70 | 41,00 | 16,18 | 16,65 | 17,69 | 18,88 |
| 30 6256 0200 050 200 | • 2,0 | 0,50 | 20 | 4 | 1,92 | 4 | 60 | 1,70 | 42,00 | 21,32 | 21,95 | 23,34 | - |

>Ø2,0 Art. 30 6261 auf Seite 59 / >Ø2,0 Art. 30 6261 on page 59



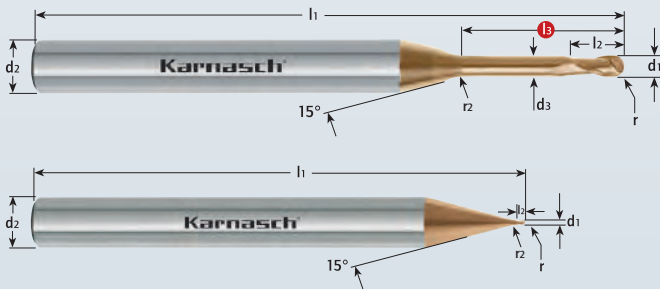
Index

30 6257

PROFESSIONAL
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VHM-Micro-3D Mini-Radiusfräser, < 15xD Schnitttiefe, Schaft 4 mm

Solid carbide miniature ball nose slot mill, < 15xD diameter cutting depth, shank 4 mm



| | |
|--------------------|-----------------------------|
| MICRO GRAIN | KARNASCH NORM |
| N/M | DIN 6535 Form HA |
| | |
| | HHC HSC HPC |
| | HXC-NANO³ |
| | |

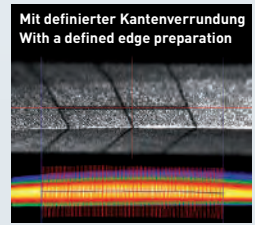
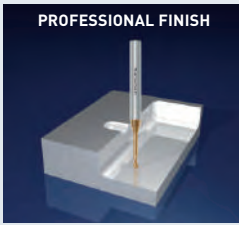
- 1 **HRC < 70**
- 2 **STAHL**
steel
< 1400 N/mm²
- 3 **INOX**
stainless steel
< 900 N/mm²
ferritic
- 4 **INOX**
stainless steel
> 900 N/mm²
martensitic
- 5 **INOX**
stainless steel
< 900 N/mm²
austenitic
- 6 **NI-ALLOYS**
< 900 N/mm²
- 7 **GG/G**
cast iron
- 8 **TITAN**
titanium

TOLERANZ / TOLERANCE

tol. r = ± 0,002

d1* = Ø 0,1 - Ø 2,0 tol 0,000 / -0,010

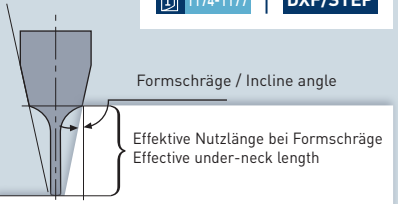
Karnasch Micro Norm.
Standard in der Serie.
Karnasch Micro Norm.
Standard in serial production.



Schnittdaten
Cutting data

Zeichnungen
Drawings

1174-1177



| Art. | d1* | r ± 0,002 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|-------|-----------|-----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6257 0010 | • 0,1 | 0,05 | - | 4 | 0,08 | - | 50 | 0,08 | 34,80 | - | - | - | - |
| 30 6257 0010 002 | • 0,1 | 0,05 | 0,2 | 4 | 0,08 | 1 | 45 | 0,08 | 60,00 | 0,36 | 0,38 | 0,41 | 0,45 |
| 30 6257 0010 003 | • 0,1 | 0,05 | 0,3 | 4 | 0,08 | 1 | 45 | 0,08 | 60,00 | 0,46 | 0,49 | 0,53 | 0,57 |
| 30 6257 0010 004 | • 0,1 | 0,05 | 0,4 | 4 | 0,08 | 1 | 45 | 0,08 | 60,00 | 0,57 | 0,60 | 0,65 | 0,70 |
| 30 6257 0010 005 | • 0,1 | 0,05 | 0,5 | 4 | 0,08 | 1 | 45 | 0,08 | 60,00 | 0,68 | 0,71 | 0,76 | 0,82 |
| 30 6257 0020 005 | • 0,2 | 0,10 | 0,5 | 4 | 0,17 | 1 | 50 | 0,20 | 51,00 | 0,70 | 0,73 | 0,78 | 0,83 |
| 30 6257 0020 010 | • 0,2 | 0,10 | 1 | 4 | 0,17 | 1 | 50 | 0,20 | 51,00 | 1,22 | 1,26 | 1,35 | 1,45 |
| 30 6257 0020 015 | • 0,2 | 0,10 | 1,5 | 4 | 0,17 | 1 | 50 | 0,20 | 51,00 | 1,74 | 1,80 | 1,93 | 2,07 |
| 30 6257 0020 020 | • 0,2 | 0,10 | 2 | 4 | 0,17 | 1 | 50 | 0,20 | 51,00 | 2,26 | 2,33 | 2,50 | 2,70 |
| 30 6257 0030 | • 0,3 | 0,15 | - | 4 | - | - | 50 | 0,25 | 47,00 | - | - | - | - |
| 30 6257 0030 010 | • 0,3 | 0,15 | 1 | 4 | 0,27 | 2 | 50 | 0,25 | 47,00 | 1,32 | 1,38 | 1,49 | 1,61 |
| 30 6257 0030 015 | • 0,3 | 0,15 | 1,5 | 4 | 0,27 | 2 | 50 | 0,25 | 47,00 | 1,84 | 1,93 | 2,07 | 2,23 |
| 30 6257 0030 020 | • 0,3 | 0,15 | 2 | 4 | 0,27 | 2 | 50 | 0,25 | 47,00 | 2,37 | 2,47 | 2,65 | 2,85 |
| 30 6257 0030 025 | • 0,3 | 0,15 | 2,5 | 4 | 0,27 | 2 | 50 | 0,25 | 47,00 | 2,89 | 3,01 | 3,22 | 3,47 |
| 30 6257 0030 030 | • 0,3 | 0,15 | 3 | 4 | 0,27 | 2 | 50 | 0,25 | 47,00 | 3,42 | 3,54 | 3,80 | 4,09 |
| 30 6257 0040 | • 0,4 | 0,20 | - | 4 | - | - | 50 | 0,30 | 42,00 | - | - | - | - |
| 30 6257 0040 010 | • 0,4 | 0,20 | 1 | 4 | 0,37 | 2 | 50 | 0,30 | 42,00 | 1,31 | 1,38 | 1,49 | 1,59 |
| 30 6257 0040 020 | • 0,4 | 0,20 | 2 | 4 | 0,37 | 2 | 50 | 0,30 | 42,00 | 2,37 | 2,46 | 2,64 | 2,84 |
| 30 6257 0040 030 | • 0,4 | 0,20 | 3 | 4 | 0,37 | 2 | 50 | 0,30 | 42,00 | 3,41 | 3,54 | 3,79 | 4,08 |
| 30 6257 0040 040 | • 0,4 | 0,20 | 4 | 4 | 0,37 | 2 | 50 | 0,30 | 42,00 | 4,45 | 4,61 | 4,94 | 5,32 |
| 30 6257 0050 | • 0,5 | 0,25 | - | 4 | - | - | 50 | 0,50 | 24,00 | - | - | - | - |
| 30 6257 0050 010 | • 0,5 | 0,25 | 1 | 4 | 0,47 | 2 | 50 | 0,40 | 42,00 | 1,31 | 1,37 | 1,48 | 1,58 |
| 30 6257 0050 020 | • 0,5 | 0,25 | 2 | 4 | 0,47 | 2 | 50 | 0,40 | 42,00 | 2,36 | 2,46 | 2,63 | 2,82 |
| 30 6257 0050 030 | • 0,5 | 0,25 | 3 | 4 | 0,47 | 2 | 50 | 0,40 | 42,00 | 3,41 | 3,53 | 3,78 | 4,07 |
| 30 6257 0050 040 | • 0,5 | 0,25 | 4 | 4 | 0,47 | 2 | 50 | 0,40 | 42,00 | 4,45 | 4,60 | 4,93 | 5,31 |
| 30 6257 0050 050 | • 0,5 | 0,25 | 5 | 4 | 0,47 | 2 | 50 | 0,40 | 42,00 | 5,49 | 5,67 | 6,08 | 6,55 |
| 30 6257 0050 060 | • 0,5 | 0,25 | 6 | 4 | 0,47 | 2 | 50 | 0,40 | 42,00 | 6,52 | 6,74 | 7,23 | 7,80 |
| 30 6257 0060 | • 0,6 | 0,30 | - | 4 | - | - | 50 | 0,60 | 21,60 | - | - | - | - |
| 30 6257 0060 020 | • 0,6 | 0,30 | 2 | 4 | 0,57 | 4 | 50 | 0,50 | 41,00 | 2,52 | 2,67 | 2,92 | 3,14 |
| 30 6257 0060 030 | • 0,6 | 0,30 | 3 | 4 | 0,57 | 4 | 50 | 0,50 | 41,00 | 3,59 | 3,77 | 4,07 | 4,38 |
| 30 6257 0060 040 | • 0,6 | 0,30 | 4 | 4 | 0,57 | 4 | 50 | 0,50 | 41,00 | 4,65 | 4,87 | 5,23 | 5,63 |
| 30 6257 0060 050 | • 0,6 | 0,30 | 5 | 4 | 0,57 | 4 | 50 | 0,50 | 41,00 | 5,70 | 5,95 | 6,38 | 6,87 |
| 30 6257 0060 060 | • 0,6 | 0,30 | 6 | 4 | 0,57 | 4 | 50 | 0,50 | 41,00 | 6,75 | 7,02 | 7,53 | 8,11 |
| 30 6257 0060 080 | • 0,6 | 0,30 | 8 | 4 | 0,57 | 4 | 50 | 0,50 | 41,00 | 8,84 | 9,16 | 9,83 | 10,60 |
| 30 6257 0080 | • 0,8 | 0,40 | - | 4 | - | - | 50 | 0,80 | 21,60 | - | - | - | - |
| 30 6257 0080 020 | • 0,8 | 0,40 | 2 | 4 | 0,77 | 4 | 50 | 0,60 | 41,00 | 2,52 | 2,66 | 2,90 | 3,12 |
| 30 6257 0080 040 | • 0,8 | 0,40 | 4 | 4 | 0,77 | 4 | 50 | 0,60 | 41,00 | 4,64 | 4,86 | 5,21 | 5,60 |
| 30 6257 0080 060 | • 0,8 | 0,40 | 6 | 4 | 0,77 | 4 | 50 | 0,60 | 41,00 | 6,75 | 7,01 | 7,51 | 8,09 |
| 30 6257 0080 080 | • 0,8 | 0,40 | 8 | 4 | 0,77 | 4 | 50 | 0,60 | 41,00 | 8,84 | 9,15 | 9,81 | 10,58 |
| 30 6257 0080 100 | • 0,8 | 0,40 | 10 | 4 | 0,77 | 4 | 50 | 0,60 | 41,00 | 10,92 | 11,29 | 12,11 | 13,06 |



| Art. | d1* | r ± 0,002 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|-------|-----------|----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6257 0100 020 | • 1,0 | 0,50 | 2 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 2,55 | 2,68 | 2,91 | 3,12 |
| 30 6257 0100 030 | • 1,0 | 0,50 | 3 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 3,61 | 3,78 | 4,07 | 4,36 |
| 30 6257 0100 040 | • 1,0 | 0,50 | 4 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 4,67 | 4,87 | 5,22 | 5,60 |
| 30 6257 0100 050 | • 1,0 | 0,50 | 5 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 5,72 | 5,95 | 6,37 | 6,85 |
| 30 6257 0100 060 | • 1,0 | 0,50 | 6 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 6,77 | 7,03 | 7,52 | 8,09 |
| 30 6257 0100 080 | • 1,0 | 0,50 | 8 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 8,86 | 9,17 | 9,82 | 10,57 |
| 30 6257 0100 100 | • 1,0 | 0,50 | 10 | 4 | 0,96 | 4 | 50 | 0,80 | 41,00 | 10,94 | 11,31 | 12,12 | 13,06 |
| 30 6257 0100 120 | • 1,0 | 0,50 | 12 | 4 | 0,96 | 4 | 55 | 0,80 | 42,00 | 13,01 | 13,45 | 14,42 | 15,55 |
| 30 6257 0100 150 | • 1,0 | 0,50 | 15 | 4 | 0,96 | 4 | 55 | 0,80 | 42,00 | 16,11 | 16,65 | 17,87 | 19,28 |
| 30 6257 0100 180 | • 1,0 | 0,50 | 18 | 4 | 0,96 | 4 | 60 | 0,80 | 43,00 | 19,21 | 19,86 | 21,32 | 23,01 |
| 30 6257 0100 200 | • 1,0 | 0,50 | 20 | 4 | 0,96 | 4 | 60 | 0,80 | 43,00 | 21,28 | 22,00 | 23,62 | 25,49 |
| 30 6257 0120 060 | • 1,2 | 0,60 | 6 | 4 | 1,15 | 4 | 50 | 1,00 | 41,00 | 6,79 | 7,04 | 7,52 | 8,09 |
| 30 6257 0120 120 | • 1,2 | 0,60 | 12 | 4 | 1,15 | 4 | 55 | 1,00 | 41,00 | 13,03 | 13,46 | 14,42 | 15,55 |
| 30 6257 0150 040 | • 1,5 | 0,75 | 4 | 4 | 1,44 | 4 | 50 | 1,20 | 41,00 | 4,72 | 4,90 | 5,22 | 5,59 |
| 30 6257 0150 060 | • 1,5 | 0,75 | 6 | 4 | 1,44 | 4 | 50 | 1,20 | 41,00 | 6,81 | 7,05 | 7,52 | 8,08 |
| 30 6257 0150 080 | • 1,5 | 0,75 | 8 | 4 | 1,44 | 4 | 50 | 1,20 | 41,00 | 8,89 | 9,19 | 9,82 | 10,56 |
| 30 6257 0150 100 | • 1,5 | 0,75 | 10 | 4 | 1,44 | 4 | 50 | 1,20 | 41,00 | 10,97 | 11,33 | 12,12 | 13,05 |
| 30 6257 0150 120 | • 1,5 | 0,75 | 12 | 4 | 1,44 | 4 | 55 | 1,20 | 41,00 | 13,04 | 13,47 | 14,42 | 15,53 |
| 30 6257 0150 140 | • 1,5 | 0,75 | 14 | 4 | 1,44 | 4 | 55 | 1,20 | 41,00 | 15,10 | 15,61 | 16,72 | 18,02 |
| 30 6257 0150 160 | • 1,5 | 0,75 | 16 | 4 | 1,44 | 4 | 55 | 1,20 | 41,00 | 17,17 | 17,75 | 19,02 | 20,51 |
| 30 6257 0150 180 | • 1,5 | 0,75 | 18 | 4 | 1,44 | 4 | 60 | 1,20 | 42,00 | 19,24 | 19,89 | 21,32 | 22,99 |
| 30 6257 0150 200 | • 1,5 | 0,75 | 20 | 4 | 1,44 | 4 | 60 | 1,20 | 42,00 | 21,31 | 22,03 | 23,62 | - |
| 30 6257 0200 040 | • 2,0 | 1,00 | 4 | 4 | 1,92 | 4 | 50 | 1,50 | 41,00 | 4,76 | 4,93 | 5,23 | 5,58 |
| 30 6257 0200 060 | • 2,0 | 1,00 | 6 | 4 | 1,92 | 4 | 50 | 1,50 | 41,00 | 6,85 | 7,07 | 7,53 | 8,06 |
| 30 6257 0200 080 | • 2,0 | 1,00 | 8 | 4 | 1,92 | 4 | 50 | 1,50 | 41,00 | 8,93 | 9,21 | 9,83 | 10,55 |
| 30 6257 0200 100 | • 2,0 | 1,00 | 10 | 4 | 1,92 | 4 | 50 | 1,50 | 41,00 | 11,00 | 11,35 | 12,13 | 13,04 |
| 30 6257 0200 120 | • 2,0 | 1,00 | 12 | 4 | 1,92 | 4 | 55 | 1,50 | 41,00 | 13,07 | 13,49 | 14,43 | 15,52 |
| 30 6257 0200 150 | • 2,0 | 1,00 | 15 | 4 | 1,92 | 4 | 55 | 1,50 | 41,00 | 16,17 | 16,70 | 17,88 | 19,25 |
| 30 6257 0200 200 | • 2,0 | 1,00 | 20 | 4 | 1,92 | 4 | 60 | 1,50 | 42,00 | 21,34 | 22,05 | 23,63 | - |

>Ø2,0 Art. 30 6264 auf Seite 63 / >Ø2,0 Art. 30 6264 on page 63

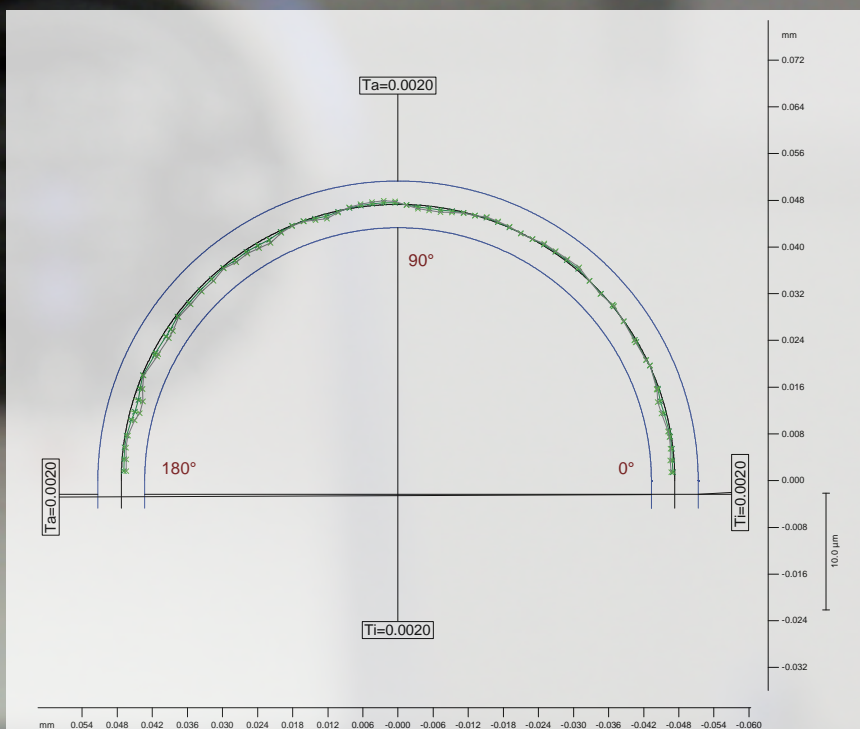
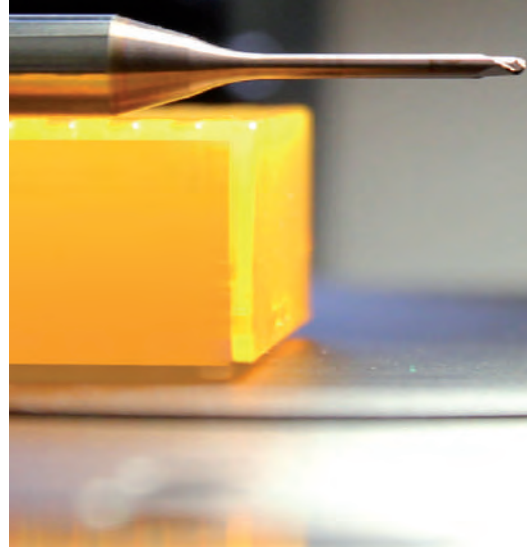
☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.

Special price / sale article. While stocks last.



Darstellung der Radiuskontur eines Karnasch-Fräser

Picture of the radius shape accuracy from a Karnasch ball nose end mill



| | | | |
|---------------------------------|-------------------------------------|--|---------------------------------|
| max. Abweichung innen 0,8 µm | Toleranzüberschr. innen -1,2 µm | Firmenname: Basistest Drehachse mit HKS | Kunde: 12-00062 Werth |
| max. Abweichung außen 0,4 µm | Toleranzüberschr. außen -1,6 µm | Soft-Datei: TEMP.S | Benutzer: Medler |
| Rotation 0,0000° | Anzahl Istteil-Punkte 67 | Ist-Datei: 306553_0.1x0.4x0.05_LineForm.asc | Datum: 30.03.2016 - 16:16:20 |
| Versch.-X 0,0 µm | Fläche 0,003 mm² | Fit-Datei: | Zechn. Nr.: 2D-Scan 10mm |
| Versch.-Y 0,0 µm | Durchm. flächengl. Kreis 65,2 µm | Bemerkung 1: Kugelradius | Teile-Nr.: MAG 9 |
| Einpass-Strategie BestFit | Spiegeln + | Bemerkung 2: | Bemerkung 3: +y oben |

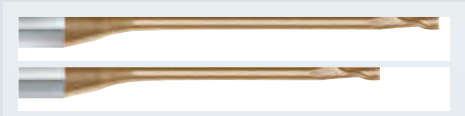
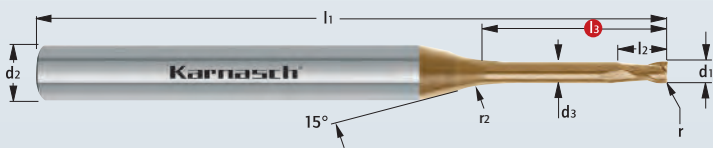
Karnasch®
PROFESSIONAL TOOLS



30 6261

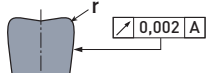
PROFESSIONAL
★ ★ ★

VHM-Micro Schaftfräser mit Eckenradius, < 20×D Schnitttiefe, Schaft 6 mm
Solid carbide miniature end mills with corner radius, < 20×D cutting depth, shank 6 mm



TOLERANZ / TOLERANCE

tol. r = -0,004

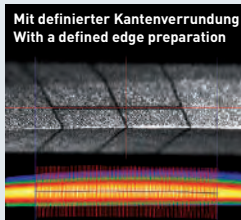
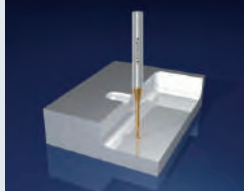


Karnasch Micro Norm.
Standard in der Serie.
Karnasch Micro Norm.
Standard in serial production.

d1* = Ø 0,2 - Ø 5,9 tol -0,002 / -0,010

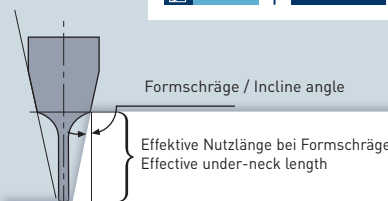
d1* r = Ø 6,0 tol -0,004 / -0,016

PROFESSIONAL FINISH



Schnittdaten
Cutting data

Zeichnungen
Drawings



| Art. | d1* | r - 0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|----------------------|-------|-----------|-----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6261 0020 005 005 | • 0,2 | 0,05 | 0,5 | 6 | 0,18 | 1 | 55 | 0,30 | 54,00 | 0,68 | 0,71 | 0,77 | 0,83 |
| 30 6261 0020 005 01 | • 0,2 | 0,05 | 1 | 6 | 0,18 | 1 | 55 | 0,30 | 54,00 | 1,20 | 1,25 | 1,34 | 1,45 |
| 30 6261 0030 005 01 | • 0,3 | 0,05 | 1 | 6 | 0,28 | 2 | 55 | 0,45 | 49,00 | 1,29 | 1,37 | 1,50 | 1,62 |
| 30 6261 0030 005 02 | • 0,3 | 0,05 | 2 | 6 | 0,28 | 2 | 55 | 0,45 | 49,00 | 2,35 | 2,46 | 2,65 | 2,86 |
| 30 6261 0030 005 03 | • 0,3 | 0,05 | 3 | 6 | 0,28 | 2 | 55 | 0,45 | 49,00 | 3,40 | 3,53 | 3,80 | 4,10 |
| 30 6261 0040 005 02 | • 0,4 | 0,05 | 2 | 6 | 0,38 | 2 | 55 | 0,60 | 44,00 | 2,35 | 2,46 | 2,65 | 2,86 |
| 30 6261 0040 005 03 | • 0,4 | 0,05 | 3 | 6 | 0,38 | 2 | 55 | 0,60 | 44,00 | 3,40 | 3,53 | 3,80 | 4,10 |
| 30 6261 0040 005 04 | • 0,4 | 0,05 | 4 | 6 | 0,38 | 2 | 55 | 0,60 | 44,00 | 4,44 | 4,60 | 4,95 | 5,35 |
| 30 6261 0050 005 02 | • 0,5 | 0,05 | 2 | 6 | 0,48 | 2 | 55 | 0,70 | 44,00 | 2,35 | 2,46 | 2,63 | 2,86 |
| 30 6261 0050 005 03 | • 0,5 | 0,05 | 3 | 6 | 0,48 | 2 | 55 | 0,70 | 44,00 | 3,40 | 3,53 | 3,80 | 4,10 |
| 30 6261 0050 005 04 | • 0,5 | 0,05 | 4 | 6 | 0,48 | 2 | 55 | 0,70 | 44,00 | 4,44 | 4,60 | 4,95 | 5,35 |
| 30 6261 0060 006 02 | • 0,6 | 0,06 | 2 | 6 | 0,58 | 4 | 55 | 0,90 | 42,00 | 2,50 | 2,67 | 2,94 | 3,19 |
| 30 6261 0060 006 03 | • 0,6 | 0,06 | 3 | 6 | 0,58 | 4 | 55 | 0,90 | 42,00 | 3,57 | 3,78 | 4,10 | 4,43 |
| 30 6261 0060 006 04 | • 0,6 | 0,06 | 4 | 6 | 0,58 | 4 | 55 | 0,90 | 42,00 | 4,63 | 4,87 | 5,25 | 5,67 |
| 30 6261 0060 006 06 | • 0,6 | 0,06 | 6 | 6 | 0,58 | 4 | 55 | 0,90 | 42,00 | 6,74 | 7,02 | 7,55 | 8,16 |
| 30 6261 0080 008 02 | • 0,8 | 0,08 | 2 | 6 | 0,77 | 4 | 55 | 1,20 | 42,00 | 2,54 | 2,70 | 2,97 | 3,21 |
| 30 6261 0080 008 04 | • 0,8 | 0,08 | 4 | 6 | 0,77 | 4 | 55 | 1,20 | 42,00 | 4,67 | 4,89 | 5,27 | 5,70 |
| 30 6261 0080 008 05 | • 0,8 | 0,08 | 5 | 6 | 0,77 | 4 | 55 | 1,20 | 42,00 | 5,72 | 5,97 | 6,42 | 6,94 |
| 30 6261 0080 008 06 | • 0,8 | 0,08 | 6 | 6 | 0,77 | 4 | 55 | 1,20 | 42,00 | 6,77 | 7,04 | 7,57 | 8,18 |
| 30 6261 0080 008 08 | • 0,8 | 0,08 | 8 | 6 | 0,77 | 4 | 55 | 1,20 | 42,00 | 8,85 | 9,18 | 9,87 | 10,67 |
| 30 6261 0080 008 10 | • 0,8 | 0,08 | 10 | 6 | 0,77 | 4 | 65 | 1,20 | 42,00 | 10,93 | 11,32 | 12,17 | 13,16 |
| 30 6261 0090 009 12 | • 0,9 | 0,09 | 12 | 6 | 0,87 | 10 | 65 | 1,30 | 23,11 | 13,63 | 14,28 | 15,25 | 16,04 |
| 30 6261 0100 010 03 | • 1,0 | 0,10 | 3 | 6 | 0,95 | 4 | 55 | 1,60 | 42,00 | 3,67 | 3,85 | 4,16 | 4,50 |
| 30 6261 0100 010 04 | • 1,0 | 0,10 | 4 | 6 | 0,95 | 4 | 55 | 1,60 | 42,00 | 4,72 | 4,94 | 5,31 | 5,74 |
| 30 6261 0100 010 05 | • 1,0 | 0,10 | 5 | 6 | 0,95 | 4 | 55 | 1,60 | 42,00 | 5,77 | 6,01 | 6,41 | 6,99 |
| 30 6261 0100 010 06 | • 1,0 | 0,10 | 6 | 6 | 0,95 | 4 | 55 | 1,60 | 42,00 | 6,82 | 7,08 | 7,61 | 8,23 |
| 30 6261 0100 010 07 | • 1,0 | 0,10 | 7 | 6 | 0,95 | 4 | 55 | 1,60 | 42,00 | 7,86 | 8,15 | 8,76 | 9,47 |
| 30 6261 0100 010 08 | • 1,0 | 0,10 | 8 | 6 | 0,95 | 4 | 55 | 1,60 | 42,00 | 8,90 | 9,22 | 9,91 | 10,72 |
| 30 6261 0100 010 10 | • 1,0 | 0,10 | 10 | 6 | 0,95 | 4 | 65 | 1,60 | 43,00 | 10,98 | 11,36 | 12,21 | 13,20 |
| 30 6261 0100 010 12 | • 1,0 | 0,10 | 12 | 6 | 0,95 | 4 | 65 | 1,60 | 43,00 | 13,04 | 13,50 | 14,51 | 15,69 |
| 30 6261 0100 010 15 | • 1,0 | 0,10 | 15 | 6 | 0,95 | 4 | 65 | 1,60 | 43,00 | 16,14 | 16,71 | 17,96 | 19,42 |
| 30 6261 0100 010 20 | • 1,0 | 0,10 | 20 | 6 | 0,95 | 4 | 65 | 1,60 | 44,00 | 21,31 | 22,06 | 23,71 | 25,63 |
| 30 6261 0100 030 04 | • 1,0 | 0,30 | 4 | 6 | 0,95 | 4 | 55 | 1,60 | 42,00 | 4,72 | 4,94 | 5,31 | 5,74 |
| 30 6261 0100 030 08 | • 1,0 | 0,30 | 8 | 6 | 0,95 | 4 | 55 | 1,60 | 42,00 | 8,90 | 9,22 | 9,91 | 10,72 |
| 30 6261 0100 030 12 | • 1,0 | 0,30 | 12 | 6 | 0,95 | 4 | 65 | 1,60 | 43,00 | 13,04 | 13,50 | 14,51 | 15,69 |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index



PROFESSIONAL



30 6261

| Art. | d1* | r - 0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|---------------------|-------|-----------|----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6261 0120 012 06 | • 1,2 | 0,12 | 6 | 6 | 1,15 | 4 | 55 | 1,90 | 42,00 | 6,82 | 7,08 | 7,61 | 8,23 |
| 30 6261 0120 012 08 | • 1,2 | 0,12 | 8 | 6 | 1,15 | 4 | 55 | 1,90 | 42,00 | 8,90 | 9,22 | 9,91 | 10,72 |
| 30 6261 0120 012 10 | • 1,2 | 0,12 | 10 | 6 | 1,15 | 4 | 65 | 1,90 | 42,00 | 10,98 | 11,36 | 12,21 | 13,20 |
| 30 6261 0120 012 12 | • 1,2 | 0,12 | 12 | 6 | 1,15 | 4 | 65 | 1,90 | 42,00 | 13,04 | 13,50 | 14,51 | 15,69 |
| 30 6261 0120 012 15 | • 1,2 | 0,12 | 15 | 6 | 1,15 | 10 | 65 | 1,90 | 22,51 | 16,84 | 17,54 | 18,60 | 19,43 |
| 30 6261 0120 012 20 | • 1,2 | 0,12 | 20 | 6 | 1,15 | 10 | 65 | 1,90 | 22,51 | 22,07 | 22,87 | 24,06 | 24,98 |
| 30 6261 0120 012 25 | • 1,2 | 0,12 | 25 | 6 | 1,15 | 10 | 70 | 1,90 | 23,71 | 27,27 | 28,17 | 29,46 | 30,45 |
| 30 6261 0120 030 06 | • 1,2 | 0,30 | 6 | 6 | 1,15 | 4 | 55 | 1,90 | 42,00 | 6,82 | 7,08 | 7,61 | 8,23 |
| 30 6261 0120 030 10 | • 1,2 | 0,30 | 10 | 6 | 1,15 | 4 | 65 | 1,90 | 42,00 | 10,98 | 11,36 | 12,21 | 13,20 |
| 30 6261 0140 014 08 | • 1,4 | 0,14 | 8 | 6 | 1,35 | 4 | 55 | 2,20 | 42,00 | 8,90 | 9,22 | 9,91 | 10,72 |
| 30 6261 0140 014 15 | • 1,4 | 0,14 | 15 | 6 | 1,35 | 4 | 65 | 2,20 | 42,00 | 16,15 | 16,71 | 17,96 | 19,42 |
| 30 6261 0150 015 06 | • 1,5 | 0,15 | 6 | 6 | 1,44 | 4 | 55 | 2,40 | 42,00 | 6,77 | 7,04 | 7,57 | 8,18 |
| 30 6261 0150 015 08 | • 1,5 | 0,15 | 8 | 6 | 1,44 | 4 | 55 | 2,40 | 42,00 | 8,85 | 9,18 | 9,87 | 10,67 |
| 30 6261 0150 015 10 | • 1,5 | 0,15 | 10 | 6 | 1,44 | 4 | 65 | 2,40 | 42,00 | 10,93 | 11,32 | 12,17 | 13,16 |
| 30 6261 0150 015 12 | • 1,5 | 0,15 | 12 | 6 | 1,44 | 4 | 65 | 2,40 | 42,00 | 13,01 | 13,46 | 14,47 | 15,64 |
| 30 6261 0150 015 15 | • 1,5 | 0,15 | 15 | 6 | 1,44 | 4 | 65 | 2,40 | 42,00 | 16,11 | 16,67 | 17,92 | 19,37 |
| 30 6261 0150 015 20 | • 1,5 | 0,15 | 20 | 6 | 1,44 | 4 | 65 | 2,40 | 43,00 | 21,28 | 22,02 | 23,67 | 25,59 |
| 30 6261 0150 030 06 | • 1,5 | 0,30 | 6 | 6 | 1,44 | 4 | 55 | 2,40 | 42,00 | 6,77 | 7,04 | 7,57 | 8,18 |
| 30 6261 0150 030 12 | • 1,5 | 0,30 | 12 | 6 | 1,44 | 4 | 65 | 2,40 | 42,00 | 13,01 | 13,46 | 14,47 | 15,64 |
| 30 6261 0150 030 20 | • 1,5 | 0,30 | 20 | 6 | 1,44 | 4 | 65 | 2,40 | 43,00 | 21,28 | 22,02 | 23,67 | 25,59 |
| 30 6261 0160 016 15 | • 1,6 | 0,16 | 15 | 6 | 1,54 | 10 | 65 | 2,50 | 22,51 | 16,87 | 17,56 | 18,61 | 19,44 |
| 30 6261 0180 018 10 | • 1,8 | 0,18 | 10 | 6 | 1,74 | 4 | 65 | 2,60 | 42,00 | 11,00 | 11,38 | 12,23 | 13,23 |
| 30 6261 0180 018 20 | • 1,8 | 0,18 | 20 | 6 | 1,74 | 4 | 65 | 2,60 | 43,00 | 21,33 | 22,08 | 23,73 | 25,66 |
| 30 6261 0200 020 06 | • 2,0 | 0,20 | 6 | 6 | 1,92 | 4 | 55 | 2,80 | 42,00 | 6,90 | 7,14 | 7,68 | 8,30 |
| 30 6261 0200 020 08 | • 2,0 | 0,20 | 8 | 6 | 1,92 | 4 | 55 | 2,80 | 42,00 | 8,97 | 9,28 | 9,98 | 10,79 |
| 30 6261 0200 020 10 | • 2,0 | 0,20 | 10 | 6 | 1,92 | 4 | 65 | 2,80 | 42,00 | 11,04 | 11,42 | 12,28 | 13,27 |
| 30 6261 0200 020 12 | • 2,0 | 0,20 | 12 | 6 | 1,92 | 4 | 65 | 2,80 | 42,00 | 13,10 | 13,56 | 14,58 | 15,76 |
| 30 6261 0200 020 15 | • 2,0 | 0,20 | 15 | 6 | 1,92 | 4 | 65 | 2,80 | 42,00 | 16,20 | 16,77 | 18,03 | 19,49 |
| 30 6261 0200 020 20 | • 2,0 | 0,20 | 20 | 6 | 1,92 | 4 | 65 | 2,80 | 43,00 | 21,37 | 22,12 | 23,77 | 25,70 |
| 30 6261 0200 020 25 | • 2,0 | 0,20 | 25 | 6 | 1,92 | 4 | 70 | 2,80 | 43,00 | 26,54 | 27,47 | 29,52 | 31,92 |
| 30 6261 0200 020 30 | • 2,0 | 0,20 | 30 | 6 | 1,92 | 4 | 75 | 2,80 | 43,00 | 31,71 | 32,81 | 35,27 | 38,13 |
| 30 6261 0200 030 25 | • 2,0 | 0,30 | 25 | 6 | 1,92 | 10 | 70 | 2,80 | 23,71 | 27,33 | 28,20 | 29,48 | 30,46 |
| 30 6261 0200 050 08 | • 2,0 | 0,50 | 8 | 6 | 1,92 | 4 | 55 | 2,80 | 42,00 | 8,97 | 9,28 | 9,98 | 10,79 |
| 30 6261 0200 050 15 | • 2,0 | 0,50 | 15 | 6 | 1,92 | 4 | 65 | 2,80 | 42,00 | 16,20 | 16,77 | 18,03 | 19,49 |
| 30 6261 0200 050 25 | • 2,0 | 0,50 | 25 | 6 | 1,92 | 4 | 70 | 2,80 | 43,00 | 26,54 | 27,47 | 29,52 | 31,92 |
| 30 6261 0250 025 10 | • 2,5 | 0,25 | 10 | 6 | 2,40 | 4 | 65 | 2,50 | 40,00 | 11,07 | 11,46 | 12,32 | 13,32 |
| 30 6261 0250 025 15 | • 2,5 | 0,25 | 15 | 6 | 2,40 | 4 | 65 | 2,50 | 40,00 | 16,24 | 16,81 | 18,07 | 19,53 |
| 30 6261 0250 025 20 | • 2,5 | 0,25 | 20 | 6 | 2,40 | 4 | 65 | 2,50 | 40,00 | 21,41 | 22,16 | 23,82 | 25,75 |
| 30 6261 0250 025 25 | • 2,5 | 0,25 | 25 | 6 | 2,40 | 4 | 70 | 2,50 | 42,00 | 26,58 | 27,50 | 29,57 | 31,97 |
| 30 6261 0300 030 10 | • 3,0 | 0,30 | 10 | 6 | 2,90 | 4 | 65 | 3,00 | 40,00 | 11,27 | 11,66 | 12,53 | 13,55 |
| 30 6261 0300 030 20 | • 3,0 | 0,30 | 20 | 6 | 2,90 | 4 | 65 | 3,00 | 40,00 | 21,60 | 22,36 | 24,03 | 25,98 |
| 30 6261 0300 030 30 | • 3,0 | 0,30 | 30 | 6 | 2,90 | 4 | 75 | 3,00 | 43,00 | 31,94 | 33,05 | 35,53 | - |
| 30 6261 0300 050 10 | • 3,0 | 0,50 | 10 | 6 | 2,90 | 4 | 65 | 3,00 | 40,00 | 11,27 | 11,66 | 12,53 | 13,55 |
| 30 6261 0300 050 15 | • 3,0 | 0,50 | 15 | 6 | 2,90 | 4 | 65 | 3,00 | 40,00 | 16,44 | 17,01 | 18,28 | 19,77 |
| 30 6261 0300 050 20 | • 3,0 | 0,50 | 20 | 6 | 2,90 | 4 | 65 | 3,00 | 40,00 | 21,60 | 22,36 | 24,03 | 25,98 |
| 30 6261 0300 050 25 | • 3,0 | 0,50 | 25 | 6 | 2,90 | 4 | 70 | 3,00 | 42,00 | 26,77 | 27,70 | 29,78 | - |
| 30 6261 0300 050 30 | • 3,0 | 0,50 | 30 | 6 | 2,90 | 4 | 75 | 3,00 | 43,00 | 31,94 | 33,05 | 35,53 | - |
| 30 6261 0400 050 10 | • 4,0 | 0,50 | 10 | 6 | 3,90 | 4 | 65 | 4,00 | 40,00 | 11,07 | 11,46 | 12,32 | 13,32 |
| 30 6261 0400 050 15 | • 4,0 | 0,50 | 15 | 6 | 3,90 | 4 | 65 | 4,00 | 40,00 | 16,24 | 16,81 | 18,07 | - |
| 30 6261 0400 050 20 | • 4,0 | 0,50 | 20 | 6 | 3,90 | 4 | 65 | 4,00 | 40,00 | 21,41 | 22,16 | 23,82 | - |
| 30 6261 0400 050 25 | • 4,0 | 0,50 | 25 | 6 | 3,90 | 4 | 70 | 4,00 | 42,00 | 26,58 | 27,50 | - | - |
| 30 6261 0400 050 30 | • 4,0 | 0,50 | 30 | 6 | 3,90 | 4 | 75 | 4,00 | 43,00 | 31,75 | 32,85 | - | - |
| 30 6261 0500 050 15 | • 5,0 | 0,50 | 15 | 6 | 4,90 | 4 | 65 | 5,00 | 40,00 | 16,44 | 17,01 | - | - |
| 30 6261 0500 050 20 | • 5,0 | 0,50 | 20 | 6 | 4,90 | 4 | 65 | 5,00 | 40,00 | 21,60 | 22,36 | - | - |
| 30 6261 0500 050 30 | • 5,0 | 0,50 | 30 | 6 | 4,90 | 4 | 75 | 5,00 | 43,00 | 31,94 | - | - | - |
| 30 6261 0500 050 40 | • 5,0 | 0,50 | 40 | 6 | 4,90 | 4 | 90 | 5,00 | 43,00 | 42,28 | - | - | - |
| 30 6261 0600 050 10 | • 6,0 | 0,50 | 10 | 6 | 5,90 | 4 | 65 | 6,00 | 40,00 | - | - | - | - |
| 30 6261 0600 050 15 | • 6,0 | 0,50 | 15 | 6 | 5,90 | 4 | 65 | 6,00 | 40,00 | - | - | - | - |
| 30 6261 0600 050 20 | • 6,0 | 0,50 | 20 | 6 | 5,90 | 4 | 65 | 6,00 | 40,00 | - | - | - | - |
| 30 6261 0600 050 30 | • 6,0 | 0,50 | 30 | 6 | 5,90 | 4 | 75 | 6,00 | 43,00 | - | - | - | - |
| 30 6261 0600 050 40 | • 6,0 | 0,50 | 40 | 6 | 5,90 | 4 | 90 | 6,00 | 43,00 | - | - | - | - |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



30 6262

VHM-Torusfräser, < 15xD Schnitttiefe
Solid carbide end mills with corner radius, < 15xD



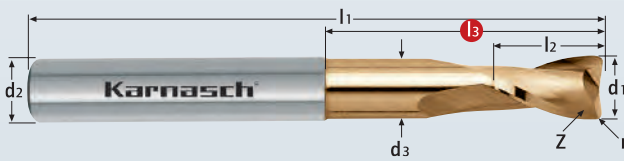
HRC < 52

STAHL
steel
< 1670 N/mm²

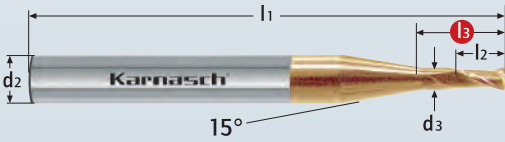
INOX
stainless steel
< 900 N/mm²
ferritic

INOX
stainless steel
> 900 N/mm²
martensitic

INOX
stainless steel
< 900 N/mm²
austenitic



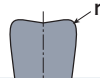
Z/2 Ø 6 - Ø 12



Z/2 Ø 0,5 - Ø 5

TOLERANZ / TOLERANCE

tol. r = -0,004



d1* = Ø ≤ 3,0 tol -0,014 / -0,028

d1* = Ø 4,0 - Ø 6,0 tol -0,020 / -0,038

d1* = Ø 8,0 - Ø 10,0 tol -0,025 / -0,047

MICRO GRAIN KARNASCH NORM

N/M DIN 6535 Form HA

25°

HHC HSC HPC

HXC-NANO³



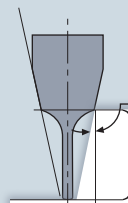
Schnittdaten
Cutting data

Zeichnungen
Drawings



Formschräge / Incline angle

Effektive Nutzlänge bei Formschräge
Effective under-neck length



| Art. | d1* | r - 0,004 | l3 | d2 h5 | d3 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|---------------------|--------|-----------|----|-------|------|----|------|--------|-------|-------|-------|-------|
| 30 6262 0050 005 02 | • 0,5 | 0,05 | 2 | 4 | 0,48 | 45 | 0,7 | 42,00 | 2,83 | 3,13 | 3,64 | 4,10 |
| 30 6262 0050 005 06 | • 0,5 | 0,05 | 6 | 4 | 0,48 | 45 | 0,7 | 42,00 | 7,20 | 7,69 | 8,44 | 9,07 |
| 30 6262 0060 006 02 | • 0,6 | 0,06 | 2 | 4 | 0,57 | 45 | 0,9 | 42,00 | 2,89 | 3,18 | 3,67 | 4,12 |
| 30 6262 0060 006 08 | • 0,6 | 0,06 | 8 | 4 | 0,57 | 45 | 0,9 | 42,00 | 9,39 | 9,93 | 10,76 | 11,44 |
| 30 6262 0080 008 04 | • 0,8 | 0,08 | 4 | 4 | 0,77 | 45 | 1,2 | 42,00 | 5,08 | 5,47 | 6,11 | 6,66 |
| 30 6262 0080 008 06 | • 0,8 | 0,08 | 6 | 4 | 0,77 | 45 | 1,2 | 42,00 | 7,24 | 7,72 | 8,46 | 9,08 |
| 30 6262 0080 008 08 | • 0,8 | 0,08 | 8 | 4 | 0,77 | 45 | 1,2 | 42,00 | 9,38 | 9,92 | 10,76 | 11,44 |
| 30 6262 0100 010 06 | • 1,0 | 0,10 | 6 | 4 | 0,95 | 45 | 1,6 | 42,00 | 7,32 | 7,78 | 8,5 | 9,11 |
| 30 6262 0100 010 10 | • 1,0 | 0,10 | 10 | 4 | 0,95 | 45 | 1,6 | 42,00 | 11,58 | 12,16 | 13,05 | 13,78 |
| 30 6262 0100 010 15 | • 1,0 | 0,10 | 15 | 4 | 0,95 | 45 | 1,6 | 42,00 | 16,84 | 17,55 | 18,60 | 19,44 |
| 30 6262 0120 012 06 | • 1,2 | 0,12 | 6 | 4 | 1,15 | 50 | 1,9 | 40,00 | 7,32 | 7,77 | 8,50 | 9,11 |
| 30 6262 0120 012 12 | • 1,2 | 0,12 | 12 | 4 | 1,15 | 50 | 1,9 | 40,00 | 13,69 | 14,32 | 15,28 | 16,06 |
| 30 6262 0150 015 06 | • 1,5 | 0,15 | 6 | 4 | 1,45 | 55 | 2,4 | 40,00 | 7,32 | 7,77 | 8,50 | 9,11 |
| 30 6262 0150 015 08 | • 1,5 | 0,15 | 8 | 4 | 1,45 | 55 | 2,4 | 40,00 | 9,45 | 9,97 | 10,79 | 11,46 |
| 30 6262 0150 015 15 | • 1,5 | 0,15 | 15 | 4 | 1,45 | 55 | 2,4 | 40,00 | 16,84 | 17,54 | 18,60 | 19,43 |
| 30 6262 0150 015 20 | • 1,5 | 0,15 | 20 | 4 | 1,45 | 55 | 2,4 | 40,00 | 22,07 | 22,87 | 24,06 | - |
| 30 6262 0200 020 06 | • 2,0 | 0,20 | 6 | 4 | 1,95 | 60 | 2,8 | 40,00 | 7,32 | 7,77 | 8,49 | 9,10 |
| 30 6262 0200 020 08 | • 2,0 | 0,20 | 8 | 4 | 1,95 | 60 | 2,8 | 40,00 | 9,45 | 9,97 | 10,78 | 11,45 |
| 30 6262 0200 020 10 | • 2,0 | 0,20 | 10 | 4 | 1,95 | 60 | 2,8 | 40,00 | 11,57 | 12,15 | 13,04 | 13,77 |
| 30 6262 0200 020 15 | • 2,0 | 0,20 | 15 | 4 | 1,95 | 60 | 2,8 | 40,00 | 16,84 | 17,54 | 18,59 | - |
| 30 6262 0200 020 20 | • 2,0 | 0,20 | 20 | 4 | 1,95 | 60 | 2,8 | 40,00 | 22,07 | 22,87 | 24,05 | - |
| 30 6262 0250 025 08 | • 2,5 | 0,25 | 8 | 4 | 2,40 | 60 | 3,5 | 40,00 | 9,62 | 10,09 | 10,87 | 11,52 |
| 30 6262 0250 025 15 | • 2,5 | 0,25 | 15 | 4 | 2,40 | 60 | 3,5 | 40,00 | 16,97 | 17,64 | 18,66 | - |
| 30 6262 0300 030 10 | • 3,0 | 0,30 | 10 | 6 | 2,90 | 60 | 4,0 | 54,00 | 11,72 | 12,26 | 13,11 | 13,82 |
| 30 6262 0300 030 15 | • 3,0 | 0,30 | 15 | 6 | 2,90 | 60 | 4,0 | 54,00 | 16,97 | 17,63 | 18,65 | 19,47 |
| 30 6262 0300 030 20 | • 3,0 | 0,30 | 20 | 6 | 2,90 | 65 | 4,0 | 57,00 | 22,18 | 22,95 | 24,10 | 25,01 |
| 30 6262 0300 030 25 | • 3,0 | 0,30 | 25 | 6 | 2,90 | 65 | 4,0 | 57,00 | 27,38 | 28,23 | 29,50 | - |
| 30 6262 0400 040 10 | • 4,0 | 0,40 | 10 | 6 | 3,90 | 70 | 5,0 | 60,00 | 11,72 | 12,25 | 13,10 | 13,81 |
| 30 6262 0400 040 15 | • 4,0 | 0,40 | 15 | 6 | 3,90 | 70 | 5,0 | 60,00 | 16,96 | 17,62 | 18,64 | 19,46 |
| 30 6262 0400 040 20 | • 4,0 | 0,40 | 20 | 6 | 3,90 | 70 | 5,0 | 61,00 | 22,18 | 22,95 | 24,10 | - |
| 30 6262 0400 040 25 | • 4,0 | 0,40 | 25 | 6 | 3,90 | 70 | 5,0 | 61,00 | 27,37 | 28,23 | - | - |
| 30 6262 0500 050 15 | • 5,0 | 0,50 | 15 | 6 | 4,90 | 70 | 6,0 | 61,00 | 11,71 | 12,24 | 13,09 | 13,79 |
| 30 6262 0500 050 20 | • 5,0 | 0,50 | 20 | 6 | 4,90 | 70 | 6,0 | 61,00 | 16,96 | 17,62 | 18,63 | 19,45 |
| 30 6262 0500 050 25 | • 5,0 | 0,50 | 25 | 6 | 4,90 | 70 | 6,0 | 61,00 | 22,17 | 22,94 | 24,09 | - |
| 30 6262 0600 050 20 | • 6,0 | 0,50 | 20 | 6 | 5,80 | 60 | 9,0 | 68,00 | 27,37 | 28,22 | - | - |
| 30 6262 0600 050 30 | • 6,0 | 0,50 | 30 | 6 | 5,80 | 70 | 9,0 | 72,00 | 16,96 | 17,62 | - | - |
| 30 6262 0600 100 20 | • 6,0 | 1,00 | 20 | 6 | 5,80 | 60 | 9,0 | 68,00 | 22,17 | 22,94 | - | - |
| 30 6262 0600 100 30 | • 6,0 | 1,00 | 30 | 6 | 5,80 | 70 | 9,0 | 72,00 | 27,37 | 28,22 | - | - |
| 30 6262 0800 050 30 | • 8,0 | 0,50 | 30 | 8 | 7,80 | 70 | 12,0 | 80,00 | - | - | - | - |
| 30 6262 0800 100 30 | • 8,0 | 1,00 | 30 | 8 | 7,80 | 70 | 12,0 | 80,00 | - | - | - | - |
| 30 6262 1000 050 40 | • 10,0 | 0,50 | 40 | 10 | 9,80 | 90 | 15,0 | 106,00 | - | - | - | - |
| 30 6262 1000 100 40 | • 10,0 | 1,00 | 40 | 10 | 9,80 | 90 | 15,0 | 106,00 | - | - | - | - |

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FÜR DIE METALLVERARBEITENDE INDUSTRIE

Efficiency for the metalworking industry

1



2



3



4



5



6



7



8



9

Index



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30 6264

PROFESSIONAL

VHM-Micro-3D Mini-Radiusfräser, < 20xD Schnitttiefe, Schaft 6 mm
Solid carbide miniature ball nose mill, < 20xD cutting depth, shank 6 mm



HRC < 70

STAHL
steel
< 1400 N/mm²

INOX
stainless steel
< 900 N/mm²
ferritic

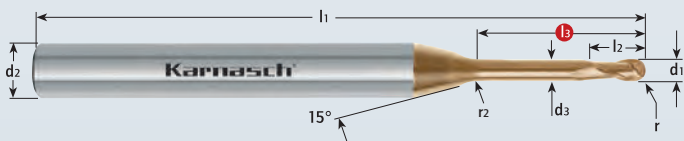
INOX
stainless steel
> 900 N/mm²
martensitic

INOX
stainless steel
< 900 N/mm²
austenitic

NI-ALLOYS
< 900 N/mm²

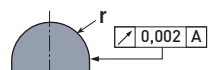
GG/G
cast iron

TITAN
titanium



TOLERANZ / TOLERANCE

tol. r max = ± 0,002

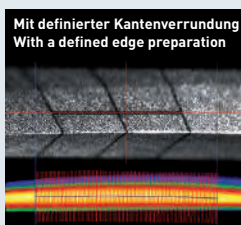


d1* = Ø 0,2 - Ø 5,9 tol -0,002 / -0,010

d1* = Ø 6,0 tol -0,004 / -0,016

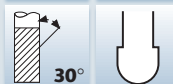
Karnasch Micro Norm.
Standard in der Serie.
Karnasch Micro Norm.
Standard in serial production.

PROFESSIONAL FINISH



MICRO GRAIN KARNASCH NORM

N/M DIN 6535 Form HA



HHC HSC HPC

HXC-NANO³

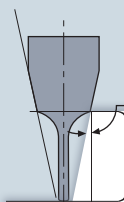


Schnittdaten
Cutting data

Zeichnungen
Drawings



Formschräge / Incline angle



Effektive Nutzlänge bei Formschräge
Effective under-neck length

| Art. | d1* | r ± 0,002 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|-------|-----------|-----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6264 0020 005 | • 0,2 | 0,10 | 0,5 | 6 | 0,18 | 1 | 55 | 0,20 | 54,00 | 0,68 | 0,71 | 0,77 | 0,83 |
| 30 6264 0020 01 | • 0,2 | 0,10 | 1 | 6 | 0,18 | 1 | 55 | 0,20 | 54,00 | 1,20 | 1,25 | 1,34 | 1,45 |
| 30 6264 0030 01 | • 0,3 | 0,15 | 1 | 6 | 0,28 | 2 | 55 | 0,25 | 49,00 | 1,29 | 1,37 | 1,50 | 1,62 |
| 30 6264 0030 02 | • 0,3 | 0,15 | 2 | 6 | 0,28 | 2 | 55 | 0,25 | 49,00 | 2,35 | 2,46 | 2,65 | 2,86 |
| 30 6264 0030 03 | • 0,3 | 0,15 | 3 | 6 | 0,28 | 2 | 55 | 0,25 | 49,00 | 3,40 | 3,53 | 3,80 | 4,10 |
| 30 6264 0030 05 | • 0,3 | 0,15 | 5 | 6 | 0,28 | 5 | 55 | 0,25 | 27,91 | 6,11 | 6,56 | 7,26 | 7,85 |
| 30 6264 0040 02 | • 0,4 | 0,20 | 2 | 6 | 0,38 | 2 | 55 | 0,30 | 44,00 | 2,35 | 2,46 | 2,65 | 2,86 |
| 30 6264 0040 03 | • 0,4 | 0,20 | 3 | 6 | 0,38 | 2 | 55 | 0,30 | 44,00 | 3,40 | 3,53 | 3,80 | 4,10 |
| 30 6264 0040 04 | • 0,4 | 0,20 | 4 | 6 | 0,38 | 2 | 55 | 0,30 | 44,00 | 4,44 | 4,60 | 4,95 | 5,35 |
| 30 6264 0040 06 | • 0,4 | 0,20 | 6 | 6 | 0,38 | 2 | 55 | 0,30 | 44,00 | 6,51 | 6,74 | 7,24 | 7,83 |
| 30 6264 0050 02 | • 0,5 | 0,25 | 2 | 6 | 0,48 | 2 | 55 | 0,40 | 44,00 | 2,35 | 2,46 | 2,65 | 2,86 |
| 30 6264 0050 03 | • 0,5 | 0,25 | 3 | 6 | 0,48 | 2 | 55 | 0,40 | 44,00 | 3,40 | 3,53 | 3,80 | 4,10 |
| 30 6264 0050 04 | • 0,5 | 0,25 | 4 | 6 | 0,48 | 2 | 55 | 0,40 | 44,00 | 4,44 | 4,60 | 4,95 | 5,35 |
| 30 6264 0050 05 | • 0,5 | 0,25 | 5 | 6 | 0,48 | 2 | 55 | 0,40 | 44,00 | 5,48 | 5,67 | 6,09 | 6,59 |
| 30 6264 0060 02 | • 0,6 | 0,30 | 2 | 6 | 0,58 | 4 | 55 | 0,50 | 42,00 | 2,50 | 2,67 | 2,94 | 3,19 |
| 30 6264 0060 03 | • 0,6 | 0,30 | 3 | 6 | 0,58 | 4 | 55 | 0,50 | 42,00 | 3,57 | 3,78 | 4,10 | 4,43 |
| 30 6264 0060 04 | • 0,6 | 0,30 | 4 | 6 | 0,58 | 4 | 55 | 0,50 | 42,00 | 4,63 | 4,87 | 5,25 | 5,67 |
| 30 6264 0060 05 | • 0,6 | 0,30 | 5 | 6 | 0,58 | 4 | 55 | 0,50 | 42,00 | 5,69 | 5,95 | 6,40 | 6,92 |
| 30 6264 0060 06 | • 0,6 | 0,30 | 6 | 6 | 0,58 | 4 | 55 | 0,50 | 42,00 | 6,74 | 7,02 | 7,55 | 8,16 |
| 30 6264 0060 08 | • 0,6 | 0,30 | 8 | 6 | 0,58 | 4 | 55 | 0,50 | 42,00 | 8,83 | 9,16 | 9,85 | 10,65 |
| 30 6264 0080 02 | • 0,8 | 0,40 | 2 | 6 | 0,77 | 4 | 55 | 0,60 | 42,00 | 2,54 | 2,70 | 2,97 | 3,21 |
| 30 6264 0080 04 | • 0,8 | 0,40 | 4 | 6 | 0,77 | 4 | 55 | 0,60 | 42,00 | 4,67 | 4,89 | 5,27 | 5,70 |
| 30 6264 0080 05 | • 0,8 | 0,40 | 5 | 6 | 0,77 | 4 | 55 | 0,60 | 42,00 | 5,72 | 5,97 | 6,42 | 6,94 |
| 30 6264 0080 06 | • 0,8 | 0,40 | 6 | 6 | 0,77 | 4 | 55 | 0,60 | 42,00 | 6,77 | 7,04 | 7,57 | 8,18 |
| 30 6264 0080 07 | • 0,8 | 0,40 | 7 | 6 | 0,77 | 10 | 55 | 0,60 | 23,11 | 8,29 | 8,79 | 9,57 | 10,21 |
| 30 6264 0080 08 | • 0,8 | 0,40 | 8 | 6 | 0,77 | 4 | 55 | 0,60 | 42,00 | 8,85 | 9,18 | 9,87 | 10,67 |
| 30 6264 0080 10 | • 0,8 | 0,40 | 10 | 6 | 0,77 | 4 | 65 | 0,60 | 42,00 | 10,93 | 11,32 | 12,17 | 13,16 |
| 30 6264 0090 06 | • 0,9 | 0,45 | 6 | 6 | 0,87 | 10 | 55 | 0,70 | 23,11 | 7,21 | 7,67 | 8,40 | 9,01 |
| 30 6264 0090 12 | • 0,9 | 0,45 | 12 | 6 | 0,87 | 10 | 65 | 0,70 | 23,11 | 13,61 | 14,25 | 15,21 | 15,99 |
| 30 6264 0100 03 | • 1,0 | 0,50 | 3 | 6 | 0,95 | 4 | 55 | 0,80 | 42,00 | 3,67 | 3,85 | 4,16 | 4,50 |
| 30 6264 0100 04 | • 1,0 | 0,50 | 4 | 6 | 0,95 | 4 | 55 | 0,80 | 42,00 | 4,72 | 4,94 | 5,31 | 5,74 |
| 30 6264 0100 05 | • 1,0 | 0,50 | 5 | 6 | 0,95 | 4 | 55 | 0,80 | 42,00 | 5,77 | 6,01 | 6,41 | 6,99 |
| 30 6264 0100 06 | • 1,0 | 0,50 | 6 | 6 | 0,95 | 4 | 55 | 0,80 | 42,00 | 6,82 | 7,08 | 7,61 | 8,23 |
| 30 6264 0100 07 | • 1,0 | 0,50 | 7 | 6 | 0,95 | 4 | 55 | 0,80 | 42,00 | 7,86 | 8,15 | 8,76 | 9,47 |
| 30 6264 0100 08 | • 1,0 | 0,50 | 8 | 6 | 0,95 | 4 | 55 | 0,80 | 42,00 | 8,90 | 9,22 | 9,91 | 10,72 |
| 30 6264 0100 10 | • 1,0 | 0,50 | 10 | 6 | 0,95 | 4 | 65 | 0,80 | 43,00 | 10,98 | 11,36 | 12,21 | 13,20 |
| 30 6264 0100 12 | • 1,0 | 0,50 | 12 | 6 | 0,95 | 4 | 65 | 0,80 | 43,00 | 13,04 | 13,50 | 14,51 | 15,69 |
| 30 6264 0100 15 | • 1,0 | 0,50 | 15 | 6 | 0,95 | 4 | 65 | 0,80 | 43,00 | 16,14 | 16,71 | 17,96 | 19,42 |
| 30 6264 0100 20 | • 1,0 | 0,50 | 20 | 6 | 0,95 | 4 | 65 | 0,80 | 44,00 | 21,31 | 22,06 | 23,71 | 25,63 |



PROFESSIONAL



30 6264

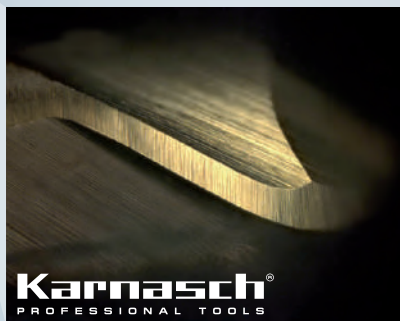
| Art. | d1* | r ± 0,002 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|-----------------|-------|-----------|----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6264 0120 05 | • 1,2 | 0,60 | 5 | 6 | 1,15 | 4 | 55 | 1,00 | 42,00 | 5,72 | 5,97 | 6,42 | 6,94 |
| 30 6264 0120 06 | • 1,2 | 0,60 | 6 | 6 | 1,15 | 4 | 55 | 1,00 | 42,00 | 6,77 | 7,04 | 7,57 | 8,18 |
| 30 6264 0120 08 | • 1,2 | 0,60 | 8 | 6 | 1,15 | 4 | 55 | 1,00 | 42,00 | 8,85 | 9,18 | 9,87 | 10,67 |
| 30 6264 0120 10 | • 1,2 | 0,60 | 10 | 6 | 1,15 | 4 | 65 | 1,00 | 42,00 | 10,93 | 11,32 | 12,17 | 13,16 |
| 30 6264 0120 12 | • 1,2 | 0,60 | 12 | 6 | 1,15 | 4 | 65 | 1,00 | 42,00 | 13,04 | 13,50 | 14,51 | 15,69 |
| 30 6264 0120 15 | • 1,2 | 0,60 | 15 | 6 | 1,15 | 4 | 65 | 1,00 | 42,00 | 16,15 | 16,71 | 17,96 | 19,42 |
| 30 6264 0120 20 | • 1,2 | 0,60 | 20 | 6 | 1,15 | 4 | 65 | 1,00 | 42,00 | 21,31 | 22,06 | 23,71 | 25,63 |
| 30 6264 0120 25 | • 1,2 | 0,60 | 25 | 6 | 1,15 | 4 | 70 | 1,00 | 43,00 | 26,48 | 27,41 | 29,46 | 31,58 |
| 30 6264 0140 15 | • 1,4 | 0,70 | 15 | 6 | 1,35 | 10 | 65 | 1,10 | 22,51 | 16,81 | 17,50 | 18,54 | 19,37 |
| 30 6264 0150 06 | • 1,5 | 0,75 | 6 | 6 | 1,44 | 4 | 55 | 1,20 | 42,00 | 6,77 | 7,04 | 7,57 | 8,18 |
| 30 6264 0150 08 | • 1,5 | 0,75 | 8 | 6 | 1,44 | 4 | 55 | 1,20 | 42,00 | 8,85 | 9,18 | 9,87 | 10,67 |
| 30 6264 0150 10 | • 1,5 | 0,75 | 10 | 6 | 1,44 | 4 | 65 | 1,20 | 42,00 | 10,93 | 11,32 | 12,17 | 13,16 |
| 30 6264 0150 12 | • 1,5 | 0,75 | 12 | 6 | 1,44 | 4 | 65 | 1,20 | 42,00 | 13,01 | 13,46 | 14,47 | 15,64 |
| 30 6264 0150 15 | • 1,5 | 0,75 | 15 | 6 | 1,44 | 4 | 65 | 1,20 | 42,00 | 16,11 | 16,67 | 17,92 | 19,37 |
| 30 6264 0150 20 | • 1,5 | 0,75 | 20 | 6 | 1,44 | 4 | 65 | 1,20 | 43,00 | 21,28 | 22,02 | 23,67 | 25,59 |
| 30 6264 0160 15 | • 1,6 | 0,80 | 15 | 6 | 1,54 | 10 | 65 | 1,30 | 22,51 | 16,84 | 17,52 | 18,55 | 19,36 |
| 30 6264 0180 20 | • 1,8 | 0,90 | 20 | 6 | 1,74 | 10 | 65 | 1,40 | 22,51 | 22,06 | 22,84 | 24,00 | 24,91 |
| 30 6264 0200 06 | • 2,0 | 1,00 | 6 | 6 | 1,92 | 4 | 55 | 1,50 | 42,00 | 6,90 | 7,14 | 7,68 | 8,30 |
| 30 6264 0200 08 | • 2,0 | 1,00 | 8 | 6 | 1,92 | 4 | 55 | 1,50 | 42,00 | 8,97 | 9,28 | 9,98 | 10,79 |
| 30 6264 0200 10 | • 2,0 | 1,00 | 10 | 6 | 1,92 | 4 | 65 | 1,50 | 42,00 | 11,04 | 11,42 | 12,28 | 13,27 |
| 30 6264 0200 12 | • 2,0 | 1,00 | 12 | 6 | 1,92 | 4 | 65 | 1,50 | 42,00 | 13,10 | 13,56 | 14,58 | 15,76 |
| 30 6264 0200 15 | • 2,0 | 1,00 | 15 | 6 | 1,92 | 4 | 65 | 1,50 | 42,00 | 16,20 | 16,77 | 18,03 | 19,49 |
| 30 6264 0200 20 | • 2,0 | 1,00 | 20 | 6 | 1,92 | 4 | 65 | 1,50 | 43,00 | 21,37 | 22,12 | 23,77 | 25,70 |
| 30 6264 0200 25 | • 2,0 | 1,00 | 25 | 6 | 1,92 | 4 | 70 | 1,50 | 43,00 | 26,54 | 27,47 | 29,52 | 31,92 |
| 30 6264 0200 30 | • 2,0 | 1,00 | 30 | 6 | 1,92 | 4 | 75 | 1,50 | 43,00 | 31,71 | 32,81 | 35,27 | 38,13 |
| 30 6264 0250 10 | • 2,5 | 1,25 | 10 | 6 | 2,40 | 4 | 65 | 2,50 | 40,00 | 11,07 | 11,46 | 12,32 | 13,32 |
| 30 6264 0250 15 | • 2,5 | 1,25 | 15 | 6 | 2,40 | 4 | 65 | 2,50 | 40,00 | 16,24 | 16,81 | 18,07 | 19,53 |
| 30 6264 0250 20 | • 2,5 | 1,25 | 20 | 6 | 2,40 | 4 | 65 | 2,50 | 40,00 | 21,41 | 22,16 | 23,82 | 25,75 |
| 30 6264 0250 25 | • 2,5 | 1,25 | 25 | 6 | 2,40 | 4 | 70 | 2,50 | 42,00 | 26,58 | 27,50 | 29,57 | 31,97 |
| 30 6264 0300 05 | • 3,0 | 1,50 | 5 | 6 | 2,90 | 4 | 55 | 2,50 | 40,00 | 6,10 | 6,31 | 6,78 | 7,33 |
| 30 6264 0300 10 | • 3,0 | 1,50 | 10 | 6 | 2,90 | 4 | 65 | 2,50 | 40,00 | 11,27 | 11,66 | 12,53 | 13,55 |
| 30 6264 0300 15 | • 3,0 | 1,50 | 15 | 6 | 2,90 | 4 | 65 | 2,50 | 40,00 | 16,44 | 17,01 | 18,28 | 19,77 |
| 30 6264 0300 20 | • 3,0 | 1,50 | 20 | 6 | 2,90 | 4 | 65 | 2,50 | 40,00 | 21,60 | 22,36 | 24,03 | 25,98 |
| 30 6264 0300 25 | • 3,0 | 1,50 | 25 | 6 | 2,90 | 4 | 70 | 2,50 | 42,00 | 26,77 | 27,70 | 29,78 | - |
| 30 6264 0300 30 | • 3,0 | 1,50 | 30 | 6 | 2,90 | 4 | 75 | 2,50 | 43,00 | 31,94 | 33,05 | 35,53 | - |
| 30 6264 0400 10 | • 4,0 | 2,00 | 10 | 6 | 3,90 | 4 | 65 | 3,20 | 40,00 | 11,07 | 11,46 | 12,32 | 13,32 |
| 30 6264 0400 15 | • 4,0 | 2,00 | 15 | 6 | 3,90 | 4 | 65 | 3,20 | 40,00 | 16,24 | 16,81 | 18,07 | - |
| 30 6264 0400 20 | • 4,0 | 2,00 | 20 | 6 | 3,90 | 4 | 65 | 3,20 | 40,00 | 21,41 | 22,16 | 23,82 | - |
| 30 6264 0400 25 | • 4,0 | 2,00 | 25 | 6 | 3,90 | 4 | 70 | 3,20 | 42,00 | 26,58 | 27,50 | - | - |
| 30 6264 0400 30 | • 4,0 | 2,00 | 30 | 6 | 3,90 | 4 | 75 | 3,20 | 43,00 | 31,75 | 32,85 | - | - |
| 30 6264 0500 10 | • 5,0 | 2,50 | 10 | 6 | 4,90 | 4 | 65 | 4,00 | 40,00 | 11,27 | 11,66 | 12,53 | - |
| 30 6264 0500 15 | • 5,0 | 2,50 | 15 | 6 | 4,90 | 4 | 65 | 4,00 | 40,00 | 16,44 | 17,01 | - | - |
| 30 6264 0500 20 | • 5,0 | 2,50 | 20 | 6 | 4,90 | 4 | 65 | 4,00 | 40,00 | 21,60 | 22,36 | - | - |
| 30 6264 0500 25 | • 5,0 | 2,50 | 25 | 6 | 4,90 | 4 | 70 | 4,00 | 43,00 | 26,77 | 27,70 | - | - |
| 30 6264 0500 30 | • 5,0 | 2,50 | 30 | 6 | 4,90 | 4 | 75 | 4,00 | 43,00 | 31,94 | - | - | - |
| 30 6264 0500 40 | • 5,0 | 2,50 | 40 | 6 | 4,90 | 4 | 90 | 4,00 | 43,00 | 42,28 | - | - | - |
| 30 6264 0600 10 | • 6,0 | 3,00 | 10 | 6 | 5,90 | 4 | 65 | 5,00 | 40,00 | - | - | - | - |
| 30 6264 0600 15 | • 6,0 | 3,00 | 15 | 6 | 5,90 | 4 | 65 | 5,00 | 40,00 | - | - | - | - |
| 30 6264 0600 20 | • 6,0 | 3,00 | 20 | 6 | 5,90 | 4 | 65 | 5,00 | 40,00 | - | - | - | - |
| 30 6264 0600 25 | • 6,0 | 3,00 | 25 | 6 | 5,90 | 4 | 70 | 5,00 | 43,00 | - | - | - | - |
| 30 6264 0600 30 | • 6,0 | 3,00 | 30 | 6 | 5,90 | 4 | 75 | 5,00 | 43,00 | - | - | - | - |
| 30 6264 0600 40 | • 6,0 | 3,00 | 40 | 6 | 5,90 | 4 | 90 | 5,00 | 43,00 | - | - | - | - |
| 30 6264 0600 50 | • 6,0 | 3,00 | 50 | 6 | 5,90 | 4 | 90 | 5,00 | 44,00 | - | - | - | - |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

30 6264 0100 15



Droplet-freie Beschichtung HXC-Nano³
Droplet-free coating HXC-Nano³



250-fache Vergrößerung
250-times magnification



Mitbewerber
Competitor



30 6276

VHM High Efficient Finishing Parabelfräser
Solid carbide high efficient finishing parabola end mill



HRC < 70

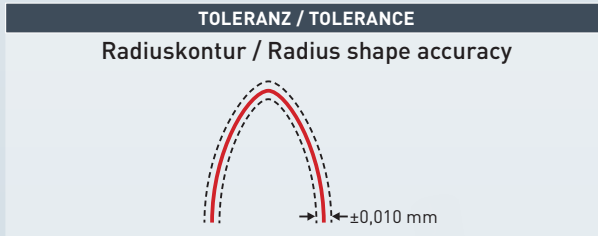
INOX
stainless steel
< 900 N/mm²
ferritic

INOX
stainless steel
> 900 N/mm²
martensitic

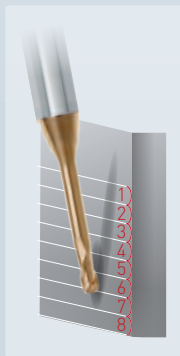
INOX
stainless steel
< 900 N/mm²
austenitic

NI-ALLOYS
< 900 N/mm²

INCONEL
HASTELLOY
TITANIUM



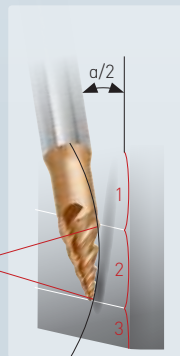
Konventionelle Bearbeitung
Conventional processing



VHM Kugelfräser
– Geringe Zustellung
in ap

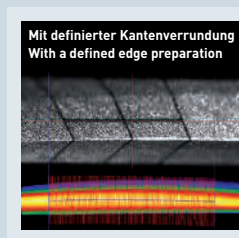
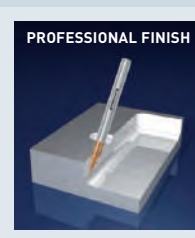
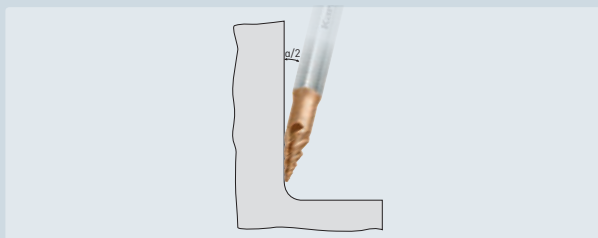
Solid carbide ball end
mill
– Small stepover in ap

Neue innovative Bearbeitungsstrategie
New innovative machining strategy



High Efficient Finishing Parabelfräser für 5 Achsen
Zerspanung mit 45° Spirale und 4 Schneiden
– bis zu 90-fach bessere Oberflächen
– bis zu 90% kürzere Bearbeitungszeiten
– wirtschaftliche Bearbeitung durch hohe Zustellung
in ap
– Reduzierung kostenintensiver Poliervorgänge

High efficient finishing parabola end mill for 5-axis
machining with 45° spiral and 4 cutting edges
– up to 90 times higher surface quality
– up to 90% shorter machining time
– efficient processing through high stepover in ap
– reduction of cost intensive polishing processes



Wir empfehlen die Fräser mit dem Anstellwinkel $a/2$ einzusetzen.
We recommend to use the end mills with work angle $a/2$.

| | |
|-----------------------|-----------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| 45° | HHC HSC HPC |
| HHC HSC HPC | HXC-NANO ³ |
| HXC-NANO ³ | |

Schnittdaten
Cutting data



1210-1211

Zeichnungen
Drawings



DXF/STEP

| Art. | d1 | r1 | r3 | a/2 | r2 | l2 | l3 | l4 | l1 | d3 | d4 | d2 | z | € |
|-----------------------|-------|------|-------|--------|----|-------|------|------|-----|-----|------|----|---|--------|
| 30 6276 0250 0125 10 | • 1,0 | 0,50 | 12,5 | 10,17° | 4 | 4,68 | 10,0 | 13,5 | 50 | 2,4 | 2,5 | 4 | 4 | 61,00 |
| 30 6276 0500 3501 75 | • 1,0 | 0,50 | 350 | 12,60° | 4 | 9,50 | 17,5 | 19,9 | 70 | – | 5 | 6 | 4 | 70,00 |
| 30 6276 0375 01875 15 | • 1,5 | 0,75 | 18,75 | 10,19° | 4 | 7,01 | 15,0 | 16,3 | 50 | 3,6 | 3,75 | 4 | 4 | 61,00 |
| 30 6276 0500 025 20 | • 2,0 | 1,00 | 25 | 10,18° | 4 | 9,35 | 20,0 | 22,8 | 60 | 4,8 | 5 | 6 | 4 | 67,00 |
| 30 6276 0700 350 175 | • 2,0 | 1,00 | 350 | 13,39° | 4 | 11,50 | 17,5 | 19,9 | 80 | – | 7 | 8 | 4 | 87,00 |
| 30 6276 0750 0375 30 | • 3,0 | 1,50 | 37,5 | 10,18° | 4 | 14,03 | 30,0 | 31,8 | 80 | 7,3 | 7,5 | 8 | 4 | 88,00 |
| 30 6276 1000 050 40 | • 4,0 | 2,00 | 50 | 10,18° | 4 | 18,70 | 40,0 | 45,2 | 100 | 9,5 | 10 | 12 | 4 | 128,00 |
| 30 6276 0900 350 175 | • 4,0 | 2,00 | 350 | 12,16° | 4 | 13,50 | 17,5 | 23,6 | 100 | – | 9 | 12 | 4 | 124,00 |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

Hocheffiziente 5-Achs-Bearbeitung von Ebenen und Freiformflächen

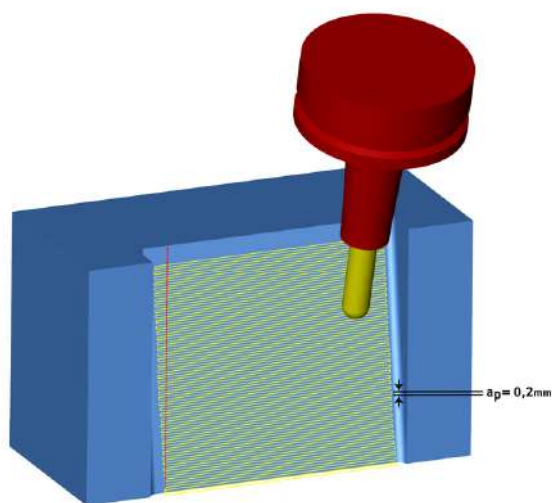
Der Einsatz der Karnasch Parabelfräser bedarf eines 5-Achsen Fräszentrum sowie einer leistungsstarken CAM-Lösung, die das Potenzial der Werkzeuggeometrie voll ausschöpft. Das Performance-Paket *hyperMILL®* MAXX Machining bietet innovative 5-Achs-Schlichtstrategien für die Bearbeitung von Ebenen und Freiformflächen. Intelligente Automatismen sorgen für eine optimale Anstellung und Führung des Werkzeugs. So lassen sich exzellente Oberflächen und eine enorme Zeiteinsparung auch in schwer zugänglichen Bereichen erzielen.

Bis zu 90 % Zeiteinsparung beim Schlichten

Durch die großen Radien an der Mantelschneide können Flächen mit sehr großen Zeilenabständen bearbeitet werden. Gegenüber konventionellen Bearbeitungsverfahren beträgt das Einsparungspotential bis zu 90 % und das bei gleichbleibender Oberflächenqualität.

Vergleich der Zeilenabstände herkömmlicher VHM-Kugelfräser zu den neuen Parabelfräsern

hyperMILL®
MAXX Machining



Kleine Bahnabstände führen zu langen Bearbeitungszeiten
Small step-over result in a long machining process.

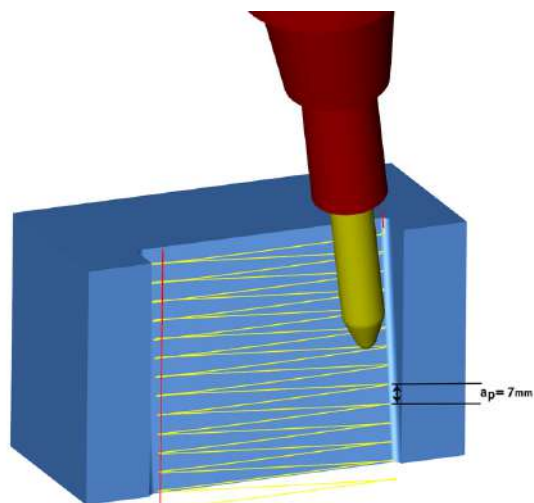
High efficient 5-axis machining of planes and free-form surfaces

Use of Karnasch High Efficient Parabola end mills demands a 5-axis milling machine together with a powerful CAM solution that fully exploits the potential of the tool geometry. The performance package *hyperMILL®* MAXX Machining offers innovative 5-axis finishing strategies for machining of planes and free-form surfaces. Intelligent automated functions ensure optimal inclination and guidance of the end mill. This allows high surface qualities and a tremendous time savings even in hard-to-reach areas.

Up to 90 % time saving when finishing

The large radii at the curved cutting edge enable flat surfaces with great step-over distance to be cut. The same surface quality compared to conventional machining, saves up to 90 % machining time.

Step-over comparison of conventional solid carbide ball end mills with the new Parabola end mills



Große Bahnabstände ermöglichen eine enorme Zeiteinsparung bei der Bearbeitung

Wide step-over enables enormous time saving during the machining process.

1



2



3



4



5



6



7



8



9



30 6265

PROFESSIONAL
★ ★ ★

VHM-Micro-Schaftfräser mit Eckenradius, konischer Hals 0,4° - 0,9° - 1,4° - 1,9° < 35xD
Micro end mill with corner radius, conical neck - 0,4° - 0,9° - 1,4° - 1,9° < 35xD



HRC < 70

STAHL
steel
< 1400 N/mm²

INOX
stainless steel
< 900 N/mm²
ferritic

INOX
stainless steel
> 900 N/mm²
martensitic

INOX
stainless steel
< 900 N/mm²
austenitic

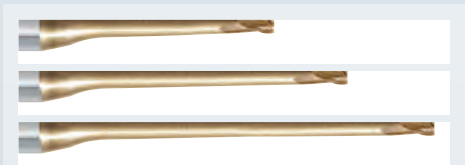
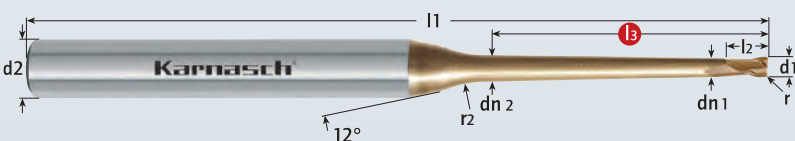
NI-ALLOYS
< 900 N/mm²

INCONEL
HASTELLOY
TITANIUM

HARDOX

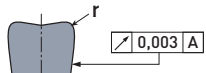
GJL

GJS



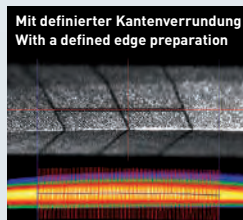
TOLERANZ / TOLERANCE

tol. r = -0,004



d1* = Ø 0,2 - Ø 2,0 tol -0,004 / -0,018

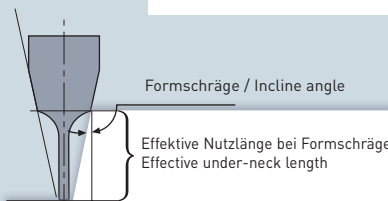
d1* = Ø 2,1 - Ø 6,0 tol -0,006 / -0,020



Schnittdaten
Cutting data



Zeichnungen
Drawings



| Art. | d1* | r - 0,004 | α | l3 | d2 h5 | l2 | dn 1 | dn 2 | r2 | l1 | € | 0° | 0,5° | 1° | 2° | 3° |
|--------------------|-----|-----------|------|----|-------|------|------|-------|----|----|-------|------|------|-------|-------|-------|
| 30 6265 0020 14 02 | 0,2 | 0,05 | 1,4° | 2 | 6 | 0,15 | 0,17 | 0,260 | 10 | 55 | 40,20 | 0,75 | 1,15 | 2,50 | 3,28 | 3,82 |
| 30 6265 0020 14 03 | 0,2 | 0,05 | 1,4° | 3 | 6 | 0,15 | 0,17 | 0,309 | 10 | 55 | 40,20 | 0,75 | 1,15 | 2,52 | 4,39 | 5,02 |
| 30 6265 0020 19 02 | 0,2 | 0,05 | 1,9° | 2 | 6 | 0,15 | 0,17 | 0,293 | 10 | 55 | 40,20 | 0,60 | 0,80 | 1,22 | 3,09 | 3,69 |
| 30 6265 0020 19 03 | 0,2 | 0,05 | 1,9° | 3 | 6 | 0,15 | 0,17 | 0,359 | 10 | 55 | 40,20 | 0,60 | 0,80 | 1,22 | 4,12 | 4,85 |
| 30 6265 0040 09 04 | 0,4 | 0,05 | 0,9° | 4 | 6 | 0,30 | 0,37 | 0,486 | 2 | 55 | 33,31 | 1,25 | 2,82 | 4,33 | 4,76 | 5,28 |
| 30 6265 0040 09 05 | 0,4 | 0,05 | 0,9° | 5 | 6 | 0,30 | 0,37 | 0,518 | 2 | 55 | 33,31 | 1,25 | 2,82 | 5,34 | 5,87 | 6,51 |
| 30 6265 0040 14 04 | 0,4 | 0,05 | 1,4° | 4 | 6 | 0,30 | 0,37 | 0,551 | 10 | 55 | 32,71 | 0,91 | 1,39 | 3,07 | 5,51 | 6,21 |
| 30 6265 0040 14 06 | 0,4 | 0,05 | 1,4° | 6 | 6 | 0,30 | 0,37 | 0,649 | 10 | 55 | 32,71 | 0,91 | 1,39 | 3,07 | 7,68 | 8,50 |
| 30 6265 0040 19 04 | 0,4 | 0,05 | 1,9° | 4 | 6 | 0,30 | 0,37 | 0,615 | 10 | 55 | 32,71 | 0,74 | 1,00 | 1,53 | 5,19 | 6,01 |
| 30 6265 0040 19 06 | 0,4 | 0,05 | 1,9° | 6 | 6 | 0,30 | 0,37 | 0,748 | 10 | 55 | 32,71 | 0,74 | 1,00 | 1,53 | 7,23 | 8,25 |
| 30 6265 0050 09 05 | 0,5 | 0,05 | 0,9° | 5 | 6 | 0,40 | 0,47 | 0,615 | 2 | 55 | 29,40 | 1,35 | 3,05 | 5,35 | 5,88 | 6,52 |
| 30 6265 0050 09 08 | 0,5 | 0,05 | 0,9° | 8 | 6 | 0,40 | 0,47 | 0,709 | 2 | 55 | 29,40 | 1,35 | 3,05 | 8,38 | 9,20 | 10,20 |
| 30 6265 0050 09 10 | 0,5 | 0,05 | 0,9° | 10 | 6 | 0,40 | 0,47 | 0,772 | 2 | 55 | 29,40 | 1,35 | 3,05 | 10,39 | 11,42 | 12,66 |
| 30 6265 0060 09 12 | 0,6 | 0,06 | 0,9° | 12 | 6 | 0,40 | 0,57 | 0,934 | 4 | 55 | 29,40 | 1,35 | 3,05 | 12,59 | 13,85 | 15,36 |
| 30 6265 0060 09 15 | 0,6 | 0,06 | 0,9° | 15 | 6 | 0,40 | 0,57 | 1,029 | 4 | 55 | 29,40 | 1,35 | 2,97 | 15,62 | 17,17 | 19,05 |
| 30 6265 0060 14 06 | 0,6 | 0,06 | 1,4° | 6 | 6 | 0,40 | 0,57 | 0,844 | 10 | 55 | 28,80 | 1,01 | 1,54 | 3,40 | 7,69 | 8,51 |
| 30 6265 0060 14 08 | 0,6 | 0,06 | 1,4° | 8 | 6 | 0,40 | 0,57 | 0,941 | 10 | 55 | 28,80 | 1,01 | 1,54 | 3,40 | 9,84 | 10,77 |
| 30 6265 0060 14 10 | 0,6 | 0,06 | 1,4° | 10 | 6 | 0,40 | 0,57 | 1,039 | 10 | 55 | 28,80 | 1,01 | 1,54 | 3,40 | 11,97 | 12,99 |
| 30 6265 0060 14 12 | 0,6 | 0,06 | 1,4° | 12 | 6 | 0,40 | 0,57 | 1,137 | 10 | 55 | 28,80 | 1,01 | 1,54 | 3,40 | 14,09 | 15,20 |
| 30 6265 0060 14 15 | 0,6 | 0,06 | 1,4° | 15 | 6 | 0,40 | 0,57 | 1,284 | 10 | 55 | 28,80 | 1,01 | 1,54 | 3,40 | 17,26 | 18,48 |
| 30 6265 0060 19 08 | 0,6 | 0,06 | 1,9° | 8 | 6 | 0,40 | 0,57 | 1,074 | 10 | 55 | 28,80 | 0,85 | 1,12 | 1,73 | 9,31 | 10,46 |
| 30 6265 0060 19 12 | 0,6 | 0,06 | 1,9° | 12 | 6 | 0,40 | 0,57 | 1,340 | 10 | 55 | 28,80 | 0,85 | 1,12 | 1,73 | 13,38 | 14,81 |
| 30 6265 0060 19 15 | 0,6 | 0,06 | 1,9° | 15 | 6 | 0,40 | 0,57 | 1,539 | 10 | 55 | 28,80 | 0,85 | 1,12 | 1,73 | 16,42 | 18,04 |
| 30 6265 0080 09 12 | 0,8 | 0,08 | 0,9° | 12 | 6 | 0,50 | 0,77 | 1,131 | 4 | 55 | 29,40 | 1,45 | 3,27 | 12,60 | 13,86 | 15,37 |
| 30 6265 0080 14 08 | 0,8 | 0,08 | 1,4° | 8 | 6 | 0,50 | 0,77 | 1,137 | 10 | 55 | 28,80 | - | - | - | - | - |
| 30 6265 0080 14 12 | 0,8 | 0,08 | 1,4° | 12 | 6 | 0,50 | 0,77 | 1,332 | 10 | 55 | 28,80 | 1,11 | 1,69 | 13,35 | 14,40 | 15,40 |
| 30 6265 0080 14 16 | 0,8 | 0,08 | 1,4° | 16 | 6 | 0,50 | 0,77 | 1,528 | 10 | 55 | 28,80 | 1,11 | 1,69 | 17,57 | 18,70 | 19,81 |
| 30 6265 0080 19 08 | 0,8 | 0,08 | 1,9° | 8 | 6 | 0,50 | 0,77 | 1,268 | 10 | 55 | 28,80 | 0,95 | 1,91 | 1,26 | 9,33 | 10,47 |
| 30 6265 0080 19 12 | 0,8 | 0,08 | 1,9° | 12 | 6 | 0,50 | 0,77 | 1,533 | 10 | 55 | 28,80 | 0,95 | 1,91 | 1,26 | 13,40 | 14,82 |
| 30 6265 0080 19 16 | 0,8 | 0,08 | 1,9° | 16 | 6 | 0,50 | 0,77 | 1,798 | 10 | 55 | 28,80 | 0,95 | 1,91 | 1,26 | 17,47 | 19,12 |
| 30 6265 0100 04 08 | 1,0 | 0,10 | 0,4° | 8 | 6 | 0,80 | 0,94 | 1,041 | 4 | 55 | 29,40 | 5,10 | 8,63 | 9,01 | 9,93 | 11,01 |
| 30 6265 0100 09 10 | 1,0 | 0,10 | 0,9° | 10 | 6 | 0,80 | 0,94 | 1,229 | 4 | 55 | 29,40 | 2,71 | 6,10 | 10,70 | 11,75 | 13,04 |
| 30 6265 0100 09 15 | 1,0 | 0,10 | 0,9° | 15 | 6 | 0,80 | 0,94 | 1,386 | 4 | 60 | 29,40 | 2,71 | 6,10 | 15,74 | 17,29 | 19,18 |
| 30 6265 0100 09 20 | 1,0 | 0,10 | 0,9° | 20 | 6 | 0,80 | 0,94 | 1,543 | 4 | 65 | 30,00 | 2,71 | 6,10 | 20,79 | 22,83 | 25,33 |
| 30 6265 0100 09 25 | 1,0 | 0,10 | 0,9° | 25 | 6 | 0,80 | 0,94 | 1,700 | 4 | 70 | 30,60 | 2,71 | 6,10 | 25,83 | 28,37 | 31,47 |
| 30 6265 0100 09 30 | 1,0 | 0,10 | 0,9° | 30 | 6 | 0,80 | 0,94 | 1,857 | 4 | 75 | 30,60 | 2,71 | 6,10 | 30,88 | 33,91 | 37,62 |
| 30 6265 0100 09 35 | 1,0 | 0,10 | 0,9° | 35 | 6 | 0,80 | 0,94 | 2,015 | 4 | 80 | 30,60 | 2,71 | 6,10 | 35,92 | 39,46 | 43,76 |
| 30 6265 0100 14 10 | 1,0 | 0,10 | 1,4° | 10 | 6 | 0,80 | 0,94 | 1,390 | 10 | 55 | 28,80 | 2,03 | 3,10 | 6,84 | 12,11 | 13,08 |
| 30 6265 0100 14 15 | 1,0 | 0,10 | 1,4° | 15 | 6 | 0,80 | 0,94 | 1,634 | 10 | 60 | 28,80 | 2,03 | 3,10 | 6,84 | 17,38 | 18,55 |
| 30 6265 0100 14 20 | 1,0 | 0,10 | 1,4° | 20 | 6 | 0,80 | 0,94 | 1,878 | 10 | 65 | 29,40 | 2,03 | 3,10 | 6,84 | 22,61 | 23,94 |
| 30 6265 0100 14 25 | 1,0 | 0,10 | 1,4° | 25 | 6 | 0,80 | 0,94 | 2,123 | 10 | 70 | 30,00 | 2,03 | 3,10 | 6,84 | 27,82 | 29,29 |
| 30 6265 0100 14 30 | 1,0 | 0,10 | 1,4° | 30 | 6 | 0,80 | 0,94 | 2,367 | 10 | 75 | 30,00 | 2,03 | 3,10 | 6,84 | 33,02 | 34,61 |



PROFESSIONAL



30 6265

| Art. | d1* | r - 0,004 | λ | l3 | d2 h5 | l2 | dn 1 | dn 2 | r2 | l1 | € | 0° | 0,5° | 1° | 2° | 3° |
|--------------------|-------|-----------|------|----|-------|------|------|-------|----|-----|-------|------|-------|-------|-------|-------|
| 30 6265 0100 19 10 | % 1,0 | 0,10 | 1,9° | 10 | 6 | 0,80 | 0,94 | 1,550 | 10 | 55 | 28,80 | 1,70 | 2,28 | 3,49 | 11,58 | 12,76 |
| 30 6265 0100 19 15 | % 1,0 | 0,10 | 1,9° | 15 | 6 | 0,80 | 0,94 | 1,882 | 10 | 60 | 28,80 | 1,70 | 2,28 | 3,49 | 16,65 | 18,14 |
| 30 6265 0100 19 20 | % 1,0 | 0,10 | 1,9° | 20 | 6 | 0,80 | 0,94 | 2,214 | 10 | 65 | 29,40 | 1,70 | 2,28 | 3,49 | 21,71 | 23,46 |
| 30 6265 0100 19 25 | % 1,0 | 0,10 | 1,9° | 25 | 6 | 0,80 | 0,94 | 2,546 | 10 | 70 | 30,00 | 1,70 | 2,28 | 3,49 | 26,77 | 28,75 |
| 30 6265 0100 19 30 | % 1,0 | 0,10 | 1,9° | 30 | 6 | 0,80 | 0,94 | 2,877 | 10 | 75 | 30,00 | 1,70 | 2,28 | 3,49 | 31,83 | 34,01 |
| 30 6265 0150 09 15 | % 1,5 | 0,15 | 0,9° | 15 | 6 | 1,35 | 1,42 | 1,849 | 4 | 60 | 29,40 | 3,90 | 8,77 | 15,84 | 17,40 | 19,30 |
| 30 6265 0150 09 25 | % 1,5 | 0,15 | 0,9° | 25 | 6 | 1,35 | 1,42 | 2,163 | 4 | 70 | 30,60 | 3,90 | 8,77 | 25,93 | 28,48 | 31,59 |
| 30 6265 0150 09 30 | % 1,5 | 0,15 | 0,9° | 30 | 6 | 1,35 | 1,42 | 2,320 | 4 | 75 | 30,60 | 3,90 | 8,77 | 30,97 | 34,02 | 37,73 |
| 30 6265 0150 14 15 | % 1,5 | 0,15 | 1,4° | 15 | 6 | 1,35 | 1,42 | 2,087 | 10 | 60 | 28,80 | 2,99 | 4,56 | 10,08 | 17,48 | 18,61 |
| 30 6265 0150 14 20 | % 1,5 | 0,15 | 1,4° | 20 | 6 | 1,35 | 1,42 | 2,332 | 10 | 65 | 29,40 | 2,99 | 4,56 | 10,08 | 22,70 | 24,00 |
| 30 6265 0150 14 30 | % 1,5 | 0,15 | 1,4° | 30 | 6 | 1,35 | 1,42 | 2,820 | 10 | 75 | 30,00 | 2,99 | 4,56 | 10,08 | 33,09 | 34,65 |
| 30 6265 0150 19 15 | % 1,5 | 0,15 | 1,9° | 15 | 6 | 1,35 | 1,42 | 2,326 | 10 | 60 | 28,80 | 2,56 | 3,41 | 5,23 | 16,84 | 18,22 |
| 30 6265 0150 19 20 | % 1,5 | 0,15 | 1,9° | 20 | 6 | 1,35 | 1,42 | 2,657 | 10 | 65 | 29,40 | 2,56 | 3,41 | 5,23 | 21,89 | 23,54 |
| 30 6265 0200 09 30 | % 2,0 | 0,20 | 0,9° | 30 | 6 | 1,70 | 1,92 | 2,809 | 4 | 70 | 30,60 | 4,25 | 9,55 | 31,00 | 34,05 | 37,77 |
| 30 6265 0200 09 40 | % 2,0 | 0,20 | 0,9° | 40 | 6 | 1,70 | 1,92 | 3,123 | 4 | 80 | 30,60 | 4,25 | 9,55 | 41,09 | 45,13 | - |
| 30 6265 0200 09 50 | % 2,0 | 0,20 | 0,9° | 50 | 6 | 1,70 | 1,92 | 3,438 | 4 | 90 | 31,80 | 4,25 | 9,55 | 51,18 | 56,21 | - |
| 30 6265 0200 14 25 | % 2,0 | 0,20 | 1,4° | 25 | 6 | 1,70 | 1,92 | 3,059 | 10 | 65 | 29,40 | 3,34 | 5,08 | 11,18 | 27,93 | 29,35 |
| 30 6265 0200 14 30 | % 2,0 | 0,20 | 1,4° | 30 | 6 | 1,70 | 1,92 | 3,303 | 10 | 70 | 30,00 | 3,34 | 5,08 | 11,18 | 33,12 | 34,66 |
| 30 6265 0200 14 35 | % 2,0 | 0,20 | 1,4° | 35 | 6 | 1,70 | 1,92 | 3,548 | 10 | 75 | 30,00 | 3,34 | 5,08 | 11,18 | 38,29 | - |
| 30 6265 0200 19 20 | % 2,0 | 0,20 | 1,9° | 20 | 6 | 1,70 | 1,92 | 3,134 | 10 | 65 | 29,40 | 2,91 | 3,87 | 5,91 | 21,95 | 23,57 |
| 30 6265 0200 19 30 | % 2,0 | 0,20 | 1,9° | 30 | 6 | 1,70 | 1,92 | 3,798 | 10 | 70 | 30,00 | 2,91 | 3,87 | 5,91 | 32,06 | 34,10 |
| 30 6265 0200 19 35 | % 2,0 | 0,20 | 1,9° | 35 | 6 | 1,70 | 1,92 | 4,129 | 10 | 75 | 30,00 | 2,91 | 3,87 | 5,91 | 37,11 | - |
| 30 6265 0200 19 40 | % 2,0 | 0,20 | 1,9° | 40 | 6 | 1,70 | 1,92 | 4,461 | 10 | 80 | 30,00 | 2,91 | 3,87 | 5,91 | 42,15 | - |
| 30 6265 0300 09 40 | % 3,0 | 0,30 | 0,9° | 40 | 6 | 2,50 | 2,86 | 4,038 | 4 | 80 | 30,60 | 6,96 | 15,65 | 41,31 | - | - |
| 30 6265 0300 09 60 | % 3,0 | 0,30 | 0,9° | 60 | 6 | 2,50 | 2,86 | 4,667 | 4 | 100 | 31,80 | 6,96 | 15,65 | 61,49 | - | - |
| 30 6265 0300 14 40 | % 3,0 | 0,30 | 1,4° | 40 | 6 | 2,50 | 2,86 | 4,693 | 10 | 80 | 30,00 | 5,36 | 8,16 | 18,00 | - | - |
| 30 6265 0300 14 50 | % 3,0 | 0,30 | 1,4° | 50 | 6 | 2,50 | 2,86 | 5,182 | 10 | 90 | 31,20 | 5,36 | 8,16 | 18,00 | - | - |
| 30 6265 0300 19 30 | % 3,0 | 0,30 | 1,9° | 30 | 6 | 2,50 | 2,86 | 4,685 | 10 | 70 | 30,00 | 4,60 | 6,13 | 9,39 | 32,33 | - |
| 30 6265 0300 19 40 | % 3,0 | 0,30 | 1,9° | 40 | 6 | 2,50 | 2,86 | 5,348 | 10 | 80 | 30,00 | 4,60 | 6,13 | 9,39 | 42,42 | - |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

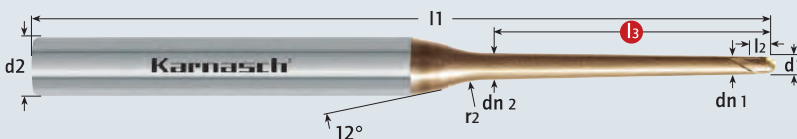


Index

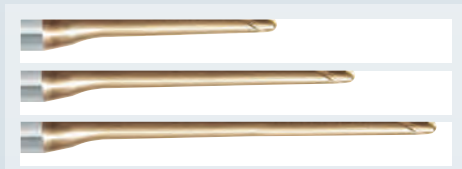
30 6266

PROFESSIONAL

VHM-Micro-Radiusfräser konischer Hals 0,4° - 0,9° - 1,4° - 1,9° < 35xD
 Micro end mill, radius cutter, conical neck - 0,4° - 0,9° - 1,4° - 1,9° < 35xD



| | |
|--------------------|-----------------------------|
| MICRO GRAIN | KARNASCH NORM |
| N/M | DIN 6535 Form HA |
| | |
| | HHC HSC HPC |
| | HXC-NANO³ |
| | |



TOLERANZ / TOLERANCE

tol. r = ±0,003

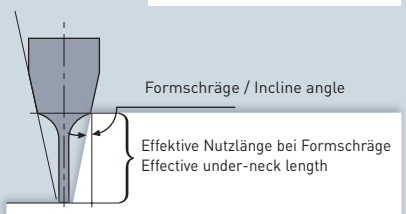
d1* = Ø 0,2 - Ø 2,0 tol -0,004 / -0,018
 d1* = Ø 2,1 - Ø 6,0 tol -0,006 / -0,020

PROFESSIONAL FINISH

Mit definierter Kantenverrundung
 With a defined edge preparation

Schnittdaten Cutting data | Zeichnungen Drawings

1183 | DXF/STEP



| Art. | d1* | r ± 0,003 | ψ | l3 | d2 h5 | l2 | dn 1 | dn 2 | r2 | l1 | € | 0,5° | 1° | 2° | 3° |
|---------------------|-----|-----------|------|-----|-------|------|------|-------|----|----|-------|------|-------|-------|-------|
| 30 6266 0020 04 010 | 0,2 | 0,10 | 0,4° | 1 | 6 | 0,15 | 0,17 | 0,182 | 1 | 55 | 40,80 | 1,19 | 1,24 | 1,37 | 1,51 |
| 30 6266 0020 04 015 | 0,2 | 0,10 | 0,4° | 1,5 | 6 | 0,15 | 0,17 | 0,189 | 1 | 55 | 40,80 | 1,69 | 1,77 | 1,94 | 2,16 |
| 30 6266 0020 09 020 | 0,2 | 0,10 | 0,9° | 2 | 6 | 0,15 | 0,17 | 0,228 | 1 | 55 | 40,80 | 2,08 | 2,20 | 2,42 | 2,69 |
| 30 6266 0020 09 025 | 0,2 | 0,10 | 0,9° | 2,5 | 6 | 0,15 | 0,17 | 0,244 | 1 | 55 | 40,80 | 2,49 | 2,71 | 2,98 | 3,30 |
| 30 6266 0020 14 020 | 0,2 | 0,10 | 1,4° | 2 | 6 | 0,15 | 0,17 | 0,260 | 10 | 55 | 40,20 | 1,10 | 2,46 | 3,26 | 3,80 |
| 30 6266 0020 14 030 | 0,2 | 0,10 | 1,4° | 3 | 6 | 0,15 | 0,17 | 0,309 | 10 | 55 | 40,20 | 1,13 | 2,42 | 4,37 | 5,00 |
| 30 6266 0020 19 020 | 0,2 | 0,10 | 1,9° | 2 | 6 | 0,15 | 0,17 | 0,293 | 10 | 55 | 40,20 | 0,76 | 1,14 | 3,07 | 3,67 |
| 30 6266 0020 19 030 | 0,2 | 0,10 | 1,9° | 3 | 6 | 0,15 | 0,17 | 0,359 | 10 | 55 | 40,20 | 0,76 | 1,14 | 4,09 | 4,83 |
| 30 6266 0040 04 020 | 0,4 | 0,20 | 0,4° | 2 | 6 | 0,30 | 0,37 | 0,394 | 2 | 55 | 33,31 | 2,29 | 2,41 | 2,65 | 2,93 |
| 30 6266 0040 04 030 | 0,4 | 0,20 | 0,4° | 3 | 6 | 0,30 | 0,37 | 0,408 | 2 | 55 | 33,31 | 3,30 | 3,46 | 3,80 | 4,22 |
| 30 6266 0040 09 040 | 0,4 | 0,20 | 0,9° | 4 | 6 | 0,30 | 0,37 | 0,486 | 2 | 55 | 33,31 | 2,82 | 4,33 | 4,76 | 5,28 |
| 30 6266 0040 09 050 | 0,4 | 0,20 | 0,9° | 5 | 6 | 0,30 | 0,37 | 0,518 | 2 | 55 | 33,31 | 2,82 | 5,34 | 5,87 | 6,51 |
| 30 6266 0040 14 040 | 0,4 | 0,20 | 1,4° | 4 | 6 | 0,30 | 0,37 | 0,551 | 10 | 55 | 33,31 | 1,21 | 2,22 | 5,47 | 6,17 |
| 30 6266 0040 14 060 | 0,4 | 0,20 | 1,4° | 6 | 6 | 0,30 | 0,37 | 0,649 | 10 | 55 | 32,71 | 1,21 | 2,22 | 7,64 | 8,47 |
| 30 6266 0040 19 040 | 0,4 | 0,20 | 1,9° | 4 | 6 | 0,30 | 0,37 | 0,615 | 10 | 55 | 32,71 | 0,95 | 1,37 | 5,13 | 5,91 |
| 30 6266 0060 04 020 | 0,6 | 0,30 | 0,4° | 2 | 6 | 0,40 | 0,57 | 0,592 | 4 | 55 | 29,40 | 2,42 | 2,60 | 2,88 | 3,20 |
| 30 6266 0060 04 040 | 0,6 | 0,30 | 0,4° | 4 | 6 | 0,40 | 0,57 | 0,620 | 4 | 55 | 29,40 | 4,45 | 4,73 | 5,20 | 5,77 |
| 30 6266 0060 09 060 | 0,6 | 0,30 | 0,9° | 6 | 6 | 0,40 | 0,57 | 0,746 | 4 | 55 | 29,40 | 3,05 | 6,51 | 7,20 | 7,99 |
| 30 6266 0060 09 080 | 0,6 | 0,30 | 0,9° | 8 | 6 | 0,40 | 0,57 | 0,809 | 4 | 55 | 29,40 | 3,05 | 8,54 | 9,42 | 10,44 |
| 30 6266 0060 09 100 | 0,6 | 0,30 | 0,9° | 10 | 6 | 0,40 | 0,57 | 0,872 | 4 | 55 | 29,40 | 3,05 | 10,56 | 11,63 | 12,90 |
| 30 6266 0060 09 120 | 0,6 | 0,30 | 0,9° | 12 | 6 | 0,40 | 0,57 | 0,934 | 4 | 55 | 29,40 | 3,05 | 12,59 | 13,85 | 15,36 |
| 30 6266 0060 09 150 | 0,6 | 0,30 | 0,9° | 15 | 6 | 0,40 | 0,57 | 1,029 | 4 | 55 | 29,40 | 3,05 | 15,62 | 17,17 | 19,05 |
| 30 6266 0060 14 060 | 0,6 | 0,30 | 1,4° | 6 | 6 | 0,40 | 0,57 | 0,844 | 10 | 55 | 28,80 | 1,41 | 2,80 | 7,63 | 8,45 |
| 30 6266 0060 14 080 | 0,6 | 0,30 | 1,4° | 8 | 6 | 0,40 | 0,57 | 0,941 | 10 | 55 | 28,80 | 1,41 | 2,80 | 9,78 | 10,71 |
| 30 6266 0060 14 100 | 0,6 | 0,30 | 1,4° | 10 | 6 | 0,40 | 0,57 | 1,039 | 10 | 55 | 28,80 | 1,41 | 2,80 | 11,92 | 12,94 |
| 30 6266 0060 14 120 | 0,6 | 0,30 | 1,4° | 12 | 6 | 0,40 | 0,57 | 1,137 | 10 | 55 | 28,80 | 1,41 | 2,80 | 14,04 | 15,15 |
| 30 6266 0060 14 150 | 0,6 | 0,30 | 1,4° | 15 | 6 | 0,40 | 0,57 | 1,284 | 10 | 55 | 28,80 | 1,41 | 2,80 | 17,21 | 18,44 |
| 30 6266 0060 19 080 | 0,6 | 0,30 | 1,9° | 8 | 6 | 0,40 | 0,57 | 1,074 | 10 | 55 | 28,80 | 1,05 | 1,47 | 9,21 | 10,40 |
| 30 6266 0080 04 040 | 0,8 | 0,40 | 0,4° | 4 | 6 | 0,50 | 0,77 | 0,819 | 4 | 55 | 29,40 | 4,46 | 4,74 | 5,20 | 5,77 |
| 30 6266 0080 04 060 | 0,8 | 0,40 | 0,4° | 6 | 6 | 0,50 | 0,77 | 0,847 | 4 | 55 | 29,40 | 6,49 | 6,84 | 7,52 | 8,34 |
| 30 6266 0080 09 080 | 0,8 | 0,40 | 0,9° | 8 | 6 | 0,50 | 0,77 | 1,006 | 4 | 55 | 29,40 | 3,27 | 8,55 | 9,42 | 10,45 |
| 30 6266 0080 09 120 | 0,8 | 0,40 | 0,9° | 12 | 6 | 0,50 | 0,77 | 1,131 | 4 | 55 | 29,40 | 3,27 | 12,60 | 13,86 | 15,37 |
| 30 6266 0080 09 160 | 0,8 | 0,40 | 0,9° | 16 | 6 | 0,50 | 0,77 | 1,257 | 4 | 55 | 29,40 | 3,27 | 16,64 | 18,29 | 20,29 |
| 30 6266 0080 14 080 | 0,8 | 0,40 | 1,4° | 8 | 6 | 0,50 | 0,77 | 1,137 | 10 | 55 | 28,80 | 1,51 | 2,90 | 9,78 | 10,70 |
| 30 6266 0080 14 120 | 0,8 | 0,40 | 1,4° | 12 | 6 | 0,50 | 0,77 | 1,332 | 10 | 55 | 28,80 | 1,51 | 2,90 | 14,04 | 15,14 |
| 30 6266 0080 14 160 | 0,8 | 0,40 | 1,4° | 16 | 6 | 0,50 | 0,77 | 1,528 | 10 | 55 | 28,80 | 1,51 | 2,90 | 18,27 | 19,51 |
| 30 6266 0080 19 120 | 0,8 | 0,40 | 1,9° | 12 | 6 | 0,50 | 0,77 | 1,533 | 10 | 55 | 28,80 | 1,15 | 1,57 | 13,29 | 14,75 |
| 30 6266 0080 19 160 | 0,8 | 0,40 | 1,9° | 16 | 6 | 0,50 | 0,77 | 1,798 | 10 | 55 | 28,80 | 1,15 | 1,57 | 17,36 | 19,06 |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index



PROFESSIONAL



30 6266

| Art. | d1* | r ± 0,003 | ψ | l3 | d2 h5 | l2 | dn 1 | dn 2 | r2 | l1 | € | 0,5° | 1° | 2° | 3° |
|---------------------|-----|-----------|------|----|-------|------|------|-------|----|-----|-------|-------|-------|-------|-------|
| 30 6266 0100 04 060 | 1,0 | 0,50 | 0,4° | 6 | 6 | 0,80 | 0,94 | 1,013 | 4 | 55 | 29,40 | 6,61 | 6,93 | 7,61 | 8,45 |
| 30 6266 0100 04 080 | 1,0 | 0,50 | 0,4° | 8 | 6 | 0,80 | 0,94 | 1,041 | 4 | 55 | 29,40 | 6,63 | 6,93 | 7,61 | 8,45 |
| 30 6266 0100 09 100 | 1,0 | 0,50 | 0,9° | 10 | 6 | 0,80 | 0,94 | 1,229 | 4 | 55 | 29,40 | 6,10 | 10,70 | 11,75 | 13,04 |
| 30 6266 0100 09 350 | 1,0 | 0,50 | 0,9° | 35 | 6 | 0,80 | 0,94 | 2,015 | 4 | 80 | 30,60 | 6,10 | 36,56 | 39,01 | 40,40 |
| 30 6266 0150 04 080 | 1,5 | 0,75 | 0,4° | 8 | 6 | 1,35 | 1,42 | 1,513 | 4 | 55 | 29,40 | 8,72 | 9,11 | 10,01 | 11,10 |
| 30 6266 0150 04 100 | 1,5 | 0,75 | 0,4° | 10 | 6 | 1,35 | 1,42 | 1,541 | 4 | 55 | 29,40 | 10,73 | 11,22 | 12,32 | 13,67 |
| 30 6266 0150 04 120 | 1,5 | 0,75 | 0,4° | 12 | 6 | 1,35 | 1,42 | 1,569 | 4 | 55 | 29,40 | 12,75 | 13,33 | 14,64 | 16,23 |
| 30 6266 0150 09 300 | 1,5 | 0,75 | 0,9° | 30 | 6 | 1,35 | 1,42 | 2,320 | 4 | 75 | 30,60 | 8,77 | 30,97 | 34,02 | 37,73 |
| 30 6266 0200 04 080 | 2,0 | 1,00 | 0,4° | 8 | 6 | 1,70 | 1,92 | 2,008 | 4 | 55 | 29,40 | 8,73 | 9,12 | 10,02 | 11,11 |
| 30 6266 0200 04 120 | 2,0 | 1,00 | 0,4° | 12 | 6 | 1,70 | 1,92 | 2,064 | 4 | 55 | 29,40 | 12,77 | 13,34 | 14,65 | 16,25 |
| 30 6266 0200 04 160 | 2,0 | 1,00 | 0,4° | 16 | 6 | 1,70 | 1,92 | 2,120 | 4 | 60 | 30,00 | 16,80 | 17,55 | 19,28 | 21,38 |
| 30 6266 0200 09 200 | 2,0 | 1,00 | 0,9° | 20 | 6 | 1,70 | 1,92 | 2,495 | 4 | 65 | 30,00 | 9,55 | 20,91 | 22,97 | 25,48 |
| 30 6266 0200 09 250 | 2,0 | 1,00 | 0,9° | 25 | 6 | 1,70 | 1,92 | 2,652 | 4 | 65 | 30,00 | 9,55 | 25,96 | 28,51 | 31,62 |
| 30 6266 0200 09 300 | 2,0 | 1,00 | 0,9° | 30 | 6 | 1,70 | 1,92 | 2,809 | 4 | 70 | 30,60 | 9,55 | 31,00 | 34,05 | 37,77 |
| 30 6266 0200 09 350 | 2,0 | 1,00 | 0,9° | 35 | 6 | 1,70 | 1,92 | 2,966 | 4 | 75 | 30,60 | 9,55 | 36,05 | 39,59 | - |
| 30 6266 0200 09 400 | 2,0 | 1,00 | 0,9° | 40 | 6 | 1,70 | 1,92 | 3,123 | 4 | 80 | 30,60 | 9,55 | 41,09 | 45,13 | - |
| 30 6266 0200 09 500 | 2,0 | 1,00 | 0,9° | 50 | 6 | 1,70 | 1,92 | 3,438 | 4 | 90 | 31,80 | 9,55 | 51,18 | 56,21 | - |
| 30 6266 0200 14 400 | 2,0 | 1,00 | 1,4° | 40 | 6 | 1,70 | 1,92 | 3,792 | 10 | 80 | 30,00 | 4,63 | 9,20 | 43,38 | - |
| 30 6266 0300 04 080 | 3,0 | 1,50 | 0,4° | 8 | 6 | 2,50 | 2,86 | 2,937 | 4 | 55 | 29,40 | 8,91 | 9,31 | 10,22 | 11,34 |
| 30 6266 0300 04 160 | 3,0 | 1,50 | 0,4° | 16 | 6 | 2,50 | 2,86 | 3,048 | 4 | 55 | 29,40 | 16,98 | 17,74 | 19,48 | 21,61 |
| 30 6266 0300 04 200 | 3,0 | 1,50 | 0,4° | 20 | 6 | 2,50 | 2,86 | 3,104 | 4 | 60 | 30,00 | 21,01 | 21,95 | 24,11 | 26,74 |
| 30 6266 0300 09 300 | 3,0 | 1,50 | 0,9° | 30 | 6 | 2,50 | 2,86 | 3,724 | 4 | 70 | 30,60 | 15,65 | 31,22 | 34,29 | - |
| 30 6266 0300 09 400 | 3,0 | 1,50 | 0,9° | 40 | 6 | 2,50 | 2,86 | 4,038 | 4 | 80 | 30,60 | 15,65 | 41,31 | - | - |
| 30 6266 0300 09 500 | 3,0 | 1,50 | 0,9° | 50 | 6 | 2,50 | 2,86 | 4,352 | 4 | 90 | 31,80 | 15,65 | 51,40 | - | - |
| 30 6266 0300 09 600 | 3,0 | 1,50 | 0,9° | 60 | 6 | 2,50 | 2,86 | 4,667 | 4 | 100 | 33,96 | 15,65 | 61,49 | - | - |

⊘ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
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Index

30 6266 0060 19 080



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- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9



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EASILY SCAN AND REGISTER

Karnasch®
PROFESSIONAL TOOLS

VHM-Schaftfräser, Rockwell Cutter
Solid carbide end mills, Rockwell Cutter



PROFESSIONAL



30 6269

HRC
< 70

STAHL
steel
< 1670 N/mm²

INOX
stainless steel
< 900 N/mm²
ferritic

INOX
stainless steel
> 900 N/mm²
martensitic

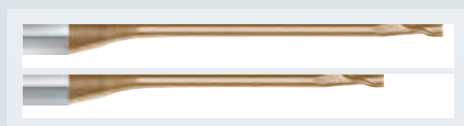
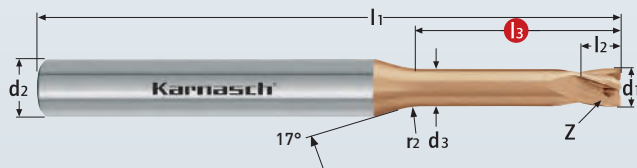
INOX
stainless steel
< 900 N/mm²
austenitic

NI-ALLOYS
< 900 N/mm²

GJL

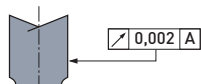
GJS

TITAN
titanium



TOLERANZ / TOLERANCE

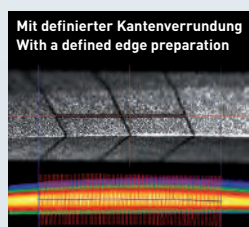
scharfkantig / sharp edge



d1* = Ø 1,0 - Ø 4,0 tol 0,000 / -0,008

d1* = Ø 6,0 tol -0,004 / -0,018

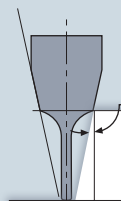
Karnasch Micro Norm.
Standard in der Serie.
Karnasch Micro Norm.
Standard in serial production.



Schnittdaten
Cutting data



Zeichnungen
Drawings



Formschräge / Incline angle

Effektive Nutzlänge bei Formschräge
Effective under-neck length

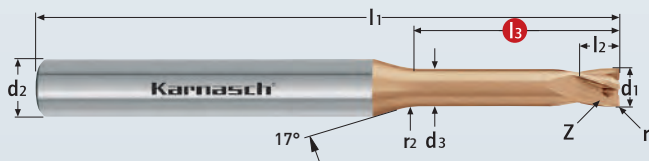
| Art. | d1* | l3 | d2 h5 | d3 | r2 | l1 | l2 | Z | € | Formschräge / Incline angle | | | |
|-----------------|-------|----|-------|------|----|----|------|---|-------|-----------------------------|-------|-------|-------|
| | | | | | | | | | | 0,5° | 1° | 2° | 3° |
| 30 6269 0100 04 | • 1,0 | 4 | 4 | 0,94 | 4 | 50 | 0,80 | 4 | 48,00 | 4,75 | 4,95 | 5,30 | 5,66 |
| 30 6269 0100 06 | • 1,0 | 6 | 4 | 0,94 | 4 | 50 | 0,80 | 4 | 48,00 | 6,84 | 7,08 | 7,55 | 8,08 |
| 30 6269 0100 08 | • 1,0 | 8 | 4 | 0,94 | 4 | 50 | 0,80 | 4 | 48,00 | 8,92 | 9,22 | 9,81 | 10,49 |
| 30 6269 0100 10 | • 1,0 | 10 | 4 | 0,94 | 4 | 50 | 0,80 | 4 | 48,00 | 10,99 | 11,34 | 12,07 | 12,90 |
| 30 6269 0100 12 | • 1,0 | 12 | 4 | 0,94 | 4 | 60 | 0,80 | 4 | 50,00 | 13,06 | 13,46 | 14,33 | 15,32 |
| 30 6269 0150 04 | • 1,5 | 4 | 4 | 1,42 | 4 | 50 | 1,35 | 4 | 48,00 | 4,80 | 5,00 | 5,33 | 5,70 |
| 30 6269 0150 08 | • 1,5 | 8 | 4 | 1,42 | 4 | 50 | 1,35 | 4 | 48,00 | 8,96 | 9,25 | 9,86 | 10,53 |
| 30 6269 0150 12 | • 1,5 | 12 | 4 | 1,42 | 4 | 60 | 1,35 | 4 | 50,00 | 13,10 | 13,50 | 14,37 | 15,36 |
| 30 6269 0200 04 | • 2,0 | 4 | 4 | 1,92 | 4 | 50 | 1,70 | 4 | 48,00 | 4,80 | 5,00 | 5,33 | 5,70 |
| 30 6269 0200 08 | • 2,0 | 8 | 4 | 1,92 | 4 | 50 | 1,70 | 4 | 48,00 | 8,96 | 9,26 | 9,85 | 10,67 |
| 30 6269 0200 12 | • 2,0 | 12 | 4 | 1,92 | 4 | 60 | 1,70 | 4 | 50,00 | 13,10 | 13,50 | 14,37 | 15,36 |
| 30 6269 0300 08 | • 3,0 | 8 | 6 | 2,86 | 4 | 60 | 2,50 | 4 | 57,00 | 9,08 | 9,36 | 9,96 | 10,65 |
| 30 6269 0300 12 | • 3,0 | 12 | 6 | 2,86 | 4 | 60 | 2,50 | 4 | 57,00 | 13,20 | 13,60 | 14,48 | 15,48 |
| 30 6269 0300 16 | • 3,0 | 16 | 6 | 2,86 | 4 | 60 | 2,50 | 4 | 57,00 | 17,32 | 17,84 | 18,99 | 20,31 |
| 30 6269 0400 12 | • 4,0 | 12 | 6 | 3,90 | 4 | 60 | 4,00 | 4 | 58,00 | 13,13 | 13,53 | 14,41 | 15,40 |
| 30 6269 0400 20 | • 4,0 | 20 | 6 | 3,90 | 4 | 60 | 4,00 | 4 | 58,00 | 21,37 | 22,01 | 23,44 | - |
| 30 6269 0400 30 | • 4,0 | 30 | 6 | 3,90 | 4 | 80 | 4,00 | 4 | 64,00 | 31,66 | 32,62 | - | - |
| 30 6269 0600 12 | • 6,0 | 12 | 6 | 5,90 | 4 | 60 | 6,00 | 4 | 58,00 | - | - | - | - |
| 30 6269 0600 20 | • 6,0 | 20 | 6 | 5,90 | 4 | 60 | 6,00 | 4 | 58,00 | - | - | - | - |
| 30 6269 0600 30 | • 6,0 | 30 | 6 | 5,90 | 4 | 80 | 6,00 | 4 | 64,00 | - | - | - | - |
| 30 6269 0600 40 | • 6,0 | 40 | 6 | 5,90 | 4 | 90 | 6,00 | 4 | 66,00 | - | - | - | - |



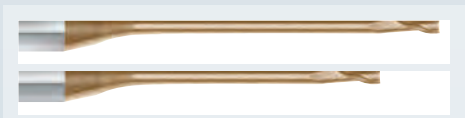
30 6267

PROFESSIONAL

VHM-Gesenckfräser mit Eckenradius, kurz, Rockwell Cutter
Solid carbide end mills with corner radius, short, Rockwell Cutter

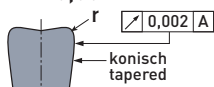


| | |
|--------------------|-----------------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HA |
| | |
| | HSC HHC |
| | HXC-NANO³ |
| | |



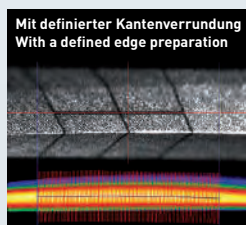
TOLERANZ / TOLERANCE

tol. r = -0,004



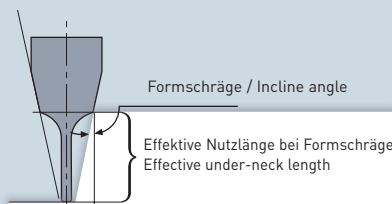
Karnasch Micro Norm. Standard in der Serie.
Karnasch Micro Norm. Standard in serial production.

d1* = Ø 1,0 - Ø 4,0 tol 0,000 / -0,008



Schnittdaten
Cutting data

Zeichnungen
Drawings



| Art. | d1* | r -0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | Z | € | 0,5° | 1° | 2° | 3° |
|---------------------|-------|----------|----|-------|------|----|----|------|---|-------|-------|-------|-------|-------|
| 30 6267 0100 005 04 | • 1,0 | 0,05 | 4 | 4 | 0,94 | 4 | 50 | 0,8 | 4 | 48,00 | 4,75 | 4,95 | 5,30 | 5,66 |
| 30 6267 0100 005 06 | • 1,0 | 0,05 | 6 | 4 | 0,94 | 4 | 50 | 0,8 | 4 | 48,00 | 6,84 | 7,08 | 7,55 | 8,08 |
| 30 6267 0100 005 08 | • 1,0 | 0,05 | 8 | 4 | 0,94 | 4 | 50 | 0,8 | 4 | 48,00 | 8,92 | 9,22 | 9,81 | 10,49 |
| 30 6267 0100 005 10 | • 1,0 | 0,05 | 10 | 4 | 0,94 | 4 | 50 | 0,8 | 4 | 48,00 | 10,99 | 11,34 | 12,07 | 12,90 |
| 30 6267 0100 005 12 | • 1,0 | 0,05 | 12 | 4 | 0,94 | 4 | 60 | 0,8 | 4 | 50,00 | 13,06 | 13,46 | 14,33 | 15,32 |
| 30 6267 0100 005 16 | • 1,0 | 0,05 | 16 | 4 | 0,94 | 4 | 60 | 0,8 | 4 | 50,00 | 17,18 | 17,70 | 18,85 | 20,15 |
| 30 6267 0100 005 20 | • 1,0 | 0,05 | 20 | 4 | 0,94 | 4 | 60 | 0,8 | 4 | 50,00 | 21,30 | 21,95 | 23,36 | 24,97 |
| 30 6267 0100 010 04 | • 1,0 | 0,10 | 4 | 4 | 0,94 | 4 | 50 | 0,8 | 4 | 48,00 | 4,75 | 4,95 | 5,30 | 5,66 |
| 30 6267 0100 010 06 | • 1,0 | 0,10 | 6 | 4 | 0,94 | 4 | 50 | 0,8 | 4 | 48,00 | 6,84 | 7,08 | 7,55 | 8,08 |
| 30 6267 0100 010 08 | • 1,0 | 0,10 | 8 | 4 | 0,94 | 4 | 50 | 0,8 | 4 | 48,00 | 8,92 | 9,22 | 9,81 | 10,49 |
| 30 6267 0100 010 10 | • 1,0 | 0,10 | 10 | 4 | 0,94 | 4 | 50 | 0,8 | 4 | 48,00 | 10,99 | 11,34 | 12,07 | 12,90 |
| 30 6267 0100 010 12 | • 1,0 | 0,10 | 12 | 4 | 0,94 | 4 | 60 | 0,8 | 4 | 50,00 | 13,06 | 13,46 | 14,33 | 15,32 |
| 30 6267 0100 010 16 | • 1,0 | 0,10 | 16 | 4 | 0,94 | 4 | 60 | 0,8 | 4 | 50,00 | 17,18 | 17,71 | 18,85 | 20,15 |
| 30 6267 0100 010 20 | • 1,0 | 0,10 | 20 | 4 | 0,94 | 4 | 60 | 0,8 | 4 | 50,00 | 21,30 | 21,95 | 23,36 | 24,97 |
| 30 6267 0150 010 04 | • 1,5 | 0,10 | 4 | 4 | 1,42 | 4 | 50 | 1,35 | 4 | 48,00 | 4,80 | 5,00 | 5,33 | 5,70 |
| 30 6267 0150 010 08 | • 1,5 | 0,10 | 8 | 4 | 1,42 | 4 | 50 | 1,35 | 4 | 48,00 | 8,96 | 9,25 | 9,86 | 10,53 |
| 30 6267 0150 010 12 | • 1,5 | 0,10 | 12 | 4 | 1,42 | 4 | 60 | 1,35 | 4 | 50,00 | 13,10 | 13,50 | 14,37 | 15,36 |
| 30 6267 0150 010 15 | • 1,5 | 0,10 | 15 | 4 | 1,42 | 4 | 60 | 1,35 | 4 | 50,00 | 16,19 | 16,68 | 17,75 | 18,98 |
| 30 6267 0150 010 20 | • 1,5 | 0,10 | 20 | 4 | 1,42 | 4 | 60 | 1,35 | 4 | 50,00 | 21,33 | 21,98 | 23,40 | - |
| 30 6267 0200 005 04 | • 2,0 | 0,05 | 4 | 4 | 1,92 | 4 | 50 | 1,70 | 4 | 48,00 | 4,80 | 5,00 | 5,33 | 5,70 |
| 30 6267 0200 005 08 | • 2,0 | 0,05 | 8 | 4 | 1,92 | 4 | 50 | 1,70 | 4 | 48,00 | 8,96 | 9,26 | 9,85 | 10,67 |
| 30 6267 0200 005 12 | • 2,0 | 0,05 | 12 | 4 | 1,92 | 4 | 60 | 1,70 | 4 | 50,00 | 13,10 | 13,50 | 14,37 | 15,36 |
| 30 6267 0200 005 16 | • 2,0 | 0,05 | 16 | 4 | 1,92 | 4 | 60 | 1,70 | 4 | 50,00 | 17,22 | 17,74 | 18,88 | - |
| 30 6267 0200 005 20 | • 2,0 | 0,05 | 20 | 4 | 1,92 | 4 | 60 | 1,70 | 4 | 50,00 | 21,33 | 21,98 | 23,40 | - |
| 30 6267 0200 010 04 | • 2,0 | 0,10 | 4 | 4 | 1,92 | 4 | 50 | 1,70 | 4 | 48,00 | 4,80 | 5,00 | 5,33 | 5,70 |
| 30 6267 0200 010 08 | • 2,0 | 0,10 | 8 | 4 | 1,92 | 4 | 50 | 1,70 | 4 | 48,00 | 8,96 | 9,26 | 9,85 | 10,67 |
| 30 6267 0200 010 12 | • 2,0 | 0,10 | 12 | 4 | 1,92 | 4 | 60 | 1,70 | 4 | 50,00 | 13,10 | 13,50 | 14,37 | 15,36 |
| 30 6267 0200 010 16 | • 2,0 | 0,10 | 16 | 4 | 1,92 | 4 | 60 | 1,70 | 4 | 50,00 | 17,22 | 17,74 | 18,88 | - |
| 30 6267 0200 010 20 | • 2,0 | 0,10 | 20 | 4 | 1,92 | 4 | 60 | 1,70 | 4 | 50,00 | 21,33 | 21,98 | 23,40 | - |
| 30 6267 0200 020 04 | • 2,0 | 0,20 | 4 | 4 | 1,92 | 4 | 50 | 1,70 | 4 | 48,00 | 4,80 | 5,00 | 5,33 | 5,70 |
| 30 6267 0200 020 08 | • 2,0 | 0,20 | 8 | 4 | 1,92 | 4 | 50 | 1,70 | 4 | 48,00 | 8,96 | 9,26 | 9,85 | 10,67 |
| 30 6267 0200 020 12 | • 2,0 | 0,20 | 12 | 4 | 1,92 | 4 | 60 | 1,70 | 4 | 50,00 | 13,10 | 13,50 | 14,37 | 15,36 |
| 30 6267 0200 020 16 | • 2,0 | 0,20 | 16 | 4 | 1,92 | 4 | 60 | 1,70 | 4 | 50,00 | 17,22 | 17,74 | 18,88 | - |
| 30 6267 0200 020 20 | • 2,0 | 0,20 | 20 | 4 | 1,92 | 4 | 60 | 1,70 | 4 | 50,00 | 21,33 | 21,98 | 23,40 | - |

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PROFESSIONAL



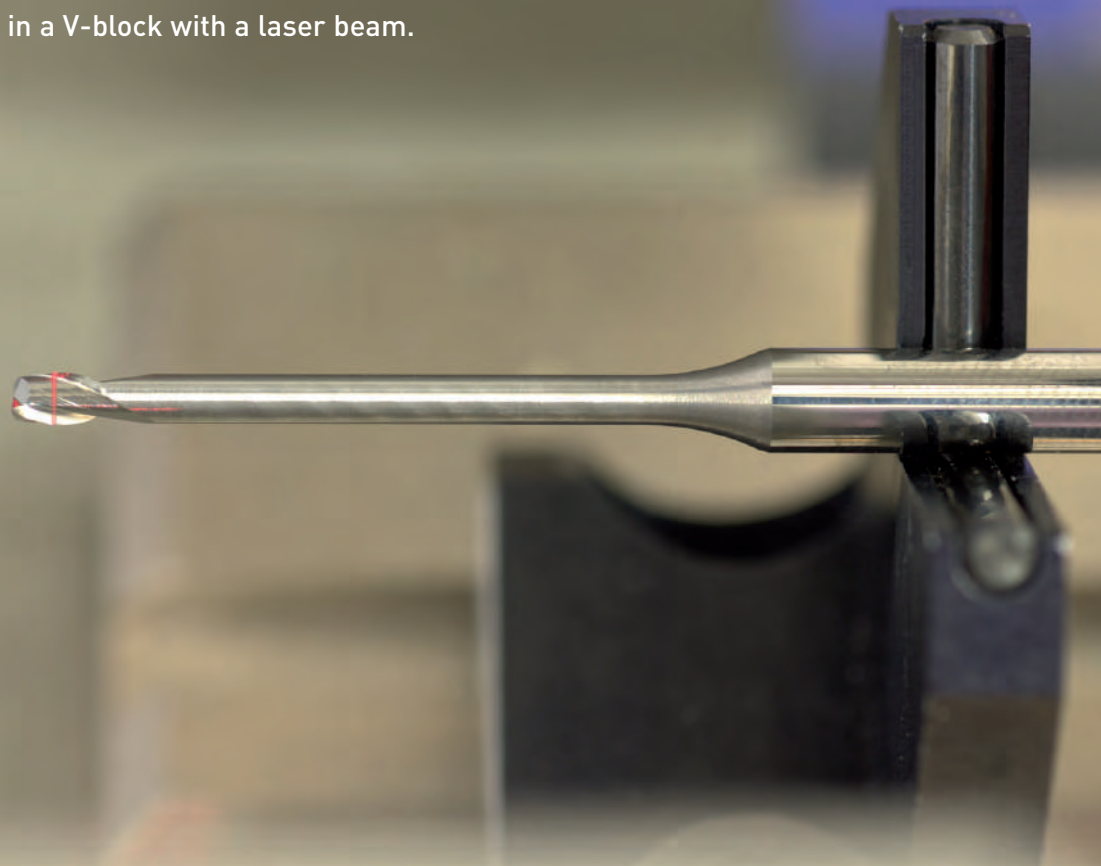
30 6267

| Art. | d1* | r -0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | Z | € | 0,5° | 1° | 2° | 3° |
|---------------------|-------|----------|----|-------|------|----|----|------|---|-------|-------|-------|-------|-------|
| 30 6267 0250 010 08 | • 2,5 | 0,10 | 8 | 4 | 2,40 | 4 | 50 | 2,00 | 4 | 48,00 | 9,00 | 9,29 | 9,89 | 10,57 |
| 30 6267 0250 010 16 | • 2,5 | 0,10 | 16 | 4 | 2,40 | 4 | 60 | 2,00 | 4 | 50,00 | 17,25 | 17,77 | 18,92 | - |
| 30 6267 0250 010 20 | • 2,5 | 0,10 | 20 | 4 | 2,40 | 4 | 60 | 2,00 | 4 | 50,00 | 21,37 | 22,01 | - | - |
| 30 6267 0250 020 08 | • 2,5 | 0,20 | 8 | 4 | 2,40 | 4 | 50 | 2,00 | 4 | 48,00 | 9,00 | 9,29 | 9,89 | 10,57 |
| 30 6267 0250 020 16 | • 2,5 | 0,20 | 16 | 4 | 2,40 | 4 | 60 | 2,00 | 4 | 50,00 | 17,25 | 17,77 | 18,92 | - |
| 30 6267 0250 020 20 | • 2,5 | 0,20 | 20 | 4 | 2,40 | 4 | 60 | 2,00 | 4 | 50,00 | 21,37 | 22,01 | - | - |
| 30 6267 0300 020 08 | • 3,0 | 0,20 | 8 | 6 | 2,86 | 4 | 60 | 2,50 | 4 | 57,00 | 9,08 | 9,36 | 9,96 | 10,65 |
| 30 6267 0300 020 12 | • 3,0 | 0,20 | 12 | 6 | 2,86 | 4 | 60 | 2,50 | 4 | 57,00 | 13,20 | 13,60 | 14,48 | 15,48 |
| 30 6267 0300 020 16 | • 3,0 | 0,20 | 16 | 6 | 2,86 | 4 | 60 | 2,50 | 4 | 57,00 | 17,32 | 17,84 | 18,99 | 20,31 |
| 30 6267 0300 020 20 | • 3,0 | 0,20 | 20 | 6 | 2,86 | 4 | 70 | 2,50 | 4 | 60,00 | 21,43 | 22,08 | 23,51 | 25,13 |
| 30 6267 0300 020 25 | • 3,0 | 0,20 | 25 | 6 | 2,86 | 4 | 70 | 2,50 | 4 | 60,00 | 26,58 | 27,39 | 29,15 | - |
| 30 6267 0300 020 30 | • 3,0 | 0,20 | 30 | 6 | 2,86 | 4 | 80 | 2,50 | 4 | 63,00 | 31,73 | 32,69 | 34,80 | - |
| 30 6267 0300 030 08 | • 3,0 | 0,30 | 8 | 6 | 2,86 | 4 | 60 | 2,50 | 4 | 57,00 | 9,08 | 9,36 | 9,96 | 10,65 |
| 30 6267 0300 030 12 | • 3,0 | 0,30 | 12 | 6 | 2,86 | 4 | 60 | 2,50 | 4 | 57,00 | 13,20 | 13,60 | 14,48 | 15,48 |
| 30 6267 0300 030 16 | • 3,0 | 0,30 | 16 | 6 | 2,86 | 4 | 60 | 2,50 | 4 | 57,00 | 17,32 | 17,84 | 18,99 | 20,31 |
| 30 6267 0300 030 20 | • 3,0 | 0,30 | 20 | 6 | 2,86 | 4 | 70 | 2,50 | 4 | 60,00 | 21,43 | 22,08 | 23,51 | 25,13 |
| 30 6267 0300 030 25 | • 3,0 | 0,30 | 25 | 6 | 2,86 | 4 | 70 | 2,50 | 4 | 60,00 | 26,58 | 27,39 | 29,15 | - |
| 30 6267 0300 030 30 | • 3,0 | 0,30 | 30 | 6 | 2,86 | 4 | 80 | 2,50 | 4 | 63,00 | 31,73 | 32,69 | 34,80 | - |
| 30 6267 0300 050 08 | • 3,0 | 0,50 | 8 | 6 | 2,86 | 4 | 60 | 2,50 | 4 | 57,00 | 9,08 | 9,36 | 9,96 | 10,65 |
| 30 6267 0300 050 12 | • 3,0 | 0,50 | 12 | 6 | 2,86 | 4 | 60 | 2,50 | 4 | 57,00 | 13,20 | 13,60 | 14,48 | 15,48 |
| 30 6267 0300 050 16 | • 3,0 | 0,50 | 16 | 6 | 2,86 | 4 | 60 | 2,50 | 4 | 57,00 | 17,32 | 17,84 | 18,99 | 20,31 |
| 30 6267 0300 050 20 | • 3,0 | 0,50 | 20 | 6 | 2,86 | 4 | 70 | 2,50 | 4 | 60,00 | 21,43 | 22,08 | 23,51 | 25,13 |
| 30 6267 0300 050 25 | • 3,0 | 0,50 | 25 | 6 | 2,86 | 4 | 70 | 2,50 | 4 | 60,00 | 26,58 | 27,39 | 29,15 | - |
| 30 6267 0300 050 30 | • 3,0 | 0,50 | 30 | 6 | 2,86 | 4 | 80 | 2,50 | 4 | 63,00 | 31,73 | 32,69 | 34,80 | - |
| 30 6267 0400 020 12 | • 4,0 | 0,20 | 12 | 6 | 3,90 | 4 | 60 | 4,00 | 4 | 58,00 | 13,13 | 13,53 | 14,40 | 15,40 |
| 30 6267 0400 020 20 | • 4,0 | 0,20 | 20 | 6 | 3,90 | 4 | 60 | 4,00 | 4 | 58,00 | 21,37 | 22,01 | 23,43 | - |
| 30 6267 0400 020 30 | • 4,0 | 0,20 | 30 | 6 | 3,90 | 4 | 80 | 4,00 | 4 | 64,00 | 31,66 | 32,62 | - | - |
| 30 6267 0400 020 40 | • 4,0 | 0,20 | 40 | 6 | 3,90 | 4 | 80 | 4,00 | 4 | 64,00 | 41,96 | 43,23 | - | - |
| 30 6267 0400 050 12 | • 4,0 | 0,50 | 12 | 6 | 3,90 | 4 | 60 | 4,00 | 4 | 58,00 | 13,13 | 13,53 | 14,40 | 15,40 |
| 30 6267 0400 050 20 | • 4,0 | 0,50 | 20 | 6 | 3,90 | 4 | 60 | 4,00 | 4 | 58,00 | 21,37 | 22,01 | 23,43 | - |
| 30 6267 0400 050 30 | • 4,0 | 0,50 | 30 | 6 | 3,90 | 4 | 80 | 4,00 | 4 | 64,00 | 31,66 | 32,62 | - | - |
| 30 6267 0400 050 40 | • 4,0 | 0,50 | 40 | 6 | 3,90 | 4 | 80 | 4,00 | 4 | 64,00 | 41,96 | 43,23 | - | - |

>Ø4,0 Art. 30 6436 - 30 6438 auf Seite 92 · >Ø4,0 Art. 30 6436 - 30 6438 on page 92

QUALITÄTSKONTROLLE · QUALITY CONTROL

Vermessung des Rundlauf im Prisma mit einem Laserstrahl.
Run out measuring in a V-block with a laser beam.



1



2



3



4



5



6



7



8



9

Index

30 6268

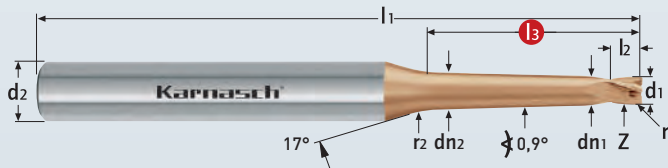
PROFESSIONAL

VHM-Gesenkräser mit Eckenradius, konischer Hals, Rockwell Cutter
Solid carbide end mills with corner radius, conical neck, Rockwell Cutter



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

| | |
|--|--------------------------|
| HRC < 70 | GJL |
| STAHL steel < 1670 N/mm ² | GJS |
| INOX stainless steel < 900 N/mm ² ferritic | TITAN titanium |
| INOX stainless steel > 900 N/mm ² martensitic | |
| INOX stainless steel < 900 N/mm ² austenitic | |
| NI-ALLOYS < 900 N/mm ² | |



TOLERANZ / TOLERANCE

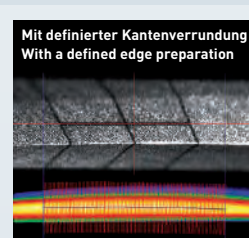
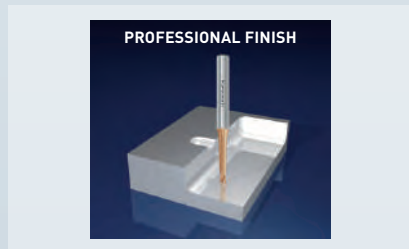
tol. r = -0,004

0,003 A

konisch tapered

d1* = Ø 1,0 - Ø 3,0 tol 0,000 / -0,008

* Rundlauf 0,010 mm bei l3 > 20 mm
Concentricity 0,010 mm for l3 > 20 mm



Schnittdaten
Cutting data

Zeichnungen
Drawings

1178-1181

DXF/STEP

MICRO GRAIN **KARNASCH NORM**

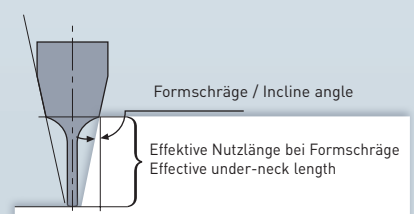
N **DIN 6535 Form HA**

20°

rp = radius-position

HSC HHC

HXC-NANO³



| Art. | d1* | r -0,004 | ψ | l3* | d2 h5 | dn1 | dn2 | r2 | l1 | l2 | Z | € | 0,5° | 1° | 2° | 3° |
|---------------------|-----|----------|------|-----|-------|------|------|----|-------|-----|---|-------|-------|-------|-------|-------|
| 30 6268 0100 010 05 | 1,0 | 0,1 | 0,9° | 5 | 6 | 0,92 | 1,04 | 4 | 60,0 | 1,0 | 4 | 28,20 | 5,33 | 5,69 | 6,15 | 6,57 |
| 30 6268 0100 010 10 | 1,0 | 0,1 | 0,9° | 10 | 6 | 0,92 | 1,20 | 7 | 60,0 | 1,0 | 4 | 28,20 | 7,25 | 10,98 | 11,96 | 12,78 |
| 30 6268 0100 010 15 | 1,0 | 0,1 | 0,9° | 15 | 6 | 0,92 | 1,36 | 10 | 60,0 | 1,0 | 4 | 28,20 | 7,25 | 16,25 | 17,77 | 18,99 |
| 30 6268 0100 010 20 | 1,0 | 0,1 | 0,9° | 20 | 6 | 0,92 | 1,52 | 10 | 70,0 | 1,0 | 4 | 29,40 | 7,25 | 21,32 | 23,12 | 24,72 |
| 30 6268 0100 010 25 | 1,0 | 0,1 | 0,9° | 25 | 6 | 0,92 | 1,68 | 10 | 70,0 | 1,0 | 4 | 29,40 | 7,25 | 26,39 | 28,47 | 30,44 |
| 30 6268 0100 010 30 | 1,0 | 0,1 | 0,9° | 30 | 6 | 0,92 | 1,84 | 10 | 80,0 | 1,0 | 4 | 30,60 | 7,25 | 31,45 | 33,83 | 36,16 |
| 30 6268 0100 010 35 | 1,0 | 0,1 | 0,9° | 35 | 6 | 0,92 | 2,00 | 10 | 80,0 | 1,0 | 4 | 30,60 | 7,25 | 36,51 | 39,18 | 41,89 |
| 30 6268 0100 010 40 | 1,0 | 0,1 | 0,9° | 40 | 6 | 0,92 | 2,14 | 10 | 90,0 | 1,0 | 4 | 31,20 | 7,25 | 41,56 | 44,54 | 47,61 |
| 30 6268 0100 010 45 | 1,0 | 0,1 | 0,9° | 45 | 6 | 0,92 | 2,30 | 10 | 90,0 | 1,0 | 4 | 31,20 | 7,25 | 46,62 | 49,89 | - |
| 30 6268 0100 010 50 | 1,0 | 0,1 | 0,9° | 50 | 6 | 0,92 | 2,46 | 10 | 100,0 | 1,0 | 4 | 32,40 | 7,25 | 51,67 | 55,25 | - |
| 30 6268 0100 020 15 | 1,0 | 0,2 | 0,9° | 15 | 6 | 0,92 | 1,36 | 10 | 60,0 | 1,0 | 4 | 28,20 | 7,25 | 16,25 | 17,77 | 18,99 |
| 30 6268 0100 020 20 | 1,0 | 0,2 | 0,9° | 20 | 6 | 0,92 | 1,52 | 10 | 70,0 | 1,0 | 4 | 29,40 | 7,25 | 21,32 | 23,12 | 24,72 |
| 30 6268 0100 020 25 | 1,0 | 0,2 | 0,9° | 25 | 6 | 0,92 | 1,68 | 10 | 70,0 | 1,0 | 4 | 29,40 | 7,25 | 26,39 | 28,47 | 30,44 |
| 30 6268 0100 020 30 | 1,0 | 0,2 | 0,9° | 30 | 6 | 0,92 | 1,84 | 10 | 80,0 | 1,0 | 4 | 30,60 | 7,25 | 31,45 | 33,83 | 36,16 |
| 30 6268 0100 020 35 | 1,0 | 0,2 | 0,9° | 35 | 6 | 0,92 | 2,00 | 10 | 80,0 | 1,0 | 4 | 30,60 | 7,25 | 36,51 | 39,18 | 41,89 |
| 30 6268 0100 020 40 | 1,0 | 0,2 | 0,9° | 40 | 6 | 0,92 | 2,14 | 10 | 90,0 | 1,0 | 4 | 31,20 | 7,25 | 41,56 | 44,54 | 47,61 |
| 30 6268 0100 020 45 | 1,0 | 0,2 | 0,9° | 45 | 6 | 0,92 | 2,30 | 10 | 90,0 | 1,0 | 4 | 31,20 | 7,25 | 46,62 | 49,89 | - |
| 30 6268 0100 020 50 | 1,0 | 0,2 | 0,9° | 50 | 6 | 0,92 | 2,46 | 10 | 100,0 | 1,0 | 4 | 32,40 | 7,25 | 51,67 | 55,25 | - |
| 30 6268 0150 015 10 | 1,5 | 0,15 | 0,9° | 10 | 6 | 1,38 | 1,63 | 7 | 60,0 | 1,5 | 4 | 28,20 | 10,25 | 11,15 | 12,05 | 12,88 |
| 30 6268 0150 015 20 | 1,5 | 0,15 | 0,9° | 20 | 6 | 1,38 | 1,98 | 10 | 70,0 | 1,5 | 4 | 28,20 | 10,88 | 21,50 | 23,21 | 24,82 |
| 30 6268 0150 015 30 | 1,5 | 0,15 | 0,9° | 30 | 6 | 1,38 | 2,28 | 10 | 80,0 | 1,5 | 4 | 30,60 | 10,88 | 31,61 | 33,92 | 36,26 |
| 30 6268 0150 015 40 | 1,5 | 0,15 | 0,9° | 40 | 6 | 1,38 | 2,60 | 10 | 90,0 | 1,5 | 4 | 31,20 | 10,88 | 41,72 | 44,63 | 47,71 |
| 30 6268 0150 015 50 | 1,5 | 0,15 | 0,9° | 50 | 6 | 1,38 | 2,92 | 10 | 100,0 | 1,5 | 4 | 32,40 | 10,88 | 51,81 | 55,34 | - |
| 30 6268 0150 030 10 | 1,5 | 0,3 | 0,9° | 10 | 6 | 1,38 | 1,63 | 7 | 60,0 | 1,5 | 4 | 28,20 | 10,25 | 11,15 | 12,05 | 12,88 |
| 30 6268 0150 030 20 | 1,5 | 0,3 | 0,9° | 20 | 6 | 1,38 | 1,98 | 10 | 70,0 | 1,5 | 4 | 28,20 | 10,88 | 21,50 | 23,21 | 24,82 |
| 30 6268 0150 030 30 | 1,5 | 0,3 | 0,9° | 30 | 6 | 1,38 | 2,28 | 10 | 80,0 | 1,5 | 4 | 30,60 | 10,88 | 31,61 | 33,92 | 36,26 |
| 30 6268 0150 030 40 | 1,5 | 0,3 | 0,9° | 40 | 6 | 1,38 | 2,60 | 10 | 90,0 | 1,5 | 4 | 31,20 | 10,88 | 41,72 | 44,63 | 47,71 |
| 30 6268 0150 030 50 | 1,5 | 0,3 | 0,9° | 50 | 6 | 1,38 | 2,92 | 10 | 100,0 | 1,5 | 4 | 32,40 | 10,88 | 51,81 | 55,34 | - |
| 30 6268 0200 020 10 | 2,0 | 0,2 | 0,9° | 10 | 6 | 1,86 | 2,10 | 7 | 60,0 | 2,0 | 4 | 29,40 | 10,62 | 11,29 | 12,14 | 12,98 |
| 30 6268 0200 020 20 | 2,0 | 0,2 | 0,9° | 20 | 6 | 1,86 | 2,42 | 7 | 70,0 | 2,0 | 4 | 30,60 | 14,50 | 21,38 | 22,85 | 24,43 |
| 30 6268 0200 020 30 | 2,0 | 0,2 | 0,9° | 30 | 6 | 1,86 | 2,72 | 10 | 80,0 | 2,0 | 4 | 31,80 | 14,50 | 31,76 | 34,02 | 36,36 |
| 30 6268 0200 020 40 | 2,0 | 0,2 | 0,9° | 40 | 6 | 1,86 | 3,04 | 10 | 90,0 | 2,0 | 4 | 32,40 | 14,50 | 41,86 | 44,73 | - |
| 30 6268 0200 020 60 | 2,0 | 0,2 | 0,9° | 60 | 6 | 1,86 | 3,68 | 10 | 110,0 | 2,0 | 4 | 35,40 | 14,50 | 62,03 | - | - |
| 30 6268 0200 050 20 | 2,0 | 0,5 | 0,9° | 20 | 6 | 1,86 | 2,42 | 7 | 70,0 | 2,0 | 4 | 30,60 | 14,50 | 21,38 | 22,85 | 24,43 |
| 30 6268 0200 050 30 | 2,0 | 0,5 | 0,9° | 30 | 6 | 1,86 | 2,72 | 10 | 80,0 | 2,0 | 4 | 31,80 | 14,50 | 31,76 | 34,02 | 36,36 |
| 30 6268 0200 050 40 | 2,0 | 0,5 | 0,9° | 40 | 6 | 1,86 | 3,04 | 10 | 90,0 | 2,0 | 4 | 32,40 | 14,50 | 41,86 | 44,73 | - |
| 30 6268 0200 050 60 | 2,0 | 0,5 | 0,9° | 60 | 6 | 1,86 | 3,68 | 10 | 110,0 | 2,0 | 4 | 35,40 | 14,50 | 62,03 | - | - |
| 30 6268 0300 030 10 | 3,0 | 0,3 | 0,9° | 10 | 6 | 2,78 | 3,00 | 7 | 60,0 | 3,0 | 4 | 33,60 | 11,02 | 11,54 | 12,33 | 13,18 |
| 30 6268 0300 030 20 | 3,0 | 0,3 | 0,9° | 20 | 6 | 2,78 | 3,22 | 7 | 70,0 | 3,0 | 4 | 35,40 | 20,37 | 21,61 | 23,04 | 24,63 |
| 30 6268 0300 030 30 | 3,0 | 0,3 | 0,9° | 30 | 6 | 2,78 | 3,64 | 10 | 80,0 | 3,0 | 4 | 37,20 | 21,75 | 32,02 | 34,20 | - |
| 30 6268 0300 030 40 | 3,0 | 0,3 | 0,9° | 40 | 6 | 2,78 | 3,94 | 10 | 90,0 | 3,0 | 4 | 37,80 | 21,75 | 42,11 | - | - |
| 30 6268 0300 030 50 | 3,0 | 0,3 | 0,9° | 50 | 6 | 2,78 | 4,26 | 10 | 100,0 | 3,0 | 4 | 39,00 | 21,75 | 52,19 | - | - |
| 30 6268 0300 030 60 | 3,0 | 0,3 | 0,9° | 60 | 6 | 2,78 | 4,58 | 10 | 110,0 | 3,0 | 4 | 40,20 | 21,75 | 62,26 | - | - |
| 30 6268 0300 050 20 | 3,0 | 0,5 | 0,9° | 20 | 6 | 2,78 | 3,22 | 7 | 70,0 | 3,0 | 4 | 35,40 | 20,37 | 21,61 | 23,04 | 24,63 |
| 30 6268 0300 050 30 | 3,0 | 0,5 | 0,9° | 30 | 6 | 2,78 | 3,64 | 10 | 80,0 | 3,0 | 4 | 37,20 | 21,75 | 32,02 | 34,20 | - |
| 30 6268 0300 050 40 | 3,0 | 0,5 | 0,9° | 40 | 6 | 2,78 | 3,94 | 10 | 90,0 | 3,0 | 4 | 37,80 | 21,75 | 42,11 | - | - |
| 30 6268 0300 050 50 | 3,0 | 0,5 | 0,9° | 50 | 6 | 2,78 | 4,26 | 10 | 100,0 | 3,0 | 4 | 39,00 | 21,75 | 52,19 | - | - |
| 30 6268 0300 050 60 | 3,0 | 0,5 | 0,9° | 60 | 6 | 2,78 | 4,58 | 10 | 110,0 | 3,0 | 4 | 40,20 | 21,75 | 62,26 | - | - |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

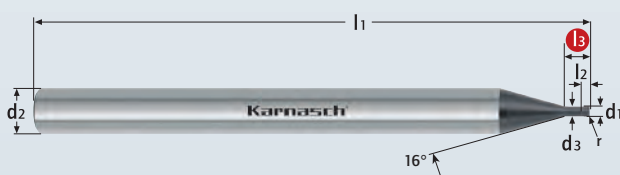
Diamantbeschichteter Micro Schaftfräser mit Eckenradius für die **Hartmetallbearbeitung**
 Diamond coated solid carbide end mills with corner radius for machining in **cemented carbide**



PROFESSIONAL
 ★ ★ ★

30 6271

- HART-METALL**
cemented carbide
- GRAPHIT**
graphite
- Zr O₂**
Zirkonoxid
gepresst
Zircon pressed
- Zr O₂**
Zirkonoxid
gehüpft
Zircon hipped
- E.MAX**
FOR
CAD/CAM
TECHNOLOGY



| | |
|--------------------|-------------------------|
| MICRO GRAIN | KARNASCH NORM |
| ITX | DIN 6535 Form HA |
| | |
| | HSC HHC |
| | D-CC |
| | |

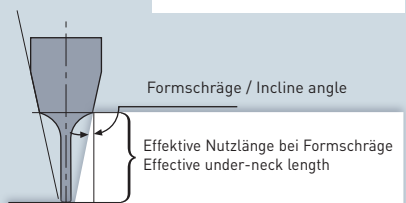
Erhöhte Diamant-Schichtdicke!
 Increased Diamond coating thickness!

TOLERANZ / TOLERANCE
 tol. r = -0,004

d1* = Ø 0,3 - Ø 2 tol -0 / -0,010



| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1220 | DXF/STEP |



| Art. | d1* | r -0,004 | l3 | d2 h5 | d3 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|----------------------|-------|----------|-----|-------|------|----|------|-------|-------|-------|-------|-------|
| 30 6271 0030 003 006 | • 0,3 | 0,03 | 0,6 | 4 | 0,28 | 50 | 0,15 | 81,00 | 0,864 | 0,922 | 1,020 | 1,120 |
| 30 6271 0030 005 006 | • 0,3 | 0,05 | 0,6 | 4 | 0,28 | 50 | 0,15 | 81,00 | 0,864 | 0,922 | 1,020 | 1,120 |
| 30 6271 0050 003 005 | • 0,5 | 0,03 | 0,5 | 4 | 0,46 | 50 | 0,25 | 80,00 | 0,829 | 0,874 | 0,960 | 1,040 |
| 30 6271 0050 003 010 | • 0,5 | 0,03 | 1 | 4 | 0,46 | 50 | 0,25 | 80,00 | 1,350 | 1,420 | 1,540 | 1,640 |
| 30 6271 0050 005 005 | • 0,5 | 0,05 | 0,5 | 4 | 0,46 | 50 | 0,25 | 80,00 | 0,829 | 0,874 | 0,960 | 1,040 |
| 30 6271 0050 005 010 | • 0,5 | 0,05 | 1 | 4 | 0,46 | 50 | 0,25 | 80,00 | 1,350 | 1,420 | 1,540 | 1,640 |
| 30 6271 0080 003 008 | • 0,8 | 0,03 | 0,8 | 4 | 0,76 | 50 | 0,4 | 80,00 | 1,300 | 1,390 | 1,570 | 1,730 |
| 30 6271 0080 003 016 | • 0,8 | 0,03 | 1,6 | 4 | 0,76 | 50 | 0,4 | 80,00 | 2,150 | 2,290 | 2,520 | 2,730 |
| 30 6271 0080 005 008 | • 0,8 | 0,05 | 0,8 | 4 | 0,76 | 50 | 0,4 | 80,00 | 1,300 | 1,390 | 1,570 | 1,730 |
| 30 6271 0080 005 016 | • 0,8 | 0,05 | 1,6 | 4 | 0,76 | 50 | 0,4 | 80,00 | 2,150 | 2,290 | 2,520 | 2,730 |
| 30 6271 0080 010 008 | • 0,8 | 0,10 | 0,8 | 4 | 0,76 | 50 | 0,4 | 80,00 | 1,300 | 1,390 | 1,570 | 1,730 |
| 30 6271 0080 010 016 | • 0,8 | 0,10 | 1,6 | 4 | 0,76 | 50 | 0,4 | 80,00 | 2,150 | 2,290 | 2,520 | 2,730 |
| 30 6271 0100 003 010 | • 1,0 | 0,03 | 1 | 4 | 0,96 | 50 | 0,5 | 80,00 | 1,510 | 1,620 | 1,810 | 1,990 |
| 30 6271 0100 003 020 | • 1,0 | 0,03 | 2 | 4 | 0,96 | 50 | 0,5 | 80,00 | 2,580 | 2,730 | 2,990 | 3,210 |
| 30 6271 0100 005 010 | • 1,0 | 0,05 | 1 | 4 | 0,96 | 50 | 0,5 | 80,00 | 1,510 | 1,620 | 1,810 | 1,990 |
| 30 6271 0100 005 020 | • 1,0 | 0,05 | 2 | 4 | 0,96 | 50 | 0,5 | 80,00 | 2,580 | 2,730 | 2,990 | 3,210 |
| 30 6271 0100 010 010 | • 1,0 | 0,10 | 1 | 4 | 0,96 | 50 | 0,5 | 80,00 | 1,510 | 1,620 | 1,810 | 1,990 |
| 30 6271 0100 010 020 | • 1,0 | 0,10 | 2 | 4 | 0,96 | 50 | 0,5 | 80,00 | 2,580 | 2,730 | 2,990 | 3,210 |
| 30 6271 0150 003 015 | • 1,5 | 0,03 | 1,5 | 4 | 1,44 | 50 | 0,75 | 81,00 | 2,210 | 2,240 | 2,450 | 2,650 |
| 30 6271 0150 003 030 | • 1,5 | 0,03 | 3 | 4 | 1,44 | 50 | 0,75 | 81,00 | 3,700 | 3,880 | 4,170 | 4,480 |
| 30 6271 0150 005 015 | • 1,5 | 0,05 | 1,5 | 4 | 1,44 | 50 | 0,75 | 81,00 | 2,210 | 2,240 | 2,450 | 2,650 |
| 30 6271 0150 005 030 | • 1,5 | 0,05 | 3 | 4 | 1,44 | 50 | 0,75 | 81,00 | 3,700 | 3,880 | 4,170 | 4,480 |
| 30 6271 0150 010 015 | • 1,5 | 0,10 | 1,5 | 4 | 1,44 | 50 | 0,75 | 81,00 | 2,210 | 2,240 | 2,450 | 2,650 |
| 30 6271 0150 010 030 | • 1,5 | 0,10 | 3 | 4 | 1,44 | 50 | 0,75 | 81,00 | 3,700 | 3,880 | 4,170 | 4,480 |
| 30 6271 0200 003 020 | • 2,0 | 0,03 | 2 | 4 | 1,90 | 50 | 1,0 | 81,00 | 2,760 | 2,890 | 3,110 | 3,350 |
| 30 6271 0200 003 040 | • 2,0 | 0,03 | 4 | 4 | 1,90 | 50 | 1,0 | 81,00 | 4,850 | 5,040 | 5,390 | 5,790 |
| 30 6271 0200 005 020 | • 2,0 | 0,05 | 2 | 4 | 1,90 | 50 | 1,0 | 81,00 | 2,760 | 2,890 | 3,110 | 3,350 |
| 30 6271 0200 005 040 | • 2,0 | 0,05 | 4 | 4 | 1,90 | 50 | 1,0 | 81,00 | 4,850 | 5,040 | 5,390 | 5,790 |
| 30 6271 0200 010 020 | • 2,0 | 0,10 | 2 | 4 | 1,90 | 50 | 1,0 | 81,00 | 2,760 | 2,890 | 3,110 | 3,350 |
| 30 6271 0200 010 040 | • 2,0 | 0,10 | 4 | 4 | 1,90 | 50 | 1,0 | 81,00 | 4,850 | 5,040 | 5,390 | 5,790 |

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- 8
- 9

30 6274

PROFESSIONAL

Diamantbeschichteter Micro 3D-Radiusfräser für die **Hartmetallbearbeitung**
Diamond coated solid carbide 3D ball nose end mills for machining in **cemented carbide**



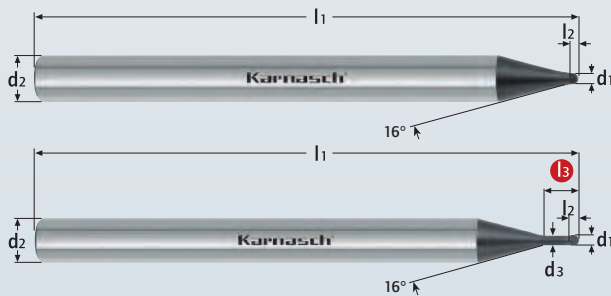
HART-METALL
cemented carbide

GRAPHIT
graphite

Zr O₂
Zirkonoxid
gepresst
Zircon pressed

Zr O₂
Zirkonoxid
gehüpft
Zircon hiped

E.MAX
FOR
CAD/CAM
TECHNOLOGY



| | |
|-------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| ITX | DIN 6535 Form HA |
| | |
| | HSC HHC |
| | D-CC |
| | Air |

Erhöhte Diamant-Schichtdicke!
Increased Diamond coating thickness!

TOLERANZ / TOLERANCE

tol. r = ±0,002

d1* = Ø 0,1 - Ø 6 tol -0 / -0,010

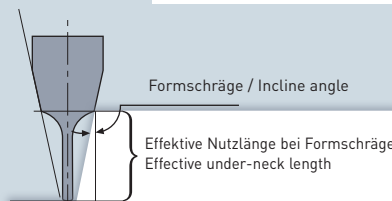


Schnittdaten
Cutting data

Zeichnungen
Drawings

1220

DXF/STEP



| Art. | d1* | r ±0,002 | l3 | d2 h5 | d3 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|-------|----------|-----|-------|------|----|------|-------|-------|-------|--------|--------|
| 30 6274 0020 | • 0,2 | 0,10 | - | 4 | - | 50 | 0,14 | 81,00 | - | - | - | - |
| 30 6274 0020 003 | • 0,2 | 0,10 | 0,3 | 4 | 0,18 | 50 | 0,14 | 81,00 | 0,467 | 0,492 | 0,538 | 0,582 |
| 30 6274 0020 005 | • 0,2 | 0,10 | 0,5 | 4 | 0,18 | 50 | 0,14 | 81,00 | 0,678 | 0,710 | 0,769 | 0,821 |
| 30 6274 0020 008 | • 0,2 | 0,10 | 0,8 | 4 | 0,18 | 50 | 0,14 | 81,00 | 0,992 | 1,070 | 1,110 | 1,190 |
| 30 6274 0020 010 | • 0,2 | 0,10 | 1 | 4 | 0,18 | 50 | 0,14 | 81,00 | 1,200 | 1,270 | 1,330 | 1,430 |
| 30 6274 0030 | • 0,3 | 0,15 | - | 4 | - | 50 | 0,21 | 81,00 | - | - | - | - |
| 30 6274 0030 003 | • 0,3 | 0,15 | 0,3 | 4 | 0,28 | 50 | 0,21 | 81,00 | 0,542 | 0,623 | 0,754 | 0,851 |
| 30 6274 0030 005 | • 0,3 | 0,15 | 0,5 | 4 | 0,28 | 50 | 0,21 | 81,00 | 0,757 | 0,859 | 0,998 | 1,050 |
| 30 6274 0030 008 | • 0,3 | 0,15 | 0,8 | 4 | 0,28 | 50 | 0,21 | 81,00 | 1,070 | 1,200 | 1,350 | 1,360 |
| 30 6274 0030 010 | • 0,3 | 0,15 | 1 | 4 | 0,28 | 50 | 0,21 | 81,00 | 1,290 | 1,430 | 1,550 | 1,610 |
| 30 6274 0040 | • 0,4 | 0,20 | - | 4 | - | 50 | 0,28 | 81,00 | - | - | - | - |
| 30 6274 0040 005 | • 0,4 | 0,20 | 0,5 | 4 | 0,36 | 50 | 0,28 | 81,00 | 0,829 | 0,917 | 1,040 | 1,050 |
| 30 6274 0040 010 | • 0,4 | 0,20 | 1 | 4 | 0,36 | 50 | 0,28 | 81,00 | 1,350 | 1,480 | 1,550 | 1,650 |
| 30 6274 0040 015 | • 0,4 | 0,20 | 1,5 | 4 | 0,36 | 50 | 0,28 | 81,00 | 1,880 | 2,030 | 2,100 | 2,260 |
| 30 6274 0040 020 | • 0,4 | 0,20 | 2 | 4 | 0,36 | 50 | 0,28 | 81,00 | 2,400 | 2,550 | 2,670 | 2,870 |
| 30 6274 0050 | • 0,5 | 0,25 | - | 4 | - | 50 | 0,35 | 80,00 | - | - | - | - |
| 30 6274 0050 005 | • 0,5 | 0,25 | 0,5 | 4 | 0,46 | 50 | 0,35 | 80,00 | 0,829 | 0,917 | 1,040 | 1,050 |
| 30 6274 0050 010 | • 0,5 | 0,25 | 1 | 4 | 0,46 | 50 | 0,35 | 80,00 | 1,350 | 1,480 | 1,550 | 1,650 |
| 30 6274 0050 015 | • 0,5 | 0,25 | 1,5 | 4 | 0,46 | 50 | 0,35 | 80,00 | 1,880 | 2,030 | 2,100 | 2,260 |
| 30 6274 0050 020 | • 0,5 | 0,25 | 2 | 4 | 0,46 | 50 | 0,35 | 80,00 | 2,400 | 2,550 | 2,670 | 2,870 |
| 30 6274 0060 | • 0,6 | 0,30 | - | 4 | - | 50 | 0,42 | 80,00 | - | - | - | - |
| 30 6274 0060 010 | • 0,6 | 0,30 | 1 | 4 | 0,56 | 50 | 0,42 | 80,00 | 1,510 | 1,710 | 1,990 | 2,100 |
| 30 6274 0060 015 | • 0,6 | 0,30 | 1,5 | 4 | 0,56 | 50 | 0,42 | 80,00 | 2,040 | 2,290 | 2,600 | 2,610 |
| 30 6274 0060 020 | • 0,6 | 0,30 | 2 | 4 | 0,56 | 50 | 0,42 | 80,00 | 2,580 | 2,860 | 3,100 | 3,200 |
| 30 6274 0060 030 | • 0,6 | 0,30 | 3 | 4 | 0,56 | 50 | 0,42 | 80,00 | 3,640 | 3,990 | 4,130 | 4,440 |
| 30 6274 0080 | • 0,8 | 0,40 | - | 4 | - | 50 | 0,56 | 80,00 | - | - | - | - |
| 30 6274 0080 020 | • 0,8 | 0,40 | 2 | 4 | 0,76 | 50 | 0,56 | 80,00 | 2,580 | 2,860 | 3,100 | 3,220 |
| 30 6274 0080 030 | • 0,8 | 0,40 | 3 | 4 | 0,76 | 50 | 0,56 | 80,00 | 3,640 | 3,990 | 4,130 | 4,440 |
| 30 6274 0080 040 | • 0,8 | 0,40 | 4 | 4 | 0,76 | 50 | 0,56 | 80,00 | 4,690 | 5,090 | 5,270 | 5,660 |
| 30 6274 0100 | • 1,0 | 0,50 | - | 4 | - | 50 | 0,70 | 80,00 | - | - | - | - |
| 30 6274 0100 020 | • 1,0 | 0,50 | 2 | 4 | 0,96 | 50 | 0,70 | 80,00 | 2,580 | 2,890 | 4,250 | 4,570 |
| 30 6274 0100 025 | • 1,0 | 0,50 | 2,5 | 4 | 0,96 | 50 | 0,70 | 80,00 | 3,110 | 3,440 | 5,390 | 5,790 |
| 30 6274 0100 030 | • 1,0 | 0,50 | 3 | 4 | 0,96 | 50 | 0,70 | 80,00 | 3,640 | 3,990 | 7,670 | 8,240 |
| 30 6274 0100 040 | • 1,0 | 0,50 | 4 | 4 | 0,96 | 50 | 0,70 | 80,00 | 4,690 | 5,090 | 9,940 | 10,700 |
| 30 6274 0100 050 | • 1,0 | 0,50 | 5 | 4 | 0,96 | 50 | 0,70 | 80,00 | 5,740 | 6,100 | 12,250 | 13,130 |



PROFESSIONAL
★ ★ ★

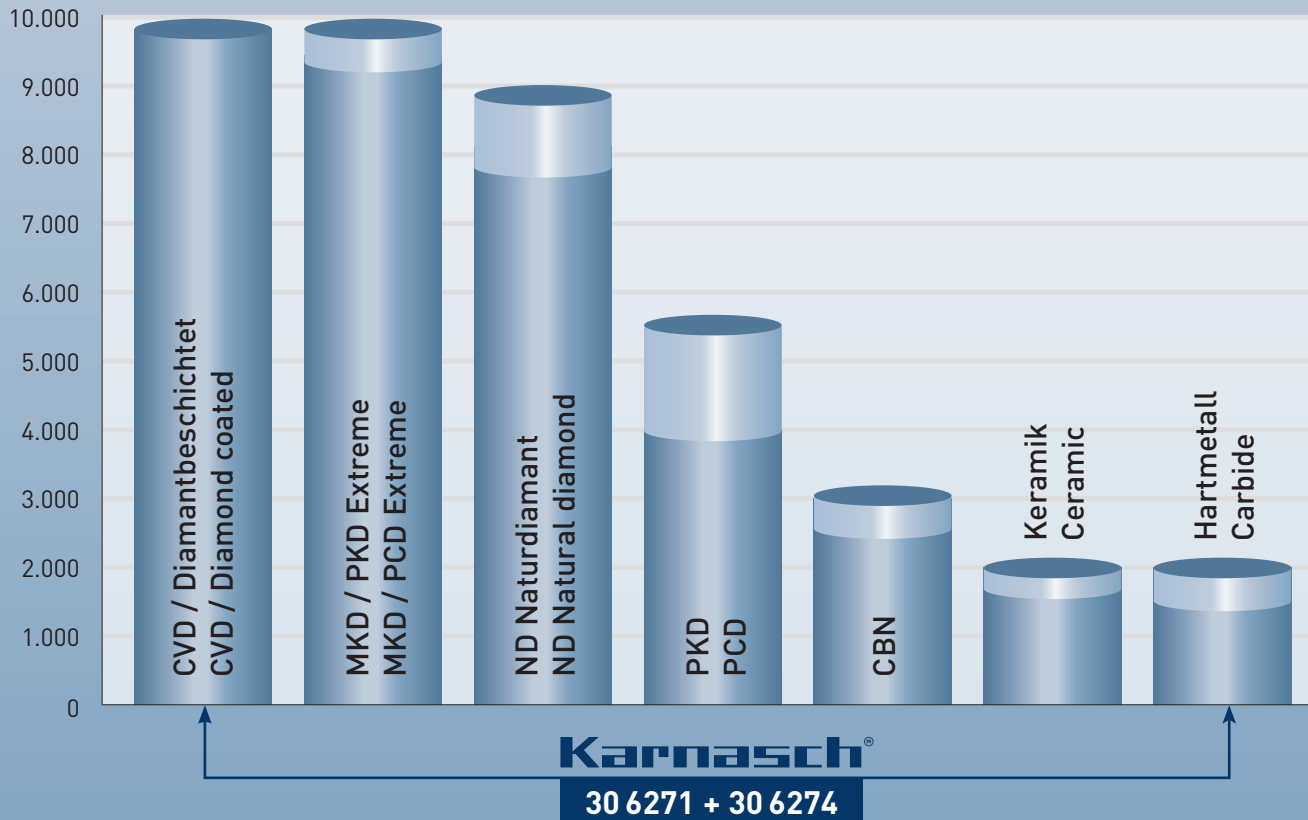
30 6274

| Art. | d1* | r ±0,002 | l3 | d2 h5 | d3 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|-------|----------|----|-------|------|----|------|--------|--------|--------|--------|--------|
| 30 6274 0200 | • 2,0 | 1,0 | - | 4 | - | 50 | 1,40 | 81,00 | - | - | - | - |
| 30 6274 0200 030 | • 2,0 | 1,0 | 3 | 4 | 1,90 | 50 | 1,40 | 81,00 | 3,810 | 4,100 | 4,250 | 4,570 |
| 30 6274 0200 040 | • 2,0 | 1,0 | 4 | 4 | 1,90 | 50 | 1,40 | 81,00 | 4,850 | 5,100 | 5,390 | 5,790 |
| 30 6274 0200 060 | • 2,0 | 1,0 | 6 | 4 | 1,90 | 50 | 1,40 | 81,00 | 6,930 | 7,100 | 7,670 | 8,240 |
| 30 6274 0200 080 | • 2,0 | 1,0 | 8 | 4 | 1,90 | 50 | 1,40 | 81,00 | 9,000 | 9,100 | 9,940 | 10,700 |
| 30 6274 0200 100 | • 2,0 | 1,0 | 10 | 4 | 1,90 | 50 | 1,40 | 81,00 | 11,070 | 11,100 | 12,250 | 13,130 |
| 30 6274 0300 | • 3,0 | 1,5 | - | 6 | - | 60 | 2,10 | 116,00 | - | - | - | - |
| 30 6274 0300 060 | • 3,0 | 1,5 | 6 | 6 | 2,90 | 60 | 2,10 | 116,00 | 6,930 | 7,100 | 7,670 | 8,240 |
| 30 6274 0300 080 | • 3,0 | 1,5 | 8 | 6 | 2,90 | 60 | 2,10 | 116,00 | 9,000 | 9,100 | 9,940 | 10,690 |
| 30 6274 0300 100 | • 3,0 | 1,5 | 10 | 6 | 2,90 | 60 | 2,10 | 116,00 | 11,070 | 11,100 | 12,220 | 13,130 |
| 30 6274 0300 120 | • 3,0 | 1,5 | 12 | 6 | 2,90 | 60 | 2,10 | 116,00 | 13,100 | 13,130 | 14,500 | 15,580 |
| 30 6274 0300 140 | • 3,0 | 1,5 | 14 | 6 | 2,90 | 60 | 2,10 | 116,00 | 15,100 | 15,190 | 16,780 | 18,030 |
| 30 6274 0400 | • 4,0 | 2,0 | - | 6 | - | 60 | 2,80 | 116,00 | - | - | - | - |
| 30 6274 0400 080 | • 4,0 | 2,0 | 8 | 6 | 3,90 | 60 | 2,80 | 116,00 | 9,010 | 9,100 | 9,940 | 10,690 |
| 30 6274 0400 100 | • 4,0 | 2,0 | 10 | 6 | 3,90 | 60 | 2,80 | 116,00 | 11,070 | 11,100 | 12,250 | 13,130 |
| 30 6274 0400 150 | • 4,0 | 2,0 | 15 | 6 | 3,90 | 60 | 2,80 | 116,00 | 16,100 | 16,230 | 17,910 | - |
| 30 6274 0500 | • 5,0 | 2,5 | - | 6 | - | 60 | 3,50 | 143,00 | - | - | - | - |
| 30 6274 0500 100 | • 5,0 | 2,5 | 10 | 6 | 4,80 | 60 | 3,50 | 143,00 | 11,100 | 11,250 | 12,420 | - |
| 30 6274 0500 150 | • 5,0 | 2,5 | 15 | 6 | 4,80 | 60 | 3,50 | 143,00 | 16,100 | 16,410 | - | - |
| 30 6274 0600 | • 6,0 | 3,0 | - | 6 | - | 60 | 4,20 | 143,00 | - | - | - | - |
| 30 6274 0600 100 | • 6,0 | 3,0 | 10 | 6 | 5,70 | 60 | 4,20 | 143,00 | - | - | - | - |
| 30 6274 0600 150 | • 6,0 | 3,0 | 15 | 6 | 5,70 | 60 | 4,20 | 143,00 | - | - | - | - |

Karnasch D-CC Diamantbeschichtete Fräser, fräsen HARTMETALL.
Karnasch D-CC diamond-coated end mills, for machining CEMENTED CARBIDE.

Härtevergleich
Hardness Comparison

Härte (Knoop kg/mm²)



30 6284

VHM-Micro-Präzisionsfräser, 3 Schneiden, lang · HSC-fräsen
Solid carbide miniature end mills, 3 cutting edges, long, HSC



HRC < 45

STAHL
steel
< 1400 N/mm²

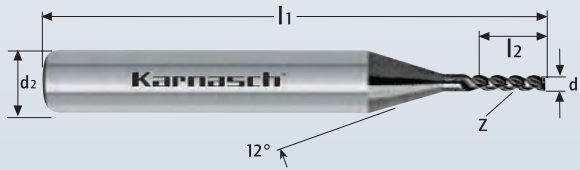
UNI

INOX
stainless steel
< 900 N/mm²
ferritic

GJL

GJS

TITAN
TITANIUM
< 1100 N/mm²



d1* = Ø ≤ 3,0 tol -0,014 / -0,028

MICRO GRAIN DIN 6527 L

N DIN 6535 Form HA



HSC High-Speed-Cutting

UFX-1 NANO



Schnittdaten
Cutting data



Zeichnungen
Drawings



| Art. | d1* | l2 | d2 h6 | l1 | Z | € |
|--------------|-------|----|-------|----|---|--------|
| 30 6284 0040 | • 0,4 | 2 | 3 | 38 | 3 | 190,00 |
| 30 6284 0060 | • 0,6 | 2 | 3 | 38 | 3 | 190,00 |
| 30 6284 0080 | • 0,8 | 3 | 3 | 38 | 3 | 190,00 |
| 30 6284 0100 | • 1,0 | 3 | 3 | 38 | 3 | 190,00 |
| 30 6284 0150 | • 1,5 | 5 | 3 | 38 | 3 | 190,00 |

10 Stück Verpackungseinheit
10 items per unit

30 6286

VHM-Micro-Radiusfräser, 2 Schneiden, lang · HSC-fräsen
Solid carbide miniature ball nose end mill, 2 cutting edges, long, HSC



HRC < 45

STAHL
steel
< 1400 N/mm²

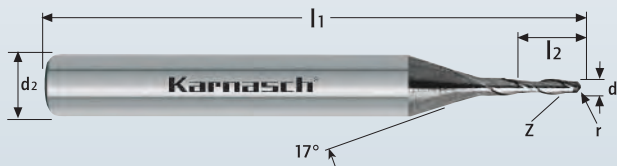
UNI

INOX
stainless steel
< 900 N/mm²
ferritic

GJL

GJS

TITAN
TITANIUM
< 1100 N/mm²



d1* = Ø ≤ 3,0 tol -0,006 / -0,020

MICRO GRAIN DIN 6527 L

N DIN 6535 Form HA



HSC High-Speed-Cutting

UFX-1 NANO



Schnittdaten
Cutting data



Zeichnungen
Drawings



| Art. | d1* | r | l2 | d2 h6 | l1 | Z | € |
|--------------|-------|------|----|-------|----|---|--------|
| 30 6286 0040 | • 0,4 | 0,2 | 3 | 3 | 38 | 2 | 300,00 |
| 30 6286 0060 | • 0,6 | 0,3 | 3 | 3 | 38 | 2 | 300,00 |
| 30 6286 0080 | • 0,8 | 0,4 | 3 | 3 | 38 | 2 | 290,00 |
| 30 6286 0100 | • 1,0 | 0,5 | 5 | 3 | 38 | 2 | 290,00 |
| 30 6286 0150 | • 1,5 | 0,75 | 5 | 3 | 38 | 2 | 290,00 |

10 Stück Verpackungseinheit
10 items per unit

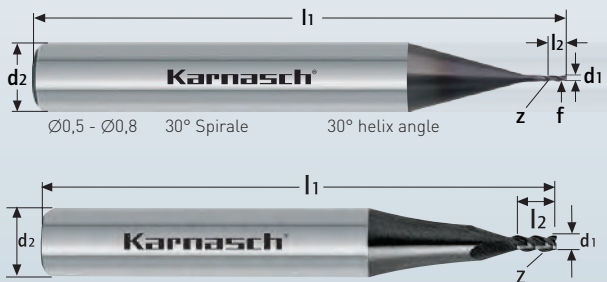


VHM-Miniplus- 3 Schneidenfräser, lang, HSC < 50 HRC = 1800 N/mm²
 Solid carbide end mills, long, 3 cutting edges HSC < 50 HRC = 1800 N/mm²



30 6296

- HRC < 50
- UNI
- INOX
stainless steel < 900 N/mm² ferritic
- NI-ALLOYS
< 900 N/mm²
- TITAN TITANIUM
< 1100 N/mm²
- TOOLOX 44
- GJL
- GJS



| *Toleranzen f / Tolerances f | | | | |
|----------------------------------|--------------|-------------|-------------|-------------|
| Fase in mm / Chamfer in mm | 0,010-0,020 | 0,021-0,029 | 0,030-0,099 | 0,100-0,200 |
| Toleranz in mm / Tolerance in mm | -0,005/0,010 | ±0,010 | ±0,020 | ±0,040 |

| Art. | d1* | f* | l2 | d2 h6 | l1 | Z | € |
|--------------|-------|-------|------|-------|----|---|--------|
| 30 6296 0050 | • 0,5 | 0,010 | 1,5 | 6 | 45 | 3 | 250,00 |
| 30 6296 0060 | • 0,6 | 0,012 | 1,8 | 6 | 45 | 3 | 250,00 |
| 30 6296 0080 | • 0,8 | 0,016 | 2,5 | 6 | 45 | 3 | 250,00 |
| 30 6296 0100 | • 1,0 | 0,020 | 3,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0120 | • 1,2 | 0,024 | 3,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0140 | • 1,4 | 0,028 | 3,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0150 | • 1,5 | 0,030 | 3,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0180 | • 1,8 | 0,036 | 4,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0200 | • 2,0 | 0,040 | 4,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0250 | • 2,5 | 0,050 | 4,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0280 | • 2,8 | 0,056 | 6,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0300 | • 3,0 | 0,060 | 6,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0350 | • 3,5 | 0,070 | 6,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0380 | • 3,8 | 0,076 | 6,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0400 | • 4,0 | 0,080 | 7,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0450 | • 4,5 | 0,090 | 7,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0480 | • 4,8 | 0,096 | 7,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0500 | • 5,0 | 0,100 | 8,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0550 | • 5,5 | 0,110 | 8,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0580 | • 5,8 | 0,116 | 8,0 | 6 | 45 | 3 | 250,00 |
| 30 6296 0600 | • 6,0 | 0,120 | 10,0 | 6 | 45 | 3 | 250,00 |

d1* = Ø 3,0 tol -0,014 / -0,028

d1* = Ø 4,0 - Ø 6,0 tol -0,020 / -0,038

10 Stück Verpackungseinheit
10 items per unit

Schnittdaten Cutting data 1188-1189

Zeichnungen Drawings DXF/STEP

MICRO GRAIN KARNASCH NORM

N DIN 6535 Form HA

45° 45°

HSC High-Speed-Cutting

UFX-1 NANO



VHM-Miniplus- 3 Schneidenfräser, lang, mit Eckenradius, HSC < 50 HRC = 1800 N/mm²
 Solid carbide end mills, long, with corner radius, 3 cutting edges HSC < 50 HRC = 1800 N/mm²



30 6297

- HRC < 50
- UNI
- INOX
stainless steel < 900 N/mm² ferritic
- NI-ALLOYS
< 900 N/mm²
- TITAN TITANIUM
< 1100 N/mm²
- TOOLOX 44
- GJL
- GJS



| | |
|---------------------|---------------------|
| d1* = Ø 3,0 | tol -0,014 / -0,028 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,020 / -0,038 |

| Art. | d1* | r ± 0,05 | l2 | d2 | l1 | Z | € |
|------------------|-------|----------|----|----|----|---|--------|
| 30 6297 0100 010 | • 1,0 | 0,1 | 3 | 6 | 45 | 3 | 290,00 |
| 30 6297 0100 020 | • 1,0 | 0,2 | 3 | 6 | 45 | 3 | 290,00 |
| 30 6297 0150 010 | • 1,5 | 0,1 | 3 | 6 | 45 | 3 | 290,00 |
| 30 6297 0150 020 | • 1,5 | 0,2 | 3 | 6 | 45 | 3 | 290,00 |
| 30 6297 0200 010 | • 2,0 | 0,1 | 4 | 6 | 45 | 3 | 290,00 |
| 30 6297 0200 030 | • 2,0 | 0,3 | 4 | 6 | 45 | 3 | 290,00 |
| 30 6297 0250 010 | • 2,5 | 0,1 | 4 | 6 | 45 | 3 | 290,00 |
| 30 6297 0250 030 | • 2,5 | 0,3 | 4 | 6 | 45 | 3 | 290,00 |
| 30 6297 0300 030 | • 3,0 | 0,3 | 6 | 6 | 45 | 3 | 290,00 |
| 30 6297 0300 050 | • 3,0 | 0,5 | 6 | 6 | 45 | 3 | 290,00 |
| 30 6297 0400 020 | • 4,0 | 0,2 | 7 | 6 | 45 | 3 | 290,00 |
| 30 6297 0400 050 | • 4,0 | 0,5 | 7 | 6 | 45 | 3 | 290,00 |
| 30 6297 0500 020 | • 5,0 | 0,2 | 8 | 6 | 45 | 3 | 290,00 |
| 30 6297 0500 050 | • 5,0 | 0,5 | 8 | 6 | 45 | 3 | 290,00 |
| 30 6297 0600 020 | • 6,0 | 0,2 | 10 | 6 | 45 | 3 | 290,00 |
| 30 6297 0600 050 | • 6,0 | 0,5 | 10 | 6 | 45 | 3 | 290,00 |

10 Stück Verpackungseinheit
10 items per unit

Schnittdaten Cutting data 1188-1189

Zeichnungen Drawings DXF/STEP

MICRO GRAIN KARNASCH NORM

N DIN 6535 Form HA

45°

HSC High-Speed-Cutting

UFX-1 NANO



30 6493

VHM-Entgrater, lang, 90°
Solid carbide deburr, long, 90°



HRC
< 68

GG/G
cast iron

INOX
stainless steel
< 900 N/mm²
ferritic

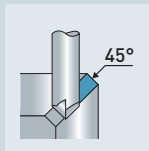
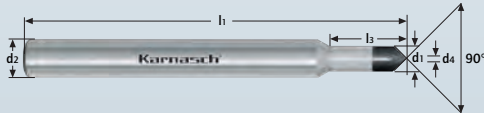
INOX
stainless steel
> 900 N/mm²
martensitic

INOX
stainless steel
< 900 N/mm²
austenitic

INCONEL
HASTELLOY
TITANIUM

kurz-
spanend
short chip

lang-
spanend
long chip



MICRO
GRAIN

DIN
6527 L

N

DIN 6535
Form HA



HHC
HSC
HPC



UFX-3



| Art. | d1 | l3 | l1 | d4 | d2 h6 | Z | € |
|-----------------|--------|----|----|-----|-------|---|-------|
| 30 6493 0050 | • 0,5 | 3 | 40 | 0,1 | 4 | 3 | 30,00 |
| 30 6493 0100 | • 1,0 | 4 | 40 | 0,1 | 4 | 3 | 31,00 |
| 30 6493 0150 | • 1,5 | 5 | 40 | 0,1 | 4 | 3 | 30,00 |
| 30 6493 0200 | • 2,0 | 6 | 40 | 0,1 | 4 | 3 | 30,00 |
| 30 6493 0250 | • 2,5 | 8 | 40 | 0,1 | 4 | 3 | 30,00 |
| 30 6493 0300 | • 3,0 | 10 | 40 | 0,1 | 4 | 3 | 31,00 |
| 30 6493 0400 | • 4,0 | - | 54 | - | 4 | 4 | 25,00 |
| 30 6493 0600 | • 6,0 | - | 57 | - | 6 | 4 | 30,00 |
| 30 6493 0600 06 | • 6,0 | - | 57 | - | 6 | 6 | 31,00 |
| 30 6493 0800 | • 8,0 | - | 63 | - | 8 | 5 | 37,00 |
| 30 6493 0800 06 | • 8,0 | - | 63 | - | 8 | 6 | 39,00 |
| 30 6493 1000 | • 10,0 | - | 72 | - | 10 | 6 | 50,00 |
| 30 6493 1200 | • 12,0 | - | 83 | - | 12 | 6 | 78,00 |
| 30 6493 1200 08 | • 12,0 | - | 83 | - | 12 | 8 | 80,00 |

Schnittdaten
Cutting data

Zeichnungen
Drawings



1215

DXF/STEP

Karnasch®
PROFESSIONAL TOOLS

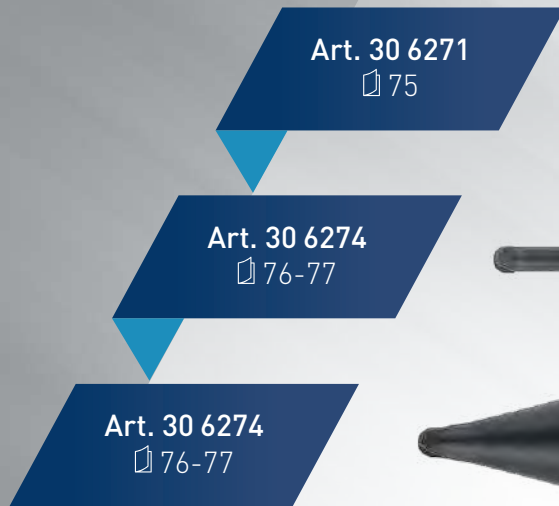
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Quality products for metalworking.

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High-tech for micro-precision

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THE KARNASCH PRODUCT RANGE ONLINE!

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Wenn Hartmetall Hartmetall bearbeitet

Bei schwer zerspanbaren Werkstoffen, wie z.B. Hartmetall, geraten Werkzeuge oftmals an Ihre Grenzen und treiben die Fertigungskosten – aufgrund langer Bearbeitungszeiten – stark in die Höhe.

Durch den Einsatz der neuesten Karnasch-Fräser für die Hartmetallbearbeitung (Zerspanung mit geometrisch bestimmter Schneide) haben wir die Wirtschaftlichkeit enorm gesteigert.

Vorteile:

- Diamantbeschichtete Karnasch-Hartmetallfräser senken die Fertigungskosten und Bearbeitungszeiten
- Die Herstellung von komplexen 3D-Formen und Konturen wird möglich
- Erreichen einer besseren Oberflächengüte
- Hartmetallbearbeitung über 2.000 HV
- Sehr hohe Schneidkantenstabilität bis zu 10.000 HV
- Weiße Erodierzonen werden vermieden

When carbide is machining carbide

During the machining of difficult materials, such as cemented carbide, tools will reach their limits and pushes up the production costs – due to long processing times.

We have enhance the productivity and efficiency by using the latest Karnasch end mills (tools with geometrically defined cutting edges).

Advantages:

- Diamond coated Karnasch carbide end mills reduce manufacturing costs and machining time
- The production of complex 3-D moulds and contours is possible
- You achieve a better surface
- Machining of carbide over 2.000 HV is possible
- Excellent cutting edge stability up to 10.000 HV
- No white erode zones

1



2



3



4



5



6



7



8



9

30 6331

VHM-Schaftfräser, lang
Solid carbide end mills, long



HRC < 45

STAHL
steel
< 1500 N/mm²

UNI

TOOLOX
44



MICRO GRAIN
DIN 6527 L

N
DIN 6535
Form HB



HSC
HPC

UFX-1
NANO



| | |
|----------------------|---------------------|
| d1* = Ø ≤ 3,0 | tol -0,014 / -0,028 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,020 / -0,038 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,025 / -0,047 |
| d1* = Ø 12,0 | tol -0,032 / -0,059 |
| d1* = Ø 20,0 | tol -0,040 / -0,073 |

| Art. | d1* | f | l3 | l2 | d2 h6 | d3 | l1 | Z | € |
|--------------|------|-----|----|----|-------|------|----|---|-------|
| 30 6331 0300 | • 3 | 0,1 | - | 7 | 6 | - | 57 | 3 | 29,00 |
| 30 6331 0400 | • 4 | 0,1 | - | 8 | 6 | - | 57 | 3 | 29,00 |
| 30 6331 0500 | • 5 | 0,1 | - | 10 | 6 | - | 57 | 3 | 29,00 |
| 30 6331 0600 | • 6 | 0,1 | 21 | 10 | 6 | 5,8 | 57 | 3 | 32,00 |
| 30 6331 0800 | • 8 | 0,1 | 25 | 16 | 8 | 7,8 | 63 | 3 | 38,00 |
| 30 6331 1000 | • 10 | 0,1 | 30 | 19 | 10 | 9,8 | 72 | 3 | 57,00 |
| 30 6331 1200 | • 12 | 0,1 | 38 | 22 | 12 | 11,8 | 83 | 3 | 79,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Schnittdaten
Cutting data

Zeichnungen
Drawings



30 6332

VHM-Schaftfräser, lang
Solid carbide end mills, long

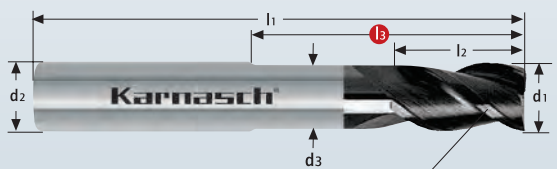


HRC < 45

STAHL
steel
< 1500 N/mm²

UNI

TOOLOX
44



MICRO GRAIN
DIN 6527 L

N
DIN 6535
Form HA



HSC
HPC

UFX-1
NANO



| | |
|----------------------|---------------------|
| d1* = Ø ≤ 3,0 | tol -0,014 / -0,028 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,020 / -0,038 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,025 / -0,047 |
| d1* = Ø 12,0 | tol -0,032 / -0,059 |

| Art. | d1* | f | l3 | l2 | d2 h6 | d3 | l1 | Z | € |
|--------------|------|-----|----|----|-------|------|----|---|-------|
| 30 6332 0300 | • 3 | 0,1 | - | 7 | 6 | - | 57 | 3 | 29,00 |
| 30 6332 0400 | • 4 | 0,1 | - | 8 | 6 | - | 57 | 3 | 29,00 |
| 30 6332 0500 | • 5 | 0,1 | - | 10 | 6 | - | 57 | 3 | 29,00 |
| 30 6332 0600 | • 6 | 0,1 | 21 | 10 | 6 | 5,8 | 57 | 3 | 32,00 |
| 30 6332 0800 | • 8 | 0,1 | 25 | 16 | 8 | 7,8 | 63 | 3 | 39,00 |
| 30 6332 1000 | • 10 | 0,1 | 30 | 19 | 10 | 9,8 | 72 | 3 | 58,00 |
| 30 6332 1200 | • 12 | 0,1 | 38 | 22 | 12 | 11,8 | 83 | 3 | 80,00 |

Schnittdaten
Cutting data

Zeichnungen
Drawings



VHM-Schaftfräser, lang
Solid carbide end mills, long



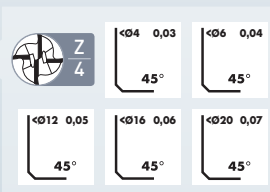
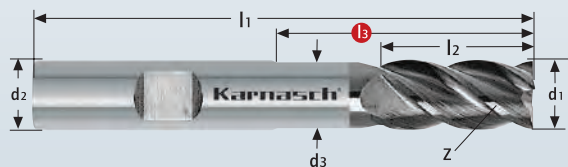
30 6341

HRC < 45

STAHL
steel
< 1500 N/mm²

UNI

TOOLOX 44



| | |
|---|---------------------|
| d1* = $\varnothing \leq 3,0$ | tol -0,014 / -0,028 |
| d1* = $\varnothing 4,0 - \varnothing 6,0$ | tol -0,020 / -0,038 |
| d1* = $\varnothing 8,0 - \varnothing 10,0$ | tol -0,025 / -0,047 |
| d1* = $\varnothing 12,0 - \varnothing 18,0$ | tol -0,032 / -0,059 |
| d1* = $\varnothing 20,0$ | tol -0,040 / -0,073 |

| Art. | d1* | f | l3 | l2 | d2 h6 | d3 | l1 | Z | € |
|--------------|------|-----|----|----|-------|------|-----|---|--------|
| 30 6341 0300 | • 3 | 0,1 | - | 10 | 6 | - | 57 | 4 | 29,00 |
| 30 6341 0400 | • 4 | 0,1 | - | 13 | 6 | - | 57 | 4 | 29,00 |
| 30 6341 0500 | • 5 | 0,1 | - | 15 | 6 | - | 57 | 4 | 29,00 |
| 30 6341 0600 | • 6 | 0,1 | 21 | 16 | 6 | 5,8 | 57 | 4 | 32,00 |
| 30 6341 0800 | • 8 | 0,1 | 25 | 19 | 8 | 7,8 | 63 | 4 | 39,00 |
| 30 6341 1000 | • 10 | 0,1 | 30 | 25 | 10 | 9,8 | 72 | 4 | 58,00 |
| 30 6341 1200 | • 12 | 0,1 | 38 | 28 | 12 | 11,8 | 83 | 4 | 80,00 |
| 30 6341 1600 | • 16 | 0,2 | 45 | 35 | 16 | 15,8 | 92 | 4 | 133,00 |
| 30 6341 1800 | • 18 | 0,2 | 45 | 35 | 18 | 17,8 | 92 | 4 | 91,20 |
| 30 6341 2000 | • 20 | 0,2 | 50 | 40 | 20 | 19,8 | 104 | 4 | 208,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

MICRO GRAIN **DIN 6527 L**

N **DIN 6535 Form HB**

45° f 45°

HSC HPC

UFX-1 NANO

Schnittdaten Cutting data **i** 1190

Zeichnungen Drawings **DXF/STEP**

VHM-Schaftfräser, lang
Solid carbide end mills, long



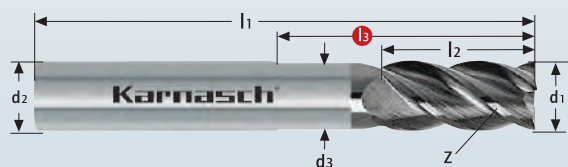
30 6342

HRC < 45

STAHL
steel
< 1500 N/mm²

UNI

TOOLOX 44



| | |
|--|---------------------|
| d1* = $\varnothing \leq 3,0$ | tol -0,014 / -0,028 |
| d1* = $\varnothing 4,0 - \varnothing 6,0$ | tol -0,020 / -0,038 |
| d1* = $\varnothing 8,0 - \varnothing 10,0$ | tol -0,025 / -0,047 |
| d1* = $\varnothing 12,0$ | tol -0,032 / -0,059 |

| Art. | d1* | f | l3 | l2 | d2 h6 | d3 | l1 | Z | € |
|--------------|------|-----|----|----|-------|------|----|---|-------|
| 30 6342 0300 | • 3 | 0,1 | - | 10 | 6 | - | 57 | 4 | 29,00 |
| 30 6342 0400 | • 4 | 0,1 | - | 13 | 6 | - | 57 | 4 | 29,00 |
| 30 6342 0500 | • 5 | 0,1 | - | 15 | 6 | - | 57 | 4 | 29,00 |
| 30 6342 0600 | • 6 | 0,1 | 21 | 16 | 6 | 5,8 | 57 | 4 | 32,00 |
| 30 6342 0800 | • 8 | 0,1 | 25 | 19 | 8 | 7,8 | 63 | 4 | 39,00 |
| 30 6342 1000 | • 10 | 0,1 | 30 | 25 | 10 | 9,8 | 72 | 4 | 58,00 |
| 30 6342 1200 | • 12 | 0,1 | 38 | 28 | 12 | 11,8 | 83 | 4 | 80,00 |

MICRO GRAIN **DIN 6527 L**

N **DIN 6535 Form HA**

45° f 45°

HSC HPC

UFX-1 NANO

Schnittdaten Cutting data **i** 1190

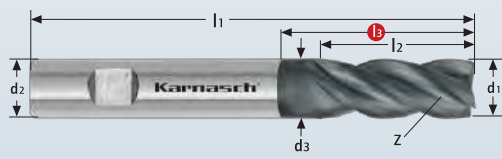
Zeichnungen Drawings **DXF/STEP**



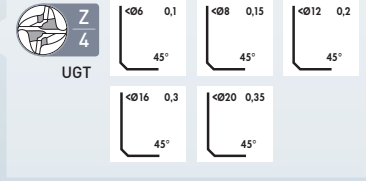
30 6345

VALUETOOL

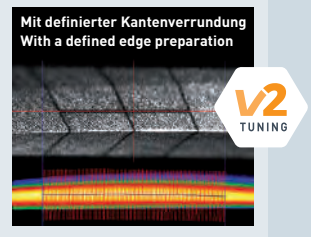
VHM-HPC-Schaftfräser ungleich geteilt, 35°/38° Spirale
Solid carbide HPC end mills with variable pitch, 35°/38° helix angle



neu new



d1* = Ø 3,0 - 20,0 tol -0,003 / -0,035



| Art. | d1* | f | l3 | l2 | d2 | d3 | l1 | Z | € |
|--------------|------|------|----|----|----|------|-----|---|--------|
| 30 6345 0300 | • 3 | 0,10 | 11 | 7 | 6 | 2,8 | 57 | 4 | 27,00 |
| 30 6345 0400 | • 4 | 0,10 | 13 | 9 | 6 | 3,8 | 57 | 4 | 27,00 |
| 30 6345 0500 | • 5 | 0,10 | 15 | 11 | 6 | 4,7 | 57 | 4 | 27,00 |
| 30 6345 0600 | • 6 | 0,10 | 21 | 13 | 6 | 5,5 | 57 | 4 | 27,00 |
| 30 6345 0800 | • 8 | 0,15 | 27 | 19 | 8 | 7,5 | 63 | 4 | 32,00 |
| 30 6345 1000 | • 10 | 0,20 | 32 | 22 | 10 | 9,5 | 72 | 4 | 38,00 |
| 30 6345 1200 | • 12 | 0,20 | 38 | 26 | 12 | 11,5 | 83 | 4 | 51,00 |
| 30 6345 1600 | • 16 | 0,30 | 44 | 32 | 16 | 15,5 | 92 | 4 | 87,00 |
| 30 6345 2000 | • 20 | 0,35 | 54 | 38 | 20 | 19,5 | 104 | 4 | 145,00 |

| | |
|-------------|------------------|
| MICRO GRAIN | DIN 6527 L |
| N | DIN 6535 Form HB |
| 35°/38° | f 45° |
| HSC HPC | |
| UFX-1 NANO | |

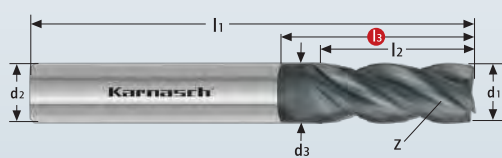
Schnittdaten Cutting data | Zeichnungen Drawings

1190 | DXF/STEP

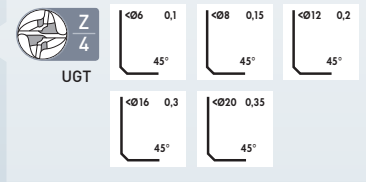
30 6346

VALUETOOL

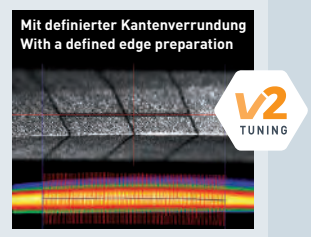
VHM-HPC-Schaftfräser ungleich geteilt, 35°/38° Spirale
Solid carbide HPC end mills with variable pitch, 35°/38° helix angle



neu new



d1* = Ø 3,0 - 20,0 tol -0,003 / -0,035



| Art. | d1* | f | l3 | l2 | d2 | d3 | l1 | Z | € |
|--------------|------|------|----|----|----|------|-----|---|--------|
| 30 6346 0300 | • 3 | 0,10 | 11 | 7 | 6 | 2,8 | 57 | 4 | 27,00 |
| 30 6346 0400 | • 4 | 0,10 | 13 | 9 | 6 | 3,8 | 57 | 4 | 27,00 |
| 30 6346 0500 | • 5 | 0,10 | 15 | 11 | 6 | 4,7 | 57 | 4 | 27,00 |
| 30 6346 0600 | • 6 | 0,10 | 21 | 13 | 6 | 5,5 | 57 | 4 | 27,00 |
| 30 6346 0800 | • 8 | 0,15 | 27 | 19 | 8 | 7,5 | 63 | 4 | 32,00 |
| 30 6346 1000 | • 10 | 0,20 | 32 | 22 | 10 | 9,5 | 72 | 4 | 38,00 |
| 30 6346 1200 | • 12 | 0,20 | 38 | 26 | 12 | 11,5 | 83 | 4 | 51,00 |
| 30 6346 1600 | • 16 | 0,30 | 44 | 32 | 16 | 15,5 | 92 | 4 | 87,00 |
| 30 6346 2000 | • 20 | 0,35 | 54 | 38 | 20 | 19,5 | 104 | 4 | 145,00 |

| | |
|-------------|------------------|
| MICRO GRAIN | DIN 6527 L |
| N | DIN 6535 Form HA |
| 35°/38° | f 45° |
| HSC HPC | |
| UFX-1 NANO | |

Schnittdaten Cutting data | Zeichnungen Drawings

1190 | DXF/STEP

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

Qualitätsprodukte für die Metallbearbeitung.
Quality products for metalworking.

PROZESSSICHERHEIT FÜR PERFEKTE QUALITÄT IN SERIE

Process reliability for perfect quality
in series production



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1



2



3



4



5



6



7



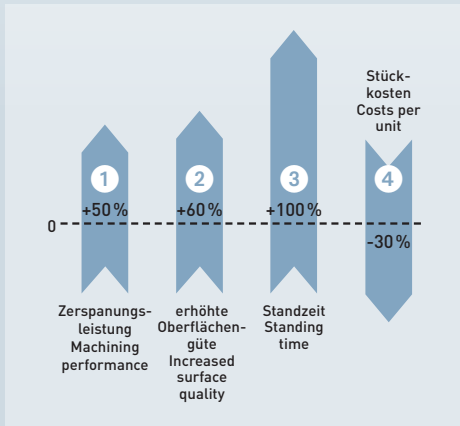
8



9

30 6353

VHM-HXF-Profil-Schrupfräser, lang
Solid carbide roughing end mills with HXF profil, long



| Art. | d1* | l2 | d2 h6 | l1 | Z | € |
|--------------|------|----|-------|-----|---|--------|
| 30 6353 0400 | • 4 | 8 | 6 | 57 | 3 | 61,00 |
| 30 6353 0600 | • 6 | 13 | 6 | 57 | 3 | 65,00 |
| 30 6353 0800 | • 8 | 19 | 8 | 63 | 3 | 81,00 |
| 30 6353 1000 | • 10 | 22 | 10 | 72 | 4 | 88,00 |
| 30 6353 1200 | • 12 | 26 | 12 | 83 | 4 | 110,00 |
| 30 6353 1600 | • 16 | 32 | 16 | 92 | 4 | 166,00 |
| 30 6353 2000 | • 20 | 38 | 20 | 104 | 4 | 248,00 |

| * tol. d1 | |
|-----------|--------------|
| Ø 4-Ø 6 | -0,01/-0,048 |
| Ø 8-Ø10 | -0,01/-0,058 |
| Ø12-Ø18 | -0,01/-0,070 |
| Ø20 | -0,01/-0,084 |

| | |
|--------------------|-------------------------|
| MICRO GRAIN | DIN 6527 L |
| HXF | DIN 6535 Form HB |
| | |
| | HSC HPC |
| | DVC-X3 |
| | |

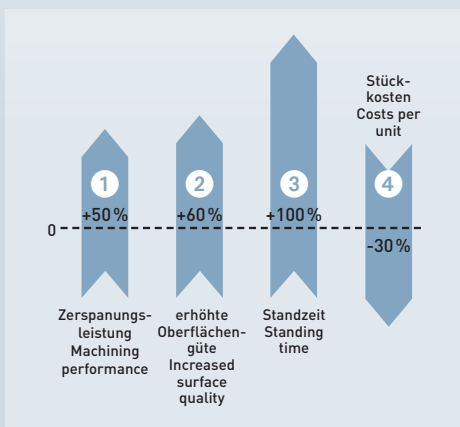
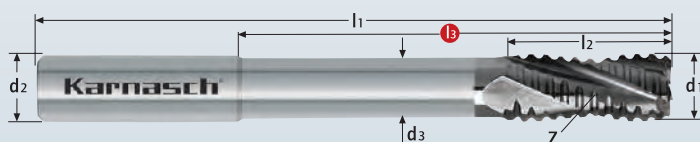
Schnittdaten Cutting data

1191 **DXF/STEP**

- 1
- 2
- 3
- 4

30 6355

VHM-HXF-Profil-Schrupfräser, extra lang
Solid carbide roughing end mills with HXF profil, extra long



| Art. | d1* | d2 h6 | d3±0,05 | l1 | l2 | l3 | Z | € |
|--------------|------|-------|---------|-----|----|----|---|--------|
| 30 6355 0600 | • 6 | 6 | 5,5 | 80 | 15 | 44 | 3 | 86,00 |
| 30 6355 0800 | • 8 | 8 | 7,5 | 85 | 21 | 49 | 3 | 108,00 |
| 30 6355 1000 | • 10 | 10 | 9,5 | 100 | 24 | 60 | 4 | 128,00 |
| 30 6355 1200 | • 12 | 12 | 11,5 | 120 | 28 | 65 | 4 | 170,00 |
| 30 6355 1600 | • 16 | 16 | 15,5 | 125 | 34 | 77 | 4 | 246,00 |

| * tol. d1 | |
|-----------|--------------|
| Ø 4-Ø 6 | -0,01/-0,048 |
| Ø 8-Ø10 | -0,01/-0,058 |
| Ø12-Ø18 | -0,01/-0,070 |
| Ø20 | -0,01/-0,084 |

| | |
|--------------------|-------------------------|
| MICRO GRAIN | KARNASCH NORM |
| HXF | DIN 6535 Form HA |
| | |
| | HSC HPC |
| | DVC-X3 |
| | |

Schnittdaten Cutting data

1191 **DXF/STEP**

- 5
- 6
- 7
- 8
- 9

Index

VHM-Feinschruppfräser, MTC*, Progressiv, Innen- und Außenschrupp
Solid carbide fine roughing end mills with HR profile. MTC-Multi-Task-Cutting, progressive



30 6356

UNI
lang-spanend
long chip

STAHL
steel
< 1400 N/mm²

Schruppen
roughing

GJL

GJS

**GTW
GTS**

TITAN
titanium

INOX
stainless steel
< 900 N/mm²
ferritic

INOX
stainless steel
> 900 N/mm²
martensitic

INOX
stainless steel
< 900 N/mm²
austenitic



* MTC – Multi-Task-Cutting geeignet für die neueste MTM-Generation von Dreh- und Fräszentren (MTC für MTM)

* MTC – Multi-Task-Cutting suitable for the newest MTM-Generation for turning and milling centres (MTC for MTM)

| | | |
|-----|-------------------|---------------------|
| d1* | = Ø 6,0 | tol -0,030 / -0,105 |
| d1* | = Ø 8,0 - Ø 10,0 | tol -0,040 / -0,130 |
| d1* | = Ø 12,0 - Ø 18,0 | tol -0,050 / -0,160 |
| d1* | = Ø 20,0 | tol -0,065 / -0,195 |

| Art. | d1* | l3 | l2 | d2 h6 | d3 | l1 | Z | € |
|-----------------|------|----|----|-------|------|-----|---|--------|
| 30 6356 0600 21 | • 6 | 21 | 16 | 6 | 5,5 | 57 | 4 | 80,00 |
| 30 6356 0800 27 | • 8 | 27 | 22 | 8 | 7,5 | 72 | 4 | 91,00 |
| 30 6356 1000 30 | • 10 | 30 | 25 | 10 | 9,5 | 72 | 4 | 101,00 |
| 30 6356 1200 38 | • 12 | 38 | 28 | 12 | 11,2 | 83 | 4 | 123,00 |
| 30 6356 1400 40 | % 14 | 40 | 30 | 14 | 13,0 | 83 | 4 | 102,60 |
| 30 6356 1800 45 | % 18 | 45 | 35 | 18 | 17,0 | 92 | 5 | 172,80 |
| 30 6356 2000 55 | % 20 | 55 | 40 | 20 | 19,0 | 104 | 5 | 206,40 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

MICRO GRAIN KARNASCH NORM

HR DIN 6535 Form HA

PROGRESSIV PROGRESSIVE

MTC

HVS

Schnittdaten
Cutting data

Zeichnungen
Drawings

1192

DXF/STEP

VHM-Schruppfräser, MTC*, mit Innenkühlung, Progressiv, Innen- und Außenschrupp
Solid carbide fine roughing end mills with HR profile. MTC-Multi-Task-Cutting, progressive, with interior cooling



30 6358

HRC < 55

UNI

TITAN
titanium

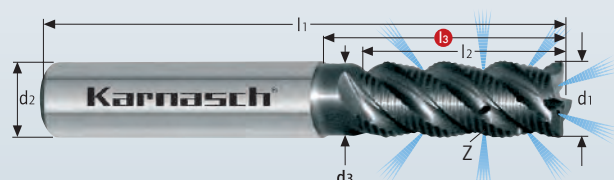
GJL

GJS

lang-spanend
long chip

kurz-spanend
short chip

Schruppen
roughing



* MTC – Multi-Task-Cutting geeignet für die neueste MTM-Generation von Dreh- und Fräszentren (MTC für MTM)

* MTC – Multi-Task-Cutting suitable for the newest MTM-Generation for turning and milling centres (MTC for MTM)

| | | |
|-----|-------------------|---------------------|
| d1* | = Ø 6,0 | tol -0,030 / -0,105 |
| d1* | = Ø 8,0 - Ø 10,0 | tol -0,040 / -0,130 |
| d1* | = Ø 12,0 - Ø 18,0 | tol -0,050 / -0,160 |
| d1* | = Ø 20,0 | tol -0,065 / -0,195 |

Mit kontrolliertem Kühlmittelaustritt
With controlled interior cooling leaving

| Art. | d1* | l3 | l2 | d2 h5 | d3 | l1 | Z | € |
|-----------------|------|----|----|-------|------|-----|---|--------|
| 30 6358 0600 21 | • 6 | 21 | 16 | 6 | 5,5 | 58 | 4 | 114,00 |
| 30 6358 0800 27 | • 8 | 27 | 22 | 8 | 7,5 | 70 | 4 | 129,00 |
| 30 6358 1000 30 | • 10 | 30 | 25 | 10 | 9,5 | 72 | 4 | 151,00 |
| 30 6358 1200 38 | • 12 | 38 | 28 | 12 | 11,2 | 82 | 4 | 189,00 |
| 30 6358 1400 40 | % 14 | 40 | 30 | 14 | 13,0 | 82 | 4 | 146,40 |
| 30 6358 1600 45 | % 16 | 45 | 35 | 16 | 15,0 | 92 | 5 | 189,60 |
| 30 6358 1800 45 | % 18 | 45 | 35 | 18 | 17,0 | 92 | 5 | 220,80 |
| 30 6358 2000 55 | % 20 | 55 | 40 | 20 | 19,0 | 104 | 5 | 265,20 |

Ø 6 ohne Kühlmittel Stirnaustritt / Ø 6 without cooling face discharge

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

MICRO GRAIN KARNASCH NORM

HR DIN 6535 Form HAK

PROGRESSIV PROGRESSIVE

MTC

HVS

f 45°

Schnittdaten
Cutting data

Zeichnungen
Drawings

1193

DXF/STEP



30 6425

VHM-Schaftfräser mit Eckenradius, überlang
Solid carbide end mills with corner radius, extra long



HRC < 60

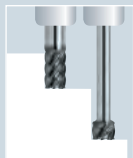
UNI

GG/G
cast iron



d1* = Ø 7,0 - Ø 9,0 tol -0,025 / -0,047

d1* = Ø 11,0 - Ø 13,0 tol -0,032 / -0,059



Wichtig/Important:

- I Generell HSC Gleichlaufräsen mit Emulsion!
General HSC synchronized milling with emulsion!
- II Guss- und NE-Metall nass bearbeiten oder mit Luftkühlung!
Caste and NE-Metal wet processed or with air cooling!
- III Stabile, schwingungsfreie Verhältnisse sind Voraussetzung.
Stabile, oscillation free relationships are the prerequisite.

MICRO GRAIN KARNASCH NORM

N/M DIN 6535 Form HA



HSC HHC

UFX-3



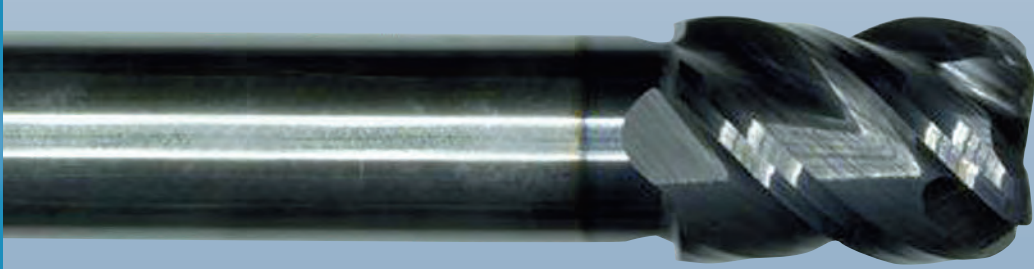
Schnittdaten
Cutting data

Zeichnungen
Drawings



| Art. | d1* | r ± 0,01 | d2 h6 | l1 | l2 | Z | € |
|-----------------|------|----------|-------|-----|----|---|--------|
| 30 6425 0700 05 | • 7 | 0,5 | 6 | 120 | 9 | 4 | 104,00 |
| 30 6425 0700 10 | • 7 | 1,0 | 6 | 120 | 9 | 4 | 104,00 |
| 30 6425 0900 05 | • 9 | 0,5 | 8 | 135 | 12 | 4 | 138,00 |
| 30 6425 0900 10 | • 9 | 1,0 | 8 | 135 | 12 | 4 | 138,00 |
| 30 6425 1100 05 | • 11 | 0,5 | 10 | 150 | 15 | 4 | 174,00 |
| 30 6425 1100 10 | • 11 | 1,0 | 10 | 150 | 15 | 4 | 174,00 |
| 30 6425 1300 05 | • 13 | 0,5 | 12 | 160 | 18 | 4 | 242,00 |
| 30 6425 1300 10 | • 13 | 1,0 | 12 | 160 | 18 | 4 | 242,00 |

Stirnseitig
Front side



30 6425 0700 05

Objektiv: Z30 × 30

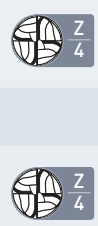
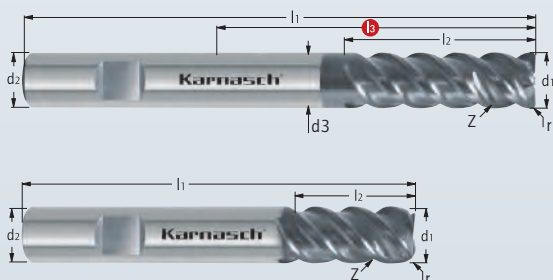


VHM-Extrem Rapid Cutter Nut- und Schruppfräser < 700 N/mm²
Solid carbide extreme rapid cutter steel < 700 N/mm²



30 6432

- UNI**
- STAHL**
steel
< 1100 N/mm²
- HRC**
< 45
- GJL**
- GJS**
- GTW**
GTS
- Schruppen
roughing
- Schrupp-
schlicht
semifinishing
- kurz-
spanend
short chip
- lang-
spanend
long chip



| d1 | tol. |
|--------|---------|
| < Ø 6 | - 0,025 |
| < Ø 10 | - 0,030 |
| < Ø 16 | - 0,035 |
| < Ø 20 | - 0,040 |

| | |
|--------------------|--------------------------------------|
| MICRO GRAIN | KARNASCH NORM |
| N DUO | DIN 6335/Form HA DIN 6335/Form HB |
| | |
| | Extrem Rapid Cutting |
| | XP-772 |
| | |

| Art. | d1* | r | l2 | l3 | d2 h5 | d3 | l1 | Z | € |
|---------------------|------|-----|----|----|-------|------|-----|---|-------|
| 30 6432 0800 050 24 | 8,0 | 0,5 | 24 | 48 | 8 | 7,80 | 90 | 4 | 40,80 |
| 30 6432 1000 050 30 | 10,0 | 0,5 | 30 | 55 | 10 | 9,80 | 100 | 4 | 54,60 |
| 30 6432 1200 100 24 | 12,0 | 1,0 | 24 | - | 12 | - | 83 | 4 | 45,31 |

d3 < Ø10 HA / d3 > Ø12 HB

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 1238 | |



| | |
|-------------------------------------|---|
| 1. Test | Reale Schnittdaten Real cutting data |
| Werkstoff / Work material | 1.7225 Tool 12,0 x 24 r 1,0 Vc = 265 m/min. n = 7.000 U/min. Vf = 6.000 mm/min. fz = 0,21 mm ae = 1,25 mm ap = 20,0 mm Q = 138 cm/min. |

| | | | |
|---|-------------------------------------|---|--------|
| | 2. Test | Reale Schnittdaten Real cutting data | |
| Länge ausserhalb Spannfutter Overhang length | Werkstoff / Work material | St 52-3U Tool 12,0 x 24 r 1,0 Vc = 150 m/min. n = 4.780 U/min. Vf = 2.200 mm/min. fz = 0,12 mm ae = 8,0 mm ap = 6,0 mm Q = 105 cm/min. Eintauchvorschub = 700 mm/min. Plunging speed | |
| l7 ≤ 4 x d1 | Vc - % | ap - % | Vf - % |
| l7 ≤ 5 x d1 | 100 | 100 | 100 |
| l7 ≤ 4 x d1 | 70 | 70 | 80 |
| l7 ≤ 4 x d1 | 50 | 50 | 70 |

| | |
|-------------------------------------|--|
| 3. Test | Reale Schnittdaten Real cutting data |
| Werkstoff / Work material | 1.2085 Tool 16 x 32 r = 1,0 Vc = 120 m/min. n = 2.355 U/min. Vf = 800 mm/min. |

- Bearbeitungshinweise:**
- Vorausgesetzt, es werden stabile Maschinenverhältnisse und einwandfreie Werkzeugaufnahmen verwendet (Schrumpffutter)
 - Die genannten Richtwerte basieren auf interpolationsfräsen auch in den Ecken. Ohne Interpolationsfräsen reduzieren Sie die Schnittgeschwindigkeit (Vc) um 50-70% sowie die Schnitttiefe (ap) um 50-80%.
 - Kühlen Sie mit MMKS (Minimalkühlschmierung) oder Luft.
 - Beim Eintauchen in Z-Achse mit einer Schräge von ≈ 2° ist der Vorschub auf 40-60% zu reduzieren.
 - Die Richtwerte beziehen sich auf eine Auskraglänge l3 von 3xD. Für tiefere Anwendungen sind Vc / ap / Vf den Gegebenheiten anzupassen.
 - Um optimale Schnittbedingungen zu erreichen sind die Einsatzbedingungen vor Ort zu berücksichtigen.

- Machining details:**
- Conditions must be: rigid machine circumstances and excellent holders. (shrinking holder)
 - The mentioned standard values based on interpolation milling also in corners.
 - Coolant with MMKS [MQL (mist)] or air blow.
 - When dipping in Z-axis, you have to reduce the feed speed 40-60%.
 - The standard values refer to the length l3 of 3xD. For deeper applications please adjust Vc/ap/Vf for the conditions.
 - In order to achieve ideal cutting results you have to consider your local operating conditions.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

30 6433

VHM High Performance-Fräser bis 60 HRC
Solid carbide – high performance end mill up to 60 HRC



HRC < 60

HRC < 55

UNI



| | |
|-----------------------|---------------------|
| d1* = Ø ≤ 3,0 | tol -0,014 / -0,028 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,020 / -0,038 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,025 / -0,047 |
| d1* = Ø 11,0 - Ø 16,0 | tol -0,032 / -0,059 |

| | |
|-------------|-----------------------|
| MICRO GRAIN | KARNASCH NORM |
| H | DIN 6535 Form HA |
| | |
| | HPC |
| | HXC-NANO ³ |
| | |

| Art. | d1* | r | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|------------------|--------|------|------|-------|------|-----|-----|---|--------|
| 30 6433 0200 05 | • 2,0 | 0,5 | 5,0 | 6 | 1,8 | 60 | 0,8 | 3 | 73,00 |
| 30 6433 0300 075 | • 3,0 | 0,75 | 7,5 | 6 | 2,7 | 60 | 1,2 | 4 | 73,00 |
| 30 6433 0400 10 | • 4,0 | 1,0 | 10,0 | 6 | 3,5 | 70 | 1,6 | 4 | 77,00 |
| 30 6433 0600 15 | • 6,0 | 1,5 | 12,0 | 6 | 5,5 | 90 | 2,5 | 4 | 105,00 |
| 30 6433 0700 15 | % 7,0 | 1,5 | - | 6 | - | 90 | 3,0 | 4 | 66,00 |
| 30 6433 0800 20 | • 8,0 | 2,0 | 16,0 | 8 | 7,2 | 105 | 3,5 | 4 | 123,00 |
| 30 6433 0900 20 | % 9,0 | 2,0 | - | 8 | - | 105 | 4,0 | 4 | 80,40 |
| 30 6433 1000 20 | • 10,0 | 2,0 | 20,0 | 10 | 9,0 | 105 | 4,0 | 4 | 153,00 |
| 30 6433 1200 30 | • 12,0 | 3,0 | 24,0 | 12 | 11,0 | 105 | 5,0 | 4 | 182,00 |
| 30 6433 1300 30 | % 13,0 | 3,0 | - | 12 | - | 105 | 5,5 | 4 | 115,80 |
| 30 6433 1600 40 | % 16,0 | 4,0 | 28,0 | 16 | 14,0 | 105 | 6,5 | 4 | 142,20 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1194 | DXF/STEP |

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VIelfalt

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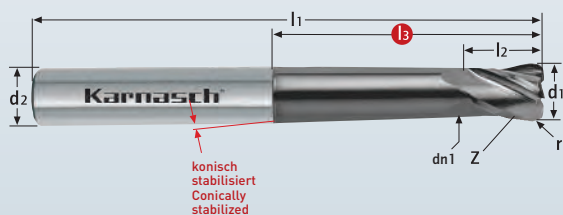
<https://shop.karnasch.tools>

VHM-Gesenckfräser mit Eckenradius, kurz, Rockwell Cutter
Solid carbide end mills with corner radius, short, Rockwell Cutter



30 6434

- HRC < 68
- UNI
- GG/G
cast iron
- TITAN
TITANIUM
< 1100 N/mm²



| | |
|-------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HA |
| | |
| | HSC HHC |
| | UF3 |
| | |

Schnittdaten
Cutting data

1202

| Art. | d1 - 0,03 | r ± 0,01 | l3 | d2 h6 | dn1 | l1 | l2 | Z | € |
|-----------------|-----------|----------|----|-------|---------|----|----|---|-------|
| 30 6434 0500 05 | % 5 | 0,5 | 18 | 5 | konisch | 54 | 6 | 4 | 15,91 |
| 30 6434 0500 10 | % 5 | 1,0 | 18 | 5 | konisch | 54 | 6 | 4 | 15,91 |

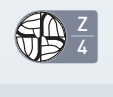
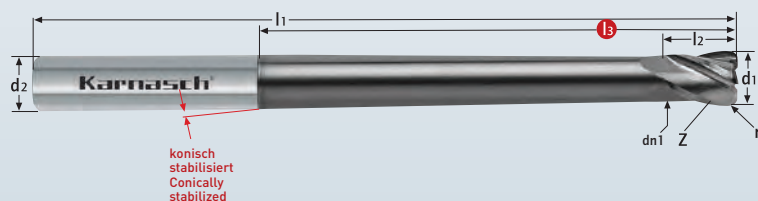
% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.
Alternative 30 6436 + 30 6438 auf Seite 92 / on page 92

VHM-Gesenckfräser mit Eckenradius, extra lang, Rockwell Cutter
Solid carbide end mills with corner radius, extra long, Rockwell Cutter



30 6435

- HRC < 68
- UNI
- GG/G
cast iron
- TITAN
TITANIUM
< 1100 N/mm²



| | |
|-------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HA |
| | |
| | HSC HHC |
| | UF3 |
| | |

Schnittdaten
Cutting data

1202

| Art. | d1 - 0,03 | r ± 0,01 | l3 | d2 h6 | dn1 | l1 | l2 | Z | € |
|-----------------|-----------|----------|----|-------|---------|-----|----|---|-------|
| 30 6435 0200 02 | % 2 | 0,2 | 27 | 3 | konisch | 75 | 3 | 4 | 16,80 |
| 30 6435 0600 15 | % 6 | 1,5 | 45 | 6 | konisch | 100 | 7 | 4 | 25,51 |
| 30 6435 1000 05 | % 10 | 0,5 | 60 | 10 | konisch | 100 | 11 | 4 | 45,31 |
| 30 6435 1000 15 | % 10 | 1,5 | 60 | 10 | konisch | 100 | 11 | 4 | 45,31 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.
Alternative 30 6437 auf Seite 93 / on page 93

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

30 6438

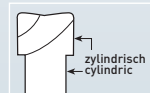
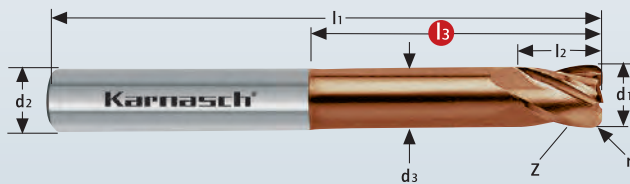
VALUETOOL

VHM-Gesenckfräser mit Eckenradius, kurz, < 55 HRC
Solid carbide end mills with corner radius, short, < 55 HRC



HRC < 55

UNI



d1* = Ø ≤ 3,0 tol -0,014 / -0,028

d1* = Ø 4,0 - Ø 6,0 tol -0,020 / -0,038

d1* = Ø 8,0 - Ø 10,0 tol -0,025 / -0,047

d1* = Ø 12,0 tol -0,032 / -0,059

| Art. | d1* | r ± 0,01 | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|-----------------|------|----------|----|-------|------|----|----|---|-------|
| 30 6438 0300 03 | • 3 | 0,3 | 14 | 6 | 2,7 | 57 | 4 | 4 | 26,00 |
| 30 6438 0400 02 | • 4 | 0,2 | 16 | 6 | 3,7 | 57 | 5 | 4 | 30,00 |
| 30 6438 0400 04 | • 4 | 0,4 | 16 | 6 | 3,7 | 57 | 5 | 4 | 30,00 |
| 30 6438 0400 05 | • 4 | 0,5 | 16 | 6 | 3,7 | 57 | 5 | 4 | 30,00 |
| 30 6438 0400 10 | • 4 | 1,0 | 16 | 6 | 3,7 | 57 | 5 | 4 | 30,00 |
| 30 6438 0500 05 | • 5 | 0,5 | 18 | 6 | 4,6 | 57 | 6 | 4 | 30,00 |
| 30 6438 0500 10 | • 5 | 1,0 | 18 | 6 | 4,6 | 57 | 6 | 4 | 30,00 |
| 30 6438 0600 02 | • 6 | 0,2 | 21 | 6 | 5,5 | 57 | 7 | 4 | 30,00 |
| 30 6438 0600 05 | • 6 | 0,5 | 21 | 6 | 5,5 | 57 | 7 | 4 | 30,00 |
| 30 6438 0600 10 | • 6 | 1,0 | 21 | 6 | 5,5 | 57 | 7 | 4 | 30,00 |
| 30 6438 0600 15 | • 6 | 1,5 | 21 | 6 | 5,5 | 57 | 7 | 4 | 30,00 |
| 30 6438 0800 02 | • 8 | 0,2 | 27 | 8 | 7,4 | 63 | 10 | 4 | 40,00 |
| 30 6438 0800 05 | • 8 | 0,5 | 27 | 8 | 7,4 | 63 | 10 | 4 | 40,00 |
| 30 6438 0800 10 | • 8 | 1,0 | 27 | 8 | 7,4 | 63 | 10 | 4 | 40,00 |
| 30 6438 0800 15 | • 8 | 1,5 | 27 | 8 | 7,4 | 63 | 10 | 4 | 40,00 |
| 30 6438 0800 20 | • 8 | 2,0 | 27 | 8 | 7,4 | 63 | 10 | 4 | 40,00 |
| 30 6438 1000 02 | • 10 | 0,2 | 32 | 10 | 9,2 | 72 | 12 | 4 | 54,00 |
| 30 6438 1000 05 | • 10 | 0,5 | 32 | 10 | 9,2 | 72 | 12 | 4 | 54,00 |
| 30 6438 1000 10 | • 10 | 1,0 | 32 | 10 | 9,2 | 72 | 12 | 4 | 54,00 |
| 30 6438 1000 15 | • 10 | 1,5 | 32 | 10 | 9,2 | 72 | 12 | 4 | 54,00 |
| 30 6438 1000 20 | • 10 | 2,0 | 32 | 10 | 9,2 | 72 | 12 | 4 | 54,00 |
| 30 6438 1200 05 | • 12 | 0,5 | 36 | 12 | 11,0 | 83 | 15 | 4 | 76,00 |
| 30 6438 1200 10 | • 12 | 1,0 | 36 | 12 | 11,0 | 83 | 15 | 4 | 76,00 |
| 30 6438 1200 15 | • 12 | 1,5 | 36 | 12 | 11,0 | 83 | 15 | 4 | 76,00 |
| 30 6438 1200 20 | • 12 | 2,0 | 36 | 12 | 11,0 | 83 | 15 | 4 | 76,00 |

MICRO GRAIN DIN 6527 K

N DIN 6535 Form HA



HSC High-Speed-Cutting

XVC²



Schnittdaten Cutting data

Zeichnungen Drawings



30 6436

VHM-Gesenckfräser mit Eckenradius, kurz, Rockwell Cutter
Solid carbide end mills with corner radius, short, Rockwell Cutter



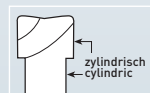
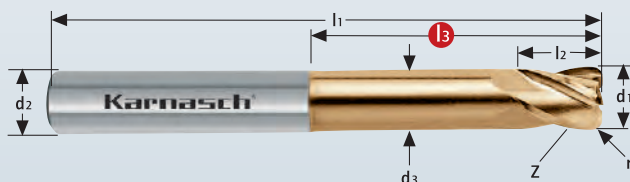
HRC < 68

UNI

TOOLOX 44

GG/G cast iron

TITAN TITANIUM < 1100 N/mm²



d1* = Ø ≤ 3,0 tol -0,014 / -0,028

d1* = Ø 4,0 - Ø 6,0 tol -0,020 / -0,038

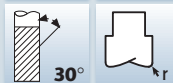
d1* = Ø 8,0 - Ø 10,0 tol -0,025 / -0,047

d1* = Ø 12,0 tol -0,032 / -0,059

| Art. | d1* | r ± 0,01 | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|-----------------|------|----------|----|-------|------|----|----|---|--------|
| 30 6436 0100 01 | • 1 | 0,1 | 10 | 6 | 0,9 | 57 | 2 | 4 | 84,00 |
| 30 6436 0100 02 | • 1 | 0,2 | 10 | 6 | 0,9 | 57 | 2 | 4 | 84,00 |
| 30 6436 0200 02 | • 2 | 0,2 | 13 | 6 | 1,9 | 57 | 3 | 4 | 50,00 |
| 30 6436 0300 03 | • 3 | 0,3 | 14 | 6 | 2,7 | 57 | 4 | 4 | 48,00 |
| 30 6436 0400 02 | • 4 | 0,2 | 16 | 6 | 3,7 | 57 | 5 | 4 | 61,00 |
| 30 6436 0400 04 | • 4 | 0,4 | 16 | 6 | 3,7 | 57 | 5 | 4 | 61,00 |
| 30 6436 0400 05 | • 4 | 0,5 | 16 | 6 | 3,7 | 57 | 5 | 4 | 61,00 |
| 30 6436 0400 10 | • 4 | 1,0 | 16 | 6 | 3,7 | 57 | 5 | 4 | 61,00 |
| 30 6436 0500 05 | • 5 | 0,5 | 18 | 6 | 4,6 | 57 | 6 | 4 | 61,00 |
| 30 6436 0600 02 | • 6 | 0,2 | 21 | 6 | 5,5 | 57 | 7 | 4 | 61,00 |
| 30 6436 0600 05 | • 6 | 0,5 | 21 | 6 | 5,5 | 57 | 7 | 4 | 61,00 |
| 30 6436 0600 10 | • 6 | 1,0 | 21 | 6 | 5,5 | 57 | 7 | 4 | 61,00 |
| 30 6436 0800 02 | • 8 | 0,2 | 27 | 8 | 7,4 | 63 | 10 | 4 | 84,00 |
| 30 6436 0800 05 | • 8 | 0,5 | 27 | 8 | 7,4 | 63 | 10 | 4 | 84,00 |
| 30 6436 0800 10 | • 8 | 1,0 | 27 | 8 | 7,4 | 63 | 10 | 4 | 84,00 |
| 30 6436 1000 02 | • 10 | 0,2 | 32 | 10 | 9,2 | 72 | 12 | 4 | 116,00 |
| 30 6436 1000 05 | • 10 | 0,5 | 32 | 10 | 9,2 | 72 | 12 | 4 | 116,00 |
| 30 6436 1000 10 | • 10 | 1,0 | 32 | 10 | 9,2 | 72 | 12 | 4 | 116,00 |
| 30 6436 1000 15 | • 10 | 1,5 | 32 | 10 | 9,2 | 72 | 12 | 4 | 116,00 |
| 30 6436 1200 05 | • 12 | 0,5 | 36 | 12 | 11,0 | 83 | 15 | 4 | 147,00 |
| 30 6436 1200 10 | • 12 | 1,0 | 36 | 12 | 11,0 | 83 | 15 | 4 | 147,00 |
| 30 6436 1200 15 | • 12 | 1,5 | 36 | 12 | 11,0 | 83 | 15 | 4 | 147,00 |

MICRO GRAIN DIN 6527 K

N DIN 6535 Form HA



HSC HHC

HXC-NANO³



Schnittdaten Cutting data

Zeichnungen Drawings



VHM-Gesenckfräser mit Eckenradius, extra lang, Rockwell Cutter
Solid carbide end mills with corner radius, extra long, Rockwell Cutter



30 6437

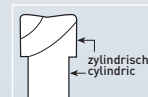
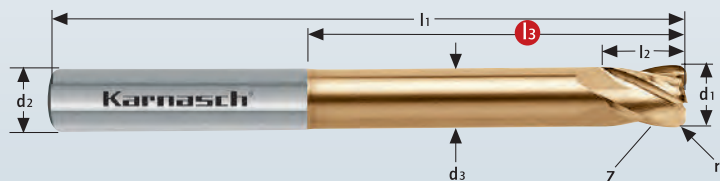
HRC < 68

UNI

TOOLOX 44

GG/G cast iron

TITAN TITANIUM < 1100 N/mm²



| | |
|----------------------|---------------------|
| d1* = Ø 6,0 - Ø 10,0 | tol -0,025 / -0,047 |
| d1* = Ø 12,0 | tol -0,032 / -0,059 |

| | |
|-------------|-----------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HA |
| 30° | |
| HSC HHC | HXC-NANO ³ |

| Art. | d1* | r ± 0,01 | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|-----------------|------|----------|----|-------|------|-----|----|---|--------|
| 30 6437 0600 05 | • 6 | 0,5 | 45 | 6 | 5,5 | 100 | 7 | 4 | 86,00 |
| 30 6437 0600 10 | • 6 | 1,0 | 45 | 6 | 5,5 | 100 | 7 | 4 | 86,00 |
| 30 6437 0800 05 | • 8 | 0,5 | 55 | 8 | 7,4 | 100 | 10 | 4 | 122,00 |
| 30 6437 0800 10 | • 8 | 1,0 | 55 | 8 | 7,4 | 100 | 10 | 4 | 122,00 |
| 30 6437 1000 05 | • 10 | 0,5 | 60 | 10 | 9,2 | 100 | 12 | 4 | 160,00 |
| 30 6437 1000 10 | • 10 | 1,0 | 60 | 10 | 9,2 | 100 | 12 | 4 | 160,00 |
| 30 6437 1000 15 | • 10 | 1,5 | 60 | 10 | 9,2 | 100 | 12 | 4 | 84,60 |
| 30 6437 1200 05 | • 12 | 0,5 | 75 | 12 | 11,0 | 120 | 15 | 4 | 211,00 |
| 30 6437 1200 10 | • 12 | 1,0 | 75 | 12 | 11,0 | 120 | 15 | 4 | 211,00 |
| 30 6437 1200 15 | • 12 | 1,5 | 75 | 12 | 11,0 | 120 | 15 | 4 | 211,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Schnittdaten Cutting data | Zeichnungen Drawings

1208-1209 | DXF/STEP

VHM-Gesenckfräser mit Eckenradius, kurz, Superfinish, Rockwell Cutter
Solid carbide end mills with corner radius, short, Superfinish, Rockwell Cutter



30 6439

HRC < 68

UNI

INOX stainless steel < 900 N/mm² ferritic

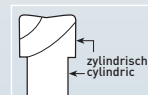
INOX stainless steel > 900 N/mm² martensitic

INOX stainless steel < 900 N/mm² austenitic

GG/G cast iron

TITAN TITANIUM < 1100 N/mm²

TOOLOX 44



| | |
|----------------------|---------------------|
| d1* = Ø ≤ 3,0 | tol -0,014 / -0,028 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,020 / -0,038 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,025 / -0,047 |
| d1* = Ø 12,0 | tol -0,032 / -0,059 |

| | |
|-------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HA |
| 45° | |
| HSC HHC | UFX-3 |

| Art. | d1* | r ± 0,01 | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|-----------------|------|----------|----|-------|------|----|-----|---|--------|
| 30 6439 0300 03 | • 3 | 0,3 | 14 | 3 | 2,7 | 50 | 4 | 4 | 43,00 |
| 30 6439 0300 05 | • 3 | 0,5 | 12 | 6 | 2,8 | 55 | 3,5 | 4 | 59,00 |
| 30 6439 0400 04 | • 4 | 0,4 | 16 | 4 | 3,7 | 54 | 5 | 4 | 49,00 |
| 30 6439 0400 05 | • 4 | 0,5 | 12 | 6 | 3,8 | 55 | 4 | 4 | 59,00 |
| 30 6439 0500 05 | • 5 | 0,5 | 18 | 6* | 4,6 | 54 | 6 | 4 | 51,00 |
| 30 6439 0600 05 | • 6 | 0,5 | 21 | 6 | 5,5 | 65 | 7 | 6 | 62,00 |
| 30 6439 0800 05 | • 8 | 0,5 | 27 | 8 | 7,4 | 70 | 9 | 6 | 77,00 |
| 30 6439 1000 05 | • 10 | 0,5 | 32 | 10 | 9,2 | 80 | 11 | 6 | 104,00 |
| 30 6439 1200 05 | • 12 | 0,5 | 38 | 12 | 11,0 | 93 | 12 | 6 | 145,00 |
| 30 6439 1200 10 | • 12 | 1,0 | 38 | 12 | 11,0 | 93 | 12 | 6 | 145,00 |

* Laufende Produktion wird geändert auf Schaft d2 = 6,0 mm
* Running production changed the shank to d2 = 6 mm

Schnittdaten Cutting data | Zeichnungen Drawings

1202 | DXF/STEP

30 6446

VHM-Schaftfräser positiv, lang, Superfinish
Solid carbide end mills, long, Superfinish



| | |
|-----------------------|---------------------|
| d1* = Ø 3,0 | tol -0,014 / -0,028 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,020 / -0,038 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,025 / -0,047 |
| d1* = Ø 12,0 - Ø 16,0 | tol -0,032 / -0,059 |
| d1* = Ø 20,0 | tol -0,040 / -0,073 |

| Art. | d1* | l2 | d2 h6 | l1 | Z | € |
|--------------|------|----|-------|-----|----|--------|
| 30 6446 0300 | • 3 | 8 | 6 | 57 | 6 | 32,00 |
| 30 6446 0400 | • 4 | 11 | 6 | 57 | 6 | 32,00 |
| 30 6446 0500 | • 5 | 13 | 6 | 57 | 6 | 32,00 |
| 30 6446 0600 | • 6 | 13 | 6 | 57 | 6 | 32,00 |
| 30 6446 0800 | • 8 | 19 | 8 | 63 | 6 | 36,00 |
| 30 6446 1000 | • 10 | 22 | 10 | 72 | 6 | 57,00 |
| 30 6446 1200 | • 12 | 26 | 12 | 83 | 6 | 79,00 |
| 30 6446 1600 | • 16 | 32 | 16 | 92 | 8 | 143,00 |
| 30 6446 2000 | • 20 | 38 | 20 | 104 | 10 | 203,00 |

| | |
|--------------------|-------------------------------|
| MICRO GRAIN | DIN 6527 L |
| N | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | UFX-2 |
| | |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1195 | DXF/STEP |

30 6447

VHM-Schaftfräser positiv, extra lang, Superfinish
Solid carbide end mills high speed cutting, extra long, Superfinish



| | |
|-----------------------|---------------------|
| d1* = Ø 6,0 | tol -0,020 / -0,038 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,025 / -0,047 |
| d1* = Ø 12,0 - Ø 16,0 | tol -0,032 / -0,059 |
| d1* = Ø 20,0 | tol -0,040 / -0,073 |

| Art. | d1* | l2 | d2 h6 | l1 | Z | € |
|--------------|------|----|-------|-----|----|--------|
| 30 6447 0600 | • 6 | 18 | 6 | 60 | 6 | 42,00 |
| 30 6447 0800 | • 8 | 24 | 8 | 70 | 6 | 47,00 |
| 30 6447 1000 | • 10 | 30 | 10 | 80 | 6 | 79,00 |
| 30 6447 1200 | • 12 | 36 | 12 | 93 | 6 | 115,00 |
| 30 6447 1600 | • 16 | 48 | 16 | 110 | 8 | 211,00 |
| 30 6447 2000 | • 20 | 60 | 20 | 125 | 10 | 314,00 |

| | |
|--------------------|-------------------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | UFX-2 |
| | |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1195 | DXF/STEP |



VHM-Schaftfräser, > 4xD, Rockwell Cutter, Progressiv
Solid carbide end mills, > 4xD, Rockwell Cutter, progressive



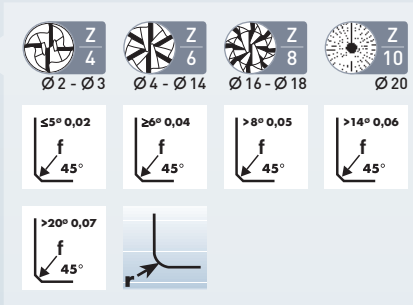
30 6456

HRC < 68

GG/G
cast iron



| | |
|-----------------------|---------------------|
| d1* = Ø 3,0 | tol -0,014 / -0,028 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,020 / -0,038 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,025 / -0,047 |
| d1* = Ø 12,0 - Ø 18,0 | tol -0,032 / -0,059 |
| d1* = Ø 20,0 | tol -0,040 / -0,073 |



| | |
|------------------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| PROGRESSIV PROGRESSIVE | r f45° |
| HSC HHC | |
| UFX-24 | |
| | |

| | |
|---------------------------|----------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1198 | DXF/STEP |

| Art. | d1* | r ± 0,01 / f | l2 | l1 | d2 h6 | Z | € |
|---------------------|--------|--------------|----|-----|-------|----|--------|
| 30 6456 0200 06 | • 2,0 | f 0,02 | 6 | 57 | 6 | 4 | 37,00 |
| 30 6456 0200 020 06 | • 2,0 | r 0,2 | 6 | 57 | 6 | 4 | 45,00 |
| 30 6456 0200 08 | • 2,0 | f 0,02 | 8 | 57 | 6 | 4 | 44,00 |
| 30 6456 0300 08 | • 3,0 | f 0,02 | 8 | 57 | 6 | 4 | 37,00 |
| 30 6456 0300 030 08 | • 3,0 | r 0,3 | 8 | 57 | 6 | 4 | 44,00 |
| 30 6456 0300 11 | • 3,0 | f 0,02 | 11 | 57 | 6 | 4 | 44,00 |
| 30 6456 0400 08 | • 4,0 | f 0,02 | 8 | 57 | 6 | 6 | 46,00 |
| 30 6456 0400 030 08 | • 4,0 | r 0,3 | 8 | 57 | 6 | 6 | 53,00 |
| 30 6456 0400 15 | • 4,0 | f 0,02 | 15 | 64 | 6 | 6 | 55,00 |
| 30 6456 0500 10 | • 5,0 | f 0,02 | 10 | 57 | 6 | 6 | 46,00 |
| 30 6456 0500 030 10 | • 5,0 | r 0,3 | 10 | 57 | 6 | 6 | 54,00 |
| 30 6456 0500 18 | • 5,0 | f 0,02 | 18 | 64 | 6 | 6 | 51,00 |
| 30 6456 0600 16 | • 6,0 | f 0,04 | 16 | 57 | 6 | 6 | 46,00 |
| 30 6456 0600 030 16 | • 6,0 | r 0,3 | 16 | 57 | 6 | 6 | 54,00 |
| 30 6456 0600 21 | • 6,0 | f 0,04 | 21 | 64 | 6 | 6 | 54,00 |
| 30 6456 0800 22 | • 8,0 | f 0,05 | 22 | 70 | 8 | 6 | 49,00 |
| 30 6456 0800 030 22 | • 8,0 | r 0,3 | 22 | 70 | 8 | 6 | 60,00 |
| 30 6456 0800 050 22 | • 8,0 | r 0,5 | 22 | 70 | 8 | 6 | 59,00 |
| 30 6456 0800 28 | • 8,0 | f 0,05 | 28 | 75 | 8 | 6 | 64,00 |
| 30 6456 1000 25 | • 10,0 | f 0,05 | 25 | 73 | 10 | 6 | 84,00 |
| 30 6456 1000 030 25 | • 10,0 | r 0,3 | 25 | 73 | 10 | 6 | 100,00 |
| 30 6456 1000 050 25 | • 10,0 | r 0,5 | 25 | 73 | 10 | 6 | 99,00 |
| 30 6456 1000 30 | • 10,0 | f 0,05 | 30 | 80 | 10 | 6 | 96,00 |
| 30 6456 1200 28 | • 12,0 | f 0,05 | 28 | 83 | 12 | 6 | 112,00 |
| 30 6456 1200 030 28 | • 12,0 | r 0,3 | 28 | 83 | 12 | 6 | 133,00 |
| 30 6456 1200 050 28 | • 12,0 | r 0,5 | 28 | 83 | 12 | 6 | 131,00 |
| 30 6456 1200 45 | • 12,0 | f 0,05 | 45 | 100 | 12 | 6 | 141,00 |
| 30 6456 1400 30 | % 14,0 | f 0,06 | 30 | 83 | 14 | 6 | 84,00 |
| 30 6456 1600 35 | • 16,0 | f 0,06 | 35 | 92 | 16 | 8 | 194,00 |
| 30 6456 1600 50 | • 16,0 | f 0,06 | 50 | 110 | 16 | 8 | 250,00 |
| 30 6456 1600 65 | • 16,0 | f 0,06 | 65 | 125 | 16 | 8 | 283,00 |
| 30 6456 1800 35 | % 18,0 | f 0,06 | 35 | 92 | 18 | 8 | 111,60 |
| 30 6456 2000 40 | % 20,0 | f 0,07 | 40 | 104 | 20 | 10 | 159,60 |
| 30 6456 2000 100 55 | % 20,0 | r 1,0 | 55 | 115 | 20 | 10 | 199,80 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

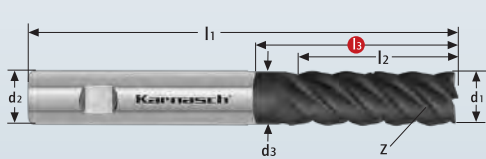


Index

30 6460

VALUETOOL

VHM-Schaftfräser für trochoidales Fräsen, mit Spanteiler
Solid carbide end mills for trochoidal milling, with chip breaker

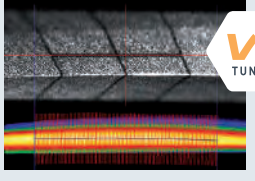


neu
new



d1* = Ø 6,0 - Ø 20 tol -0,002 / -0,034

Mit definierter Kantenverrundung
With a defined edge preparation



| | |
|-------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HB |
| | |
| | HPC |
| | UFX-3 |
| | |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1196-1197 | DXF/STEP |

| Art. | d1* | f ± 0,05 | l2 | l3 | d3 | l1 | Z | € |
|------------------|------|----------|----|----|------|-----|---|--------|
| 30 6460 0600 018 | • 6 | 0,12 | 18 | 25 | 5,8 | 63 | 5 | 40,00 |
| 30 6460 0800 024 | • 8 | 0,16 | 24 | 30 | 7,8 | 72 | 5 | 51,00 |
| 30 6460 1000 030 | • 10 | 0,20 | 30 | 35 | 9,8 | 83 | 5 | 72,00 |
| 30 6460 1200 036 | • 12 | 0,24 | 36 | 45 | 11,8 | 93 | 5 | 86,00 |
| 30 6460 1600 048 | • 16 | 0,32 | 48 | 55 | 15,8 | 104 | 5 | 139,00 |
| 30 6460 2000 060 | • 20 | 0,40 | 60 | 70 | 19,8 | 125 | 5 | 252,00 |

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- 9

Index

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30 5955

VHM-3D-Radiusfräser, mit Innenkühlung, lang, Rockwell Cutter
Solid carbide ball nose end mills, with interior cooling, long



HRC < 65

STAHL
steel
< 1400 N/mm²

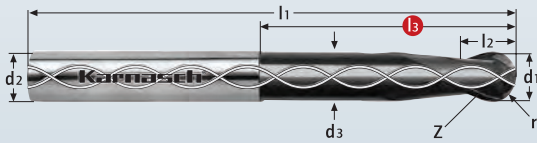
GG/G
cast iron

INOX
stainless steel
< 900 N/mm²
ferritic

INOX
stainless steel
> 900 N/mm²
martensitic

INOX
stainless steel
< 900 N/mm²
austenitic

NI-ALLOYS
< 900 N/mm²



MICRO GRAIN DIN 6527 K

MF DIN 6535 Form HAK



HSC HHC

UFX-3



Schnittdaten
Cutting data



| Art. | d1/f8 | r ± 0,005 | l3 | d2 h5 | d3 | l1 | l2 | Z | € |
|--------------|--------|-----------|----|-------|------|----|----|---|-------|
| 30 5955 1000 | % 10,0 | 5,0 | 32 | 10 | 9,8 | 72 | 10 | 2 | 33,00 |
| 30 5955 1200 | % 12,0 | 6,0 | 38 | 12 | 11,8 | 83 | 12 | 2 | 54,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

30 5958

VHM-3D-Radiusfräser, mit Innenkühlung, extra lang, Rockwell Cutter
Solid carbide ball nose end mills, with interior cooling, extra long



HRC < 65

STAHL
steel
< 1400 N/mm²

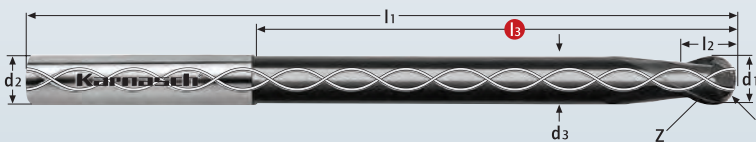
GG/G
cast iron

INOX
stainless steel
< 900 N/mm²
ferritic

INOX
stainless steel
> 900 N/mm²
martensitic

INOX
stainless steel
< 900 N/mm²
austenitic

NI-ALLOYS
< 900 N/mm²



MICRO GRAIN KARNASCH NORM

MF DIN 6535 Form HAK



HSC HHC

UFX-3



Schnittdaten
Cutting data



| Art. | d1/f8 | r ± 0,005 | l3 | d2 h5 | d3 | l1 | l2 | Z | € |
|--------------|--------|-----------|-----|-------|------|-----|----|---|-------|
| 30 5958 0400 | % 4,0 | 2,0 | 44 | 6 | 3,9 | 80 | 4 | 2 | 23,40 |
| 30 5958 0500 | % 5,0 | 2,5 | 54 | 6 | 4,8 | 90 | 5 | 2 | 23,40 |
| 30 5958 0600 | % 6,0 | 3,0 | 64 | 6 | 5,8 | 100 | 6 | 2 | 23,40 |
| 30 5958 0800 | % 8,0 | 4,0 | 84 | 8 | 7,8 | 120 | 8 | 2 | 32,40 |
| 30 5958 1000 | % 10,0 | 5,0 | 100 | 10 | 9,8 | 140 | 10 | 2 | 42,00 |
| 30 5958 1200 | % 12,0 | 6,0 | 105 | 12 | 11,8 | 150 | 12 | 2 | 62,40 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



Index

VHM-3D-Radiusfräser, lang, Rockwell Cutter
Solid carbide 3D ball nose end mills, long, Rockwell Cutter

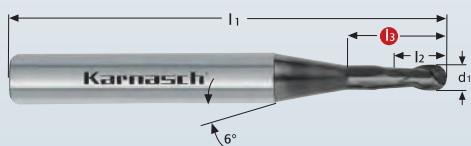


30 6474

HRC < 68

UNI

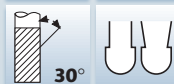
GG/G
cast iron



$\varnothing 0,2 - \varnothing 2,5$

MICRO GRAIN DIN 6527 K

MF DIN 6535 Form HA



HHC HSC HPC

UFX-3



Schnittdaten
Cutting data



1199

| Art. | d1 f8 | r | l3 | d2 h5 | d3 | l1 | l2 | Z | € |
|--------------|-------|------|-----|-------|----|----|------|---|-------|
| 30 6474 0090 | % 0,9 | 0,45 | 2,5 | 3 | - | 50 | 1,50 | 2 | 15,91 |
| 30 6474 0120 | % 1,2 | 0,60 | 2,8 | 3 | - | 50 | 1,60 | 2 | 13,51 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.
Nachfolgewerkzeug / Replacement article 30 6264 / 30 6476 auf Seite 62-63 + 100 / on page 62-63 + 100

VHM-3D-Radiusfräser, extra lang, Rockwell Cutter
Solid carbide 3D ball nose end mills, extra long, Rockwell Cutter

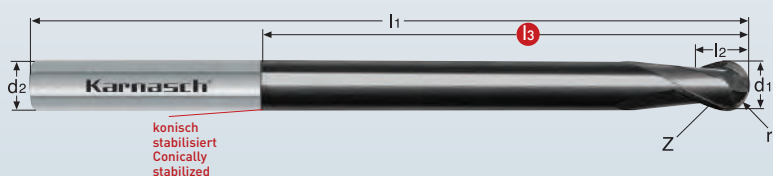


30 6475

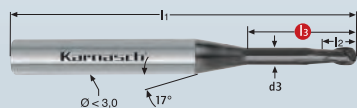
HRC < 68

UNI

GG/G
cast iron



$\varnothing 3,0 - \varnothing 10,0$



$\varnothing 0,6 - \varnothing 2,0$

MICRO GRAIN KARNASCH NORM

MF DIN 6535 Form HA



HHC HSC HPC

UFX-3



Schnittdaten
Cutting data



1199

| Art. | d1 f8 | r | l3 | d2 h5 | d3 | l1 | l2 | Z | € |
|--------------|--------|------|-----|-------|------|-----|------|---|-------|
| 30 6475 0070 | % 0,7 | 0,35 | 8 | 3 | 0,77 | 65 | 1,2 | 2 | 15,31 |
| 30 6475 0080 | % 0,8 | 0,40 | 8 | 3 | 0,77 | 65 | 1,2 | 2 | 15,31 |
| 30 6475 0090 | % 0,9 | 0,45 | 12 | 3 | 0,85 | 65 | 1,5 | 2 | 15,31 |
| 30 6475 0100 | % 1,0 | 0,50 | 12 | 3 | 0,95 | 65 | 1,5 | 2 | 14,71 |
| 30 6475 0110 | % 1,1 | 0,55 | 12 | 3 | 1,05 | 65 | 1,6 | 2 | 14,71 |
| 30 6475 0120 | % 1,2 | 0,60 | 12 | 3 | 1,15 | 65 | 1,6 | 2 | 14,71 |
| 30 6475 0140 | % 1,4 | 0,70 | 15 | 3 | 1,34 | 65 | 1,8 | 2 | 14,71 |
| 30 6475 0150 | % 1,5 | 0,75 | 15 | 3 | 1,44 | 65 | 1,8 | 2 | 14,71 |
| 30 6475 0160 | % 1,6 | 0,80 | 15 | 3 | 1,54 | 65 | 1,8 | 2 | 14,71 |
| 30 6475 0180 | % 1,8 | 0,90 | 20 | 3 | 1,72 | 65 | 2,0 | 2 | 14,71 |
| 30 6475 0200 | % 2,0 | 1,00 | 20 | 3 | 1,92 | 65 | 2,0 | 2 | 14,71 |
| 30 6475 0600 | % 6,0 | 3,00 | 64 | 6 | - | 100 | 6,0 | 2 | 18,60 |
| 30 6475 1000 | % 10,0 | 5,00 | 100 | 10 | - | 140 | 10,0 | 2 | 33,31 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.
Nachfolgewerkzeug / Replacement article 30 6264 / 30 6477 auf Seite 62-63 + 100 / on page 62-63 + 100



30 6476

EXPERT

★ ★ ★

VHM-3D-Radiusfräser, kurz, Rockwell Cutter
Solid carbide 3D ball nose end mills, short, Rockwell Cutter

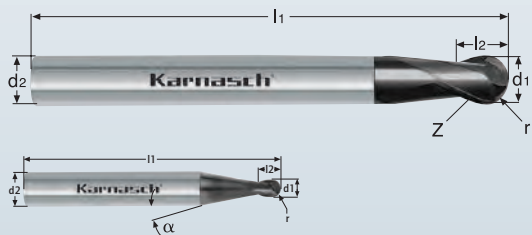


HRC < 70

GJL

TOOLOX 44

kurz-spanend
short chip



$\frac{Z}{2}$ Ø 6 - Ø 12

$\frac{Z}{2}$ Ø 0,1 - Ø 5

| Art. | d1* | r ± 0,005 | d2 h6 | l1 | l2 | α | Z | € |
|-----------------|--------|-----------|-------|----|------|----|---|-------|
| 30 6476 0010 03 | • 0,1 | 0,05 | 3 | 38 | 0,2 | 8 | 2 | 78,00 |
| 30 6476 0020 03 | • 0,2 | 0,10 | 3 | 38 | 0,4 | 8 | 2 | 67,00 |
| 30 6476 0030 03 | • 0,3 | 0,15 | 3 | 38 | 0,5 | 8 | 2 | 63,00 |
| 30 6476 0040 03 | • 0,4 | 0,20 | 3 | 38 | 0,5 | 8 | 2 | 43,00 |
| 30 6476 0050 03 | • 0,5 | 0,25 | 3 | 38 | 0,5 | 8 | 2 | 37,00 |
| 30 6476 0050 06 | • 0,5 | 0,25 | 6 | 54 | 0,8 | 12 | 2 | 39,00 |
| 30 6476 0060 03 | • 0,6 | 0,30 | 3 | 38 | 0,8 | 8 | 2 | 39,00 |
| 30 6476 0080 03 | • 0,8 | 0,40 | 3 | 38 | 0,8 | 8 | 2 | 37,00 |
| 30 6476 0100 03 | • 1,0 | 0,50 | 3 | 50 | 1,0 | 8 | 2 | 37,00 |
| 30 6476 0100 06 | • 1,0 | 0,50 | 6 | 54 | 1,5 | 12 | 2 | 39,00 |
| 30 6476 0120 03 | • 1,2 | 0,60 | 3 | 50 | 1,5 | 8 | 2 | 37,00 |
| 30 6476 0150 03 | • 1,5 | 0,75 | 3 | 50 | 1,8 | 8 | 2 | 37,00 |
| 30 6476 0150 06 | • 1,5 | 0,75 | 6 | 54 | 1,8 | 12 | 2 | 39,00 |
| 30 6476 0160 03 | • 1,6 | 0,80 | 3 | 50 | 2,0 | 8 | 2 | 18,60 |
| 30 6476 0200 03 | • 2,0 | 1,00 | 3 | 50 | 2,0 | 8 | 2 | 37,00 |
| 30 6476 0200 06 | • 2,0 | 1,00 | 6 | 54 | 2,0 | 12 | 2 | 38,00 |
| 30 6476 0250 03 | • 2,5 | 1,25 | 3 | 50 | 2,5 | 8 | 2 | 18,60 |
| 30 6476 0300 03 | • 3,0 | 1,50 | 3 | 50 | 3,0 | - | 2 | 37,00 |
| 30 6476 0300 06 | • 3,0 | 1,50 | 6 | 54 | 3,0 | 12 | 2 | 38,00 |
| 30 6476 0400 04 | • 4,0 | 2,00 | 4 | 54 | 4,0 | - | 2 | 38,00 |
| 30 6476 0400 06 | • 4,0 | 2,00 | 6 | 54 | 4,0 | 12 | 2 | 38,00 |
| 30 6476 0500 05 | • 5,0 | 2,50 | 5 | 54 | 5,0 | - | 2 | 38,00 |
| 30 6476 0500 06 | • 5,0 | 2,50 | 6 | 54 | 5,0 | 12 | 2 | 38,00 |
| 30 6476 0600 06 | • 6,0 | 3,00 | 6 | 54 | 6,0 | - | 2 | 39,00 |
| 30 6476 0800 08 | • 8,0 | 4,00 | 8 | 60 | 8,0 | - | 2 | 44,00 |
| 30 6476 1000 10 | • 10,0 | 5,00 | 10 | 68 | 10,0 | - | 2 | 54,00 |
| 30 6476 1200 12 | • 12,0 | 6,00 | 12 | 75 | 12,0 | - | 2 | 81,00 |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

MICRO GRAIN KARNASCH NORM

N/M DIN 6535 Form HA



HHC HSC HPC

UFX-24



Schnittdaten
Cutting data



1199

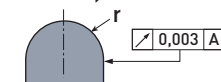
Zeichnungen
Drawings



DXF/STEP

TOLERANZ / TOLERANCE

tol. r = ±0,005



d1* = Ø 0,1 - Ø 3,0 tol -0,006 / -0,020

d1* = Ø 4,0 - Ø 6,0 tol -0,010 / -0,028

d1* = Ø 8,0 - Ø 10,0 tol -0,013 / -0,035

d1* = Ø 12,0 tol -0,016 / -0,043

30 6477

EXPERT

★ ★ ★

VHM-3D-Radiusfräser, lang, Rockwell Cutter
Solid carbide 3D ball nose end mills, long, Rockwell Cutter

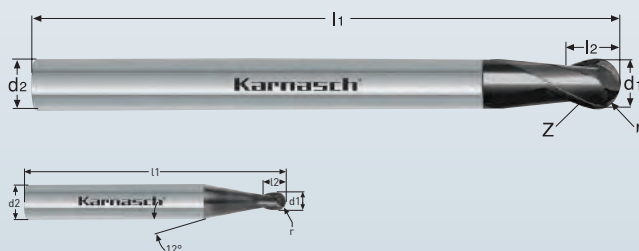


HRC < 70

GJL

TOOLOX 44

kurz-spanend
short chip

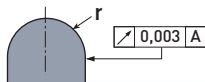


$\frac{Z}{2}$ Ø 6 - Ø 12

$\frac{Z}{2}$ Ø 1 - Ø 5

TOLERANZ / TOLERANCE

tol. r = ±0,005



d1* = Ø ≤ 3,0 tol -0,006 / -0,020

d1* = Ø 4,0 - Ø 6,0 tol -0,010 / -0,028

d1* = Ø 8,0 - Ø 10,0 tol -0,013 / -0,035

d1* = Ø 12,0 - Ø 18,0 tol -0,016 / -0,043

| Art. | d1* | r ± 0,005 | d2 h6 | l1 | l2 | Z | € |
|--------------|--------|-----------|-------|-----|------|---|--------|
| 30 6477 0100 | • 1,0 | 0,50 | 6 | 80 | 1,5 | 2 | 52,00 |
| 30 6477 0150 | • 1,5 | 0,75 | 6 | 80 | 1,8 | 2 | 52,00 |
| 30 6477 0200 | • 2,0 | 1,00 | 6 | 80 | 2,0 | 2 | 52,00 |
| 30 6477 0250 | • 2,5 | 1,25 | 6 | 80 | 2,5 | 2 | 52,00 |
| 30 6477 0300 | • 3,0 | 1,50 | 6 | 80 | 3,0 | 2 | 52,00 |
| 30 6477 0400 | • 4,0 | 2,00 | 6 | 80 | 4,0 | 2 | 52,00 |
| 30 6477 0500 | • 5,0 | 2,50 | 6 | 100 | 5,0 | 2 | 53,00 |
| 30 6477 0600 | • 6,0 | 3,00 | 6 | 100 | 6,0 | 2 | 53,00 |
| 30 6477 0800 | • 8,0 | 4,00 | 8 | 100 | 8,0 | 2 | 61,00 |
| 30 6477 1000 | • 10,0 | 5,00 | 10 | 100 | 10,0 | 2 | 82,00 |
| 30 6477 1200 | • 12,0 | 6,00 | 12 | 100 | 12,0 | 2 | 108,00 |

MICRO GRAIN KARNASCH NORM

N/M DIN 6535 Form HA



HHC HSC HPC

UFX-24



Schnittdaten
Cutting data



1199

Zeichnungen
Drawings



DXF/STEP

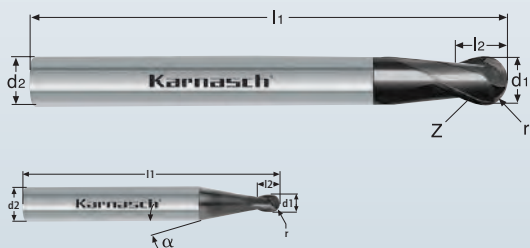
VHM-3D-Radiusfräser, kurz
Solid carbide 3D ball nose end mills, short



EXPERT
★ ★ ★

30 6478

HRC < 55
UNI
GG/G
cast iron

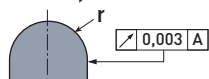


Z/2 Ø 6 - Ø 12

Z/2 Ø 1 - Ø 5

TOLERANZ / TOLERANCE

tol. r = ±0,005



d1* = Ø 1,0 - Ø 3,0 tol -0,006 / -0,020

d1* = Ø 4,0 - Ø 6,0 tol -0,010 / -0,028

d1* = Ø 8,0 - Ø 10,0 tol -0,013 / -0,035

d1* = Ø 12,0 tol -0,016 / -0,043

| Art. | d1* | r ± 0,005 | d2 h6 | l1 | l2 | Z | € |
|--------------|--------|-----------|-------|----|------|---|-------|
| 30 6478 0100 | • 1,0 | 0,5 | 6 | 54 | 1,5 | 2 | 35,00 |
| 30 6478 0150 | • 1,5 | 0,75 | 6 | 54 | 1,8 | 2 | 35,00 |
| 30 6478 0200 | • 2,0 | 1,0 | 6 | 54 | 2,0 | 2 | 35,00 |
| 30 6478 0250 | • 2,5 | 1,25 | 6 | 54 | 2,5 | 2 | 35,00 |
| 30 6478 0300 | • 3,0 | 1,5 | 6 | 54 | 3,0 | 2 | 35,00 |
| 30 6478 0400 | • 4,0 | 2,0 | 6 | 54 | 4,0 | 2 | 35,00 |
| 30 6478 0500 | • 5,0 | 2,5 | 6 | 54 | 5,0 | 2 | 35,00 |
| 30 6478 0600 | • 6,0 | 3,0 | 6 | 54 | 6,0 | 2 | 35,00 |
| 30 6478 0800 | • 8,0 | 4,0 | 8 | 58 | 8,0 | 2 | 42,00 |
| 30 6478 1000 | • 10,0 | 5,0 | 10 | 66 | 10,0 | 2 | 51,00 |
| 30 6478 1200 | • 12,0 | 6,0 | 12 | 73 | 12,0 | 2 | 77,00 |

MICRO GRAIN DIN 6527 K
N DIN 6535 Form HA
30°
HSC HHC
UFX-3

Schnittdaten Cutting data
Zeichnungen Drawings
1199 DXF/STEP

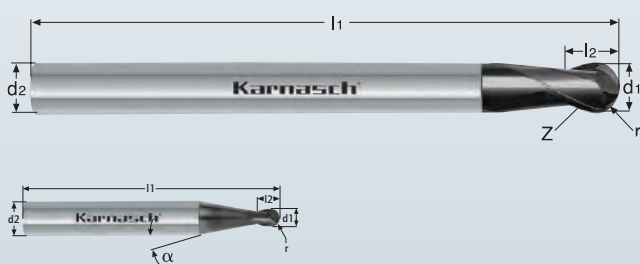
VHM-3D-Radiusfräser, extra lang
Solid carbide 3D ball nose end mills, extra long



EXPERT
★ ★ ★

30 6479

HRC < 55
UNI
GG/G
cast iron

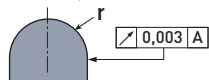


Z/2 Ø 6 - Ø 12

Z/2 Ø 1 - Ø 5

TOLERANZ / TOLERANCE

tol. r = ±0,005



d1* = Ø ≤ 3,0 tol -0,006 / -0,020

d1* = Ø 5,0 - Ø 6,0 tol -0,010 / -0,028

d1* = Ø 8,0 - Ø 10,0 tol -0,013 / -0,035

d1* = Ø 12,0 tol -0,016 / -0,043

| Art. | d1 f8 | r ± 0,005 | d2 h6 | l1 | l2 | Z | € |
|--------------|--------|-----------|-------|-----|------|---|-------|
| 30 6479 0150 | % 1,5 | 0,75 | 6 | 80 | 1,8 | 2 | 21,91 |
| 30 6479 0200 | % 2,0 | 1,0 | 6 | 80 | 2,0 | 2 | 21,91 |
| 30 6479 0250 | % 2,5 | 1,25 | 6 | 80 | 2,5 | 2 | 21,91 |
| 30 6479 0500 | % 5,0 | 2,5 | 6 | 100 | 5,0 | 2 | 21,91 |
| 30 6479 0600 | % 6,0 | 3,0 | 6 | 100 | 6,0 | 2 | 28,80 |
| 30 6479 0800 | % 8,0 | 4,0 | 8 | 100 | 8,0 | 2 | 34,80 |
| 30 6479 1200 | % 12,0 | 6,0 | 12 | 100 | 12,0 | 2 | 61,80 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.

Special price / sale article. While stocks last.

Nachfolgewerkzeug / Replacement article 30 6264 / 30 6477 auf Seite 62-63 + 100 / on page 62-63 + 100

MICRO GRAIN KARNASCH NORM
N DIN 6535 Form HA
30°
HSC HHC
UFX-3

Schnittdaten Cutting data

1199



Index

30 6486

EXPERT



Vollhartmetall-3D-Radiusfräser, Rockwell Cutter – Der erste wahre Vierschneider mit 4 Stirnschneiden bis zum Zentrum
Solid carbide 3D ball nose end mills, Rockwell Cutter – 4 cutting edges into the middle



HRC < 70

TOOLOX 44

kurzspanend
short chip



d1 Ø 6 - Ø 12



d1 Ø 6 - Ø 12



d1 Ø 2 - Ø 5

MICRO GRAIN KARNASCH NORM

N/M DIN 6535 Form HA



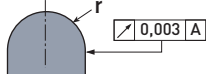
HSC HPC

UFX-24



TOLERANZ / TOLERANCE

tol. r = ±0,004



| | | |
|-----|------------------|---------------------|
| d1* | = Ø 2,0 - Ø 3,0 | tol -0,006 / -0,020 |
| d1* | = Ø 4,0 - Ø 6,0 | tol -0,010 / -0,028 |
| d1* | = Ø 8,0 - Ø 10,0 | tol -0,013 / -0,035 |
| d1* | = Ø 12 | tol -0,016 / -0,043 |

Schnittdaten
Cutting data



Zeichnungen
Drawings



| Art. | d1* | r ± 0,004 | l3 | d2 h5 | d3 | l1 | l2 | α | Z | € |
|---------------------|--------|-----------|----|-------|------|-----|----|-----|---|--------|
| 30 6486 0200 055 | • 2,0 | 1,0 | - | 6 | - | 55 | 4 | 15° | 4 | 64,00 |
| 30 6486 0200 12 055 | • 2,0 | 1,0 | 12 | 6 | 1,8 | 55 | 4 | 15° | 4 | 64,00 |
| 30 6486 0200 080 | • 2,0 | 1,0 | - | 6 | - | 80 | 4 | 15° | 4 | 84,00 |
| 30 6486 0200 20 080 | • 2,0 | 1,0 | 20 | 6 | 1,8 | 80 | 4 | 15° | 4 | 84,00 |
| 30 6486 0300 055 | • 3,0 | 1,5 | - | 6 | - | 55 | 5 | 15° | 4 | 62,00 |
| 30 6486 0300 14 055 | • 3,0 | 1,5 | 14 | 6 | 2,8 | 55 | 5 | 15° | 4 | 64,00 |
| 30 6486 0300 080 | • 3,0 | 1,5 | - | 6 | - | 80 | 5 | 15° | 4 | 83,00 |
| 30 6486 0300 30 080 | • 3,0 | 1,5 | 30 | 6 | 2,8 | 80 | 5 | 15° | 4 | 80,00 |
| 30 6486 0400 055 | • 4,0 | 2,0 | - | 6 | - | 55 | 8 | 15° | 4 | 61,00 |
| 30 6486 0400 16 055 | • 4,0 | 2,0 | 16 | 6 | 3,8 | 55 | 8 | 15° | 4 | 64,00 |
| 30 6486 0400 080 | • 4,0 | 2,0 | - | 6 | - | 80 | 8 | 15° | 4 | 84,00 |
| 30 6486 0400 30 080 | • 4,0 | 2,0 | 30 | 6 | 3,8 | 80 | 8 | 15° | 4 | 81,00 |
| 30 6486 0500 055 | • 5,0 | 2,5 | - | 6 | - | 55 | 9 | 15° | 4 | 61,00 |
| 30 6486 0500 18 055 | • 5,0 | 2,5 | 18 | 6 | 4,8 | 55 | 9 | 15° | 4 | 64,00 |
| 30 6486 0500 100 | • 5,0 | 2,5 | - | 6 | - | 100 | 9 | 15° | 4 | 82,00 |
| 30 6486 0500 35 100 | • 5,0 | 2,5 | 35 | 6 | 4,8 | 100 | 9 | 15° | 4 | 83,00 |
| 30 6486 0600 055 | • 6,0 | 3,0 | - | 6 | - | 55 | 10 | - | 4 | 61,00 |
| 30 6486 0600 21 055 | • 6,0 | 3,0 | 21 | 6 | 5,8 | 55 | 10 | - | 4 | 64,00 |
| 30 6486 0600 100 | • 6,0 | 3,0 | - | 6 | - | 100 | 10 | - | 4 | 91,00 |
| 30 6486 0600 40 100 | • 6,0 | 3,0 | 40 | 6 | 5,8 | 100 | 10 | - | 4 | 83,00 |
| 30 6486 0800 060 | • 8,0 | 4,0 | - | 8 | - | 60 | 12 | - | 4 | 75,00 |
| 30 6486 0800 21 060 | • 8,0 | 4,0 | 21 | 8 | 7,8 | 60 | 12 | - | 4 | 78,00 |
| 30 6486 0800 100 | • 8,0 | 4,0 | - | 8 | - | 100 | 12 | - | 4 | 102,00 |
| 30 6486 0800 50 100 | • 8,0 | 4,0 | 50 | 8 | 7,8 | 100 | 12 | - | 4 | 99,00 |
| 30 6486 1000 068 | • 10,0 | 5,0 | - | 10 | - | 68 | 14 | - | 4 | 101,00 |
| 30 6486 1000 30 068 | • 10,0 | 5,0 | 30 | 10 | 9,8 | 68 | 14 | - | 4 | 97,00 |
| 30 6486 1000 100 | • 10,0 | 5,0 | - | 10 | - | 100 | 14 | - | 4 | 129,00 |
| 30 6486 1000 50 100 | • 10,0 | 5,0 | 50 | 10 | 9,8 | 100 | 14 | - | 4 | 129,00 |
| 30 6486 1200 075 | • 12,0 | 6,0 | - | 12 | - | 75 | 16 | - | 4 | 134,00 |
| 30 6486 1200 35 075 | • 12,0 | 6,0 | 35 | 12 | 11,8 | 75 | 16 | - | 4 | 128,00 |
| 30 6486 1200 100 | • 12,0 | 6,0 | - | 12 | - | 100 | 16 | - | 4 | 167,00 |
| 30 6486 1200 50 100 | • 12,0 | 6,0 | 50 | 12 | 11,8 | 100 | 16 | - | 4 | 170,00 |

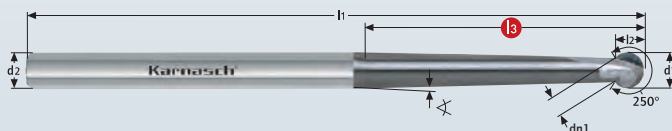
Vollhartmetall-3D-Radiusfräser mit Kugelstirn 250°, extra lang
Solid carbide ball nose end mill 250°, extra long



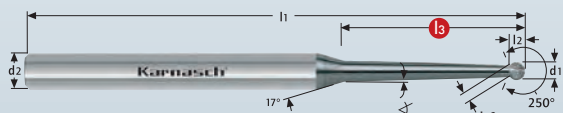
30 6485

HRC < 65

UNI



$\frac{Z}{2}$ d1 Ø 4 - Ø 10



$\frac{Z}{2}$ d1 Ø 1 - Ø 3



| | | | |
|-----|-----------------|-----|-----------------|
| d1* | = Ø 3,0 | tol | -0,006 / -0,020 |
| d1* | = Ø 4,0 - Ø 6,0 | tol | -0,010 / -0,028 |
| d1* | = Ø 8,0 | tol | -0,013 / -0,035 |

Schnittdaten
Cutting data



Zeichnungen
Drawings



| | |
|-------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HA |
| 15° | r=250° |
| HSC HHC | |
| UFX-3 | |

| Art. | d1* | r | d2 h5 | dn1 | ∠ | l1 | l2 | l3 | Z | € |
|--------------|-----|-----|-------|------|------|-----|------|----|---|--------|
| 30 6485 0100 | • 1 | 0,5 | 6 | 0,77 | 1,5° | 80 | 0,70 | 20 | 2 | 95,00 |
| 30 6485 0200 | • 2 | 1,0 | 6 | 1,53 | 1,5° | 80 | 1,35 | 20 | 2 | 95,00 |
| 30 6485 0300 | • 3 | 1,5 | 6 | 2,30 | 1,5° | 80 | 2,00 | 30 | 2 | 92,00 |
| 30 6485 0400 | • 4 | 2,0 | 6 | 3,06 | 3,0° | 80 | 2,70 | 30 | 2 | 92,00 |
| 30 6485 0500 | • 5 | 2,5 | 6 | 3,83 | 1,0° | 90 | 3,40 | 40 | 2 | 92,00 |
| 30 6485 0600 | • 6 | 3,0 | 6 | 4,60 | 1,0° | 100 | 4,05 | 45 | 2 | 92,00 |
| 30 6485 0800 | • 8 | 4,0 | 8 | 6,13 | 1,0° | 100 | 5,40 | 45 | 2 | 125,00 |

VHM-Vorwärts- und Rückwärts Viertelkreisentgrater
Solid carbide-forward- and backward quartercircle - profile end mill



30 6489

HRC < 68

GG/G cast iron

INOX stainless steel < 900 N/mm² ferritic

INOX stainless steel > 900 N/mm² martensitic

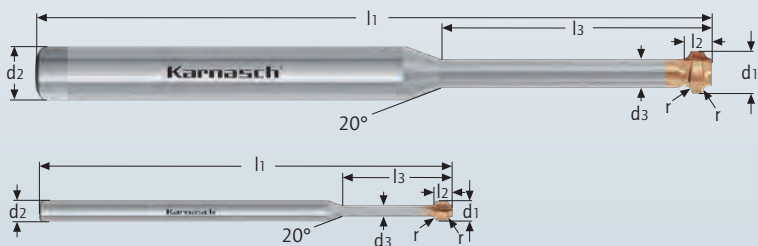
INOX stainless steel < 900 N/mm² austenitic

INCONEL HASTELLOY TITANIUM

NE METALLE non-ferrous

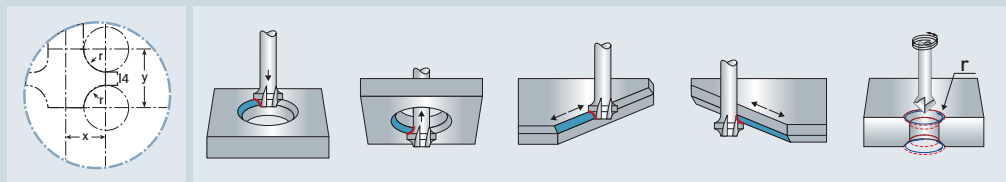
kurz-spanend short chip

lang-spanend long chip



$\frac{Z}{2}$ $\frac{Z}{3}$

$\frac{Z}{2}$ $\frac{Z}{3}$



| Art. | r ± 0,02 | l3 | d1 | d2 h5 | d3 | x | y | l4 | l1 | l2 | Z | € |
|-----------------|----------|----|------|-------|-----|------|------|------|-----|------|---|--------|
| 30 6489 002 009 | • 0,2 | 9 | 1,9 | 3 | 1,2 | 0,87 | 1,32 | 0,90 | 60 | 1,45 | 2 | 73,00 |
| 30 6489 003 010 | • 0,3 | 10 | 2,3 | 3 | 1,4 | 1,07 | 1,82 | 1,20 | 60 | 1,95 | 2 | 73,00 |
| 30 6489 004 012 | • 0,4 | 12 | 2,6 | 3 | 1,5 | 1,22 | 2,37 | 1,55 | 60 | 2,50 | 2 | 73,00 |
| 30 6489 005 015 | • 0,5 | 15 | 2,9 | 3 | 1,6 | 1,37 | 2,87 | 1,85 | 60 | 3,00 | 2 | 73,00 |
| 30 6489 005 023 | • 0,5 | 23 | 4,9 | 6 | 3,6 | 2,37 | 3,17 | 2,15 | 100 | 3,30 | 3 | 95,00 |
| 30 6489 006 028 | • 0,6 | 28 | 5,2 | 6 | 3,7 | 2,52 | 3,37 | 2,14 | 100 | 3,50 | 3 | 95,00 |
| 30 6489 008 033 | • 0,8 | 33 | 5,9 | 6 | 4,0 | 2,89 | 3,77 | 2,14 | 100 | 3,90 | 3 | 95,00 |
| 30 6489 010 039 | • 1,0 | 39 | 6,6 | 8 | 4,3 | 3,22 | 4,27 | 2,23 | 100 | 4,30 | 3 | 126,00 |
| 30 6489 012 040 | • 1,2 | 40 | 7,4 | 8 | 4,7 | 3,62 | 5,07 | 2,63 | 100 | 5,20 | 3 | 126,00 |
| 30 6489 015 040 | • 1,5 | 40 | 8,4 | 10 | 5,1 | 4,12 | 5,77 | 2,73 | 100 | 5,80 | 3 | 153,00 |
| 30 6489 018 040 | • 1,8 | 40 | 9,3 | 10 | 5,4 | 4,57 | 6,37 | 2,72 | 100 | 6,40 | 3 | 153,00 |
| 30 6489 020 040 | • 2,0 | 40 | 9,9 | 10 | 5,6 | 4,87 | 6,87 | 2,82 | 100 | 6,80 | 3 | 153,00 |
| 30 6489 025 042 | • 2,5 | 42 | 10,9 | 12 | 5,6 | 5,37 | 7,97 | 2,90 | 100 | 7,80 | 3 | 186,00 |
| 30 6489 030 043 | • 3,0 | 43 | 11,9 | 12 | 5,6 | 5,87 | 9,07 | 3,00 | 100 | 8,80 | 3 | 186,00 |

Schnittdaten
Cutting data



Zeichnungen
Drawings



| | |
|-----------------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HA |
| 0° | |
| HHC HSC HPC | |
| HXC-NANO ³ | |



Index

30 6490

VHM-Vorwärts- und Rückwärts Viertelkreisentgrater
Solid carbide-forward- and backward quatercircle - profile end mill



HRC < 68

GG/G
cast iron

INOX
stainless steel
< 900 N/mm²
ferritic

INOX
stainless steel
> 900 N/mm²
martensitic

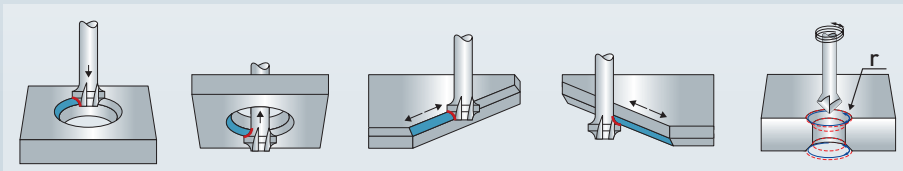
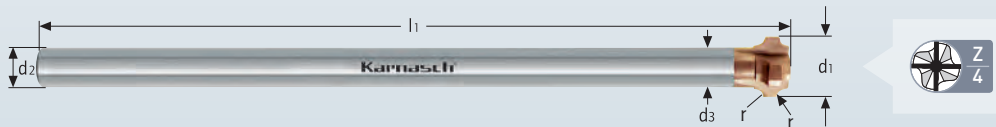
INOX
stainless steel
< 900 N/mm²
austenitic

INCONEL
HASTELLOY
TITANIUM

NE
METALLE
non-ferrous

kurz-
spanend
short chip

lang-
spanend
long chip



| | |
|-------------|-----------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HA |
| | |
| | HHC HSC HPC |
| | HXC-NANO ³ |
| | |

Schnittdaten
Cutting data

Zeichnungen
Drawings



| Art. | r ± 0,008 | d1 | d2 h6 | d3 | l1 | l2 | Z | € |
|------------------|-----------|----|-------|-----|-----|----|---|--------|
| 30 6490 0020 075 | • 0,2 | 6 | 4 | 5,6 | 75 | 2 | 4 | 151,00 |
| 30 6490 0030 075 | • 0,3 | 6 | 4 | 5,4 | 75 | 2 | 4 | 151,00 |
| 30 6490 0040 075 | • 0,4 | 6 | 4 | 5,2 | 75 | 2 | 4 | 151,00 |
| 30 6490 0050 075 | • 0,5 | 6 | 4 | 5,0 | 75 | 2 | 4 | 151,00 |
| 30 6490 0080 100 | • 0,8 | 10 | 6 | 8,4 | 100 | 4 | 4 | 166,00 |
| 30 6490 0100 100 | • 1,0 | 10 | 6 | 8,0 | 100 | 4 | 4 | 166,00 |
| 30 6490 0120 100 | • 1,2 | 10 | 6 | 7,6 | 100 | 5 | 4 | 167,00 |
| 30 6490 0150 100 | • 1,5 | 10 | 6 | 7,0 | 100 | 5 | 4 | 167,00 |

30 6491

VHM-Vorwärts- und Rückwärtsentgrater, 45°
Forward- and backward burr remover, 45°



HRC < 68

GG/G
cast iron

INOX
stainless steel
< 900 N/mm²
ferritic

INOX
stainless steel
> 900 N/mm²
martensitic

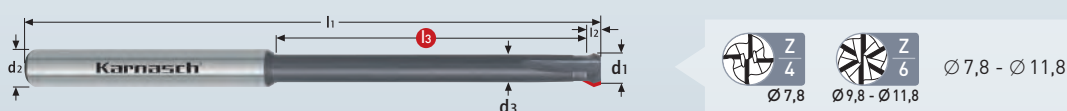
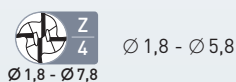
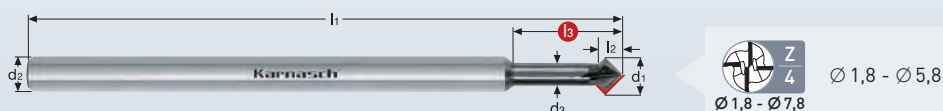
INOX
stainless steel
< 900 N/mm²
austenitic

INCONEL
HASTELLOY
TITANIUM

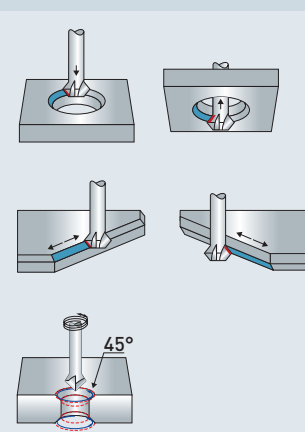
NE
METALLE
non-ferrous

kurz-
spanend
short chip

lang-
spanend
long chip



| Art. | d1 + 0,1 | l3 | d2 h6 | d3 ± 0,05 | l1 | l2 + 0,5 | Z | € |
|-----------------|----------|----|-------|-----------|-----|----------|---|--------|
| 30 6491 0180 | • 1,8 | 8 | 6 | 1,4 | 80 | 1,4 | 4 | 68,00 |
| 30 6491 0280 | • 2,8 | 10 | 6 | 2,2 | 100 | 2,0 | 4 | 71,00 |
| 30 6491 0380 | • 3,8 | 15 | 6 | 2,9 | 100 | 2,7 | 4 | 74,00 |
| 30 6491 0380 15 | • 3,8 | 15 | 6 | 2,3 | 54 | 1,4 | 4 | 60,00 |
| 30 6491 0480 | • 4,8 | 15 | 6 | 3,9 | 100 | 3,0 | 4 | 71,00 |
| 30 6491 0480 16 | • 4,8 | 16 | 6 | 2,8 | 54 | 1,9 | 4 | 60,00 |
| 30 6491 0580 | • 5,8 | 19 | 6 | 3,9 | 100 | 4,0 | 4 | 69,00 |
| 30 6491 0580 18 | • 5,8 | 18 | 6 | 3,3 | 57 | 2,4 | 4 | 60,00 |
| 30 6491 0580 28 | • 5,8 | 28 | 6 | 3,3 | 67 | 2,4 | 4 | 63,00 |
| 30 6491 0780 27 | • 7,8 | 27 | 8 | 5,3 | 65 | 2,4 | 4 | 68,00 |
| 30 6491 0780 42 | • 7,8 | 42 | 8 | 5,3 | 80 | 2,4 | 4 | 77,00 |
| 30 6491 0780 | • 7,8 | - | 6 | - | 100 | 2,0 | 4 | 109,00 |
| 30 6491 0980 38 | • 9,8 | 38 | 10 | 7,3 | 80 | 2,4 | 6 | 93,00 |
| 30 6491 0980 53 | • 9,8 | 53 | 10 | 7,3 | 95 | 2,4 | 6 | 99,00 |
| 30 6491 0980 | • 9,8 | - | 6 | - | 100 | 4,0 | 6 | 128,00 |
| 30 6491 1180 48 | • 11,8 | 48 | 12 | 9,3 | 95 | 2,4 | 6 | 115,00 |
| 30 6491 1180 63 | • 11,8 | 63 | 12 | 9,3 | 110 | 2,4 | 6 | 125,00 |
| 30 6491 1180 | • 11,8 | - | 6 | - | 100 | 6,0 | 6 | 150,00 |



| | |
|-------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HA |
| | |
| | HHC HSC HPC |
| | UFX-3 |
| | |

Schnittdaten
Cutting data

Zeichnungen
Drawings



VHM-Entgrater, lang, 60°
Solid carbide deburr, long, 60°



30 6492

HRC < 68

GG/G cast iron

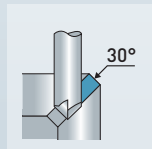
INOX stainless steel < 900 N/mm² ferritic

INOX stainless steel > 900 N/mm² martensitic

INOX stainless steel < 900 N/mm² austenitic

INCONEL HASTELLOY TITANIUM

kurz-spanend short chip



| | |
|-------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HA |
| 0° | |
| HHC HSC HPC | |
| UFX-3 | |
| 30° | |

Schnittdaten Cutting data 1215

Zeichnungen Drawings DXF/STEP

| Art. | d1 | l1 | d2 h6 | Z | € |
|-----------------|----|----|-------|---|-------|
| 30 6492 0400 | 4 | 54 | 4 | 4 | 25,00 |
| 30 6492 0600 | 6 | 57 | 6 | 4 | 30,00 |
| 30 6492 0600 06 | 6 | 57 | 6 | 6 | 31,00 |
| 30 6492 0800 | 8 | 63 | 8 | 5 | 37,00 |
| 30 6492 0800 06 | 8 | 63 | 8 | 6 | 39,00 |
| 30 6492 1000 | 10 | 72 | 10 | 6 | 50,00 |
| 30 6492 1200 08 | 12 | 83 | 12 | 8 | 78,00 |
| 30 6492 1200 | 12 | 83 | 12 | 6 | 80,00 |

VHM-Entgrater, lang, 90°
Solid carbide deburr, long, 90°



30 6493

HRC < 68

GG/G cast iron

INOX stainless steel < 900 N/mm² ferritic

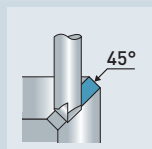
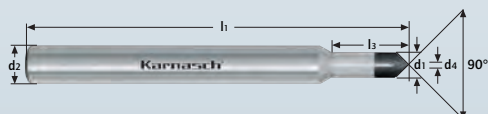
INOX stainless steel > 900 N/mm² martensitic

INOX stainless steel < 900 N/mm² austenitic

INCONEL HASTELLOY TITANIUM

kurz-spanend short chip

lang-spanend long chip



| | |
|-------------|------------------|
| MICRO GRAIN | DIN 6527 L |
| N | DIN 6535 Form HA |
| 0° | |
| HHC HSC HPC | |
| UFX-3 | |
| 45° | |

Schnittdaten Cutting data 1215

Zeichnungen Drawings DXF/STEP

| Art. | d1 | l3 | l1 | d4 | d2 h6 | Z | € |
|-----------------|------|----|----|-----|-------|---|-------|
| 30 6493 0050 | 0,5 | 3 | 40 | 0,1 | 4 | 3 | 30,00 |
| 30 6493 0100 | 1,0 | 4 | 40 | 0,1 | 4 | 3 | 31,00 |
| 30 6493 0150 | 1,5 | 5 | 40 | 0,1 | 4 | 3 | 30,00 |
| 30 6493 0200 | 2,0 | 6 | 40 | 0,1 | 4 | 3 | 30,00 |
| 30 6493 0250 | 2,5 | 8 | 40 | 0,1 | 4 | 3 | 30,00 |
| 30 6493 0300 | 3,0 | 10 | 40 | 0,1 | 4 | 3 | 31,00 |
| 30 6493 0400 | 4,0 | - | 54 | - | 4 | 4 | 25,00 |
| 30 6493 0600 | 6,0 | - | 57 | - | 6 | 4 | 30,00 |
| 30 6493 0600 06 | 6,0 | - | 57 | - | 6 | 6 | 31,00 |
| 30 6493 0800 | 8,0 | - | 63 | - | 8 | 5 | 37,00 |
| 30 6493 0800 06 | 8,0 | - | 63 | - | 8 | 6 | 39,00 |
| 30 6493 1000 | 10,0 | - | 72 | - | 10 | 6 | 50,00 |
| 30 6493 1200 | 12,0 | - | 83 | - | 12 | 6 | 78,00 |
| 30 6493 1200 08 | 12,0 | - | 83 | - | 12 | 8 | 80,00 |



30 6494

Viertelkreis- Profilfräser, konkav, lang
Corner rounding cutters, concave



HRC

< 68

GG/G

cast iron

INOX

stainless steel

< 900 N/mm²

ferritic

INOX

stainless steel

> 900 N/mm²

martensitic

INOX

stainless steel

< 900 N/mm²

austenitic

INCONEL

HASTELLOY

TITANIUM

NE

METALLE

non-ferrous

kurz-

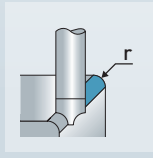
spanend

short chip

lang-

spanend

long chip



| Art. | Radius r ± 0,01 | d1 h11 | d2 h6 | l1 | Z | € |
|--------------|-----------------|--------|-------|----|---|--------|
| 30 6494 0020 | • 0,2 | 3,6 | 4 | 50 | 4 | 70,00 |
| 30 6494 0030 | • 0,3 | 3,4 | 4 | 50 | 4 | 70,00 |
| 30 6494 0040 | • 0,4 | 3,2 | 4 | 50 | 4 | 70,00 |
| 30 6494 0050 | • 0,5 | 7 | 8 | 70 | 4 | 86,00 |
| 30 6494 0060 | • 0,6 | 6,8 | 8 | 70 | 4 | 86,00 |
| 30 6494 0080 | • 0,8 | 6,4 | 8 | 70 | 4 | 86,00 |
| 30 6494 0100 | • 1,0 | 6 | 8 | 70 | 4 | 85,00 |
| 30 6494 0150 | • 1,5 | 7 | 10 | 75 | 4 | 99,00 |
| 30 6494 0200 | • 2,0 | 6 | 10 | 75 | 4 | 99,00 |
| 30 6494 0250 | • 2,5 | 7 | 12 | 75 | 4 | 116,00 |
| 30 6494 0300 | • 3,0 | 6 | 12 | 75 | 4 | 116,00 |
| 30 6494 0350 | • 3,5 | 9 | 16 | 80 | 4 | 154,00 |
| 30 6494 0400 | • 4,0 | 8 | 16 | 80 | 4 | 154,00 |
| 30 6494 0450 | • 4,5 | 7 | 16 | 80 | 4 | 154,00 |
| 30 6494 0500 | • 5,0 | 10 | 20 | 80 | 4 | 210,00 |
| 30 6494 0600 | • 6,0 | 8 | 20 | 80 | 4 | 210,00 |

Andere Radien kurzfristig lieferbar! / Other radiuses can be delivered short term!

| | |
|--------------------|-------------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HA |
| | |
| | |

Schnittdaten Cutting data

1215 **DXF/STEP**

30 6495

Micro-VHM-Viertelkreis-Profilfräser, konkav
Miniature Micro Grain rounding cutter, concave



HRC

< 68

GG/G

cast iron

INOX

stainless steel

< 900 N/mm²

ferritic

INOX

stainless steel

> 900 N/mm²

martensitic

INOX

stainless steel

< 900 N/mm²

austenitic

INCONEL

HASTELLOY

TITANIUM

NE

METALLE

non-ferrous

kurz-

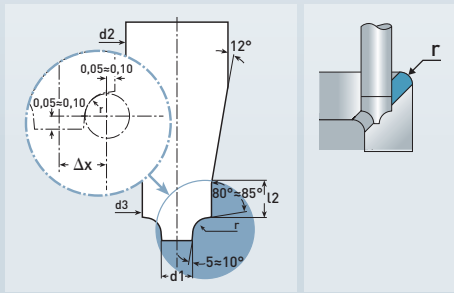
spanend

short chip

lang-

spanend

long chip



| Art. | r ± 0,008 | d1 ± 0,008 | d2 h6 | d3 | l1 | l2 | Z | € |
|--------------|-----------|------------|-------|------|----|-------|---|--------|
| 30 6495 0010 | • 0,1 | 0,5 | 3 | 0,8 | 50 | 2,5 | 2 | 58,00 |
| 30 6495 0020 | • 0,2 | 0,5 | 3 | 1,0 | 50 | 2,5 | 2 | 58,00 |
| 30 6495 0030 | • 0,3 | 0,5 | 3 | 1,2 | 50 | 2,5 | 2 | 55,00 |
| 30 6495 0040 | • 0,4 | 0,5 | 3 | 1,4 | 50 | 2,5 | 2 | 55,00 |
| 30 6495 0050 | • 0,5 | 0,5 | 3 | 1,6 | 50 | 2,5 | 2 | 55,00 |
| 30 6495 0060 | • 0,6 | 0,5 | 3 | 1,8 | 50 | 3,0 | 2 | 55,00 |
| 30 6495 0080 | • 0,8 | 0,8 | 3 | 2,5 | 50 | 4,0 | 2 | 55,00 |
| 30 6495 0100 | • 1,0 | 0,8 | 3 | 2,9 | 50 | 4,0 | 2 | 55,00 |
| 30 6495 0150 | • 1,5 | 1,5 | 5 | 4,6 | 50 | 6,0 | 2 | 69,00 |
| 30 6495 0200 | • 2,0 | 1,5 | 6 | 5,6 | 50 | 8,0 | 2 | 69,00 |
| 30 6495 0250 | • 2,5 | 1,5 | 8 | 6,5 | 50 | 10,00 | 2 | 86,00 |
| 30 6495 0300 | • 3,0 | 1,5 | 8 | 7,5 | 50 | 10,00 | 2 | 86,00 |
| 30 6495 0400 | • 4,0 | 1,9 | 10 | 10,0 | 55 | - | 2 | 123,00 |
| 30 6495 0500 | • 5,0 | 1,9 | 12 | 12,0 | 63 | - | 2 | 137,00 |

Andere Radien kurzfristig lieferbar! / Other radiuses can be delivered short term!

| | |
|--------------------|-------------------------|
| MICRO GRAIN | KARNASCH NORM |
| MF | DIN 6535 Form HA |
| | |
| | |

Schnittdaten Cutting data

1215 **DXF/STEP**

VHM-Kegelsenker 90°
Solid carbide countersink 90°



30 6497

HRC
< 68

GG/G
cast iron

INOX
stainless steel
< 900 N/mm²
ferritic

INOX
stainless steel
> 900 N/mm²
martensitic

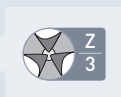
INOX
stainless steel
< 900 N/mm²
austenitic

INCONEL
HASTELLOY
TITANIUM

NE
METALLE
non-ferrous

kurzspanend
short chip

langspanend
long chip



| | |
|-----------------------|---------------------|
| d1* = Ø 6,3 - Ø 8,3 | tol -0,000 / -0,015 |
| d1* = Ø 10,4 - Ø 16,5 | tol -0,000 / -0,018 |
| d1* = Ø 20,5 - Ø 25,0 | tol -0,000 / -0,021 |
| d1* = Ø 31,0 | tol -0,000 / -0,025 |

Nicht für 3-Backenfutter geeignet!
Not suitable for 3 jaw chucks!

| Art. | d1* | d2 h9 | d3 | l1 | Z | € |
|--------------|--------|-------|-----|----|---|--------|
| 30 6497 0630 | • 6,3 | 5 | 1,5 | 45 | 3 | 70,00 |
| 30 6497 0830 | • 8,3 | 6 | 2,0 | 50 | 3 | 74,00 |
| 30 6497 1040 | • 10,4 | 6 | 2,5 | 50 | 3 | 79,00 |
| 30 6497 1240 | • 12,4 | 8 | 2,8 | 57 | 3 | 84,00 |
| 30 6497 1650 | • 16,5 | 10 | 3,2 | 60 | 3 | 111,00 |
| 30 6497 2050 | • 20,5 | 10 | 3,5 | 64 | 3 | 125,00 |
| 30 6497 2500 | • 25,0 | 10 | 3,8 | 68 | 3 | 159,00 |
| 30 6497 3100 | • 31,0 | 12 | 4,2 | 72 | 3 | 206,00 |

Ø 6,3 - Ø 10,4 Komplett aus VHM / Completely solid carbide
Ø 12,4 - Ø 31,0 Mit aufgelötetem Stahlschaft / With a soldered steel shank

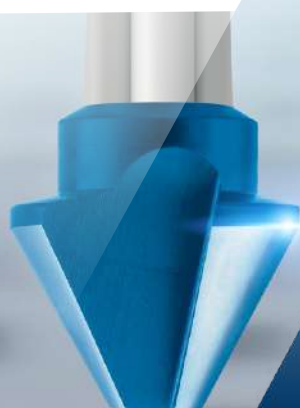
| | |
|--------------------|-------------------------|
| MICRO GRAIN | DIN 335 C |
| N | DIN 6535 Form HA |
| | |
| | HHC HSC HPC |
| | UFX-2 |
| | |

Schnittdaten Cutting data **1203**

Zeichnungen Drawings **DXF/STEP**

Qualitätsprodukte für die Metallbearbeitung.
Quality products for metalworking.

Karnasch®
PROFESSIONAL TOOLS



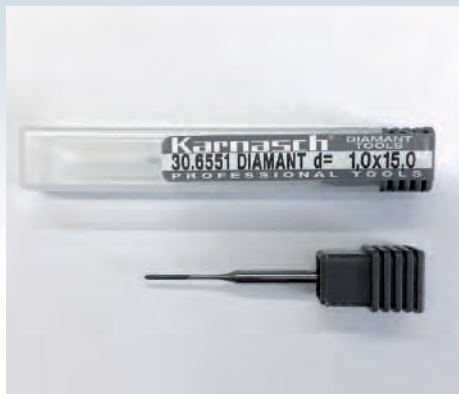
NÄHER AN DER PERFEKTION

Closer to perfection

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

Qualitätsmerkmale diamantbeschichteter VHM-Fräser – **Konsequent** "Nur das Beste" bei einer **100% Kontrolle**
 Quality characteristics of diamond coated Karnasch solid carbide end mills – **Consistently** "Only the best" with a **100% control**



Höchstmögliche Standzeiten und Präzision werden nur erzielt wenn das verwendete Hartmetall, die Beschichtung sowie die Werkzeuggeometrien bis ins kleinste Detail aufeinander abgestimmt sind.

Diamantbeschichtete Karnasch-Fräser werden mit speziellen Geometrien für die Graphitbearbeitung sowie mit einer optimierten Nano-Kristallinen sowie **dropletfreien** Diamantschicht geliefert. Zudem erfolgt eine **100% Kontrolle** der Fräser

The highest possible service life and precision are only scoring, if the used hard metal, the coating and the tool geometries are designed to the last detail.

Diamond coated Karnasch-end mills are supplied with special geometries for machining graphite, as well as an optimized nano-crystalline and **droplet free** diamond coating. In addition to that, all the tools will be **checked by 100%**

Rundlauftoleranzen von max. 3 µ
 Concentricity tolerance of max. 3 µ

Durchmessertoleranzen von 0/-0,010 mm
 Diameter tolerance of 0/-0,010 mm

Radiuskontur von max. ± 0,002 mm
 Radius contour accuracy of max. ± 0,002 mm

Dadurch lässt sich die Oberflächengüte sowie die Standzeit erheblich steigern.

This allows to increase considerably the surface finish and the tool life.

Karnasch-Hochleistungsfräser werden zur besseren Unterscheidung der jeweiligen Fräser und deren Anwendung in farblich unterschiedlichen Schutzhülsen verpackt und etikettiert. Diamantbeschichtete Fräser werden mit grauen Etiketten und grauen Verpackungen geliefert.

For a better distinguish of our end mills and their application, are the Karnasch high performance end mills, packed and labelled in different coloured protective packaging tubes. Diamond coated end mills are labelled in grey with protective packaging tubes in grey.

Um ein Höchstmaß an Präzision zu gewährleisten, wird jedes µ gesucht. Aus diesem Grund werden Karnasch-Micro-Präzisionswerkzeuge auf dem Schaftboden beschriftet. Dadurch erreichen wir eine bessere Rundlaufgüte. Gleichzeitig erhöht sich die Standzeit bei messbar glatteren Oberflächen.

In order to guarantee the maximum level of precision, every micron will be searched. That's why Karnasch-Micro-Precision end mills are marked on the shank bottom side. Thereby we achieve a better concentricity. At the same time, the lifetime increases with measurable smoother surfaces.

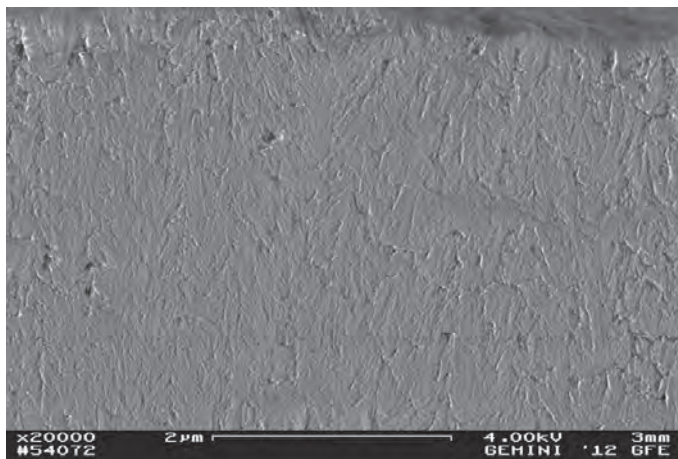
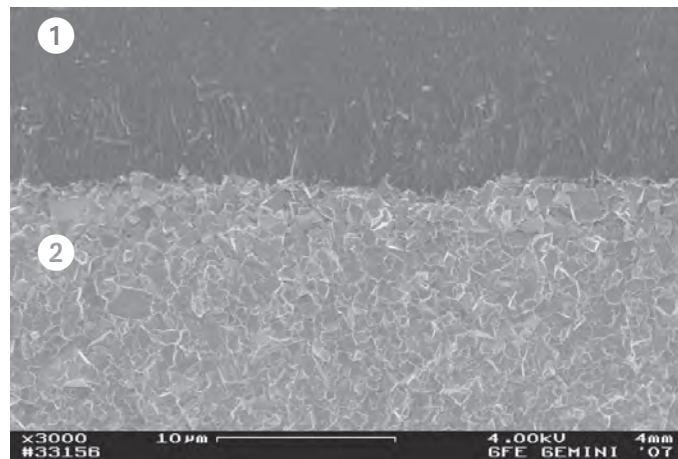


BILD DER DIAMANTSCHICHT

Kompaktes Gefüge der nano-kristallinen Diamantschicht

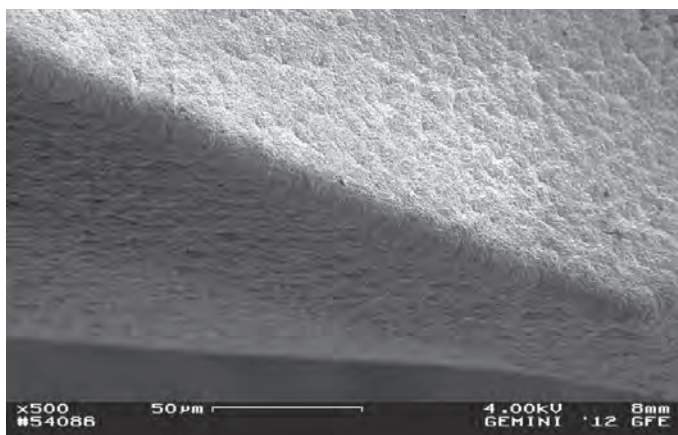
PICTURE OF THE DIAMOND COATING

Compact structure of nano-crystalline diamond coating.



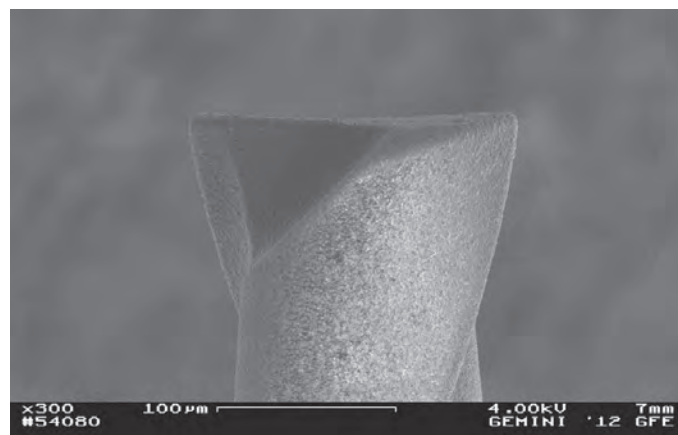
1 DIAMANTSCHICHT DIAMOND COATING

2 VHM-TRÄGERMATERIAL SOLID CARBIDE – SUBSTRATE



GLEICHMÄSSIGE BESCHICHTUNG AUCH AN DER SCHNEIDKANTE

CONSTAND COATING ALSO ON THE CUTTING EDGE



KONTURGETREUE DIAMANTBESCHICHTUNG AUCH BEI FRÄSERDURCHMESSER 0,2 MM

ACCURATE CONTOUR DIAMOND COATING EVEN WITH END MILL DIAMETER 0,2 MM.

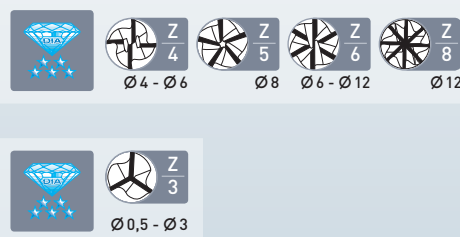
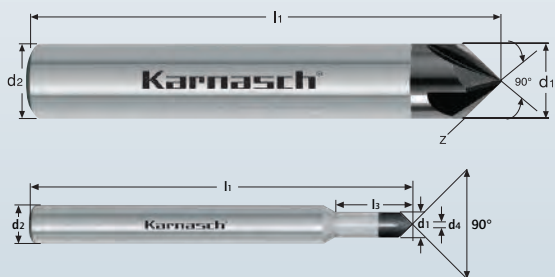


Diamantbeschichteter VHM-Entgrater, lang, 90°
Diamond coated solid carbide deburr, long, 90°



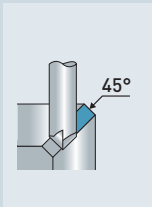
30 6539

- GRAPHIT
graphite
- GFK-CFK
GFRP-CFRP
- PA66
GF30
- PVDF
GF30
- PEEK
GF30
- PEEK
CF30
- POM
GF25
- PTFE
CF25
- ZIRKON
OXID
ZIRCONIA
- FR 4



| | |
|------------------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HA |
| 0° | HHC HSC HPC |
| DIAMANT DIAMOND DCA-06 | |
| 45° | |

| Werkstoffgruppe / Material group | Vc m/min | Ø4-8 f mm/U | Ø10-12 f mm/U |
|---|----------|--------------|---------------|
| 14.1 Feine Graphitkörnung Fine grained graphite | 200 | 0,015 - 0,08 | 0,08-0,095 |
| 14.2 Mittlere Graphitkörnung Medium grained graphite | 300 | 0,015 - 0,07 | 0,07-0,085 |
| 14.3 Grobe Graphitkörnung Coarse grained graphite | 400 | 0,01 - 0,06 | 0,06-0,075 |



| Art. | d1 | l3 | l1 | d4 | d2 h6 | Z | € |
|-----------------|------|----|----|-----|-------|---|--------|
| 30 6539 0050 | 0,5 | 3 | 40 | 0,1 | 4 | 3 | 62,00 |
| 30 6539 0100 | 1,0 | 4 | 40 | 0,1 | 4 | 3 | 62,00 |
| 30 6539 0150 | 1,5 | 5 | 40 | 0,1 | 4 | 3 | 62,00 |
| 30 6539 0200 | 2,0 | 6 | 40 | 0,1 | 4 | 3 | 62,00 |
| 30 6539 0250 | 2,5 | 8 | 40 | 0,1 | 4 | 3 | 62,00 |
| 30 6539 0300 | 3,0 | 10 | 40 | 0,1 | 4 | 3 | 63,00 |
| 30 6539 0400 | 4,0 | - | 54 | - | 4 | 4 | 57,00 |
| 30 6539 0600 | 6,0 | - | 57 | - | 6 | 4 | 75,00 |
| 30 6539 0600 06 | 6,0 | - | 57 | - | 6 | 6 | 77,00 |
| 30 6539 0800 | 8,0 | - | 63 | - | 8 | 5 | 98,00 |
| 30 6539 0800 06 | 8,0 | - | 63 | - | 8 | 6 | 99,00 |
| 30 6539 1000 | 10,0 | - | 72 | - | 10 | 6 | 121,00 |
| 30 6539 1200 | 12,0 | - | 83 | - | 12 | 6 | 158,00 |
| 30 6539 1200 08 | 12,0 | - | 83 | - | 12 | 8 | 160,00 |

Schnittdaten Cutting data | Zeichnungen Drawings

109 | DXF/STEP

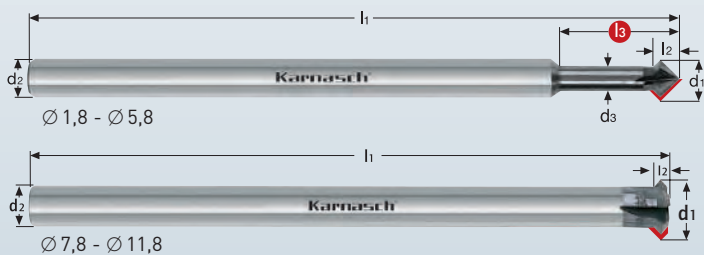


Diamantbeschichteter VHM-Vorwärts- und Rückwärtsentgrater, extra lang, 45°
Diamond coated forward- and backward burr remover, extra long, 45°



30 6540

- GRAPHIT
graphite
- GFK-CFK
GFRP-CFRP
- PA66
GF30
- PVDF
GF30
- PEEK
GF30
- PEEK
CF30
- POM
GF25
- PTFE
CF25
- ZIRKON
OXID
ZIRCONIA
- FR 4



| | |
|-------------|------------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HA |
| 15° | HSC HPC |
| 45° | DIAMANT DIAMOND DCA-06 |
| 45° | |

| Werkstoffgruppe / Material group | Vc m/min | Ø1,8-9,8 f mm/U | Ø11,8 f mm/U |
|---|----------|-----------------|--------------|
| 14.1 Feine Graphitkörnung Fine grained graphite | 400 | 0,015 - 0,08 | 0,095 |
| 14.2 Mittlere Graphitkörnung Medium grained graphite | 600 | 0,015 - 0,07 | 0,085 |
| 14.3 Grobe Graphitkörnung Coarse grained graphite | 800 | 0,01 - 0,06 | 0,075 |

| Art. | d1 + 0,1 | l3 | d2 h6 | d3 | l1 | l2 + 0,5 | Z | € |
|--------------|----------|----|-------|-----|-----|----------|---|--------|
| 30 6540 0180 | 1,8 | 8 | 6 | 1,4 | 80 | 1,4 | 4 | 118,00 |
| 30 6540 0280 | 2,8 | 10 | 6 | 2,2 | 100 | 2,0 | 4 | 118,00 |
| 30 6540 0380 | 3,8 | 13 | 6 | 2,9 | 100 | 2,7 | 4 | 118,00 |
| 30 6540 0480 | 4,8 | 15 | 6 | 3,9 | 100 | 3,0 | 4 | 126,00 |
| 30 6540 0580 | 5,8 | 15 | 6 | 3,9 | 100 | 4,0 | 4 | 124,00 |
| 30 6540 0780 | 7,8 | - | 6 | - | 100 | 2,0 | 4 | 164,00 |
| 30 6540 0980 | 9,8 | - | 6 | - | 100 | 4,0 | 6 | 212,00 |
| 30 6540 1180 | 11,8 | - | 6 | - | 100 | 6,0 | 6 | 248,00 |

Schnittdaten Cutting data | Zeichnungen Drawings

109 | DXF/STEP



29 0120

Diamantbeschichtete VHM-Hochleistungsbohrer für CFK/GFK – multidirektional – mit 90° Spitzwinkel vermeidet Delamination
Diamond-coated solid-carbide drill for CFRP/GFRP – multidirectional – with 90° tip angle, prevents delamination



GRAPHIT
graphite

COMPOSITES

CFK
CFRP

GFK
GFRP

PEEK
CF30

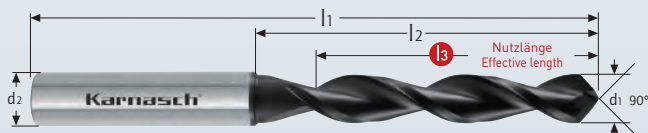
PEEK
GF30

GF
GF25

PVDF
GF25

ZIRKON OXID
ZIRCONIA

FR 4



MICRO GRAIN KARNASCH NORM

MF DIN 6535 Form HA



Composites

DCC 0318



Empfohlene Schnittdaten / Recommended cutting data

| Werkstoffgruppe Material group | WERKSTOFF WORKPIECE MATERIAL | vc m/min | f mm/U | | | | |
|-----------------------------------|------------------------------------|----------|-------------|-------------|-------------|-------------|---------------|
| | | | Ø <3 | Ø 3,0 - 4,9 | Ø 5,0 - 7,9 | Ø 8,0 - 9,9 | Ø 10,0 - 12,0 |
| 8.3 | GFK / CFK Composites | 160 | 0,02 - 0,03 | 0,04 | 0,05 | 0,07 | 0,1 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|-------|-----|-----|----|-------|--------|
| 29 0120 0050 0045 | 0,5 | 4,5 | 5,5 | 55 | 3 | 67,00 |
| 29 0120 0060 0045 | 0,6 | 4,5 | 5,5 | 55 | 3 | 67,00 |
| 29 0120 0070 0045 | 0,7 | 4,5 | 5,5 | 55 | 3 | 67,00 |
| 29 0120 0080 0045 | 0,8 | 4,5 | 5,5 | 55 | 3 | 67,00 |
| 29 0120 0090 0045 | 0,9 | 4,5 | 5,5 | 55 | 3 | 67,00 |
| 29 0120 0100 005 | 1,0 | 5 | 8 | 55 | 3 | 67,00 |
| 29 0120 0110 008 | 1,1 | 8 | 12 | 55 | 3 | 67,00 |
| 29 0120 0120 008 | 1,2 | 8 | 12 | 55 | 3 | 67,00 |
| 29 0120 0130 008 | 1,3 | 8 | 12 | 55 | 3 | 67,00 |
| 29 0120 0140 008 | 1,4 | 8 | 12 | 55 | 3 | 67,00 |
| 29 0120 0150 008 | 1,5 | 8 | 12 | 55 | 3 | 67,00 |
| 29 0120 0160 011 | 1,6 | 11 | 16 | 68 | 3 | 71,00 |
| 29 0120 0170 011 | 1,7 | 11 | 16 | 68 | 3 | 71,00 |
| 29 0120 0180 011 | 1,8 | 11 | 16 | 68 | 3 | 71,00 |
| 29 0120 0190 011 | 1,9 | 11 | 16 | 68 | 3 | 71,00 |
| 29 0120 0200 011 | 2,0 | 11 | 16 | 68 | 3 | 71,00 |
| 29 0120 0210 014 | 2,1 | 14 | 20 | 74 | 3 | 73,00 |
| 29 0120 0220 014 | 2,2 | 14 | 20 | 74 | 3 | 73,00 |
| 29 0120 0230 014 | 2,3 | 14 | 20 | 74 | 3 | 73,00 |
| 29 0120 0240 014 | 2,4 | 14 | 20 | 74 | 3 | 73,00 |
| 29 0120 0250 014 | 2,5 | 14 | 20 | 74 | 3 | 73,00 |
| 29 0120 0260 016 | 2,6 | 16 | 23 | 81 | 3 | 75,00 |
| 29 0120 0270 016 | 2,7 | 16 | 23 | 81 | 3 | 75,00 |
| 29 0120 0280 016 | 2,8 | 16 | 23 | 81 | 3 | 75,00 |
| 29 0120 0290 016 | 2,9 | 16 | 23 | 81 | 3 | 75,00 |
| 29 0120 0300 023 | 3,0 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0310 023 | 3,1 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 03175 023 | 3,175 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0320 023 | 3,2 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0330 023 | 3,3 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0340 023 | 3,4 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0350 023 | 3,5 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0360 023 | 3,6 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0370 023 | 3,7 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0380 023 | 3,8 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0390 023 | 3,9 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0400 029 | 4,0 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0410 029 | 4,1 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0420 029 | 4,2 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0430 029 | 4,3 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0440 029 | 4,4 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0450 029 | 4,5 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0460 029 | 4,6 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0470 029 | 4,7 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 04763 029 | 4,763 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0480 029 | 4,8 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0490 029 | 4,9 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0500 035 | 5,0 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0510 035 | 5,1 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0520 035 | 5,2 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0530 035 | 5,3 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0540 035 | 5,4 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0550 035 | 5,5 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0560 035 | 5,6 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0570 035 | 5,7 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0580 035 | 5,8 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0590 035 | 5,9 | 35 | 44 | 82 | 6 | 129,00 |

Schnittdaten
Cutting data



110

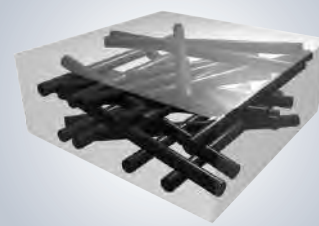
Film
Movie



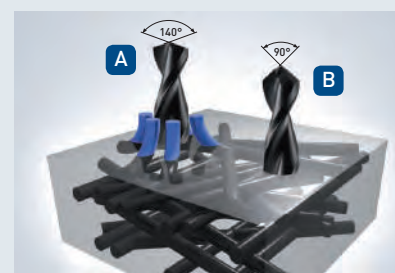
Zeichnungen
Drawings



MULTIDIREKTIONAL



Chaotische Ausrichtung des Faserverlaufs
Chaotic alignment of fibre progress



A Delamination und Gratbildung mit konventionellen Bohrern.
B Sauberer Bohrungsaustritt durch optimierte Führungsfase des Bohrwerkzeuges.

Diamantbeschichtete VHM-Hochleistungsbohrer für CFK/GFK – multidirektional – mit 90° Spitzwinkel vermeidet Delamination
 Diamond-coated solid-carbide drill for CFRP/GFRP – multidirectional – with 90° tip angle, prevents delamination

29 0120

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|----------|----|----|-----|-------|--------|
| 29 0120 0600 035 | • 6,0 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0610 043 | • 6,1 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0620 043 | • 6,2 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0630 043 | • 6,3 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0635 043 | • 6,350 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0640 043 | • 6,4 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0650 043 | • 6,5 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0660 043 | • 6,6 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0670 043 | • 6,7 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0680 043 | • 6,8 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0690 043 | • 6,9 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0700 043 | • 7,0 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0710 043 | • 7,1 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0720 043 | • 7,2 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0730 043 | • 7,3 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0740 043 | • 7,4 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0750 043 | • 7,5 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0760 043 | • 7,6 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0770 043 | • 7,7 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0780 043 | • 7,8 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0790 043 | • 7,9 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 07938 043 | • 7,938 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0800 043 | • 8,0 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0810 049 | • 8,1 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0820 049 | • 8,2 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0830 049 | • 8,3 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0840 049 | • 8,4 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0850 049 | • 8,5 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0860 049 | • 8,6 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0870 049 | • 8,7 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0880 049 | • 8,8 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0890 049 | • 8,9 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0900 049 | • 9,0 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0910 049 | • 9,1 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0920 049 | • 9,2 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0930 049 | • 9,3 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0940 049 | • 9,4 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0950 049 | • 9,5 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 09525 049 | • 9,525 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0960 049 | • 9,6 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0970 049 | • 9,7 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0980 049 | • 9,8 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0990 049 | • 9,9 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 1000 049 | • 10,0 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 1010 056 | • 10,1 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1020 056 | • 10,2 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1030 056 | • 10,3 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1040 056 | • 10,4 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1050 056 | • 10,5 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1060 056 | • 10,6 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1070 056 | • 10,7 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1080 056 | • 10,8 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1090 056 | • 10,9 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1100 056 | • 11,0 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 11111 056 | • 11,111 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1200 056 | • 12,0 | 56 | 71 | 118 | 12 | 251,00 |

Karnasch®
 PROFESSIONAL TOOLS





Diamant - Beschichtungstest Diamond - coating test

1

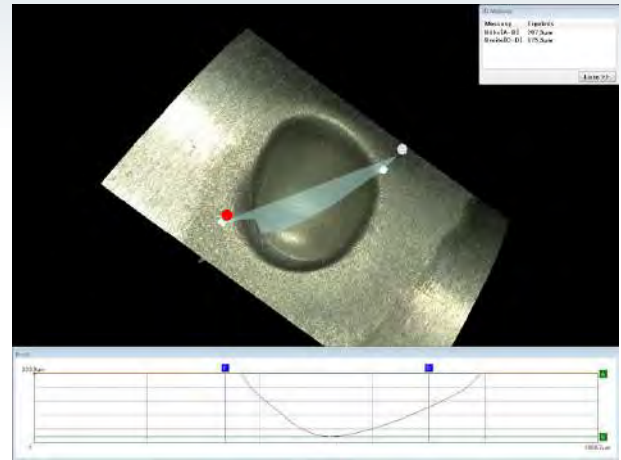


Strahlverschleißtest am Schaft
Blast wear test on the shank



100-fache Vergrößerung
100-times magnification

Lochbildung durch Verschleiß
Hole because of wear



100-fache Vergrößerung
100-times magnification

2



3



4



5



6



7



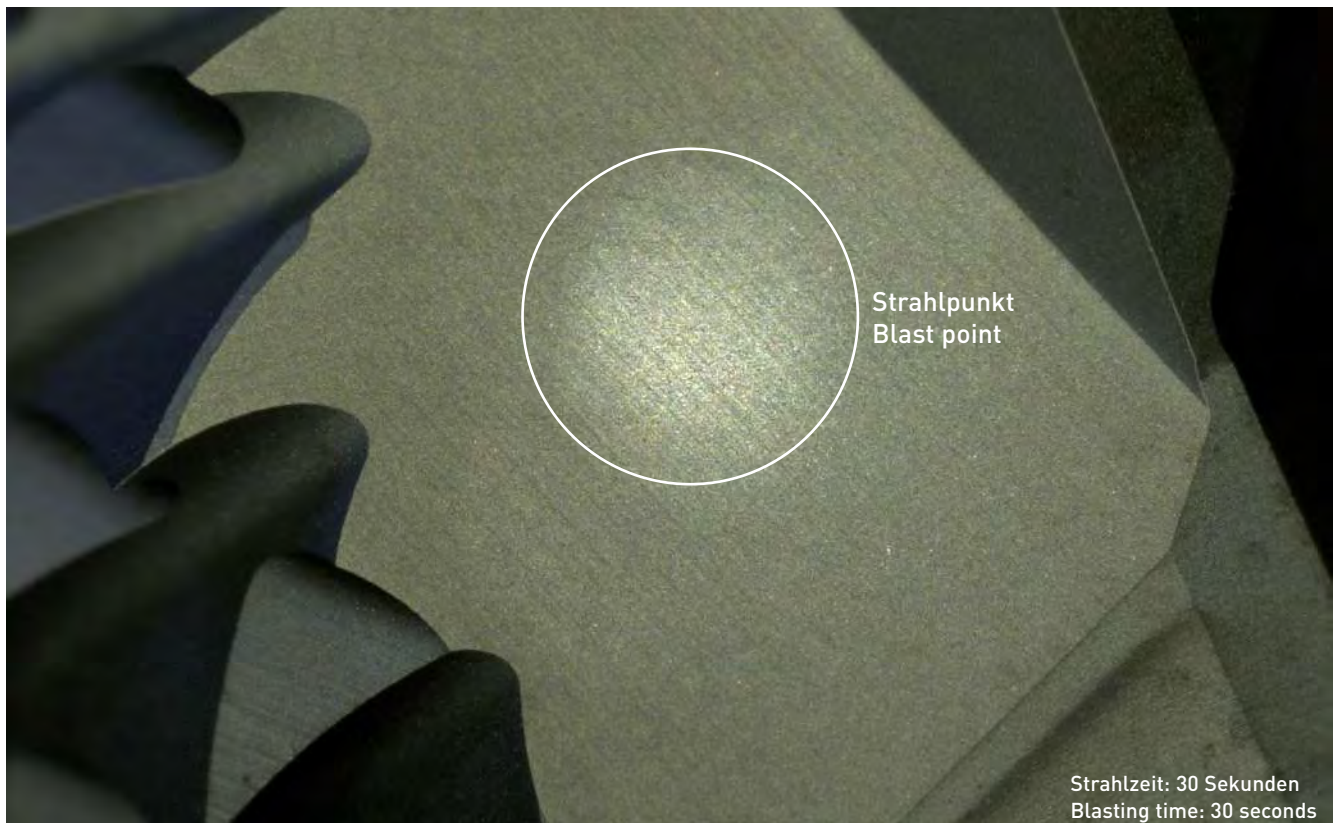
8



9

Index

Strahlverschleißtest stirnseitig auf der Diamantbeschichtung
Blast wear test on the diamond coated face



100-fache Vergrößerung
100-times magnification

Resultat: Bei gleicher Strahlzeit entsteht ein enormer Verschleißschutz durch die Verwendung der Karnasch-Diamantbeschichtung

Result: You will achieve a tremendous wear resistant by the same blasting time, with our Karnasch-diamond coating

Diamantbeschichteter Micro Schaftfräser mit Eckenradius für die **Hartmetallbearbeitung**
 Diamond coated solid carbide end mills with corner radius for machining in **cemented carbide**



PROFESSIONAL
 ★ ★ ★

30 6271

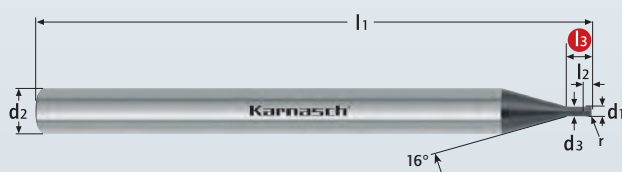
HART-METALL
 cemented carbide

GRAPHIT
 graphite

Zr O₂
 Zirkonoxid
 gepresst
 Zircon pressed

Zr O₂
 Zirkonoxid
 gehippt
 Zircon hipped

E.MAX
 FOR
 CAD/CAM
 TECHNOLOGY



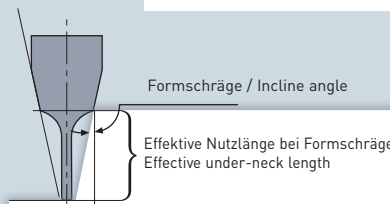
Erhöhte Diamant-Schichtdicke!
 Increased diamond coating thickness!

TOLERANZ / TOLERANCE
 tol. r = -0,004

d1* = Ø 0,3 - Ø 2 tol -0 / -0,010

MICRO GRAIN KARNASCH NORM
ITX DIN 6535 Form HA
 HSC HHC
 D-CC
 Air

Schnittdaten Cutting data
 Zeichnungen Drawings
 1220 DXF/STEP



| Art. | d1* | r -0,004 | l3 | d2 h5 | d3 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|----------------------|-----|----------|-----|-------|------|----|------|-------|-------|-------|-------|-------|
| 30 6271 0030 003 006 | 0,3 | 0,03 | 0,6 | 4 | 0,28 | 50 | 0,15 | 81,00 | 0,864 | 0,922 | 1,020 | 1,120 |
| 30 6271 0030 005 006 | 0,3 | 0,05 | 0,6 | 4 | 0,28 | 50 | 0,15 | 81,00 | 0,864 | 0,922 | 1,020 | 1,120 |
| 30 6271 0050 003 005 | 0,5 | 0,03 | 0,5 | 4 | 0,46 | 50 | 0,25 | 80,00 | 0,829 | 0,874 | 0,960 | 1,040 |
| 30 6271 0050 003 010 | 0,5 | 0,03 | 1 | 4 | 0,46 | 50 | 0,25 | 80,00 | 1,350 | 1,420 | 1,540 | 1,640 |
| 30 6271 0050 005 005 | 0,5 | 0,05 | 0,5 | 4 | 0,46 | 50 | 0,25 | 80,00 | 0,829 | 0,874 | 0,960 | 1,040 |
| 30 6271 0050 005 010 | 0,5 | 0,05 | 1 | 4 | 0,46 | 50 | 0,25 | 80,00 | 1,350 | 1,420 | 1,540 | 1,640 |
| 30 6271 0080 003 008 | 0,8 | 0,03 | 0,8 | 4 | 0,76 | 50 | 0,4 | 80,00 | 1,300 | 1,390 | 1,570 | 1,730 |
| 30 6271 0080 003 016 | 0,8 | 0,03 | 1,6 | 4 | 0,76 | 50 | 0,4 | 80,00 | 2,150 | 2,290 | 2,520 | 2,730 |
| 30 6271 0080 005 008 | 0,8 | 0,05 | 0,8 | 4 | 0,76 | 50 | 0,4 | 80,00 | 1,300 | 1,390 | 1,570 | 1,730 |
| 30 6271 0080 005 016 | 0,8 | 0,05 | 1,6 | 4 | 0,76 | 50 | 0,4 | 80,00 | 2,150 | 2,290 | 2,520 | 2,730 |
| 30 6271 0080 010 008 | 0,8 | 0,10 | 0,8 | 4 | 0,76 | 50 | 0,4 | 80,00 | 1,300 | 1,390 | 1,570 | 1,730 |
| 30 6271 0080 010 016 | 0,8 | 0,10 | 1,6 | 4 | 0,76 | 50 | 0,4 | 80,00 | 2,150 | 2,290 | 2,520 | 2,730 |
| 30 6271 0100 003 010 | 1,0 | 0,03 | 1 | 4 | 0,96 | 50 | 0,5 | 80,00 | 1,510 | 1,620 | 1,810 | 1,990 |
| 30 6271 0100 003 020 | 1,0 | 0,03 | 2 | 4 | 0,96 | 50 | 0,5 | 80,00 | 2,580 | 2,730 | 2,990 | 3,210 |
| 30 6271 0100 005 010 | 1,0 | 0,05 | 1 | 4 | 0,96 | 50 | 0,5 | 80,00 | 1,510 | 1,620 | 1,810 | 1,990 |
| 30 6271 0100 005 020 | 1,0 | 0,05 | 2 | 4 | 0,96 | 50 | 0,5 | 80,00 | 2,580 | 2,730 | 2,990 | 3,210 |
| 30 6271 0100 010 010 | 1,0 | 0,10 | 1 | 4 | 0,96 | 50 | 0,5 | 80,00 | 1,510 | 1,620 | 1,810 | 1,990 |
| 30 6271 0100 010 020 | 1,0 | 0,10 | 2 | 4 | 0,96 | 50 | 0,5 | 80,00 | 2,580 | 2,730 | 2,990 | 3,210 |
| 30 6271 0150 003 015 | 1,5 | 0,03 | 1,5 | 4 | 1,44 | 50 | 0,75 | 81,00 | 2,210 | 2,240 | 2,450 | 2,650 |
| 30 6271 0150 003 030 | 1,5 | 0,03 | 3 | 4 | 1,44 | 50 | 0,75 | 81,00 | 3,700 | 3,880 | 4,170 | 4,480 |
| 30 6271 0150 005 015 | 1,5 | 0,05 | 1,5 | 4 | 1,44 | 50 | 0,75 | 81,00 | 2,210 | 2,240 | 2,450 | 2,650 |
| 30 6271 0150 005 030 | 1,5 | 0,05 | 3 | 4 | 1,44 | 50 | 0,75 | 81,00 | 3,700 | 3,880 | 4,170 | 4,480 |
| 30 6271 0150 010 015 | 1,5 | 0,10 | 1,5 | 4 | 1,44 | 50 | 0,75 | 81,00 | 2,210 | 2,240 | 2,450 | 2,650 |
| 30 6271 0150 010 030 | 1,5 | 0,10 | 3 | 4 | 1,44 | 50 | 0,75 | 81,00 | 3,700 | 3,880 | 4,170 | 4,480 |
| 30 6271 0200 003 020 | 2,0 | 0,03 | 2 | 4 | 1,90 | 50 | 1,0 | 81,00 | 2,760 | 2,890 | 3,110 | 3,350 |
| 30 6271 0200 003 040 | 2,0 | 0,03 | 4 | 4 | 1,90 | 50 | 1,0 | 81,00 | 4,850 | 5,040 | 5,390 | 5,790 |
| 30 6271 0200 005 020 | 2,0 | 0,05 | 2 | 4 | 1,90 | 50 | 1,0 | 81,00 | 2,760 | 2,890 | 3,110 | 3,350 |
| 30 6271 0200 005 040 | 2,0 | 0,05 | 4 | 4 | 1,90 | 50 | 1,0 | 81,00 | 4,850 | 5,040 | 5,390 | 5,790 |
| 30 6271 0200 010 020 | 2,0 | 0,10 | 2 | 4 | 1,90 | 50 | 1,0 | 81,00 | 2,760 | 2,890 | 3,110 | 3,350 |
| 30 6271 0200 010 040 | 2,0 | 0,10 | 4 | 4 | 1,90 | 50 | 1,0 | 81,00 | 4,850 | 5,040 | 5,390 | 5,790 |



Index

30 6542

PROFESSIONAL
★ ★ ★

Diamantbeschichteter Micro Schaftfräser < 20xD Schnitttiefe
Diamond coated solid carbide end mills < 20xD using length



GRAPHIT
graphite

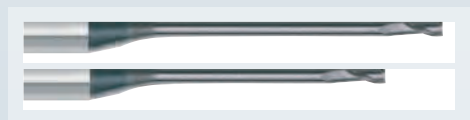
ZIRKONIUM
ZIRCONIUM

Zr O₂
Zirkonoxid
gepresst
Zircon pressed

Zr O₂
Zirkonoxid
gehippt
Zircon hipped

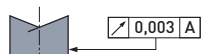
GFK-CFK
GFRP-CFRP

FR 4



TOLERANZ / TOLERANCE

scharfkantig / sharp edge



d1* = Ø 0,1 - Ø 3,0 tol 0,000 / - 0,010



MICRO
GRAIN

KARNASCH
NORM

ITX

DIN 6535
Form HA



HSC
High-Speed-
Cutting



DCC
0318



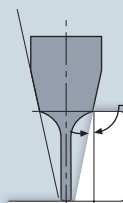
Schnittdaten
Cutting data

Zeichnungen
Drawings



1221-1223

DXF/STEP



Formschräge / Incline angle

Effektive Nutzlänge bei Formschräge
Effective under-neck length

| Art. | d1* | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|--------|------|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6542 0010 002 | • 0,10 | 0,2 | 4 | 0,08 | 1 | 40 | 0,15 | 59,00 | 0,36 | 0,38 | 0,42 | 0,46 |
| 30 6542 0010 004 | • 0,10 | 0,4 | 4 | 0,08 | 1 | 40 | 0,15 | 59,00 | 0,57 | 0,60 | 0,65 | 0,70 |
| 30 6542 0015 003 | • 0,15 | 0,3 | 4 | 0,13 | 1 | 40 | 0,20 | 59,00 | 0,47 | 0,49 | 0,54 | 0,58 |
| 30 6542 0015 006 | • 0,15 | 0,6 | 4 | 0,13 | 1 | 40 | 0,20 | 59,00 | 0,78 | 0,82 | 0,88 | 0,94 |
| 30 6542 0020 004 | • 0,20 | 0,4 | 4 | 0,18 | 1 | 40 | 0,30 | 59,00 | 0,57 | 0,60 | 0,65 | 0,70 |
| 30 6542 0020 006 | • 0,20 | 0,6 | 4 | 0,18 | 1 | 40 | 0,30 | 59,00 | 0,78 | 0,82 | 0,88 | 0,94 |
| 30 6542 0020 008 | • 0,20 | 0,8 | 4 | 0,18 | 1 | 40 | 0,30 | 59,00 | 0,99 | 1,04 | 1,11 | 1,19 |
| 30 6542 0020 010 | • 0,20 | 1,0 | 4 | 0,18 | 1 | 40 | 0,30 | 59,00 | 1,20 | 1,25 | 1,33 | 1,43 |
| 30 6542 0020 015 | • 0,20 | 1,5 | 4 | 0,18 | 1 | 40 | 0,30 | 59,00 | 1,72 | 1,78 | 1,90 | 2,03 |
| 30 6542 0030 006 | • 0,30 | 0,6 | 4 | 0,27 | 2 | 40 | 0,30 | 59,00 | - | - | - | - |
| 30 6542 0030 010 | • 0,30 | 1,0 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 1,32 | 1,39 | 1,52 | 1,63 |
| 30 6542 0030 015 | • 0,30 | 1,5 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 1,85 | 1,94 | 2,09 | 2,23 |
| 30 6542 0030 020 | • 0,30 | 2,0 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 2,38 | 2,49 | 2,65 | 2,83 |
| 30 6542 0030 030 | • 0,30 | 3,0 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6542 0030 045 | • 0,30 | 4,5 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 4,98 | 5,14 | 5,47 | 5,85 |
| 30 6542 0030 060 | • 0,30 | 6,0 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 6,53 | 6,73 | 7,17 | 7,66 |
| 30 6542 0040 020 | • 0,40 | 2,0 | 4 | 0,36 | 2 | 40 | 0,60 | 59,00 | 2,40 | 2,50 | 2,67 | 2,85 |
| 30 6542 0040 040 | • 0,40 | 4,0 | 4 | 0,36 | 2 | 40 | 0,60 | 59,00 | 4,48 | 4,63 | 4,93 | 5,27 |
| 30 6542 0040 060 | • 0,40 | 6,0 | 4 | 0,36 | 2 | 40 | 0,60 | 59,00 | 6,55 | 6,75 | 7,18 | 7,68 |
| 30 6542 0040 080 | • 0,40 | 8,0 | 4 | 0,36 | 2 | 60 | 0,60 | 61,00 | 8,61 | 8,87 | 9,44 | 10,09 |
| 30 6542 0050 020 | • 0,50 | 2,0 | 4 | 0,45 | 2 | 40 | 0,70 | 59,00 | 2,43 | 2,52 | 2,69 | 2,87 |
| 30 6542 0050 040 | • 0,50 | 4,0 | 4 | 0,45 | 2 | 40 | 0,70 | 59,00 | 4,50 | 4,65 | 4,95 | 5,29 |
| 30 6542 0050 060 | • 0,50 | 6,0 | 4 | 0,45 | 2 | 40 | 0,70 | 59,00 | 6,57 | 6,77 | 7,20 | 7,70 |
| 30 6542 0050 080 | • 0,50 | 8,0 | 4 | 0,45 | 2 | 60 | 0,70 | 61,00 | 8,63 | 8,89 | 9,46 | 10,11 |
| 30 6542 0050 100 | • 0,50 | 10,0 | 4 | 0,45 | 2 | 60 | 0,70 | 61,00 | 10,69 | 11,01 | 11,72 | 12,53 |
| 30 6542 0060 020 | • 0,60 | 2,0 | 4 | 0,55 | 4 | 40 | 1,00 | 61,00 | 2,62 | 2,76 | 3,01 | 3,23 |
| 30 6542 0060 030 | • 0,60 | 3,0 | 4 | 0,55 | 4 | 40 | 1,00 | 61,00 | 3,67 | 3,85 | 4,15 | 4,44 |
| 30 6542 0060 060 | • 0,60 | 6,0 | 4 | 0,55 | 4 | 40 | 1,00 | 61,00 | 6,82 | 7,08 | 7,54 | 8,06 |
| 30 6542 0060 090 | • 0,60 | 9,0 | 4 | 0,55 | 4 | 60 | 1,00 | 63,00 | 9,94 | 10,27 | 10,93 | 11,68 |
| 30 6542 0060 120 | • 0,60 | 12,0 | 4 | 0,55 | 4 | 60 | 1,00 | 63,00 | 13,04 | 13,45 | 14,31 | 15,30 |
| 30 6542 0080 020 | • 0,80 | 2,0 | 4 | 0,75 | 4 | 40 | 1,20 | 61,00 | 2,62 | 2,76 | 3,01 | 3,23 |
| 30 6542 0080 040 | • 0,80 | 4,0 | 4 | 0,75 | 4 | 40 | 1,20 | 61,00 | 4,72 | 4,94 | 5,28 | 5,65 |
| 30 6542 0080 060 | • 0,80 | 6,0 | 4 | 0,75 | 4 | 40 | 1,20 | 61,00 | 6,82 | 7,08 | 7,54 | 8,06 |



| Art. | d1* | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|--------|------|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6542 0080 080 | ● 0,80 | 8,0 | 4 | 0,75 | 4 | 60 | 1,20 | 63,00 | 8,90 | 9,21 | 9,80 | 10,48 |
| 30 6542 0080 120 | ● 0,80 | 12,0 | 4 | 0,75 | 4 | 60 | 1,20 | 63,00 | 13,04 | 13,45 | 14,31 | 15,30 |
| 30 6542 0080 160 | ● 0,80 | 16,0 | 4 | 0,75 | 4 | 60 | 1,20 | 63,00 | 17,17 | 17,69 | 18,83 | 20,13 |
| 30 6542 0100 020 | ● 1,00 | 2,0 | 4 | 0,95 | 4 | 40 | 1,60 | 63,00 | 2,62 | 2,76 | 3,01 | 3,23 |
| 30 6542 0100 050 | ● 1,00 | 5,0 | 4 | 0,95 | 4 | 40 | 1,60 | 63,00 | 6,26 | 6,68 | 7,36 | 7,94 |
| 30 6542 0100 080 | ● 1,00 | 8,0 | 4 | 0,95 | 4 | 60 | 1,60 | 65,00 | 8,90 | 9,21 | 9,80 | 10,48 |
| 30 6542 0100 100 | ● 1,00 | 10,0 | 4 | 0,95 | 4 | 60 | 1,60 | 65,00 | 10,98 | 11,33 | 12,06 | 12,89 |
| 30 6542 0100 150 | ● 1,00 | 15,0 | 4 | 0,95 | 6 | 60 | 1,60 | 65,00 | 16,41 | 16,95 | 18,04 | 19,28 |
| 30 6542 0100 200 | ● 1,00 | 20,0 | 4 | 0,95 | 6 | 60 | 1,60 | 65,00 | 21,59 | 22,25 | 23,68 | 25,32 |
| 30 6542 0150 050 | ● 1,50 | 5,0 | 4 | 1,44 | 4 | 40 | 2,40 | 63,00 | 5,80 | 6,03 | 6,43 | 6,87 |
| 30 6542 0150 100 | ● 1,50 | 10,0 | 4 | 1,44 | 4 | 60 | 2,40 | 65,00 | 11,00 | 11,34 | 12,08 | 12,91 |
| 30 6542 0150 150 | ● 1,50 | 15,0 | 4 | 1,44 | 4 | 60 | 2,40 | 65,00 | 16,16 | 16,65 | 17,72 | 18,94 |
| 30 6542 0150 200 | ● 1,50 | 20,0 | 4 | 1,44 | 6 | 60 | 2,40 | 65,00 | 21,60 | 22,27 | 23,70 | 25,34 |
| 30 6542 0200 040 | ● 2,00 | 4,0 | 4 | 1,92 | 4 | 40 | 3,00 | 64,00 | 4,81 | 5,00 | 5,34 | 5,71 |
| 30 6542 0200 060 | ● 2,00 | 6,0 | 4 | 1,92 | 4 | 40 | 3,00 | 64,00 | 6,89 | 7,14 | 7,60 | 8,12 |
| 30 6542 0200 080 | ● 2,00 | 8,0 | 4 | 1,92 | 4 | 60 | 3,00 | 66,00 | 8,97 | 9,26 | 9,85 | 10,53 |
| 30 6542 0200 120 | ● 2,00 | 12,0 | 4 | 1,92 | 4 | 60 | 3,00 | 66,00 | 13,10 | 13,50 | 14,37 | 15,36 |
| 30 6542 0200 180 | ● 2,00 | 18,0 | 4 | 1,92 | 4 | 60 | 3,00 | 66,00 | 19,28 | 19,86 | 21,14 | 22,60 |
| 30 6542 0200 240 | ● 2,00 | 24,0 | 4 | 1,92 | 6 | 60 | 3,00 | 66,00 | 25,76 | 26,54 | 28,25 | 30,21 |
| 30 6542 0200 300 | ● 2,00 | 30,0 | 4 | 1,92 | 6 | 60 | 3,00 | 66,00 | 31,93 | 32,91 | 35,03 | 37,45 |
| 30 6542 0300 150 | ● 3,00 | 15,0 | 4 | 2,90 | 4 | 65 | 4,50 | 66,00 | 16,22 | 16,72 | 17,79 | 19,02 |
| 30 6542 0300 200 | ● 3,00 | 20,0 | 4 | 2,90 | 4 | 65 | 4,50 | 66,00 | 21,37 | 22,02 | 23,44 | 25,06 |
| 30 6542 0300 250 | ● 3,00 | 25,0 | 4 | 2,90 | 4 | 75 | 4,50 | 67,00 | 26,52 | 27,32 | 29,08 | 31,09 |
| 30 6542 0300 300 | ● 3,00 | 30,0 | 4 | 2,90 | 4 | 75 | 4,50 | 67,00 | 31,67 | 32,62 | 34,73 | 37,13 |

Qualitätsprodukte für die Metallbearbeitung.
Quality products for metalworking.

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PROFESSIONAL TOOLS



**HOCHLEISTUNG
FÜR JEDEN ANWENDBEREICH**

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THE KARNASCH PRODUCT RANGE ONLINE!

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30 6544

PROFESSIONAL
★ ★ ★

Diamantbeschichteter Micro Schaftfräser mit Eckenradius < 25xD Schnitttiefe
Diamond coated solid carbide end mills with corner radius, < 25xD using length



GRAPHIT
graphite

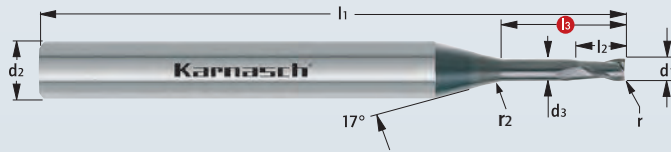
ZIRKONIUM
ZIRCONIUM

Zr O₂
Zirkonoxid
gepresst
Zircon pressed

Zr O₂
Zirkonoxid
gehüpft
Zircon hiped

GFK-CFK
GFRP-CFRP

FR 4



MICRO GRAIN KARNASCH NORM

ITX DIN 6535 Form HA



HSC High-Speed-Cutting

DCC 0318

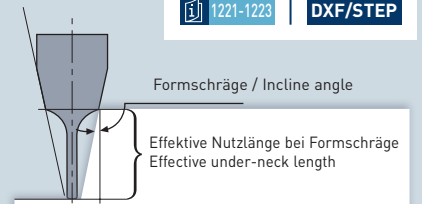


TOLERANZ / TOLERANCE
tol. r = -0,004

d1* = Ø 0,2 - Ø 12 tol -0 / -0,010

Schnittdaten Cutting data
Zeichnungen Drawings

1221-1223



| Art. | d1* | r - 0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|---------------------|-------|-----------|----|-------|------|----|----|-----|-------|-------|-------|-------|-------|
| 30 6544 0020 005 01 | • 0,2 | 0,05 | 1 | 3 | 0,18 | 1 | 55 | 0,3 | 58,00 | 1,20 | 1,25 | 1,33 | 1,43 |
| 30 6544 0030 005 01 | • 0,3 | 0,05 | 1 | 3 | 0,27 | 2 | 55 | 0,4 | 58,00 | 1,32 | 1,39 | 1,52 | 1,63 |
| 30 6544 0030 005 02 | • 0,3 | 0,05 | 2 | 3 | 0,27 | 2 | 55 | 0,4 | 58,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6544 0030 005 03 | • 0,3 | 0,05 | 3 | 3 | 0,27 | 2 | 55 | 0,4 | 58,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6544 0040 005 04 | • 0,4 | 0,05 | 4 | 3 | 0,36 | 2 | 55 | 0,5 | 58,00 | 4,48 | 4,63 | 4,93 | 5,27 |
| 30 6544 0040 005 06 | • 0,4 | 0,05 | 6 | 3 | 0,36 | 2 | 55 | 0,5 | 58,00 | 6,55 | 6,75 | 7,18 | 7,68 |
| 30 6544 0040 005 08 | • 0,4 | 0,05 | 8 | 3 | 0,36 | 2 | 55 | 0,5 | 58,00 | 8,61 | 8,87 | 9,44 | 10,09 |
| 30 6544 0050 005 05 | • 0,5 | 0,05 | 5 | 3 | 0,45 | 2 | 55 | 0,6 | 58,00 | 5,54 | 5,71 | 6,07 | 6,49 |
| 30 6544 0050 005 08 | • 0,5 | 0,05 | 8 | 3 | 0,45 | 2 | 55 | 0,6 | 58,00 | 8,63 | 8,89 | 9,46 | 10,11 |
| 30 6544 0050 005 10 | • 0,5 | 0,05 | 10 | 3 | 0,45 | 2 | 55 | 0,6 | 58,00 | 10,69 | 11,01 | 11,72 | 12,53 |
| 30 6544 0060 006 03 | • 0,6 | 0,06 | 3 | 3 | 0,55 | 4 | 55 | 0,8 | 60,00 | 3,67 | 3,85 | 4,15 | 4,44 |
| 30 6544 0060 006 04 | • 0,6 | 0,06 | 4 | 3 | 0,55 | 10 | 55 | 0,8 | 31,20 | 5,03 | 5,44 | 6,09 | 6,64 |
| 30 6544 0060 006 06 | • 0,6 | 0,06 | 6 | 3 | 0,55 | 4 | 55 | 0,8 | 60,00 | 6,82 | 7,08 | 7,54 | 8,06 |
| 30 6544 0060 006 08 | • 0,6 | 0,06 | 8 | 3 | 0,55 | 10 | 55 | 0,8 | 31,20 | 9,35 | 9,90 | 10,74 | 11,43 |
| 30 6544 0060 006 09 | • 0,6 | 0,06 | 9 | 3 | 0,55 | 10 | 55 | 0,8 | 31,20 | 10,41 | 10,99 | 11,88 | 12,59 |
| 30 6544 0060 006 10 | • 0,6 | 0,06 | 10 | 3 | 0,55 | 10 | 55 | 0,8 | 31,20 | - | - | - | - |
| 30 6544 0060 006 12 | • 0,6 | 0,06 | 12 | 3 | 0,55 | 4 | 55 | 0,8 | 60,00 | 13,04 | 13,45 | 14,31 | 15,30 |
| 30 6544 0080 008 04 | • 0,8 | 0,08 | 4 | 3 | 0,75 | 4 | 55 | 1,0 | 60,00 | 4,72 | 4,96 | 5,28 | 5,65 |
| 30 6544 0080 008 08 | • 0,8 | 0,08 | 8 | 3 | 0,75 | 4 | 55 | 1,0 | 60,00 | 8,90 | 9,21 | 9,80 | 10,48 |
| 30 6544 0080 008 12 | • 0,8 | 0,08 | 12 | 3 | 0,75 | 4 | 55 | 1,0 | 60,00 | 13,04 | 13,45 | 14,31 | 15,30 |
| 30 6544 0080 008 14 | • 0,8 | 0,08 | 14 | 3 | 0,75 | 10 | 55 | 1,0 | 31,20 | - | - | - | - |
| 30 6544 0080 008 16 | • 0,8 | 0,08 | 16 | 3 | 0,75 | 4 | 55 | 1,0 | 60,00 | 17,17 | 17,69 | 18,83 | 20,13 |
| 30 6544 0100 010 05 | • 1,0 | 0,10 | 5 | 3 | 0,95 | 4 | 55 | 1,2 | 62,00 | 5,77 | 6,01 | 6,41 | 6,85 |
| 30 6544 0100 010 10 | • 1,0 | 0,10 | 10 | 3 | 0,95 | 4 | 55 | 1,2 | 62,00 | 10,98 | 11,33 | 12,06 | 12,89 |
| 30 6544 0100 010 15 | • 1,0 | 0,10 | 15 | 3 | 0,95 | 6 | 55 | 1,2 | 62,00 | 16,41 | 16,95 | 18,04 | - |
| 30 6544 0100 010 20 | • 1,0 | 0,10 | 20 | 3 | 0,95 | 6 | 55 | 1,2 | 62,00 | 21,59 | 22,25 | 23,68 | - |
| 30 6544 0100 010 25 | • 1,0 | 0,10 | 25 | 3 | 0,95 | 6 | 55 | 1,2 | 62,00 | 26,74 | 27,55 | - | - |
| 30 6544 0120 012 10 | • 1,2 | 0,12 | 10 | 3 | 1,15 | 4 | 55 | 1,4 | 62,00 | 10,98 | 11,33 | 12,06 | 12,89 |
| 30 6544 0120 012 15 | • 1,2 | 0,12 | 15 | 3 | 1,15 | 6 | 55 | 1,4 | 62,00 | 16,41 | 16,95 | 18,04 | - |
| 30 6544 0150 015 05 | • 1,5 | 0,15 | 5 | 3 | 1,44 | 4 | 55 | 1,8 | 62,00 | 5,80 | 6,03 | 6,43 | 6,87 |
| 30 6544 0150 015 10 | • 1,5 | 0,15 | 10 | 3 | 1,44 | 4 | 55 | 1,8 | 62,00 | 11,00 | 11,34 | 12,08 | 12,91 |
| 30 6544 0150 015 15 | • 1,5 | 0,15 | 15 | 3 | 1,44 | 4 | 55 | 1,8 | 62,00 | 16,16 | 16,65 | 17,72 | - |
| 30 6544 0150 015 20 | • 1,5 | 0,15 | 20 | 3 | 1,44 | 6 | 55 | 1,8 | 62,00 | 21,60 | 22,27 | - | - |
| 30 6544 0150 015 25 | • 1,5 | 0,15 | 25 | 3 | 1,44 | 6 | 55 | 1,8 | 62,00 | 26,76 | 27,57 | - | - |
| 30 6544 0180 018 10 | • 1,8 | 0,18 | 10 | 3 | 1,74 | 10 | 55 | 1,9 | 33,00 | 11,61 | 12,17 | 13,06 | - |
| 30 6544 0200 020 10 | • 2,0 | 0,20 | 10 | 3 | 1,92 | 4 | 65 | 2,0 | 63,00 | 11,04 | 11,38 | 12,11 | - |
| 30 6544 0200 020 15 | • 2,0 | 0,20 | 15 | 3 | 1,92 | 4 | 65 | 2,0 | 63,00 | 16,19 | 16,68 | - | - |
| 30 6544 0200 020 20 | • 2,0 | 0,20 | 20 | 3 | 1,92 | 4 | 65 | 2,0 | 63,00 | 21,31 | 21,98 | - | - |
| 30 6544 0200 020 25 | • 2,0 | 0,20 | 25 | 3 | 1,92 | 6 | 65 | 2,0 | 63,00 | 26,79 | 27,60 | - | - |

Alternative 30 6545 bis / until Ø 2,0 mit Schaft / with shank 4 mm auf Seite / on page 118
Alternative 30 6546 bis / until Ø 3,0 mit Schaft / with shank 6 mm auf Seite / on page 120



PROFESSIONAL



30 6544

| Art. | d1* | r - 0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|-------------------------|--------|-----------|-----|-------|-------|----|-----|------|--------|-------|-------|-------|----|
| 30 6544 0200 050 10 | • 2,0 | 0,50 | 10 | 3 | 1,92 | 4 | 65 | 2,0 | 63,00 | 11,04 | 11,38 | 12,11 | - |
| 30 6544 0200 050 15 | • 2,0 | 0,50 | 15 | 3 | 1,92 | 4 | 65 | 2,0 | 63,00 | 16,19 | 16,68 | - | - |
| 30 6544 0200 050 20 | • 2,0 | 0,50 | 20 | 3 | 1,92 | 4 | 65 | 2,0 | 63,00 | 21,34 | 21,98 | - | - |
| 30 6544 0200 050 25 | • 2,0 | 0,50 | 25 | 3 | 1,92 | 6 | 65 | 2,0 | 63,00 | 26,79 | 27,60 | - | - |
| 30 6544 0300 030 15 | • 3,0 | 0,30 | 15 | 4 | 2,90 | 4 | 65 | 3,0 | 63,00 | 16,39 | 16,89 | - | - |
| 30 6544 0300 030 25 | • 3,0 | 0,30 | 25 | 4 | 2,90 | 4 | 75 | 3,0 | 64,00 | 26,69 | 27,49 | - | - |
| 30 6544 0300 050 15 | • 3,0 | 0,50 | 15 | 4 | 2,90 | 4 | 65 | 3,0 | 63,00 | 16,39 | 16,89 | - | - |
| 30 6544 0300 050 20 | • 3,0 | 0,50 | 20 | 4 | 2,90 | 4 | 65 | 3,0 | 63,00 | 21,54 | 22,19 | - | - |
| 30 6544 0300 050 25 | • 3,0 | 0,50 | 25 | 4 | 2,90 | 4 | 75 | 3,0 | 64,00 | 26,69 | 27,49 | - | - |
| 30 6544 0300 050 30 | • 3,0 | 0,50 | 30 | 4 | 2,90 | 4 | 75 | 3,0 | 64,00 | 31,83 | - | - | - |
| 30 6544 0400 040 25 | • 4,0 | 0,40 | 25 | 6 | 3,90 | 4 | 75 | 4,0 | 74,00 | 26,52 | 27,32 | - | - |
| 30 6544 0400 050 20 | • 4,0 | 0,50 | 20 | 6 | 3,90 | 4 | 65 | 4,0 | 72,00 | 21,37 | 22,02 | 23,44 | - |
| 30 6544 0400 050 30 | • 4,0 | 0,50 | 30 | 6 | 3,90 | 4 | 75 | 4,0 | 74,00 | 31,67 | 32,62 | - | - |
| 30 6544 0400 050 40 | • 4,0 | 0,50 | 40 | 6 | 3,90 | 4 | 90 | 4,0 | 92,00 | 41,94 | 43,20 | - | - |
| 30 6544 0500 050 20 | • 5,0 | 0,50 | 20 | 6 | 4,90 | 4 | 75 | 5,0 | 79,00 | 22,17 | 22,94 | - | - |
| 30 6544 0500 050 30 | • 5,0 | 0,50 | 30 | 6 | 4,90 | 4 | 75 | 5,0 | 79,00 | 32,55 | - | - | - |
| 30 6544 0500 050 40 | • 5,0 | 0,50 | 40 | 6 | 4,90 | 4 | 90 | 5,0 | 97,00 | 41,94 | - | - | - |
| 30 6544 0500 050 50 | • 5,0 | 0,50 | 50 | 6 | 4,90 | 4 | 90 | 5,0 | 97,00 | 52,24 | - | - | - |
| 30 6544 0600 050 030 | • 6,0 | 0,50 | 30 | 6 | 5,90 | 4 | 75 | 6,0 | 100,00 | - | - | - | - |
| 30 6544 0600 050 040 | • 6,0 | 0,50 | 40 | 6 | 5,90 | 4 | 90 | 6,0 | 117,00 | - | - | - | - |
| 30 6544 0600 050 050 | • 6,0 | 0,50 | 50 | 6 | 5,90 | 4 | 90 | 6,0 | 117,00 | - | - | - | - |
| 30 6544 0600 050 060 | • 6,0 | 0,50 | 60 | 6 | 5,90 | 4 | 100 | 6,0 | 120,00 | - | - | - | - |
| 30 6544 0600 050 100 | • 6,0 | 0,50 | 100 | 6 | 5,90 | 10 | 150 | 6,0 | 67,20 | - | - | - | - |
| 30 6544 0600 050 100 08 | • 6,0 | 0,50 | 100 | 8 | 5,90 | 10 | 150 | 6,0 | 67,20 | - | - | - | - |
| 30 6544 0600 100 030 | • 6,0 | 1,00 | 30 | 6 | 5,90 | 4 | 75 | 6,0 | 100,00 | - | - | - | - |
| 30 6544 0600 100 040 | • 6,0 | 1,00 | 40 | 6 | 5,90 | 4 | 90 | 6,0 | 117,00 | - | - | - | - |
| 30 6544 0600 100 100 | • 6,0 | 1,00 | 100 | 6 | 5,90 | 10 | 150 | 6,0 | 67,80 | - | - | - | - |
| 30 6544 0600 100 100 08 | • 6,0 | 1,00 | 100 | 8 | 5,90 | 10 | 150 | 6,0 | 67,80 | - | - | - | - |
| 30 6544 0800 050 030 | • 8,0 | 0,50 | 30 | 8 | 7,80 | 4 | 80 | 8,0 | 159,00 | - | - | - | - |
| 30 6544 0800 050 060 | • 8,0 | 0,50 | 60 | 8 | 7,80 | 4 | 100 | 8,0 | 165,00 | - | - | - | - |
| 30 6544 0800 100 100 | • 8,0 | 1,00 | 100 | 8 | 7,80 | 10 | 150 | 8,0 | 89,40 | - | - | - | - |
| 30 6544 0800 100 100 10 | • 8,0 | 1,00 | 100 | 10 | 7,80 | 10 | 150 | 8,0 | 89,40 | - | - | - | - |
| 30 6544 1000 050 030 | • 10,0 | 0,50 | 30 | 10 | 9,80 | 4 | 80 | 10,0 | 189,00 | - | - | - | - |
| 30 6544 1000 050 060 | • 10,0 | 0,50 | 60 | 10 | 9,80 | 4 | 100 | 10,0 | 201,00 | - | - | - | - |
| 30 6544 1000 100 060 | • 10,0 | 1,00 | 60 | 10 | 9,80 | 4 | 100 | 10,0 | 201,00 | - | - | - | - |
| 30 6544 1200 050 30 | • 12,0 | 0,50 | 30 | 12 | 11,80 | 10 | 80 | 12,0 | 88,80 | - | - | - | - |
| 30 6544 1200 100 30 | • 12,0 | 1,00 | 30 | 12 | 11,80 | 10 | 80 | 12,0 | 88,80 | - | - | - | - |

Alternative 30 6523. % Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.



PKD EXTREME

Schaftfräser mit Eckenradius
End mill with corner radius



EXPERT



30 6523

GRAPHIT
graphite

Aluminium
< 6% Si

Aluminium
> 6% Si

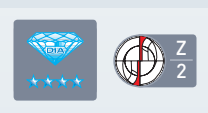
MESSING
brass

Kupfer
copper

GFK-CFK
GFRP-CFRP

kurz-
spanend
short chip

lang-
spanend
long chip



PKD EXTREME

PKD (Kristalliner Diamant) ist der derzeit dominierende Schneidstoff in industriellen Anwendungen, nicht zuletzt wegen seiner leichteren Verarbeitbarkeit gegenüber dem reinen Diamant. PKD-EXTREME ist ein neues, gesintertes Diamantpulver in einer metallischen Bindungsmatrix. Die Bearbeitung ist nur durch Lasern möglich.

PCD EXTREME

PCD (Polycrystalline Diamond) is currently the dominant tool material in industrial applications, not least because of its easy workability compared to pure diamond. PCD-EXTREME is a new sintered diamondpowder in a metallic bond matrix. Machining is possible only by laser.

Bestseller - preisreduziert · Bestseller - price reduced

| Art. | d1 0/-0,01 | r ± 0,005 | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|--------------------|------------|-----------|----|-------|-----|-----|----|---|--------|
| 30 6523 0600 05 60 | • 6 | 0,5 | 60 | 6 | 5,9 | 100 | 6 | 2 | 234,00 |
| 30 6523 0800 05 60 | • 8 | 0,5 | 60 | 8 | 7,8 | 100 | 8 | 2 | 290,00 |
| 30 6523 0800 10 60 | • 8 | 1,0 | 60 | 8 | 7,8 | 100 | 8 | 2 | 290,00 |
| 30 6523 1000 05 60 | • 10 | 0,5 | 60 | 10 | 9,8 | 105 | 10 | 2 | 324,00 |
| 30 6523 1000 10 60 | • 10 | 1,0 | 60 | 10 | 9,8 | 105 | 10 | 2 | 324,00 |

Auszug aus dem PKD Schaftfräser Programm. Weitere Abmessungen auf Seite 220
Extract of the PCD end mill product range. More dimensions on page 220

| | |
|----------------------------|---------------------|
| PKD EXTREME PCD EXTREME | KARNASCH NORM |
| SPEZIAL SPEZIAL | DIN 6535 Form HA |
| 0° | |
| HSC High-Speed-Cutting | |
| POLIERT POLISHED | |
| | OK Emul MMMS AIR |

Schnittdaten
Cutting data

Zeichnungen
Drawings



Index

30 6545

PROFESSIONAL

Diamantbeschichteter Micro Schaftfräser mit Eckenradius < 20xD Schnitttiefe
Diamond coated solid carbide end mills with corner radius, < 20xD using length



GRAPHIT
graphite

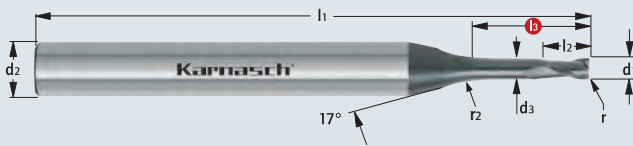
ZIRKONIUM
ZIRCONIUM

Zr O₂
Zirkonoxid
gepresst
Zircon pressed

Zr O₂
Zirkonoxid
gehüpft
Zircon hipped

GFK-CFK
GFRP-CFRP

FR 4



TOLERANZ / TOLERANCE

tol. r = -0,004

d1* = Ø 0,1 - Ø 2 tol -0 / -0,010

MICRO GRAIN **KARNASCH NORM**

ITX **DIN 6535 Form HA**

HSC High-Speed-Cutting

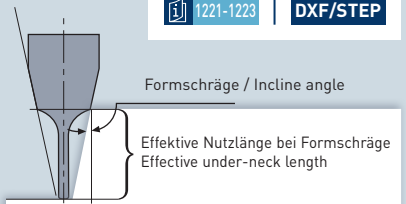
DCC 0318

Air

Schnittdaten
Cutting data

Zeichnungen
Drawings

1221-1223 **DXF/STEP**



| Art. | d1* | r -0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|----------------------|--------|----------|-----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6545 0010 001 002 | • 0,1 | 0,01 | 0,2 | 4 | 0,08 | 1 | 40 | 0,15 | 59,00 | 0,36 | 0,38 | 0,42 | 0,46 |
| 30 6545 0010 001 004 | • 0,1 | 0,01 | 0,4 | 4 | 0,08 | 1 | 40 | 0,15 | 59,00 | 0,57 | 0,60 | 0,65 | 0,70 |
| 30 6545 0015 001 003 | • 0,15 | 0,01 | 0,3 | 4 | 0,13 | 1 | 40 | 0,20 | 59,00 | 0,47 | 0,49 | 0,54 | 0,58 |
| 30 6545 0015 001 006 | • 0,15 | 0,01 | 0,6 | 4 | 0,13 | 1 | 40 | 0,20 | 59,00 | 0,78 | 0,82 | 0,88 | 0,94 |
| 30 6545 0020 002 004 | • 0,2 | 0,02 | 0,4 | 4 | 0,18 | 1 | 40 | 0,30 | 59,00 | 0,57 | 0,60 | 0,65 | 0,70 |
| 30 6545 0020 002 006 | • 0,2 | 0,02 | 0,6 | 4 | 0,18 | 1 | 40 | 0,30 | 59,00 | 0,78 | 0,82 | 0,88 | 0,94 |
| 30 6545 0020 002 008 | • 0,2 | 0,02 | 0,8 | 4 | 0,18 | 1 | 40 | 0,30 | 59,00 | 0,99 | 1,03 | 1,11 | 1,18 |
| 30 6545 0020 002 010 | • 0,2 | 0,02 | 1 | 4 | 0,18 | 1 | 40 | 0,30 | 59,00 | 1,20 | 1,25 | 1,33 | 1,42 |
| 30 6545 0020 002 015 | • 0,2 | 0,02 | 1,5 | 4 | 0,18 | 1 | 40 | 0,30 | 59,00 | 1,72 | 1,78 | 1,90 | 2,03 |
| 30 6545 0030 002 005 | • 0,3 | 0,02 | 0,5 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 0,65 | 0,72 | 0,84 | 0,94 |
| 30 6545 0030 002 010 | • 0,3 | 0,02 | 1 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 1,32 | 1,39 | 1,51 | 1,62 |
| 30 6545 0030 002 015 | • 0,3 | 0,02 | 1,5 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 1,85 | 1,94 | 2,08 | 2,23 |
| 30 6545 0030 002 020 | • 0,3 | 0,02 | 2 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6545 0030 002 030 | • 0,3 | 0,02 | 3 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6545 0030 002 045 | • 0,3 | 0,02 | 4,5 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 4,98 | 5,14 | 5,47 | 5,85 |
| 30 6545 0030 002 060 | • 0,3 | 0,02 | 6 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 6,53 | 6,73 | 7,16 | 7,66 |
| 30 6545 0030 005 005 | • 0,3 | 0,05 | 0,5 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 0,64 | 0,72 | 0,83 | 0,93 |
| 30 6545 0030 005 010 | • 0,3 | 0,05 | 1 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 1,32 | 1,39 | 1,51 | 1,62 |
| 30 6545 0030 005 015 | • 0,3 | 0,05 | 1,5 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 1,85 | 1,94 | 2,08 | 2,22 |
| 30 6545 0030 005 020 | • 0,3 | 0,05 | 2 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 2,37 | 2,48 | 2,64 | 2,82 |
| 30 6545 0030 005 030 | • 0,3 | 0,05 | 3 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 3,42 | 3,55 | 3,77 | 4,03 |
| 30 6545 0030 005 045 | • 0,3 | 0,05 | 4,5 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 4,98 | 5,14 | 5,47 | 5,84 |
| 30 6545 0030 005 060 | • 0,3 | 0,05 | 6 | 4 | 0,27 | 2 | 40 | 0,50 | 59,00 | 6,53 | 6,73 | 7,16 | 7,65 |
| 30 6545 0040 002 020 | • 0,4 | 0,02 | 2 | 4 | 0,36 | 2 | 40 | 0,60 | 59,00 | 2,40 | 2,50 | 2,67 | 2,85 |
| 30 6545 0040 002 040 | • 0,4 | 0,02 | 4 | 4 | 0,36 | 2 | 40 | 0,60 | 59,00 | 4,48 | 4,63 | 4,93 | 5,26 |
| 30 6545 0040 002 060 | • 0,4 | 0,02 | 6 | 4 | 0,36 | 2 | 40 | 0,60 | 59,00 | 6,55 | 6,75 | 7,18 | 7,68 |
| 30 6545 0040 002 080 | • 0,4 | 0,02 | 8 | 4 | 0,36 | 2 | 60 | 0,60 | 61,00 | 8,61 | 8,87 | 9,44 | 10,09 |
| 30 6545 0040 005 020 | • 0,4 | 0,05 | 2 | 4 | 0,36 | 2 | 40 | 0,60 | 59,00 | 2,40 | 2,50 | 2,66 | 2,84 |
| 30 6545 0040 005 040 | • 0,4 | 0,05 | 4 | 4 | 0,36 | 2 | 40 | 0,60 | 59,00 | 4,48 | 4,63 | 4,92 | 5,26 |
| 30 6545 0040 005 060 | • 0,4 | 0,05 | 6 | 4 | 0,36 | 2 | 40 | 0,60 | 59,00 | 6,55 | 6,75 | 7,18 | 7,67 |
| 30 6545 0040 005 080 | • 0,4 | 0,05 | 8 | 4 | 0,36 | 2 | 60 | 0,60 | 61,00 | 8,61 | 8,87 | 9,44 | 10,09 |
| 30 6545 0050 005 020 | • 0,5 | 0,05 | 2 | 4 | 0,45 | 2 | 40 | 0,70 | 59,00 | 2,43 | 2,52 | 2,68 | 2,86 |
| 30 6545 0050 005 040 | • 0,5 | 0,05 | 4 | 4 | 0,45 | 2 | 40 | 0,70 | 59,00 | 4,50 | 4,64 | 4,94 | 5,28 |
| 30 6545 0050 005 060 | • 0,5 | 0,05 | 6 | 4 | 0,45 | 2 | 40 | 0,70 | 59,00 | 6,57 | 6,76 | 7,20 | 7,69 |
| 30 6545 0050 005 080 | • 0,5 | 0,05 | 8 | 4 | 0,45 | 2 | 60 | 0,70 | 61,00 | 8,62 | 8,89 | 9,46 | 10,10 |
| 30 6545 0050 005 100 | • 0,5 | 0,05 | 10 | 4 | 0,45 | 2 | 60 | 0,70 | 61,00 | 10,68 | 11,01 | 11,71 | 12,52 |
| 30 6545 0060 005 020 | • 0,6 | 0,05 | 2 | 4 | 0,55 | 4 | 40 | 1,0 | 61,00 | 2,61 | 2,76 | 3,01 | 3,22 |
| 30 6545 0060 005 030 | • 0,6 | 0,05 | 3 | 4 | 0,55 | 4 | 40 | 1,0 | 61,00 | 3,67 | 3,85 | 4,15 | 4,43 |

Alternative 30 6544 mit Schaft / with shank 3 mm auf Seite / on page 116
Alternative 30 6546 mit Schaft / with shank 6 mm auf Seite / on page 120



PROFESSIONAL



30 6545

| Art. | d1* | r-0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|----------------------|-------|---------|----|-------|------|----|----|-----|-------|-------|-------|-------|-------|
| 30 6545 0060 005 060 | • 0,6 | 0,05 | 6 | 4 | 0,55 | 4 | 40 | 1,0 | 61,00 | 6,82 | 7,08 | 7,54 | 8,05 |
| 30 6545 0060 005 090 | • 0,6 | 0,05 | 9 | 4 | 0,55 | 4 | 60 | 1,0 | 63,00 | 9,94 | 10,26 | 10,92 | 11,67 |
| 30 6545 0060 005 120 | • 0,6 | 0,05 | 12 | 4 | 0,55 | 4 | 60 | 1,0 | 63,00 | 13,04 | 13,44 | 14,31 | 15,29 |
| 30 6545 0060 006 020 | • 0,6 | 0,06 | 2 | 4 | 0,55 | 4 | 40 | 1,0 | 61,00 | 2,61 | 2,76 | 3,01 | 3,22 |
| 30 6545 0060 006 030 | • 0,6 | 0,06 | 3 | 4 | 0,55 | 4 | 40 | 1,0 | 61,00 | 3,67 | 3,85 | 4,15 | 4,43 |
| 30 6545 0060 006 060 | • 0,6 | 0,06 | 6 | 4 | 0,55 | 4 | 40 | 1,0 | 61,00 | 6,82 | 7,08 | 7,54 | 8,05 |
| 30 6545 0060 006 090 | • 0,6 | 0,06 | 9 | 4 | 0,55 | 4 | 60 | 1,0 | 63,00 | 9,94 | 10,26 | 10,92 | 11,67 |
| 30 6545 0060 006 120 | • 0,6 | 0,06 | 12 | 4 | 0,55 | 4 | 60 | 1,0 | 63,00 | 13,04 | 13,44 | 14,31 | 15,29 |
| 30 6545 0080 005 020 | • 0,8 | 0,05 | 2 | 4 | 0,75 | 4 | 40 | 1,2 | 61,00 | 2,61 | 2,76 | 3,01 | 3,22 |
| 30 6545 0080 005 040 | • 0,8 | 0,05 | 4 | 4 | 0,75 | 4 | 40 | 1,2 | 61,00 | 4,72 | 4,93 | 5,28 | 5,64 |
| 30 6545 0080 005 060 | • 0,8 | 0,05 | 6 | 4 | 0,75 | 4 | 40 | 1,2 | 61,00 | 6,82 | 7,08 | 7,54 | 8,05 |
| 30 6545 0080 005 080 | • 0,8 | 0,05 | 8 | 4 | 0,75 | 4 | 60 | 1,2 | 63,00 | 8,90 | 9,20 | 9,79 | 10,47 |
| 30 6545 0080 005 120 | • 0,8 | 0,05 | 12 | 4 | 0,75 | 4 | 60 | 1,2 | 63,00 | 13,04 | 13,44 | 14,31 | 15,29 |
| 30 6545 0080 005 160 | • 0,8 | 0,05 | 16 | 4 | 0,75 | 4 | 60 | 1,2 | 63,00 | 17,17 | 17,69 | 18,82 | 20,12 |
| 30 6545 0080 008 020 | • 0,8 | 0,08 | 2 | 4 | 0,75 | 4 | 40 | 1,2 | 61,00 | 2,61 | 2,75 | 3,00 | 3,22 |
| 30 6545 0080 008 040 | • 0,8 | 0,08 | 4 | 4 | 0,75 | 4 | 40 | 1,2 | 61,00 | 4,72 | 4,93 | 5,27 | 5,63 |
| 30 6545 0080 008 060 | • 0,8 | 0,08 | 6 | 4 | 0,75 | 4 | 40 | 1,2 | 61,00 | 6,81 | 7,08 | 7,53 | 8,05 |
| 30 6545 0080 008 080 | • 0,8 | 0,08 | 8 | 4 | 0,75 | 4 | 60 | 1,2 | 63,00 | 8,90 | 9,20 | 9,79 | 10,46 |
| 30 6545 0080 008 120 | • 0,8 | 0,08 | 12 | 4 | 0,75 | 4 | 60 | 1,2 | 63,00 | 13,04 | 13,44 | 14,30 | 15,29 |
| 30 6545 0080 008 160 | • 0,8 | 0,08 | 16 | 4 | 0,75 | 4 | 60 | 1,2 | 63,00 | 17,17 | 17,69 | 18,82 | 20,11 |
| 30 6545 0100 005 020 | • 1,0 | 0,05 | 2 | 4 | 0,95 | 4 | 40 | 1,6 | 63,00 | 2,61 | 2,76 | 3,01 | 3,22 |
| 30 6545 0100 005 050 | • 1,0 | 0,05 | 5 | 4 | 0,95 | 4 | 40 | 1,6 | 63,00 | 5,77 | 6,01 | 6,41 | 6,85 |
| 30 6545 0100 005 080 | • 1,0 | 0,05 | 8 | 4 | 0,95 | 4 | 60 | 1,6 | 65,00 | 8,90 | 9,20 | 9,79 | 10,47 |
| 30 6545 0100 005 100 | • 1,0 | 0,05 | 10 | 4 | 0,95 | 4 | 60 | 1,6 | 65,00 | 10,97 | 11,32 | 12,05 | 12,88 |
| 30 6545 0100 005 150 | • 1,0 | 0,05 | 15 | 4 | 0,95 | 6 | 60 | 1,6 | 65,00 | 16,41 | 16,94 | 18,03 | 19,27 |
| 30 6545 0100 005 200 | • 1,0 | 0,05 | 20 | 4 | 0,95 | 6 | 60 | 1,6 | 65,00 | 21,58 | 22,25 | 23,68 | 25,31 |
| 30 6545 0100 010 020 | • 1,0 | 0,10 | 2 | 4 | 0,95 | 4 | 40 | 1,6 | 63,00 | 2,61 | 2,75 | 3,00 | 3,21 |
| 30 6545 0100 010 050 | • 1,0 | 0,10 | 5 | 4 | 0,95 | 4 | 40 | 1,6 | 63,00 | 5,77 | 6,00 | 6,40 | 6,83 |
| 30 6545 0100 010 080 | • 1,0 | 0,10 | 8 | 4 | 0,95 | 4 | 60 | 1,6 | 65,00 | 8,90 | 9,20 | 9,79 | 10,46 |
| 30 6545 0100 010 100 | • 1,0 | 0,10 | 10 | 4 | 0,95 | 4 | 60 | 1,6 | 65,00 | 10,97 | 11,32 | 12,04 | 12,87 |
| 30 6545 0100 010 150 | • 1,0 | 0,10 | 15 | 4 | 0,95 | 6 | 60 | 1,6 | 65,00 | 16,41 | 16,94 | 18,03 | 19,26 |
| 30 6545 0100 010 200 | • 1,0 | 0,10 | 20 | 4 | 0,95 | 6 | 60 | 1,6 | 65,00 | 21,58 | 22,24 | 23,67 | 25,30 |
| 30 6545 0100 020 020 | • 1,0 | 0,20 | 2 | 4 | 0,95 | 4 | 40 | 1,6 | 63,00 | 2,61 | 2,74 | 2,98 | 3,19 |
| 30 6545 0100 020 050 | • 1,0 | 0,20 | 5 | 4 | 0,95 | 4 | 40 | 1,6 | 63,00 | 5,76 | 6,00 | 6,39 | 6,81 |
| 30 6545 0100 020 080 | • 1,0 | 0,20 | 8 | 4 | 0,95 | 4 | 60 | 1,6 | 65,00 | 8,89 | 9,19 | 9,77 | 10,44 |
| 30 6545 0100 020 100 | • 1,0 | 0,20 | 10 | 4 | 0,95 | 4 | 60 | 1,6 | 65,00 | 10,97 | 11,31 | 12,03 | 12,85 |
| 30 6545 0100 020 150 | • 1,0 | 0,20 | 15 | 4 | 0,95 | 6 | 60 | 1,6 | 65,00 | 16,40 | 16,93 | 18,01 | 19,24 |
| 30 6545 0100 020 200 | • 1,0 | 0,20 | 20 | 4 | 0,95 | 6 | 60 | 1,6 | 65,00 | 21,58 | 22,24 | 23,66 | 25,28 |
| 30 6545 0150 005 050 | • 1,5 | 0,05 | 5 | 4 | 1,44 | 4 | 40 | 2,4 | 63,00 | 5,80 | 6,03 | 6,42 | 6,86 |
| 30 6545 0150 005 100 | • 1,5 | 0,05 | 10 | 4 | 1,44 | 4 | 60 | 2,4 | 65,00 | 10,99 | 11,34 | 12,07 | 12,90 |
| 30 6545 0150 005 150 | • 1,5 | 0,05 | 15 | 4 | 1,44 | 4 | 60 | 2,4 | 65,00 | 16,16 | 16,64 | 17,71 | 18,93 |
| 30 6545 0150 005 200 | • 1,5 | 0,05 | 20 | 4 | 1,44 | 6 | 60 | 2,4 | 65,00 | 21,60 | 22,26 | 23,70 | - |
| 30 6545 0150 015 050 | • 1,5 | 0,15 | 5 | 4 | 1,44 | 4 | 40 | 2,4 | 63,00 | 5,79 | 6,02 | 6,41 | 6,84 |
| 30 6545 0150 015 100 | • 1,5 | 0,15 | 10 | 4 | 1,44 | 4 | 60 | 2,4 | 65,00 | 10,99 | 11,34 | 12,06 | 12,88 |
| 30 6545 0150 015 150 | • 1,5 | 0,15 | 15 | 4 | 1,44 | 4 | 60 | 2,4 | 65,00 | 16,15 | 16,64 | 17,70 | 18,91 |
| 30 6545 0150 015 200 | • 1,5 | 0,15 | 20 | 4 | 1,44 | 6 | 60 | 2,4 | 65,00 | 21,60 | 22,26 | 23,68 | - |
| 30 6545 0150 020 050 | • 1,5 | 0,20 | 5 | 4 | 1,44 | 4 | 40 | 2,4 | 63,00 | 5,79 | 6,02 | 6,41 | 6,83 |
| 30 6545 0150 020 100 | • 1,5 | 0,20 | 10 | 4 | 1,44 | 4 | 60 | 2,4 | 65,00 | 10,99 | 11,33 | 12,05 | 12,87 |
| 30 6545 0150 020 150 | • 1,5 | 0,20 | 15 | 4 | 1,44 | 4 | 60 | 2,4 | 65,00 | 16,15 | 16,63 | 17,70 | 18,90 |
| 30 6545 0150 020 200 | • 1,5 | 0,20 | 20 | 4 | 1,44 | 6 | 60 | 2,4 | 65,00 | 21,60 | 22,25 | 23,68 | - |
| 30 6545 0200 005 040 | • 2,0 | 0,05 | 4 | 4 | 1,92 | 4 | 40 | 3,0 | 64,00 | 4,80 | 5,00 | 5,33 | 5,70 |
| 30 6545 0200 005 060 | • 2,0 | 0,05 | 6 | 4 | 1,92 | 4 | 40 | 3,0 | 64,00 | 6,89 | 7,13 | 7,59 | 8,11 |
| 30 6545 0200 005 080 | • 2,0 | 0,05 | 8 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 8,96 | 9,25 | 9,85 | 10,52 |
| 30 6545 0200 005 120 | • 2,0 | 0,05 | 12 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 13,10 | 13,50 | 14,36 | 15,35 |
| 30 6545 0200 005 180 | • 2,0 | 0,05 | 18 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 19,28 | 19,86 | 21,14 | - |
| 30 6545 0200 005 240 | • 2,0 | 0,05 | 24 | 4 | 1,92 | 6 | 60 | 3,0 | 66,00 | 25,76 | 26,54 | 28,25 | - |
| 30 6545 0200 005 300 | • 2,0 | 0,05 | 30 | 4 | 1,92 | 6 | 60 | 3,0 | 66,00 | 31,94 | 32,90 | - | - |
| 30 6545 0200 020 040 | • 2,0 | 0,20 | 4 | 4 | 1,92 | 4 | 40 | 3,0 | 64,00 | 4,80 | 4,99 | 5,31 | 5,67 |
| 30 6545 0200 020 060 | • 2,0 | 0,20 | 6 | 4 | 1,92 | 4 | 40 | 3,0 | 64,00 | 6,88 | 7,12 | 7,57 | 8,08 |
| 30 6545 0200 020 080 | • 2,0 | 0,20 | 8 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 8,96 | 9,25 | 9,83 | 10,49 |
| 30 6545 0200 020 120 | • 2,0 | 0,20 | 12 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 13,09 | 13,49 | 14,35 | 15,32 |
| 30 6545 0200 020 180 | • 2,0 | 0,20 | 18 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 19,27 | 19,85 | 21,12 | - |
| 30 6545 0200 020 240 | • 2,0 | 0,20 | 24 | 4 | 1,92 | 6 | 60 | 3,0 | 66,00 | 25,76 | 26,53 | 28,23 | - |
| 30 6545 0200 020 300 | • 2,0 | 0,20 | 30 | 4 | 1,92 | 6 | 60 | 3,0 | 66,00 | 31,93 | 32,89 | - | - |
| 30 6545 0200 030 040 | • 2,0 | 0,30 | 4 | 4 | 1,92 | 4 | 40 | 3,0 | 64,00 | 4,79 | 4,98 | 5,30 | 5,65 |
| 30 6545 0200 030 060 | • 2,0 | 0,30 | 6 | 4 | 1,92 | 4 | 40 | 3,0 | 64,00 | 6,88 | 7,12 | 7,56 | 8,06 |
| 30 6545 0200 030 080 | • 2,0 | 0,30 | 8 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 8,95 | 9,24 | 9,82 | 10,47 |
| 30 6545 0200 030 120 | • 2,0 | 0,30 | 12 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 13,09 | 13,48 | 14,33 | 15,30 |
| 30 6545 0200 030 180 | • 2,0 | 0,30 | 18 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 19,27 | 19,85 | 21,11 | - |
| 30 6545 0200 030 240 | • 2,0 | 0,30 | 24 | 4 | 1,92 | 6 | 60 | 3,0 | 66,00 | 25,75 | 26,53 | 28,22 | - |
| 30 6545 0200 030 300 | • 2,0 | 0,30 | 30 | 4 | 1,92 | 6 | 60 | 3,0 | 66,00 | 31,93 | 32,89 | - | - |
| 30 6545 0200 050 040 | • 2,0 | 0,50 | 4 | 4 | 1,92 | 4 | 40 | 3,0 | 64,00 | 4,78 | 4,96 | 5,28 | 5,61 |
| 30 6545 0200 050 060 | • 2,0 | 0,50 | 6 | 4 | 1,92 | 4 | 40 | 3,0 | 64,00 | 6,87 | 7,10 | 7,53 | 8,02 |
| 30 6545 0200 050 080 | • 2,0 | 0,50 | 8 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 8,95 | 9,23 | 9,79 | 10,43 |
| 30 6545 0200 050 120 | • 2,0 | 0,50 | 12 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 13,09 | 13,47 | 14,31 | 15,26 |
| 30 6545 0200 050 180 | • 2,0 | 0,50 | 18 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 19,26 | 19,83 | 21,08 | - |
| 30 6545 0200 050 240 | • 2,0 | 0,50 | 24 | 4 | 1,92 | 6 | 60 | 3,0 | 66,00 | 25,75 | 26,51 | 28,19 | - |
| 30 6545 0200 050 300 | • 2,0 | 0,50 | 30 | 4 | 1,92 | 6 | 60 | 3,0 | 66,00 | 31,93 | 32,88 | - | - |



30 6546

PROFESSIONAL
★ ★ ★

Diamantbeschichteter Micro Schaftfräser mit Eckenradius < 20×D Schnitttiefe
Diamond coated solid carbide end mills with corner radius, < 20×D using length



GRAPHIT
graphite

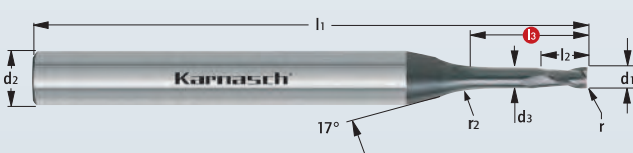
ZIRKONIUM
ZIRCONIUM

Zr O₂
Zirkonoxid
gepresst
Zircon pressed

Zr O₂
Zirkonoxid
gehippt
Zircon hipped

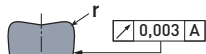
GFK-CFK
GFRP-CFRP

FR 4



TOLERANZ / TOLERANCE

tol. r = -0,004



d1* = Ø 0,1 - Ø 3 tol -0 / -0,010

MICRO GRAIN KARNASCH NORM

ITX DIN 6535 Form HA



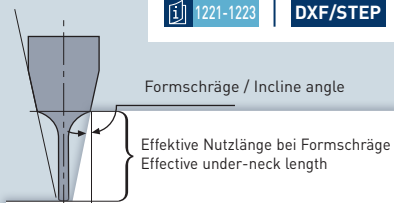
HSC High-Speed-Cutting

DCC 0318



Schnittdaten
Cutting data

Zeichnungen
Drawings



| Art. | d1* | r -0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|----------------------|------|----------|-----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6546 0010 001 002 | 0,1 | 0,01 | 0,2 | 6 | 0,08 | 1 | 60 | 0,15 | 38,40 | 0,36 | 0,38 | 0,42 | 0,46 |
| 30 6546 0010 001 004 | 0,1 | 0,01 | 0,4 | 6 | 0,08 | 1 | 60 | 0,15 | 38,40 | 0,57 | 0,60 | 0,65 | 0,70 |
| 30 6546 0015 001 003 | 0,15 | 0,01 | 0,3 | 6 | 0,13 | 1 | 60 | 0,2 | 38,40 | 0,47 | 0,49 | 0,54 | 0,58 |
| 30 6546 0015 001 006 | 0,15 | 0,01 | 0,6 | 6 | 0,13 | 1 | 60 | 0,2 | 38,40 | 0,78 | 0,82 | 0,88 | 0,94 |
| 30 6546 0020 002 004 | 0,2 | 0,02 | 0,4 | 6 | 0,18 | 1 | 60 | 0,3 | 38,40 | 0,57 | 0,60 | 0,65 | 0,70 |
| 30 6546 0020 002 006 | 0,2 | 0,02 | 0,6 | 6 | 0,18 | 1 | 60 | 0,3 | 38,40 | 0,78 | 0,82 | 0,88 | 0,94 |
| 30 6546 0020 002 008 | 0,2 | 0,02 | 0,8 | 6 | 0,18 | 1 | 60 | 0,3 | 38,40 | 0,99 | 1,03 | 1,11 | 1,18 |
| 30 6546 0020 002 010 | 0,2 | 0,02 | 1 | 6 | 0,18 | 1 | 60 | 0,3 | 38,40 | 1,20 | 1,25 | 1,33 | 1,42 |
| 30 6546 0020 002 015 | 0,2 | 0,02 | 1,5 | 6 | 0,18 | 1 | 60 | 0,3 | 38,40 | 1,72 | 1,78 | 1,90 | 2,03 |
| 30 6546 0030 002 005 | 0,3 | 0,02 | 0,5 | 6 | 0,27 | 2 | 60 | 0,5 | 38,40 | 0,65 | 0,72 | 0,84 | 0,94 |
| 30 6546 0030 002 01 | 0,3 | 0,02 | 1 | 6 | 0,27 | 2 | 60 | 0,5 | 38,40 | 1,32 | 1,39 | 1,51 | 1,62 |
| 30 6546 0030 002 015 | 0,3 | 0,02 | 1,5 | 6 | 0,27 | 2 | 60 | 0,5 | 38,40 | 1,85 | 1,94 | 2,08 | 2,23 |
| 30 6546 0030 002 02 | 0,3 | 0,02 | 2 | 6 | 0,27 | 2 | 60 | 0,5 | 38,40 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6546 0030 002 03 | 0,3 | 0,02 | 3 | 6 | 0,27 | 2 | 60 | 0,5 | 38,40 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6546 0030 002 045 | 0,3 | 0,02 | 4,5 | 6 | 0,27 | 2 | 60 | 0,5 | 38,40 | 4,98 | 5,14 | 5,47 | 5,85 |
| 30 6546 0030 002 06 | 0,3 | 0,02 | 6 | 6 | 0,27 | 2 | 60 | 0,5 | 38,40 | 6,53 | 6,73 | 7,16 | 7,66 |
| 30 6546 0040 002 02 | 0,4 | 0,02 | 2 | 6 | 0,36 | 2 | 60 | 0,6 | 38,40 | 2,40 | 2,50 | 2,67 | 2,85 |
| 30 6546 0040 002 04 | 0,4 | 0,02 | 4 | 6 | 0,36 | 2 | 60 | 0,6 | 38,40 | 4,48 | 4,63 | 4,93 | 5,26 |
| 30 6546 0040 002 06 | 0,4 | 0,02 | 6 | 6 | 0,36 | 2 | 60 | 0,6 | 38,40 | 6,55 | 6,75 | 7,18 | 7,68 |
| 30 6546 0040 002 08 | 0,4 | 0,02 | 8 | 6 | 0,36 | 2 | 60 | 0,6 | 38,40 | 8,61 | 8,87 | 9,44 | 10,09 |
| 30 6546 0050 005 02 | 0,5 | 0,05 | 2 | 6 | 0,45 | 2 | 60 | 0,7 | 38,40 | 2,43 | 2,52 | 2,68 | 2,86 |
| 30 6546 0050 005 04 | 0,5 | 0,05 | 4 | 6 | 0,45 | 2 | 60 | 0,7 | 38,40 | 4,50 | 4,64 | 4,94 | 5,28 |
| 30 6546 0050 005 06 | 0,5 | 0,05 | 6 | 6 | 0,45 | 2 | 60 | 0,7 | 38,40 | 6,57 | 6,76 | 7,20 | 7,69 |
| 30 6546 0050 005 08 | 0,5 | 0,05 | 8 | 6 | 0,45 | 2 | 60 | 0,7 | 38,40 | 8,63 | 8,89 | 9,46 | 10,10 |
| 30 6546 0050 005 10 | 0,5 | 0,05 | 10 | 6 | 0,45 | 2 | 60 | 0,7 | 38,40 | 10,68 | 11,01 | 11,71 | 12,52 |
| 30 6546 0060 005 03 | 0,6 | 0,05 | 3 | 6 | 0,55 | 4 | 60 | 1,0 | 39,60 | 3,67 | 3,85 | 4,15 | 4,43 |
| 30 6546 0060 005 06 | 0,6 | 0,05 | 6 | 6 | 0,55 | 4 | 60 | 1,0 | 39,60 | 6,82 | 7,08 | 7,54 | 8,05 |
| 30 6546 0060 005 09 | 0,6 | 0,05 | 9 | 6 | 0,55 | 4 | 60 | 1,0 | 39,60 | 9,94 | 10,26 | 10,92 | 11,67 |
| 30 6546 0060 005 12 | 0,6 | 0,05 | 12 | 6 | 0,55 | 4 | 60 | 1,0 | 39,60 | 13,04 | 13,44 | 14,31 | 15,29 |
| 30 6546 0080 005 04 | 0,8 | 0,05 | 4 | 6 | 0,75 | 4 | 60 | 1,2 | 39,60 | 4,72 | 4,93 | 5,28 | 5,64 |
| 30 6546 0080 005 06 | 0,8 | 0,05 | 6 | 6 | 0,75 | 4 | 60 | 1,2 | 39,60 | 6,82 | 7,08 | 7,54 | 8,05 |
| 30 6546 0080 005 08 | 0,8 | 0,05 | 8 | 6 | 0,75 | 4 | 60 | 1,2 | 39,60 | 8,90 | 9,20 | 9,79 | 10,47 |
| 30 6546 0080 005 12 | 0,8 | 0,05 | 12 | 6 | 0,75 | 4 | 60 | 1,2 | 39,60 | 13,04 | 13,44 | 14,31 | 15,29 |
| 30 6546 0080 005 16 | 0,8 | 0,05 | 16 | 6 | 0,75 | 4 | 60 | 1,2 | 39,60 | 17,17 | 17,69 | 18,82 | 20,12 |
| 30 6546 0100 005 05 | 1,0 | 0,05 | 5 | 6 | 0,95 | 4 | 60 | 1,6 | 40,80 | 5,77 | 6,01 | 6,41 | 6,85 |
| 30 6546 0100 005 10 | 1,0 | 0,05 | 10 | 6 | 0,95 | 4 | 60 | 1,6 | 40,80 | 10,97 | 11,32 | 12,05 | 12,88 |
| 30 6546 0100 005 15 | 1,0 | 0,05 | 15 | 6 | 0,95 | 6 | 60 | 1,6 | 40,80 | 16,41 | 16,94 | 18,03 | 19,27 |
| 30 6546 0100 005 20 | 1,0 | 0,05 | 20 | 6 | 0,95 | 6 | 60 | 1,6 | 40,80 | 21,58 | 22,25 | 23,68 | 25,31 |

Alternative 30 6544 mit Schaft / with shank 3 mm auf Seite / on page 116

Alternative 30 6545 bis / until Ø2,0 mit Schaft / with shank 4 mm auf Seite / on page 118



PROFESSIONAL



30 6546

| Art. | d1* | r -0,004 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|---------------------|-----|----------|----|-------|------|----|----|-----|-------|-------|-------|-------|-------|
| 30 6546 0100 010 05 | 1,0 | 0,10 | 5 | 6 | 0,95 | 4 | 60 | 1,6 | 40,80 | 5,77 | 6,00 | 6,40 | 6,83 |
| 30 6546 0100 010 10 | 1,0 | 0,10 | 10 | 6 | 0,95 | 4 | 60 | 1,6 | 40,80 | 10,97 | 11,32 | 12,04 | 12,87 |
| 30 6546 0100 010 15 | 1,0 | 0,10 | 15 | 6 | 0,95 | 6 | 60 | 1,6 | 40,80 | 16,41 | 16,94 | 18,03 | 19,26 |
| 30 6546 0100 010 20 | 1,0 | 0,10 | 20 | 6 | 0,95 | 6 | 60 | 1,6 | 40,80 | 21,58 | 22,24 | 23,67 | 25,30 |
| 30 6546 0150 005 05 | 1,5 | 0,05 | 5 | 6 | 1,44 | 4 | 60 | 2,4 | 40,80 | 5,80 | 6,03 | 6,42 | 6,86 |
| 30 6546 0150 005 10 | 1,5 | 0,05 | 10 | 6 | 1,44 | 4 | 60 | 2,4 | 40,80 | 10,99 | 11,34 | 12,07 | 12,90 |
| 30 6546 0150 005 15 | 1,5 | 0,05 | 15 | 6 | 1,44 | 4 | 60 | 2,4 | 40,80 | 16,16 | 16,64 | 17,71 | 18,93 |
| 30 6546 0150 005 20 | 1,5 | 0,05 | 20 | 6 | 1,44 | 6 | 60 | 2,4 | 40,80 | 21,60 | 22,26 | 23,70 | 25,33 |
| 30 6546 0150 015 05 | 1,5 | 0,15 | 5 | 6 | 1,44 | 4 | 60 | 2,4 | 40,80 | 5,79 | 6,02 | 6,41 | 6,84 |
| 30 6546 0150 015 10 | 1,5 | 0,15 | 10 | 6 | 1,44 | 4 | 60 | 2,4 | 40,80 | 10,99 | 11,34 | 12,06 | 12,88 |
| 30 6546 0150 015 15 | 1,5 | 0,15 | 15 | 6 | 1,44 | 4 | 60 | 2,4 | 40,80 | 16,15 | 16,64 | 17,70 | 18,91 |
| 30 6546 0150 015 20 | 1,5 | 0,15 | 20 | 6 | 1,44 | 6 | 60 | 2,4 | 40,80 | 21,60 | 22,26 | 23,68 | 25,31 |
| 30 6546 0200 005 06 | 2,0 | 0,05 | 6 | 6 | 1,92 | 4 | 60 | 3 | 41,40 | 6,89 | 7,13 | 7,59 | 8,11 |
| 30 6546 0200 005 12 | 2,0 | 0,05 | 12 | 6 | 1,92 | 4 | 60 | 3 | 41,40 | 13,10 | 13,50 | 14,36 | 15,35 |
| 30 6546 0200 005 18 | 2,0 | 0,05 | 18 | 6 | 1,92 | 4 | 60 | 3 | 41,40 | 19,28 | 19,86 | 21,14 | 22,59 |
| 30 6546 0200 005 24 | 2,0 | 0,05 | 24 | 6 | 1,92 | 6 | 60 | 3 | 41,40 | 25,76 | 26,54 | 28,25 | 30,20 |
| 30 6546 0200 005 30 | 2,0 | 0,05 | 30 | 6 | 1,92 | 6 | 60 | 3 | 41,40 | 31,94 | 32,90 | 35,02 | 37,44 |
| 30 6546 0200 030 06 | 2,0 | 0,30 | 6 | 6 | 1,92 | 4 | 60 | 3 | 41,40 | 6,88 | 7,12 | 7,56 | 8,06 |
| 30 6546 0200 030 18 | 2,0 | 0,30 | 18 | 6 | 1,92 | 4 | 60 | 3 | 41,40 | 19,27 | 19,85 | 21,11 | 22,54 |
| 30 6546 0200 030 24 | 2,0 | 0,30 | 24 | 6 | 1,92 | 6 | 60 | 3 | 41,40 | 25,75 | 26,53 | 28,22 | 30,15 |
| 30 6546 0200 030 30 | 2,0 | 0,30 | 30 | 6 | 1,92 | 6 | 60 | 3 | 41,40 | 31,93 | 32,89 | 34,99 | 37,39 |
| 30 6546 0200 050 06 | 2,0 | 0,50 | 6 | 6 | 1,92 | 4 | 60 | 3 | 41,40 | 6,87 | 7,10 | 7,53 | 8,02 |
| 30 6546 0200 050 12 | 2,0 | 0,50 | 12 | 6 | 1,92 | 4 | 60 | 3 | 41,40 | 13,09 | 13,47 | 14,31 | 15,26 |
| 30 6546 0200 050 18 | 2,0 | 0,50 | 18 | 6 | 1,92 | 4 | 60 | 3 | 41,40 | 19,26 | 19,83 | 21,08 | 22,50 |
| 30 6546 0200 050 24 | 2,0 | 0,50 | 24 | 6 | 1,92 | 6 | 60 | 3 | 41,40 | 25,75 | 26,51 | 28,19 | 30,11 |
| 30 6546 0200 050 30 | 2,0 | 0,50 | 30 | 6 | 1,92 | 6 | 60 | 3 | 41,40 | 31,93 | 32,88 | 34,97 | 37,35 |
| 30 6546 0300 005 09 | 3,0 | 0,05 | 9 | 6 | 2,90 | 4 | 60 | 3,5 | 46,20 | 10,04 | 10,35 | 11,01 | 11,77 |
| 30 6546 0300 005 18 | 3,0 | 0,05 | 18 | 6 | 2,90 | 4 | 60 | 3,5 | 46,20 | 19,32 | 19,90 | 21,18 | 22,64 |
| 30 6546 0300 005 30 | 3,0 | 0,05 | 30 | 6 | 2,90 | 4 | 60 | 3,5 | 46,20 | 31,66 | 32,62 | 34,72 | - |
| 30 6546 0300 030 09 | 3,0 | 0,30 | 9 | 6 | 2,90 | 4 | 60 | 3,5 | 46,20 | 10,03 | 10,33 | 10,98 | 11,72 |
| 30 6546 0300 030 18 | 3,0 | 0,30 | 18 | 6 | 2,90 | 4 | 60 | 3,5 | 46,20 | 19,30 | 19,88 | 21,14 | 22,58 |
| 30 6546 0300 030 30 | 3,0 | 0,30 | 30 | 6 | 2,90 | 4 | 60 | 3,5 | 46,20 | 31,66 | 32,61 | 34,69 | - |

☒ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



Diamantbeschichteter Gesenkfräser mit Eckenradius, < 12xD Schnitttiefe
Solid carbide end mills with corner radius, < 12xD, extra long, HSC



EXPERT



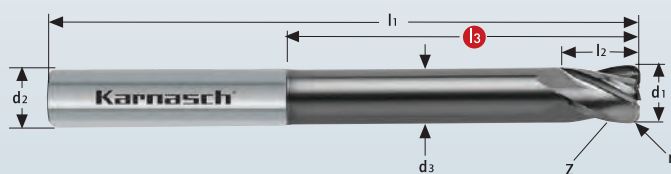
30 6560

GRAPHIT
graphite

GFK-CFK
GFRP-CFRP

ZIRKON OXID
ZIRCONIA

FR 4



d1* Ø 6,0 - 12,0 tol 0 / -0,015



MICRO GRAIN KARNASCH NORM

ITX DIN 6535 Form HA

HSC High-Speed-Cutting

DCC 0318

30°

Air

| Art. | d1* | r | l3 | d2 h5 | d3 | l1 | l2 | Z | € |
|----------------------|------|-----|-----|-------|------|-----|----|---|--------|
| 30 6560 0600 050 30 | 6,0 | 0,5 | 30 | 6 | 5,7 | 100 | 9 | 4 | 144,00 |
| 30 6560 0600 050 60 | 6,0 | 0,5 | 60 | 6 | 5,7 | 100 | 9 | 4 | 152,00 |
| 30 6560 0600 100 30 | 6,0 | 1,0 | 30 | 6 | 5,7 | 100 | 9 | 4 | 144,00 |
| 30 6560 0600 100 60 | 6,0 | 1,0 | 60 | 6 | 5,7 | 100 | 9 | 4 | 152,00 |
| 30 6560 0800 050 030 | 8,0 | 0,5 | 30 | 8 | 7,6 | 100 | 12 | 4 | 170,00 |
| 30 6560 0800 050 060 | 8,0 | 0,5 | 60 | 8 | 7,6 | 120 | 12 | 4 | 192,00 |
| 30 6560 0800 050 100 | 8,0 | 0,5 | 100 | 8 | 7,6 | 150 | 12 | 4 | 213,00 |
| 30 6560 0800 100 030 | 8,0 | 1,0 | 30 | 8 | 7,6 | 100 | 12 | 4 | 170,00 |
| 30 6560 0800 100 060 | 8,0 | 1,0 | 60 | 8 | 7,6 | 120 | 12 | 4 | 192,00 |
| 30 6560 0800 100 100 | 8,0 | 1,0 | 100 | 8 | 7,6 | 150 | 12 | 4 | 213,00 |
| 30 6560 1000 050 030 | 10,0 | 0,5 | 30 | 10 | 9,5 | 100 | 15 | 4 | 200,00 |
| 30 6560 1000 050 060 | 10,0 | 0,5 | 60 | 10 | 9,5 | 120 | 15 | 4 | 223,00 |
| 30 6560 1000 050 100 | 10,0 | 0,5 | 100 | 10 | 9,5 | 150 | 15 | 4 | 256,00 |
| 30 6560 1000 100 030 | 10,0 | 1,0 | 30 | 10 | 9,5 | 100 | 15 | 4 | 200,00 |
| 30 6560 1000 100 060 | 10,0 | 1,0 | 60 | 10 | 9,5 | 120 | 15 | 4 | 223,00 |
| 30 6560 1000 100 100 | 10,0 | 1,0 | 100 | 10 | 9,5 | 150 | 15 | 4 | 256,00 |
| 30 6560 1200 100 45 | 12,0 | 1,0 | 45 | 12 | 11,0 | 100 | 18 | 4 | 251,00 |
| 30 6560 1200 100 60 | 12,0 | 1,0 | 60 | 12 | 11,0 | 150 | 18 | 4 | 288,00 |

Schnittdaten Cutting data

Zeichnungen Drawings

1237

DXF/STEP



30 6274

PROFESSIONAL

Diamantbeschichteter Micro 3D-Radiusfräser für die **Hartmetallbearbeitung**
Diamond coated solid carbide 3D ball nose end mills for machining in **cemented carbide**



1



2



3



4



5



6



7



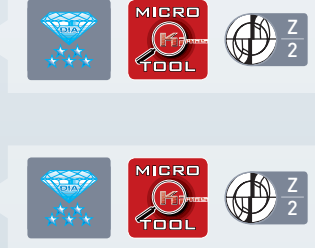
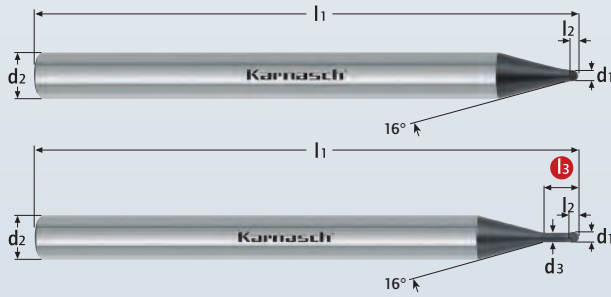
8



9



- HART-METALL
cemented carbide
- GRAPHIT
graphite
- Zr O₂
Zirkonoxid
gepresst
Zircon pressed
- Zr O₂
Zirkonoxid
gehüpft
Zircon hippt
- E.MAX
FOR
CAD/CAM
TECHNOLOGY



| | |
|-------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| ITX | DIN 6535 Form HA |
| | |
| | HSC HHC |
| | D-CC |
| | Air |

Erhöhte Diamant-Schichtdicke!
Increased Diamond coating thickness!

TOLERANZ / TOLERANCE

tol. r = ±0,002

d1* = Ø 0,1 - Ø 6 tol -0 / -0,010

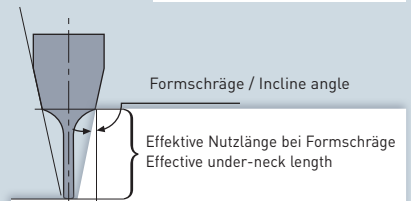


Schnittdaten
Cutting data

Zeichnungen
Drawings

1220

DXF/STEP



| Art. | d1* | r ±0,002 | l3 | d2 h5 | d3 | l1 | l2 | € | Formschräge / Incline angle | | | |
|------------------|-------|----------|-----|-------|------|----|------|-------|-----------------------------|-------|--------|--------|
| | | | | | | | | | 0,5° | 1° | 2° | 3° |
| 30 6274 0020 | • 0,2 | 0,10 | - | 4 | - | 50 | 0,14 | 81,00 | - | - | - | - |
| 30 6274 0020 003 | • 0,2 | 0,10 | 0,3 | 4 | 0,18 | 50 | 0,14 | 81,00 | 0,467 | 0,492 | 0,538 | 0,582 |
| 30 6274 0020 005 | • 0,2 | 0,10 | 0,5 | 4 | 0,18 | 50 | 0,14 | 81,00 | 0,678 | 0,710 | 0,769 | 0,821 |
| 30 6274 0020 008 | • 0,2 | 0,10 | 0,8 | 4 | 0,18 | 50 | 0,14 | 81,00 | 0,992 | 1,070 | 1,110 | 1,190 |
| 30 6274 0020 010 | • 0,2 | 0,10 | 1 | 4 | 0,18 | 50 | 0,14 | 81,00 | 1,200 | 1,270 | 1,330 | 1,430 |
| 30 6274 0030 | • 0,3 | 0,15 | - | 4 | - | 50 | 0,21 | 81,00 | - | - | - | - |
| 30 6274 0030 003 | • 0,3 | 0,15 | 0,3 | 4 | 0,28 | 50 | 0,21 | 81,00 | 0,542 | 0,623 | 0,754 | 0,851 |
| 30 6274 0030 005 | • 0,3 | 0,15 | 0,5 | 4 | 0,28 | 50 | 0,21 | 81,00 | 0,757 | 0,859 | 0,998 | 1,050 |
| 30 6274 0030 008 | • 0,3 | 0,15 | 0,8 | 4 | 0,28 | 50 | 0,21 | 81,00 | 1,070 | 1,200 | 1,350 | 1,360 |
| 30 6274 0030 010 | • 0,3 | 0,15 | 1 | 4 | 0,28 | 50 | 0,21 | 81,00 | 1,290 | 1,430 | 1,550 | 1,610 |
| 30 6274 0040 | • 0,4 | 0,20 | - | 4 | - | 50 | 0,28 | 81,00 | - | - | - | - |
| 30 6274 0040 005 | • 0,4 | 0,20 | 0,5 | 4 | 0,36 | 50 | 0,28 | 81,00 | 0,829 | 0,917 | 1,040 | 1,050 |
| 30 6274 0040 010 | • 0,4 | 0,20 | 1 | 4 | 0,36 | 50 | 0,28 | 81,00 | 1,350 | 1,480 | 1,550 | 1,650 |
| 30 6274 0040 015 | • 0,4 | 0,20 | 1,5 | 4 | 0,36 | 50 | 0,28 | 81,00 | 1,880 | 2,030 | 2,100 | 2,260 |
| 30 6274 0040 020 | • 0,4 | 0,20 | 2 | 4 | 0,36 | 50 | 0,28 | 81,00 | 2,400 | 2,550 | 2,670 | 2,870 |
| 30 6274 0050 | • 0,5 | 0,25 | - | 4 | - | 50 | 0,35 | 80,00 | - | - | - | - |
| 30 6274 0050 005 | • 0,5 | 0,25 | 0,5 | 4 | 0,46 | 50 | 0,35 | 80,00 | 0,829 | 0,917 | 1,040 | 1,050 |
| 30 6274 0050 010 | • 0,5 | 0,25 | 1 | 4 | 0,46 | 50 | 0,35 | 80,00 | 1,350 | 1,480 | 1,550 | 1,650 |
| 30 6274 0050 015 | • 0,5 | 0,25 | 1,5 | 4 | 0,46 | 50 | 0,35 | 80,00 | 1,880 | 2,030 | 2,100 | 2,260 |
| 30 6274 0050 020 | • 0,5 | 0,25 | 2 | 4 | 0,46 | 50 | 0,35 | 80,00 | 2,400 | 2,550 | 2,670 | 2,870 |
| 30 6274 0060 | • 0,6 | 0,30 | - | 4 | - | 50 | 0,42 | 80,00 | - | - | - | - |
| 30 6274 0060 010 | • 0,6 | 0,30 | 1 | 4 | 0,56 | 50 | 0,42 | 80,00 | 1,510 | 1,710 | 1,990 | 2,100 |
| 30 6274 0060 015 | • 0,6 | 0,30 | 1,5 | 4 | 0,56 | 50 | 0,42 | 80,00 | 2,040 | 2,290 | 2,600 | 2,610 |
| 30 6274 0060 020 | • 0,6 | 0,30 | 2 | 4 | 0,56 | 50 | 0,42 | 80,00 | 2,580 | 2,860 | 3,100 | 3,200 |
| 30 6274 0060 030 | • 0,6 | 0,30 | 3 | 4 | 0,56 | 50 | 0,42 | 80,00 | 3,640 | 3,990 | 4,130 | 4,440 |
| 30 6274 0080 | • 0,8 | 0,40 | - | 4 | - | 50 | 0,56 | 80,00 | - | - | - | - |
| 30 6274 0080 020 | • 0,8 | 0,40 | 2 | 4 | 0,76 | 50 | 0,56 | 80,00 | 2,580 | 2,860 | 3,100 | 3,220 |
| 30 6274 0080 030 | • 0,8 | 0,40 | 3 | 4 | 0,76 | 50 | 0,56 | 80,00 | 3,640 | 3,990 | 4,130 | 4,440 |
| 30 6274 0080 040 | • 0,8 | 0,40 | 4 | 4 | 0,76 | 50 | 0,56 | 80,00 | 4,690 | 5,090 | 5,270 | 5,660 |
| 30 6274 0100 | • 1,0 | 0,50 | - | 4 | - | 50 | 0,70 | 80,00 | - | - | - | - |
| 30 6274 0100 020 | • 1,0 | 0,50 | 2 | 4 | 0,96 | 50 | 0,70 | 80,00 | 2,580 | 2,890 | 4,250 | 4,570 |
| 30 6274 0100 025 | • 1,0 | 0,50 | 2,5 | 4 | 0,96 | 50 | 0,70 | 80,00 | 3,110 | 3,440 | 5,390 | 5,790 |
| 30 6274 0100 030 | • 1,0 | 0,50 | 3 | 4 | 0,96 | 50 | 0,70 | 80,00 | 3,640 | 3,990 | 7,670 | 8,240 |
| 30 6274 0100 040 | • 1,0 | 0,50 | 4 | 4 | 0,96 | 50 | 0,70 | 80,00 | 4,690 | 5,090 | 9,940 | 10,700 |
| 30 6274 0100 050 | • 1,0 | 0,50 | 5 | 4 | 0,96 | 50 | 0,70 | 80,00 | 5,740 | 6,100 | 12,250 | 13,130 |



PROFESSIONAL



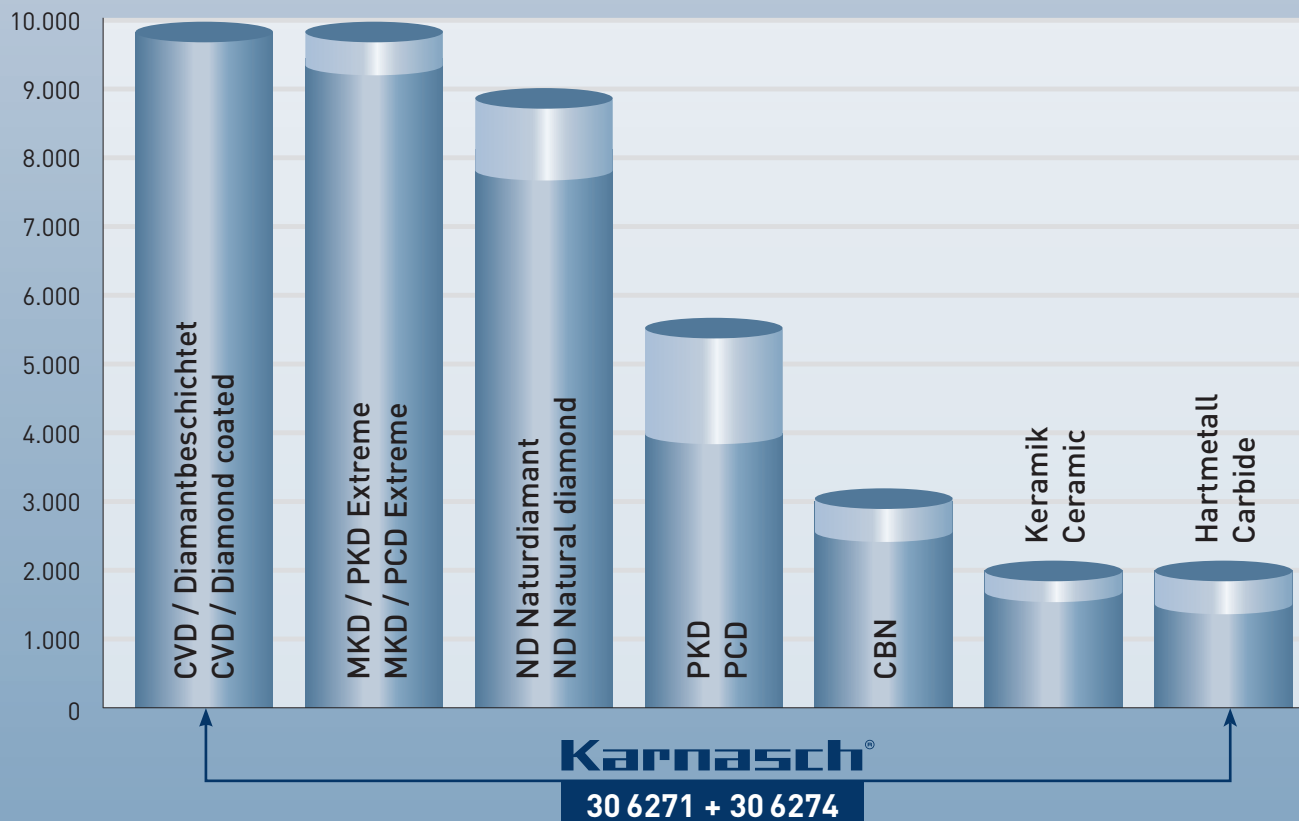
30 6274

| Art. | d1* | r ±0,002 | l3 | d2 h5 | d3 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|-------|----------|----|-------|------|----|------|--------|--------|--------|--------|--------|
| 30 6274 0200 | • 2,0 | 1,0 | - | 4 | - | 50 | 1,40 | 81,00 | - | - | - | - |
| 30 6274 0200 030 | • 2,0 | 1,0 | 3 | 4 | 1,90 | 50 | 1,40 | 81,00 | 3,810 | 4,100 | 4,250 | 4,570 |
| 30 6274 0200 040 | • 2,0 | 1,0 | 4 | 4 | 1,90 | 50 | 1,40 | 81,00 | 4,850 | 5,100 | 5,390 | 5,790 |
| 30 6274 0200 060 | • 2,0 | 1,0 | 6 | 4 | 1,90 | 50 | 1,40 | 81,00 | 6,930 | 7,100 | 7,670 | 8,240 |
| 30 6274 0200 080 | • 2,0 | 1,0 | 8 | 4 | 1,90 | 50 | 1,40 | 81,00 | 9,000 | 9,100 | 9,940 | 10,700 |
| 30 6274 0200 100 | • 2,0 | 1,0 | 10 | 4 | 1,90 | 50 | 1,40 | 81,00 | 11,070 | 11,100 | 12,250 | 13,130 |
| 30 6274 0300 | • 3,0 | 1,5 | - | 6 | - | 60 | 2,10 | 116,00 | - | - | - | - |
| 30 6274 0300 060 | • 3,0 | 1,5 | 6 | 6 | 2,90 | 60 | 2,10 | 116,00 | 6,930 | 7,100 | 7,670 | 8,240 |
| 30 6274 0300 080 | • 3,0 | 1,5 | 8 | 6 | 2,90 | 60 | 2,10 | 116,00 | 9,000 | 9,100 | 9,940 | 10,690 |
| 30 6274 0300 100 | • 3,0 | 1,5 | 10 | 6 | 2,90 | 60 | 2,10 | 116,00 | 11,070 | 11,100 | 12,220 | 13,130 |
| 30 6274 0300 120 | • 3,0 | 1,5 | 12 | 6 | 2,90 | 60 | 2,10 | 116,00 | 13,100 | 13,130 | 14,500 | 15,580 |
| 30 6274 0300 140 | • 3,0 | 1,5 | 14 | 6 | 2,90 | 60 | 2,10 | 116,00 | 15,100 | 15,190 | 16,780 | 18,030 |
| 30 6274 0400 | • 4,0 | 2,0 | - | 6 | - | 60 | 2,80 | 116,00 | - | - | - | - |
| 30 6274 0400 080 | • 4,0 | 2,0 | 8 | 6 | 3,90 | 60 | 2,80 | 116,00 | 9,010 | 9,100 | 9,940 | 10,690 |
| 30 6274 0400 100 | • 4,0 | 2,0 | 10 | 6 | 3,90 | 60 | 2,80 | 116,00 | 11,070 | 11,100 | 12,250 | 13,130 |
| 30 6274 0400 150 | • 4,0 | 2,0 | 15 | 6 | 3,90 | 60 | 2,80 | 116,00 | 16,100 | 16,230 | 17,910 | - |
| 30 6274 0500 | • 5,0 | 2,5 | - | 6 | - | 60 | 3,50 | 143,00 | - | - | - | - |
| 30 6274 0500 100 | • 5,0 | 2,5 | 10 | 6 | 4,80 | 60 | 3,50 | 143,00 | 11,100 | 11,250 | 12,420 | - |
| 30 6274 0500 150 | • 5,0 | 2,5 | 15 | 6 | 4,80 | 60 | 3,50 | 143,00 | 16,100 | 16,410 | - | - |
| 30 6274 0600 | • 6,0 | 3,0 | - | 6 | - | 60 | 4,20 | 143,00 | - | - | - | - |
| 30 6274 0600 100 | • 6,0 | 3,0 | 10 | 6 | 5,70 | 60 | 4,20 | 143,00 | - | - | - | - |
| 30 6274 0600 150 | • 6,0 | 3,0 | 15 | 6 | 5,70 | 60 | 4,20 | 143,00 | - | - | - | - |

Karnasch D-CC Diamantbeschichtete Fräser, fräsen HARTMETALL.
Karnasch D-CC diamond-coated end mills, for machining CEMENTED CARBIDE.

Härtevergleich
Hardness Comparison

Härte (Knoop kg/mm²)



30 6551

PROFESSIONAL
★ ★ ★

Diamantbeschichteter Micro-3D-Radiusfräser < 30×D Schnitttiefe
Diamond coated solid carbide 3D ball nose end mills, < 30×D, HSC



GRAPHIT
graphite

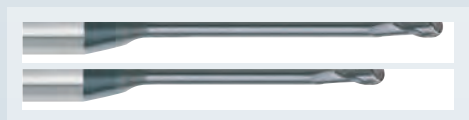
ZIRKONIUM
ZIRCONIUM

Zr O₂
Zirkonoxid
gepresst
Zircon pressed

Zr O₂
Zirkonoxid
gehippt
Zircon hipped

GFK-CFK
GFRP-CFRP

FR 4



TOLERANZ / TOLERANCE

tol. r = ±0,002

d1* = Ø 0,2 - Ø 12 tol -0 / -0,010



MICRO GRAIN KARNASCH NORM

ITX DIN 6535 Form HA



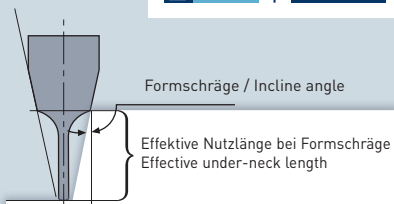
HSC High-Speed-Cutting

DCC 0318



Schnittdaten Cutting data
Zeichnungen Drawings

1221-1225 DXF/STEP



| Art. | d1* | r ±0,002 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|-----------------|-------|----------|----|-------|------|----|----|-----|-------|-------|-------|-------|-------|
| 30 6551 0020 01 | • 0,2 | 0,10 | 1 | 3 | 0,18 | 1 | 55 | 0,3 | 58,00 | 1,20 | 1,25 | 1,33 | 1,43 |
| 30 6551 0030 01 | • 0,3 | 0,15 | 1 | 3 | 0,27 | 2 | 55 | 0,4 | 58,00 | 1,32 | 1,39 | 1,52 | 1,63 |
| 30 6551 0030 02 | • 0,3 | 0,15 | 2 | 3 | 0,27 | 2 | 55 | 0,4 | 58,00 | 2,38 | 2,48 | 2,65 | 2,83 |
| 30 6551 0030 03 | • 0,3 | 0,15 | 3 | 3 | 0,27 | 2 | 55 | 0,4 | 58,00 | 3,42 | 3,55 | 3,78 | 4,04 |
| 30 6551 0030 05 | • 0,3 | 0,15 | 5 | 3 | 0,27 | 2 | 55 | 0,4 | 58,00 | 5,50 | 5,67 | 6,04 | 6,45 |
| 30 6551 0040 04 | • 0,4 | 0,20 | 4 | 3 | 0,36 | 2 | 55 | 0,5 | 58,00 | 4,48 | 4,63 | 4,93 | 5,27 |
| 30 6551 0040 06 | • 0,4 | 0,20 | 6 | 3 | 0,36 | 2 | 55 | 0,5 | 58,00 | 6,55 | 6,75 | 7,18 | 7,68 |
| 30 6551 0040 08 | • 0,4 | 0,20 | 8 | 3 | 0,36 | 2 | 55 | 0,5 | 58,00 | 8,61 | 8,87 | 9,44 | 10,09 |
| 30 6551 0050 05 | • 0,5 | 0,25 | 5 | 3 | 0,45 | 2 | 55 | 0,6 | 58,00 | 5,54 | 5,71 | 6,07 | 6,49 |
| 30 6551 0050 08 | • 0,5 | 0,25 | 8 | 3 | 0,45 | 2 | 55 | 0,6 | 58,00 | 8,63 | 8,89 | 9,46 | 10,11 |
| 30 6551 0050 10 | • 0,5 | 0,25 | 10 | 3 | 0,45 | 4 | 55 | 0,6 | 58,00 | 10,69 | 11,01 | 11,72 | 12,53 |
| 30 6551 0060 04 | • 0,6 | 0,30 | 4 | 3 | 0,55 | 4 | 55 | 0,8 | 60,00 | 4,72 | 4,94 | 5,28 | 5,65 |
| 30 6551 0060 06 | • 0,6 | 0,30 | 6 | 3 | 0,55 | 4 | 55 | 0,8 | 60,00 | 6,82 | 7,08 | 7,54 | 8,06 |
| 30 6551 0060 09 | • 0,6 | 0,30 | 9 | 3 | 0,55 | 4 | 55 | 0,8 | 60,00 | 9,94 | 10,27 | 10,93 | 11,68 |
| 30 6551 0060 12 | • 0,6 | 0,30 | 12 | 3 | 0,55 | 4 | 55 | 0,8 | 60,00 | 13,04 | 13,45 | 14,31 | 15,30 |
| 30 6551 0070 14 | • 0,7 | 0,35 | 14 | 3 | 0,68 | 10 | 55 | 0,9 | 31,20 | 15,69 | 16,39 | 17,43 | 18,25 |
| 30 6551 0080 08 | • 0,8 | 0,40 | 8 | 3 | 0,75 | 4 | 55 | 1,0 | 60,00 | 8,90 | 9,21 | 9,80 | 10,48 |
| 30 6551 0080 10 | • 0,8 | 0,40 | 10 | 3 | 0,75 | 4 | 55 | 1,0 | 60,00 | 10,98 | 11,33 | 12,06 | 12,89 |
| 30 6551 0080 12 | • 0,8 | 0,40 | 12 | 3 | 0,75 | 4 | 55 | 1,0 | 60,00 | 13,04 | 13,45 | 14,31 | 15,30 |
| 30 6551 0080 14 | • 0,8 | 0,40 | 14 | 3 | 0,75 | 10 | 55 | 1,0 | 31,20 | - | - | - | - |
| 30 6551 0080 16 | • 0,8 | 0,40 | 16 | 3 | 0,75 | 4 | 55 | 1,0 | 60,00 | 17,17 | 17,69 | 18,83 | 20,13 |
| 30 6551 0100 05 | • 1,0 | 0,50 | 5 | 3 | 0,95 | 4 | 55 | 1,2 | 62,00 | 5,77 | 6,01 | 6,41 | 6,85 |
| 30 6551 0100 10 | • 1,0 | 0,50 | 10 | 3 | 0,95 | 4 | 55 | 1,2 | 62,00 | 10,98 | 11,33 | 12,06 | 12,89 |
| 30 6551 0100 15 | • 1,0 | 0,50 | 15 | 3 | 0,95 | 6 | 55 | 1,2 | 62,00 | 16,41 | 16,95 | 18,04 | - |
| 30 6551 0100 20 | • 1,0 | 0,50 | 20 | 3 | 0,95 | 6 | 55 | 1,2 | 62,00 | 21,59 | 22,25 | 23,68 | - |
| 30 6551 0100 25 | • 1,0 | 0,50 | 25 | 3 | 0,95 | 6 | 55 | 1,2 | 62,00 | 26,74 | 27,55 | - | - |
| 30 6551 0100 30 | • 1,0 | 0,50 | 30 | 3 | 0,95 | 6 | 65 | 1,2 | 63,00 | 32,66 | 33,44 | - | - |
| 30 6551 0120 10 | • 1,2 | 0,60 | 10 | 3 | 1,15 | 4 | 55 | 1,4 | 62,00 | 10,98 | 11,33 | 12,06 | 12,89 |
| 30 6551 0120 15 | • 1,2 | 0,60 | 15 | 3 | 1,15 | 6 | 55 | 1,4 | 62,00 | 16,41 | 16,95 | 18,04 | - |
| 30 6551 0150 10 | • 1,5 | 0,75 | 10 | 3 | 1,44 | 4 | 55 | 1,8 | 62,00 | 11,00 | 11,34 | 12,08 | 12,91 |
| 30 6551 0150 15 | • 1,5 | 0,75 | 15 | 3 | 1,44 | 4 | 55 | 1,8 | 62,00 | 16,16 | 16,65 | 17,72 | - |
| 30 6551 0150 20 | • 1,5 | 0,75 | 20 | 3 | 1,44 | 6 | 55 | 1,8 | 62,00 | 21,60 | 22,27 | - | - |
| 30 6551 0150 25 | • 1,5 | 0,75 | 25 | 3 | 1,44 | 6 | 55 | 1,8 | 62,00 | 26,76 | 27,57 | - | - |
| 30 6551 0180 10 | • 1,8 | 0,90 | 10 | 3 | 1,74 | 10 | 55 | 1,9 | 33,00 | 11,56 | 12,11 | 12,97 | - |
| 30 6551 0180 20 | • 1,8 | 0,90 | 20 | 3 | 1,74 | 10 | 55 | 1,9 | 33,00 | 22,06 | 22,84 | - | - |

Alternative 30 6553 bis / until Ø2,0 mm mit Schaft / with shank 4 mm auf Seite / on page 128
Alternative 30 6554 bis / until Ø3,0 mm mit Schaft / with shank 6 mm auf Seite / on page 130



Index



PROFESSIONAL



30 6551

| Art. | d1* | r ±0,002 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|--------|----------|----|-------|-------|----|-----|------|--------|-------|-------|-------|----|
| 30 6551 0200 10 | • 2,0 | 1,00 | 10 | 3 | 1,92 | 4 | 65 | 2,0 | 63,00 | 11,04 | 11,38 | 12,11 | - |
| 30 6551 0200 15 | • 2,0 | 1,00 | 15 | 3 | 1,92 | 4 | 65 | 2,0 | 63,00 | 16,19 | 16,68 | - | - |
| 30 6551 0200 20 | • 2,0 | 1,00 | 20 | 3 | 1,92 | 4 | 65 | 2,0 | 63,00 | 21,31 | 21,98 | - | - |
| 30 6551 0200 25 | • 2,0 | 1,00 | 25 | 3 | 1,92 | 6 | 65 | 2,0 | 63,00 | 26,79 | 27,60 | - | - |
| 30 6551 0200 30 | • 2,0 | 1,00 | 30 | 3 | 1,92 | 6 | 65 | 2,0 | 63,00 | 31,63 | - | - | - |
| 30 6551 0300 10 | • 3,0 | 1,50 | 10 | 4 | 2,90 | 4 | 65 | 3,0 | 63,00 | 11,08 | 11,41 | 12,15 | - |
| 30 6551 0300 15 | • 3,0 | 1,50 | 15 | 4 | 2,90 | 4 | 65 | 3,0 | 63,00 | 16,39 | 16,89 | - | - |
| 30 6551 0300 20 | • 3,0 | 1,50 | 20 | 4 | 2,90 | 4 | 65 | 3,0 | 63,00 | 21,54 | 22,19 | - | - |
| 30 6551 0300 25 | • 3,0 | 1,50 | 25 | 4 | 2,90 | 4 | 75 | 3,0 | 64,00 | 26,69 | 27,49 | - | - |
| 30 6551 0300 30 | • 3,0 | 1,50 | 30 | 4 | 2,90 | 4 | 75 | 3,0 | 64,00 | 31,83 | - | - | - |
| 30 6551 0400 20 | • 4,0 | 2,00 | 20 | 6 | 3,90 | 4 | 65 | 4,0 | 72,00 | 21,37 | 22,02 | 23,44 | - |
| 30 6551 0400 30 | • 4,0 | 2,00 | 30 | 6 | 3,90 | 4 | 75 | 4,0 | 74,00 | 31,67 | 32,62 | - | - |
| 30 6551 0400 40 | • 4,0 | 2,00 | 40 | 6 | 3,90 | 4 | 90 | 4,0 | 92,00 | 41,90 | 43,11 | - | - |
| 30 6551 0500 20 | • 5,0 | 2,50 | 20 | 6 | 4,90 | 4 | 65 | 5,0 | 78,00 | 22,17 | 22,94 | - | - |
| 30 6551 0500 30 | • 5,0 | 2,50 | 30 | 6 | 4,90 | 4 | 75 | 5,0 | 79,00 | 32,55 | - | - | - |
| 30 6551 0500 40 | • 5,0 | 2,50 | 40 | 6 | 4,90 | 4 | 90 | 5,0 | 97,00 | 41,89 | - | - | - |
| 30 6551 0500 50 | • 5,0 | 2,50 | 50 | 6 | 4,90 | 4 | 90 | 5,0 | 97,00 | 52,18 | - | - | - |
| 30 6551 0600 030 | • 6,0 | 3,00 | 30 | 6 | 5,90 | 4 | 75 | 6,0 | 100,00 | - | - | - | - |
| 30 6551 0600 040 | • 6,0 | 3,00 | 40 | 6 | 5,90 | 4 | 90 | 6,0 | 117,00 | - | - | - | - |
| 30 6551 0600 050 | • 6,0 | 3,00 | 50 | 6 | 5,90 | 4 | 90 | 6,0 | 117,00 | - | - | - | - |
| 30 6551 0600 060 | • 6,0 | 3,00 | 60 | 6 | 5,90 | 4 | 100 | 6,0 | 120,00 | - | - | - | - |
| 30 6551 0800 030 | • 8,0 | 4,00 | 30 | 8 | 7,80 | 4 | 80 | 8,0 | 159,00 | - | - | - | - |
| 30 6551 0800 060 | • 8,0 | 4,00 | 60 | 8 | 7,80 | 4 | 100 | 8,0 | 165,00 | - | - | - | - |
| 30 6551 1000 060 | • 10,0 | 5,00 | 60 | 10 | 9,80 | 4 | 100 | 10,0 | 201,00 | - | - | - | - |
| 30 6551 1200 030 | • 12,0 | 6,00 | 30 | 12 | 11,80 | 10 | 80 | 12,0 | 88,80 | - | - | - | - |

Alternative 30 6522. % Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.



PKD EXTREME

3D-Radiusfräser mit Kugelstirn
3D-Ball nose end mill



EXPERT



30 6522

GRAPHIT
graphite

Aluminium
< 6% Si

Aluminium
> 6% Si

MESSING
brass

Kupfer
copper

GFK-CFK
GFRP-CFRP

kurz-
spanend
short chip

lang-
spanend
long chip



BEST
SELLER



PKD EXTREME

PKD (Kristalliner Diamant) ist der derzeit dominierende Schneidstoff in industriellen Anwendungen, nicht zuletzt wegen seiner leichteren Verarbeitbarkeit gegenüber dem reinen Diamant. PKD-EXTREME ist ein neues, gesintertes Diamantpulver in einer metallischen Bindungsmatrix. Die Bearbeitung ist nur durch Lasern möglich.

PCD EXTREME

PCD (Polycrystalline Diamond) is currently the dominant tool material in industrial applications, not least because of its easy workability compared to pure diamond. PCD-EXTREME is a new sintered diamondpowder in a metallic bond matrix. Machining is possible only by laser.

Bestseller - preisreduziert · Bestseller - price reduced

| Art. | d1 0/-0,01 | r ±0,005 | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|-----------------|------------|----------|----|-------|-----|-----|----|---|--------|
| 30 6522 0600 60 | • 6 | 3 | 60 | 6 | 5,9 | 100 | 6 | 2 | 169,00 |
| 30 6522 0800 60 | • 8 | 4 | 60 | 8 | 7,8 | 100 | 8 | 2 | 267,00 |
| 30 6522 1000 60 | • 10 | 5 | 60 | 10 | 9,8 | 105 | 10 | 2 | 320,00 |

Auszug aus dem PKD Radiusfräser Programm. Weitere Abmessungen auf Seite 219
Extract of the PCD ball nose end mill product range. More dimensions on page 219

| | |
|-------------------------------|---------------------|
| PKD EXTREME PCD EXTREME | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| 0° | |
| HSC High-Speed-Cutting | |
| POLIERT POLISHED | |
| | OK EMUL AN |

Schnittdaten
Cutting data



Zeichnungen
Drawings



Index

30 6552

PROFESSIONAL

Micro-3D-Radiusfräser
Solid carbide 3D ball nose end mills, HSC



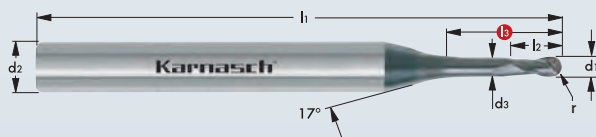
GRAPHIT
graphite

ZIRKONIUM
ZIRCONIUM

Zr O₂
Zirkonoxid
gehüpft
Zircon hipped

Zr O₂
Zirkonoxid
gepresst
Zircon pressed

GFK-CFK
GFRP-CFRP



MICRO
GRAIN
CLEAN

KARNASCH
NORM

SPEZIAL
SPECIAL

Form HA



HSC
High-Speed-
Cutting

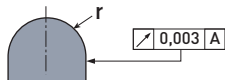


DCC
0318



TOLERANZ / TOLERANCE

tol. r = ±0,003



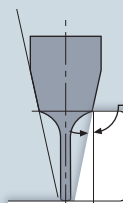
Schnittdaten
Cutting data

Zeichnungen
Drawings



1221-1223

DXF/STEP





Formschräge / Incline angle

Effektive Nutzlänge bei Formschräge
Effective under-neck length

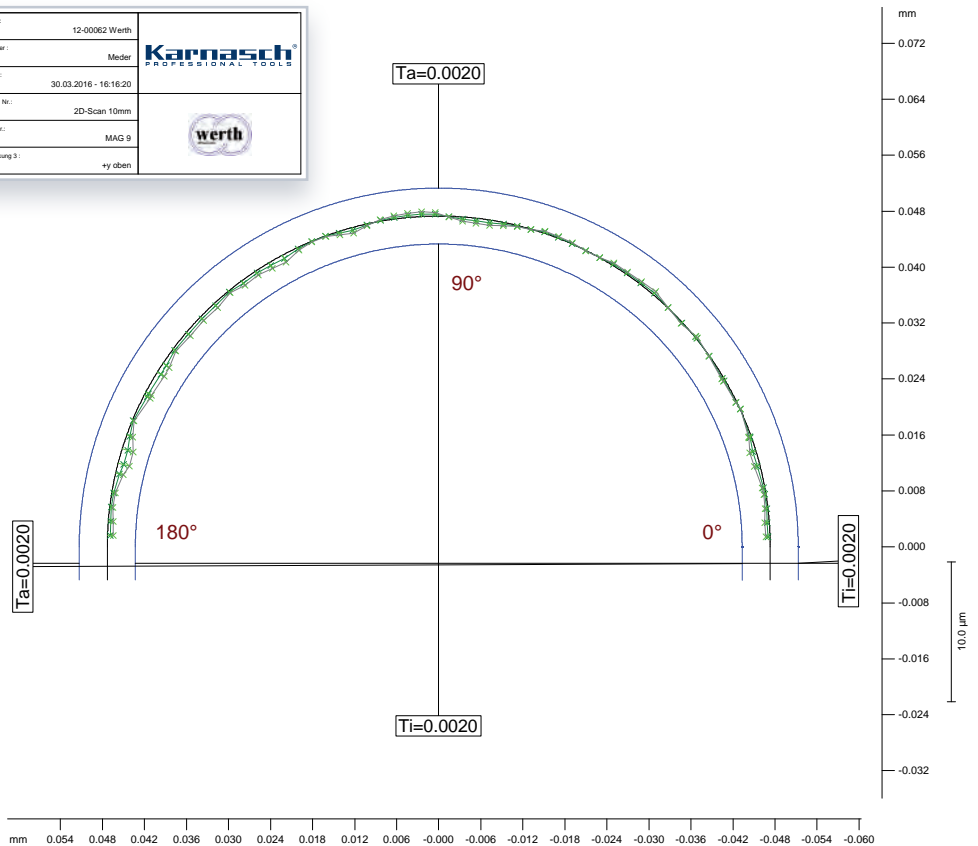
| Art. | d1 -0,008 | r ± 0,003 | l3 | d2 h5 | d3 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|--------------------|-----------|-----------|----|-------|------|----|-----|-------|-------|-------|-------|-------|
| 30 6552 0100 14 03 | • 1,0 | 0,5 | 14 | 3 | 0,95 | 45 | 1,5 | 56,00 | 15,80 | 16,48 | 17,51 | 18,33 |
| 30 6552 0100 16 03 | • 1,0 | 0,5 | 16 | 3 | 0,95 | 45 | 1,5 | 56,00 | 17,89 | 18,62 | 19,71 | - |
| 30 6552 0100 18 03 | • 1,0 | 0,5 | 18 | 3 | 0,95 | 45 | 1,5 | 56,00 | 19,99 | 20,76 | 21,89 | - |
| 30 6552 0100 20 03 | • 1,0 | 0,5 | 20 | 3 | 0,95 | 45 | 1,5 | 56,00 | 22,07 | 22,88 | 24,07 | - |
| 30 6552 0100 14 04 | • 1,0 | 0,5 | 14 | 4 | 0,95 | 45 | 1,5 | 61,00 | 15,80 | 16,48 | 17,51 | 18,33 |
| 30 6552 0100 16 04 | • 1,0 | 0,5 | 16 | 4 | 0,95 | 45 | 1,5 | 61,00 | 17,89 | 18,62 | 19,71 | 20,57 |
| 30 6552 0100 18 04 | • 1,0 | 0,5 | 18 | 4 | 0,95 | 45 | 1,5 | 61,00 | 19,99 | 20,76 | 21,89 | 22,78 |
| 30 6552 0100 20 04 | • 1,0 | 0,5 | 20 | 4 | 0,95 | 45 | 1,5 | 61,00 | 20,07 | 22,88 | 24,07 | 24,99 |
| 30 6552 0100 14 06 | • 1,0 | 0,5 | 14 | 6 | 0,95 | 45 | 1,5 | 65,00 | 15,80 | 16,48 | 17,51 | 18,33 |
| 30 6552 0100 16 06 | • 1,0 | 0,5 | 16 | 6 | 0,95 | 45 | 1,5 | 65,00 | 17,89 | 18,62 | 19,71 | 20,57 |
| 30 6552 0100 18 06 | • 1,0 | 0,5 | 18 | 6 | 0,95 | 45 | 1,5 | 65,00 | 19,38 | 19,89 | 20,63 | 21,17 |
| 30 6552 0100 20 06 | • 1,0 | 0,5 | 20 | 6 | 0,95 | 45 | 1,5 | 65,00 | 21,44 | 21,98 | 22,74 | 23,30 |
| 30 6552 0200 14 03 | • 2,0 | 1,0 | 14 | 3 | 1,92 | 45 | 3,0 | 58,00 | 15,88 | 16,54 | - | - |
| 30 6552 0200 16 03 | • 2,0 | 1,0 | 16 | 3 | 1,92 | 45 | 3,0 | 58,00 | 17,97 | 18,68 | - | - |
| 30 6552 0200 18 03 | • 2,0 | 1,0 | 18 | 3 | 1,92 | 45 | 3,0 | 58,00 | 20,06 | 20,81 | - | - |
| 30 6552 0200 20 03 | • 2,0 | 1,0 | 20 | 3 | 1,92 | 45 | 3,0 | 58,00 | 22,15 | 22,93 | - | - |
| 30 6552 0200 14 04 | • 2,0 | 1,0 | 14 | 4 | 1,92 | 45 | 3,0 | 61,00 | 15,88 | 16,54 | 17,55 | 18,36 |
| 30 6552 0200 16 04 | • 2,0 | 1,0 | 16 | 4 | 1,92 | 45 | 3,0 | 61,00 | 17,97 | 18,68 | 19,75 | - |
| 30 6552 0200 18 04 | • 2,0 | 1,0 | 18 | 4 | 1,92 | 45 | 3,0 | 61,00 | 20,06 | 20,81 | 21,93 | - |
| 30 6552 0200 20 04 | • 2,0 | 1,0 | 20 | 4 | 1,92 | 45 | 3,0 | 61,00 | 22,15 | 22,93 | 24,11 | - |
| 30 6552 0200 14 06 | • 2,0 | 1,0 | 14 | 6 | 1,92 | 45 | 3,0 | 66,00 | 15,88 | 16,54 | 17,55 | 18,36 |
| 30 6552 0200 16 06 | • 2,0 | 1,0 | 16 | 6 | 1,92 | 45 | 3,0 | 66,00 | 17,97 | 18,68 | 19,75 | 20,60 |
| 30 6552 0200 18 06 | • 2,0 | 1,0 | 18 | 6 | 1,92 | 45 | 3,0 | 66,00 | 19,43 | 19,93 | 20,65 | 21,19 |
| 30 6552 0200 20 06 | • 2,0 | 1,0 | 20 | 6 | 1,92 | 45 | 3,0 | 66,00 | 21,49 | 22,02 | 22,77 | 23,32 |
| 30 6552 0300 14 03 | • 3,0 | 1,5 | 14 | 3 | 2,90 | 45 | 3,5 | 58,00 | - | - | - | - |
| 30 6552 0300 16 03 | • 3,0 | 1,5 | 16 | 3 | 2,90 | 45 | 3,5 | 58,00 | - | - | - | - |
| 30 6552 0300 18 03 | • 3,0 | 1,5 | 18 | 3 | 2,90 | 45 | 3,5 | 58,00 | - | - | - | - |
| 30 6552 0300 20 03 | • 3,0 | 1,5 | 20 | 3 | 2,90 | 45 | 3,5 | 58,00 | - | - | - | - |
| 30 6552 0300 14 04 | • 3,0 | 1,5 | 14 | 4 | 2,90 | 45 | 3,5 | 61,00 | 15,94 | 16,58 | - | - |
| 30 6552 0300 16 04 | • 3,0 | 1,5 | 16 | 4 | 2,90 | 45 | 3,5 | 61,00 | 18,03 | 18,72 | - | - |
| 30 6552 0300 18 04 | • 3,0 | 1,5 | 18 | 4 | 2,90 | 45 | 3,5 | 61,00 | 20,11 | 20,86 | - | - |
| 30 6552 0300 20 04 | • 3,0 | 1,5 | 20 | 4 | 2,90 | 45 | 3,5 | 61,00 | 22,19 | - | - | - |
| 30 6552 0300 14 06 | • 3,0 | 1,5 | 14 | 6 | 2,90 | 45 | 3,5 | 74,00 | 15,94 | 16,58 | 17,58 | 18,39 |
| 30 6552 0300 16 06 | • 3,0 | 1,5 | 16 | 6 | 2,90 | 45 | 3,5 | 74,00 | 18,03 | 18,72 | 19,78 | 20,62 |
| 30 6552 0300 18 06 | • 3,0 | 1,5 | 18 | 6 | 2,90 | 45 | 3,5 | 74,00 | 19,47 | 19,96 | 20,67 | 21,20 |
| 30 6552 0300 20 06 | • 3,0 | 1,5 | 20 | 6 | 2,90 | 45 | 3,5 | 74,00 | 21,52 | 22,04 | 22,78 | 23,33 |

Messprotokoll aus der Qualitätskontrolle
Measurement report from the quality control

|  | | Siemensstraße 1 68542 Heddesheim ☎ +49 6203 4039-0 ✉ info@karnasch.de www.karnasch.de | | | | | |
|--|---------|---|--------|---------|------------|--------|---------------------|
| | |  | | | | | |
| Datum: 30.03.2016 | | | | | | | |
| Uhrzeit: 16:00:33 | | | | | | | |
| Benutzer: | | | | | | | |
| Werkzeug: 306553_0.1x0.4x0.05 | | | | | | | |
| Bemerkung 1: | | | | | | | |
| Bemerkung 2: | | | | | | | |
| Bemerkung 3: | | | | | | | |
| Bemerkung 4: Messen zu Nominal Zentrum, Einrichtmodus | | | | | | | |
| SYM | Istwert | Sollwert | Otol | Utol | Abweichung | | Bezeichnung |
| Dst | 0.0468 | 0.0472 | 0.0020 | -0.0020 | -0.0003 | 0.0000 | 0 |
| Dst | 0.0471 | 0.0472 | 0.0020 | -0.0020 | -0.0001 | 0.0000 | 10 |
| Dst | 0.0469 | 0.0472 | 0.0020 | -0.0020 | -0.0003 | 0.0000 | 20 |
| Dst | 0.0470 | 0.0472 | 0.0020 | -0.0020 | -0.0002 | 0.0000 | 30 |
| Dst | 0.0472 | 0.0472 | 0.0020 | -0.0020 | 0.0000 | 0.0000 | 40 |
| Dst | 0.0474 | 0.0472 | 0.0020 | -0.0020 | 0.0003 | 0.0000 | 50 |
| Dst | 0.0471 | 0.0472 | 0.0020 | -0.0020 | 0.0000 | 0.0000 | 60 |
| Dst | 0.0472 | 0.0472 | 0.0020 | -0.0020 | 0.0000 | 0.0000 | 70 |
| Dst | 0.0467 | 0.0472 | 0.0020 | -0.0020 | -0.0004 | 0.0000 | 80 |
| Dst | 0.0470 | 0.0472 | 0.0020 | -0.0020 | -0.0002 | 0.0000 | 90 |
| Dst | 0.0472 | 0.0472 | 0.0020 | -0.0020 | -0.0001 | 0.0000 | 100 |
| Dst | 0.0470 | 0.0472 | 0.0020 | -0.0020 | -0.0001 | 0.0000 | 110 |
| Dst | 0.0467 | 0.0472 | 0.0020 | -0.0020 | -0.0005 | 0.0000 | 120 |
| Dst | 0.0469 | 0.0472 | 0.0020 | -0.0020 | -0.0002 | 0.0000 | 130 |
| Dst | 0.0468 | 0.0472 | 0.0020 | -0.0020 | -0.0003 | 0.0000 | 140 |
| Dst | 0.0468 | 0.0472 | 0.0020 | -0.0020 | -0.0004 | 0.0000 | 150 |
| Dst | 0.0468 | 0.0472 | 0.0020 | -0.0020 | -0.0004 | 0.0000 | 160 |
| Dst | 0.0469 | 0.0472 | 0.0020 | -0.0020 | -0.0003 | 0.0000 | 170 |
| Dst | 0.0468 | 0.0472 | 0.0020 | -0.0020 | -0.0003 | 0.0000 | 180 |
| Dst | 0.0470 | 0.0472 | 0.0020 | -0.0020 | -0.0002 | 0.0000 | Mittelwert Radius |
| Dst | 0.0467 | 0.0472 | 0.0020 | -0.0020 | -0.0005 | 0.0000 | Minimum Radius |
| Dst | 0.0474 | 0.0472 | 0.0020 | -0.0020 | 0.0003 | 0.0000 | Maximum Radius |
| Dst | 0.0007 | 0.0000 | 0.0000 | 0.0000 | 0.0007 | 0.0007 | R Form Max-Min |
| LT | 0.0003 | 0.0000 | 0.0000 | 0.0000 | 0.0003 | 0.0003 | Rundlauf |
| Dst | 0.0931 | 0.1000 | 0.0000 | -0.0100 | -0.0069 | 0.0000 | Durchm1 |
| Dst | 0.0929 | 0.1000 | 0.0000 | -0.0100 | -0.0071 | 0.0000 | Durchm D1 ohne Rund |

Darstellung der Radiuskontur eines Karnasch-Fräser
Picture of the radius shape accuracy from a Karnasch ball nose end mill

| | | | | |
|---------------------------------|------------------------------------|--|---------------------------------|---|
| max. Abweichung innen 0.8 µm | Toleranzübersch. innen -1.2 µm | Firmenname: Basisset Drehhohse mit HKS | Kunde: 12-0062 Werth |  |
| max. Abweichung außen 0.4 µm | Toleranzübersch. außen -1.6 µm | Teil-Date: TEMP.S | Benutzer: Meder | |
| Rotation 0.0000° | Achsen total-Punkte 67 | Teil-Date: 306553_0.1x0.4x0.05_LineForm.asc | Datum: 30.03.2016 - 16:16:20 |  |
| versch.-X 0.0 µm | Fläche 0.003 mm² | File-Date: 2D-Scan 10mm | Zeich. Nr.: | |
| versch.-Y 0.0 µm | Durchm. flächeng. Kreis 65.4 µm | Bemerkung 1: Kugelradius | Tafel-Nr.: | |
| Einplatz-Strategie BestFit | Spiegel + | Bemerkung 2: | Bemerkung 3: +y oben | |



30 6553

PROFESSIONAL
★ ★ ★

Diamantbeschichteter Micro-3D-Radiusfräser < 25xD Schnitttiefe
Diamond coated solid carbide 3D ball nose end mills, < 25xD, HSC



GRAPHIT
graphite

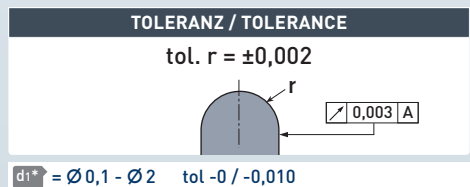
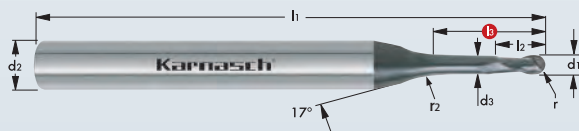
ZIRKONIUM
ZIRCONIUM

Zr O₂
Zirkonoxid
gepresst
Zircon pressed

Zr O₂
Zirkonoxid
gehüpft
Zircon hiped

GFK-CFK
GFRP-CFRP

FR 4



MICRO GRAIN KARNASCH NORM

ITX DIN 6535 Form HA



HSC High-Speed-Cutting

DCC 0318



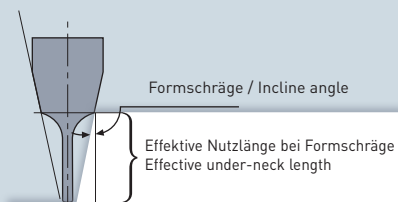
Schnittdaten
Cutting data

Zeichnungen
Drawings



1221-1225

DXF/STEP



| Art. | d1* | r ±0,002 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|--------|----------|-----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6553 0010 002 | • 0,1 | 0,05 | 0,2 | 4 | 0,09 | 1 | 40 | 0,15 | 59,00 | 0,32 | 0,34 | 0,38 | 0,42 |
| 30 6553 0010 004 | • 0,1 | 0,05 | 0,4 | 4 | 0,09 | 1 | 40 | 0,15 | 59,00 | 0,54 | 0,57 | 0,62 | 0,67 |
| 30 6553 0015 003 | • 0,15 | 0,075 | 0,3 | 4 | 0,14 | 1 | 40 | 0,2 | 59,00 | 0,43 | 0,45 | 0,50 | 0,54 |
| 30 6553 0015 006 | • 0,15 | 0,075 | 0,6 | 4 | 0,14 | 1 | 40 | 0,2 | 59,00 | 0,75 | 0,79 | 0,85 | 0,91 |
| 30 6553 0020 006 | • 0,2 | 0,10 | 0,6 | 4 | 0,18 | 1 | 40 | 0,3 | 59,00 | 0,78 | 0,81 | 0,87 | 0,92 |
| 30 6553 0020 008 | • 0,2 | 0,10 | 0,8 | 4 | 0,18 | 1 | 40 | 0,3 | 59,00 | 0,99 | 1,03 | 1,10 | 1,17 |
| 30 6553 0020 010 | • 0,2 | 0,10 | 1 | 4 | 0,18 | 1 | 40 | 0,3 | 59,00 | 1,20 | 1,24 | 1,32 | 1,41 |
| 30 6553 0020 015 | • 0,2 | 0,10 | 1,5 | 4 | 0,18 | 1 | 40 | 0,3 | 59,00 | 1,72 | 1,78 | 1,89 | 2,01 |
| 30 6553 0030 005 | • 0,3 | 0,15 | 0,5 | 4 | 0,27 | 2 | 40 | 0,5 | 59,00 | 0,63 | 0,70 | 0,80 | 0,89 |
| 30 6553 0030 010 | • 0,3 | 0,15 | 1 | 4 | 0,27 | 2 | 40 | 0,5 | 59,00 | 1,32 | 1,38 | 1,49 | 1,60 |
| 30 6553 0030 015 | • 0,3 | 0,15 | 1,5 | 4 | 0,27 | 2 | 40 | 0,5 | 59,00 | 1,84 | 1,93 | 2,07 | 2,20 |
| 30 6553 0030 020 | • 0,3 | 0,15 | 2 | 4 | 0,27 | 2 | 40 | 0,5 | 59,00 | 2,37 | 2,47 | 2,63 | 2,80 |
| 30 6553 0030 030 | • 0,3 | 0,15 | 3 | 4 | 0,27 | 2 | 40 | 0,5 | 59,00 | 3,42 | 3,54 | 3,76 | 4,01 |
| 30 6553 0030 045 | • 0,3 | 0,15 | 4,5 | 4 | 0,27 | 2 | 40 | 0,5 | 59,00 | 4,98 | 5,13 | 5,45 | 5,82 |
| 30 6553 0030 060 | • 0,3 | 0,15 | 6 | 4 | 0,27 | 2 | 40 | 0,5 | 59,00 | 6,53 | 6,72 | 7,15 | 7,63 |
| 30 6553 0040 010 | • 0,4 | 0,20 | 1 | 4 | 0,36 | 2 | 40 | 0,6 | 59,00 | 1,35 | 1,40 | 1,51 | 1,61 |
| 30 6553 0040 020 | • 0,4 | 0,20 | 2 | 4 | 0,36 | 2 | 40 | 0,6 | 59,00 | 2,39 | 2,49 | 2,64 | 2,81 |
| 30 6553 0040 030 | • 0,4 | 0,20 | 3 | 4 | 0,36 | 2 | 40 | 0,6 | 59,00 | 3,44 | 3,56 | 3,77 | 4,02 |
| 30 6553 0040 040 | • 0,4 | 0,20 | 4 | 4 | 0,36 | 2 | 40 | 0,6 | 59,00 | 4,48 | 4,62 | 4,90 | 5,23 |
| 30 6553 0040 060 | • 0,4 | 0,20 | 6 | 4 | 0,36 | 2 | 40 | 0,6 | 59,00 | 6,54 | 6,74 | 7,16 | 7,64 |
| 30 6553 0040 080 | • 0,4 | 0,20 | 8 | 4 | 0,36 | 2 | 60 | 0,6 | 61,00 | 8,60 | 8,86 | 9,42 | 10,05 |
| 30 6553 0050 020 | • 0,5 | 0,25 | 2 | 4 | 0,45 | 2 | 40 | 0,7 | 59,00 | 2,42 | 2,50 | 2,66 | 2,82 |
| 30 6553 0050 040 | • 0,5 | 0,25 | 4 | 4 | 0,45 | 2 | 40 | 0,7 | 59,00 | 4,49 | 4,63 | 4,91 | 5,24 |
| 30 6553 0050 060 | • 0,5 | 0,25 | 6 | 4 | 0,45 | 2 | 40 | 0,7 | 59,00 | 6,56 | 6,75 | 7,17 | 7,65 |
| 30 6553 0050 080 | • 0,5 | 0,25 | 8 | 4 | 0,45 | 2 | 60 | 0,7 | 61,00 | 8,62 | 8,87 | 9,43 | 10,06 |
| 30 6553 0050 100 | • 0,5 | 0,25 | 10 | 4 | 0,45 | 2 | 60 | 0,7 | 61,00 | 10,68 | 10,99 | 11,69 | 12,48 |
| 30 6553 0060 020 | • 0,6 | 0,30 | 2 | 4 | 0,55 | 4 | 40 | 1,0 | 61,00 | 2,60 | 2,73 | 2,97 | 3,17 |
| 30 6553 0060 030 | • 0,6 | 0,30 | 3 | 4 | 0,55 | 4 | 40 | 1,0 | 61,00 | 3,66 | 3,83 | 4,11 | 4,38 |
| 30 6553 0060 060 | • 0,6 | 0,30 | 6 | 4 | 0,55 | 4 | 40 | 1,0 | 61,00 | 6,81 | 7,06 | 7,50 | 8,00 |
| 30 6553 0060 090 | • 0,6 | 0,30 | 9 | 4 | 0,55 | 4 | 60 | 1,0 | 63,00 | 9,93 | 10,25 | 10,89 | 11,62 |
| 30 6553 0060 120 | • 0,6 | 0,30 | 12 | 4 | 0,55 | 4 | 60 | 1,0 | 63,00 | 13,04 | 13,43 | 14,28 | 15,24 |
| 30 6553 0080 020 | • 0,8 | 0,40 | 2 | 4 | 0,75 | 4 | 40 | 1,2 | 61,00 | 2,59 | 2,72 | 2,95 | 3,15 |
| 30 6553 0080 040 | • 0,8 | 0,40 | 4 | 4 | 0,75 | 4 | 40 | 1,2 | 61,00 | 4,71 | 4,91 | 5,23 | 5,57 |
| 30 6553 0080 060 | • 0,8 | 0,40 | 6 | 4 | 0,75 | 4 | 40 | 1,2 | 61,00 | 6,80 | 7,05 | 7,49 | 7,98 |
| 30 6553 0080 080 | • 0,8 | 0,40 | 8 | 4 | 0,75 | 4 | 60 | 1,2 | 63,00 | 8,89 | 9,18 | 9,75 | 10,40 |
| 30 6553 0080 120 | • 0,8 | 0,40 | 12 | 4 | 0,75 | 4 | 60 | 1,2 | 63,00 | 13,03 | 13,42 | 14,26 | 15,22 |
| 30 6553 0080 160 | • 0,8 | 0,40 | 16 | 4 | 0,75 | 4 | 60 | 1,2 | 63,00 | 17,16 | 17,67 | 18,78 | 20,05 |

Alternative 30 6551 - Schaft / Shank 3 mm auf Seite / on page 124
Alternative 30 6554 - Schaft / Shank 6 mm auf Seite / on page 130



PROFESSIONAL



30 6553

| Art. | d1* | r ±0,002 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|-------|----------|----|-------|------|----|----|-----|-------|-------|-------|-------|-------|
| 30 6553 0100 020 | • 1,0 | 0,50 | 2 | 4 | 0,95 | 4 | 40 | 1,6 | 63,00 | 2,59 | 2,71 | 2,93 | 3,13 |
| 30 6553 0100 050 | • 1,0 | 0,50 | 5 | 4 | 0,95 | 4 | 40 | 1,6 | 63,00 | 5,75 | 5,98 | 6,35 | 6,75 |
| 30 6553 0100 080 | • 1,0 | 0,50 | 8 | 4 | 0,95 | 4 | 60 | 1,6 | 65,00 | 8,88 | 9,18 | 9,74 | 10,37 |
| 30 6553 0100 100 | • 1,0 | 0,50 | 10 | 4 | 0,95 | 4 | 60 | 1,6 | 65,00 | 10,96 | 11,30 | 11,99 | 12,79 |
| 30 6553 0100 150 | • 1,0 | 0,50 | 15 | 4 | 0,95 | 6 | 60 | 1,6 | 65,00 | 16,39 | 16,92 | 17,98 | 19,18 |
| 30 6553 0100 200 | • 1,0 | 0,50 | 20 | 4 | 0,95 | 6 | 60 | 1,6 | 65,00 | 21,57 | 22,22 | 23,62 | 25,22 |
| 30 6553 0100 250 | • 1,0 | 0,50 | 25 | 4 | 0,95 | 6 | 60 | 1,6 | 65,00 | 26,73 | 27,52 | 29,27 | - |
| 30 6553 0150 050 | • 1,5 | 0,75 | 5 | 4 | 1,45 | 4 | 40 | 2,4 | 63,00 | 5,74 | 5,96 | 6,32 | 6,70 |
| 30 6553 0150 100 | • 1,5 | 0,75 | 10 | 4 | 1,45 | 4 | 60 | 2,4 | 65,00 | 10,95 | 11,28 | 11,96 | 12,74 |
| 30 6553 0150 150 | • 1,5 | 0,75 | 15 | 4 | 1,45 | 4 | 60 | 2,4 | 65,00 | 16,12 | 16,58 | 17,61 | 18,77 |
| 30 6553 0150 200 | • 1,5 | 0,75 | 20 | 4 | 1,45 | 6 | 60 | 2,4 | 65,00 | 21,56 | 22,20 | 23,59 | - |
| 30 6553 0150 250 | • 1,5 | 0,75 | 25 | 4 | 1,45 | 6 | 60 | 2,4 | 65,00 | 26,72 | 27,51 | 29,23 | - |
| 30 6553 0200 040 | • 2,0 | 1,00 | 4 | 4 | 1,92 | 4 | 40 | 3,0 | 64,00 | 4,76 | 4,93 | 5,21 | 5,51 |
| 30 6553 0200 060 | • 2,0 | 1,00 | 6 | 4 | 1,92 | 4 | 40 | 3,0 | 64,00 | 6,85 | 7,07 | 7,47 | 7,92 |
| 30 6553 0200 080 | • 2,0 | 1,00 | 8 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 8,93 | 9,20 | 9,73 | 10,33 |
| 30 6553 0200 100 | • 2,0 | 1,00 | 10 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 11,00 | 11,32 | 11,99 | 12,75 |
| 30 6553 0200 120 | • 2,0 | 1,00 | 12 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 13,07 | 13,44 | 14,24 | 15,16 |
| 30 6553 0200 160 | • 2,0 | 1,00 | 16 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 17,19 | 17,68 | 18,76 | 19,99 |
| 30 6553 0200 180 | • 2,0 | 1,00 | 18 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 19,25 | 19,80 | 21,02 | - |
| 30 6553 0200 200 | • 2,0 | 1,00 | 20 | 4 | 1,92 | 4 | 60 | 3,0 | 66,00 | 21,31 | 21,92 | 23,28 | - |
| 30 6553 0200 240 | • 2,0 | 1,00 | 24 | 4 | 1,92 | 6 | 60 | 3,0 | 66,00 | 25,73 | 26,48 | 28,13 | - |
| 30 6553 0200 300 | • 2,0 | 1,00 | 30 | 4 | 1,92 | 6 | 60 | 3,0 | 66,00 | 31,91 | 32,85 | - | - |

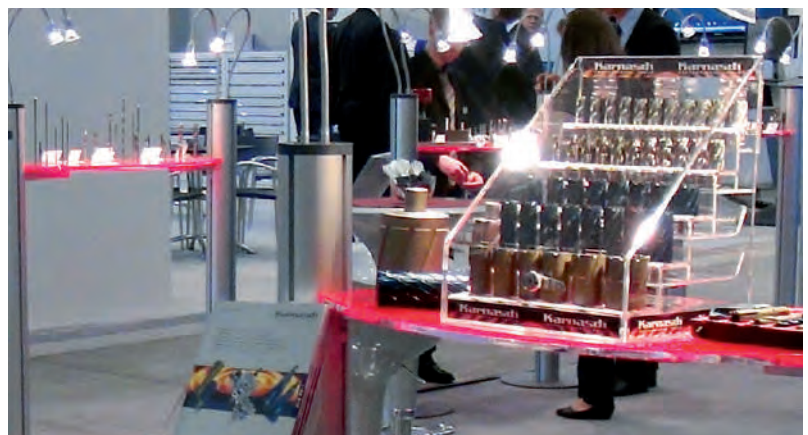
Alternative 30 6551 - Schaft / Shank 3 mm auf Seite / on page 124
 Alternative 30 6554 - Schaft / Shank 6 mm auf Seite / on page 130



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30 6554

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Diamond coated solid carbide 3D ball nose end mills, < 25xD, HSC



GRAPHIT
graphite

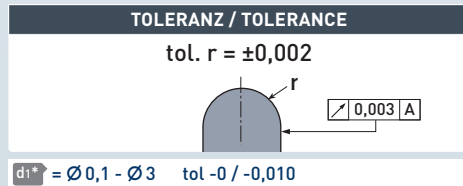
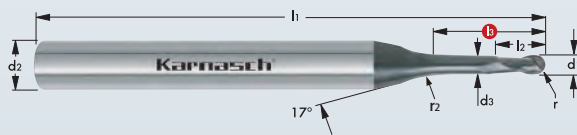
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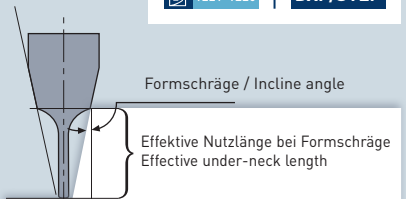


| | |
|-------------|------------------------|
| MICRO GRAIN | KARNASCH NORM |
| ITX | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | DCC 0318 |
| | Air |

Schnittdaten
Cutting data



Zeichnungen
Drawings



| Art. | d1* | r ±0,002 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|------------------|--------|----------|-----|-------|------|----|----|------|-------|-------|-------|-------|-------|
| 30 6554 0010 002 | • 0,1 | 0,05 | 0,2 | 6 | 0,09 | 1 | 60 | 0,15 | 65,00 | 0,32 | 0,34 | 0,38 | 0,42 |
| 30 6554 0010 004 | • 0,1 | 0,05 | 0,4 | 6 | 0,09 | 1 | 60 | 0,15 | 65,00 | 0,54 | 0,57 | 0,62 | 0,67 |
| 30 6554 0015 003 | • 0,15 | 0,075 | 0,3 | 6 | 0,14 | 1 | 60 | 0,2 | 65,00 | 0,43 | 0,45 | 0,50 | 0,54 |
| 30 6554 0015 006 | • 0,15 | 0,075 | 0,6 | 6 | 0,14 | 1 | 60 | 0,2 | 65,00 | 0,75 | 0,79 | 0,85 | 0,91 |
| 30 6554 0020 006 | • 0,2 | 0,10 | 0,6 | 6 | 0,18 | 1 | 60 | 0,3 | 65,00 | 0,78 | 0,81 | 0,87 | 0,92 |
| 30 6554 0020 008 | • 0,2 | 0,10 | 0,8 | 6 | 0,18 | 1 | 60 | 0,3 | 65,00 | 0,99 | 1,03 | 1,10 | 1,17 |
| 30 6554 0020 010 | • 0,2 | 0,10 | 1 | 6 | 0,18 | 1 | 60 | 0,3 | 65,00 | 1,20 | 1,24 | 1,32 | 1,41 |
| 30 6554 0020 015 | • 0,2 | 0,10 | 1,5 | 6 | 0,18 | 1 | 60 | 0,3 | 65,00 | 1,72 | 1,78 | 1,89 | 2,01 |
| 30 6554 0030 005 | • 0,3 | 0,15 | 0,5 | 6 | 0,27 | 2 | 60 | 0,5 | 65,00 | 0,63 | 0,70 | 0,80 | 0,89 |
| 30 6554 0030 01 | • 0,3 | 0,15 | 1 | 6 | 0,27 | 2 | 60 | 0,5 | 65,00 | 1,32 | 1,38 | 1,49 | 1,60 |
| 30 6554 0030 015 | • 0,3 | 0,15 | 1,5 | 6 | 0,27 | 2 | 60 | 0,5 | 65,00 | 1,84 | 1,93 | 2,07 | 2,20 |
| 30 6554 0030 02 | • 0,3 | 0,15 | 2 | 6 | 0,27 | 2 | 60 | 0,5 | 65,00 | 2,37 | 2,47 | 2,63 | 2,80 |
| 30 6554 0030 03 | • 0,3 | 0,15 | 3 | 6 | 0,27 | 2 | 60 | 0,5 | 65,00 | 3,42 | 3,54 | 3,76 | 4,01 |
| 30 6554 0030 045 | • 0,3 | 0,15 | 4,5 | 6 | 0,27 | 2 | 60 | 0,5 | 65,00 | 4,98 | 5,13 | 5,45 | 5,82 |
| 30 6554 0030 06 | • 0,3 | 0,15 | 6 | 6 | 0,27 | 2 | 60 | 0,5 | 65,00 | 6,53 | 6,72 | 7,15 | 7,63 |
| 30 6554 0040 01 | • 0,4 | 0,20 | 1 | 6 | 0,36 | 2 | 60 | 0,6 | 65,00 | 1,35 | 1,40 | 1,51 | 1,61 |
| 30 6554 0040 02 | • 0,4 | 0,20 | 2 | 6 | 0,36 | 2 | 60 | 0,6 | 65,00 | 2,40 | 2,49 | 2,65 | 2,82 |
| 30 6554 0040 03 | • 0,4 | 0,20 | 3 | 6 | 0,36 | 2 | 60 | 0,6 | 65,00 | 3,44 | 3,56 | 3,77 | 4,02 |
| 30 6554 0040 04 | • 0,4 | 0,20 | 4 | 6 | 0,36 | 2 | 60 | 0,6 | 65,00 | 4,48 | 4,62 | 4,90 | 5,23 |
| 30 6554 0040 06 | • 0,4 | 0,20 | 6 | 6 | 0,36 | 2 | 60 | 0,6 | 65,00 | 6,54 | 6,74 | 7,16 | 7,64 |
| 30 6554 0040 08 | • 0,4 | 0,20 | 8 | 6 | 0,36 | 2 | 60 | 0,6 | 65,00 | 8,60 | 8,86 | 9,42 | 10,05 |
| 30 6554 0050 02 | • 0,5 | 0,25 | 2 | 6 | 0,45 | 2 | 60 | 0,7 | 65,00 | 2,42 | 2,50 | 2,66 | 2,82 |
| 30 6554 0050 04 | • 0,5 | 0,25 | 4 | 6 | 0,45 | 2 | 60 | 0,7 | 65,00 | 4,49 | 4,63 | 4,91 | 5,24 |
| 30 6554 0050 06 | • 0,5 | 0,25 | 6 | 6 | 0,45 | 2 | 60 | 0,7 | 65,00 | 6,56 | 6,75 | 7,17 | 7,65 |
| 30 6554 0050 08 | • 0,5 | 0,25 | 8 | 6 | 0,45 | 2 | 60 | 0,7 | 65,00 | 8,62 | 8,87 | 9,43 | 10,06 |
| 30 6554 0050 10 | • 0,5 | 0,25 | 10 | 6 | 0,45 | 2 | 60 | 0,7 | 65,00 | 10,68 | 10,99 | 11,67 | 12,48 |
| 30 6554 0060 03 | • 0,6 | 0,30 | 3 | 6 | 0,55 | 4 | 60 | 1,0 | 68,00 | 3,66 | 3,83 | 4,11 | 4,38 |
| 30 6554 0060 06 | • 0,6 | 0,30 | 6 | 6 | 0,55 | 4 | 60 | 1,0 | 68,00 | 6,81 | 7,06 | 7,50 | 8,00 |
| 30 6554 0060 09 | • 0,6 | 0,30 | 9 | 6 | 0,55 | 4 | 60 | 1,0 | 68,00 | 9,93 | 10,25 | 10,89 | 11,62 |
| 30 6554 0060 12 | • 0,6 | 0,30 | 12 | 6 | 0,55 | 4 | 60 | 1,0 | 68,00 | 13,04 | 13,43 | 14,28 | 15,24 |
| 30 6554 0080 04 | • 0,8 | 0,40 | 4 | 6 | 0,75 | 4 | 60 | 1,2 | 68,00 | 4,71 | 4,91 | 5,23 | 5,57 |
| 30 6554 0080 06 | • 0,8 | 0,40 | 6 | 6 | 0,75 | 4 | 60 | 1,2 | 68,00 | 6,80 | 7,05 | 7,49 | 7,98 |
| 30 6554 0080 08 | • 0,8 | 0,40 | 8 | 6 | 0,75 | 4 | 60 | 1,2 | 68,00 | 8,89 | 9,18 | 9,75 | 10,40 |
| 30 6554 0080 12 | • 0,8 | 0,40 | 12 | 6 | 0,75 | 4 | 60 | 1,2 | 68,00 | 13,03 | 13,42 | 14,26 | 15,22 |
| 30 6554 0080 16 | • 0,8 | 0,40 | 16 | 6 | 0,75 | 4 | 60 | 1,2 | 68,00 | 17,16 | 17,67 | 18,78 | 20,05 |
| 30 6554 0100 05 | • 1,0 | 0,50 | 5 | 6 | 0,95 | 4 | 60 | 1,6 | 70,00 | 5,75 | 5,98 | 6,35 | 6,75 |
| 30 6554 0100 10 | • 1,0 | 0,50 | 10 | 6 | 0,95 | 4 | 60 | 1,6 | 70,00 | 10,96 | 11,30 | 11,99 | 12,79 |
| 30 6554 0100 15 | • 1,0 | 0,50 | 15 | 6 | 0,95 | 6 | 60 | 1,6 | 70,00 | 16,39 | 16,92 | 17,98 | 19,18 |
| 30 6554 0100 20 | • 1,0 | 0,50 | 20 | 6 | 0,95 | 6 | 60 | 1,6 | 70,00 | 21,57 | 22,22 | 23,62 | 25,22 |
| 30 6554 0100 25 | • 1,0 | 0,50 | 25 | 6 | 0,95 | 6 | 60 | 1,6 | 70,00 | 26,73 | 27,52 | 29,27 | 31,25 |

Alternative 30 6551 - Schaft / Shank 3 mm auf Seite / on page 124
Alternative 30 6553 bis / until Ø2,0 - Schaft / Shank 4 mm auf Seite / on page 128



PROFESSIONAL



30 6554

| Art. | d1* | r ±0,002 | l3 | d2 h5 | d3 | r2 | l1 | l2 | € | 0,5° | 1° | 2° | 3° |
|-----------------|-------|----------|----|-------|------|----|----|-----|-------|-------|-------|-------|-------|
| 30 6554 0150 05 | • 1,5 | 0,75 | 5 | 6 | 1,45 | 4 | 60 | 2,4 | 70,00 | 5,74 | 5,96 | 6,32 | 6,70 |
| 30 6554 0150 10 | • 1,5 | 0,75 | 10 | 6 | 1,45 | 4 | 60 | 2,4 | 70,00 | 10,95 | 11,28 | 11,96 | 12,74 |
| 30 6554 0150 15 | • 1,5 | 0,75 | 15 | 6 | 1,45 | 4 | 60 | 2,4 | 70,00 | 16,12 | 16,58 | 17,61 | 18,77 |
| 30 6554 0150 20 | • 1,5 | 0,75 | 20 | 6 | 1,45 | 6 | 60 | 2,4 | 70,00 | 21,56 | 22,20 | 23,59 | 25,17 |
| 30 6554 0150 25 | • 1,5 | 0,75 | 25 | 6 | 1,45 | 6 | 60 | 2,4 | 70,00 | 26,72 | 27,51 | 29,23 | 31,20 |
| 30 6554 0200 06 | • 2,0 | 1,00 | 6 | 6 | 1,92 | 4 | 60 | 3,0 | 70,00 | 6,85 | 7,07 | 7,47 | 7,92 |
| 30 6554 0200 08 | • 2,0 | 1,00 | 8 | 6 | 1,92 | 4 | 60 | 3,0 | 70,00 | 8,93 | 9,20 | 9,73 | 10,33 |
| 30 6554 0200 10 | • 2,0 | 1,00 | 10 | 6 | 1,92 | 4 | 60 | 3,0 | 70,00 | 11,00 | 11,32 | 11,99 | 12,75 |
| 30 6554 0200 12 | • 2,0 | 1,00 | 12 | 6 | 1,92 | 4 | 60 | 3,0 | 70,00 | 13,07 | 13,44 | 14,24 | 15,16 |
| 30 6554 0200 16 | • 2,0 | 1,00 | 16 | 6 | 1,92 | 4 | 60 | 3,0 | 70,00 | 17,19 | 17,68 | 18,76 | 19,99 |
| 30 6554 0200 18 | • 2,0 | 1,00 | 18 | 6 | 1,92 | 4 | 60 | 3,0 | 70,00 | 19,25 | 19,80 | 21,02 | 22,40 |
| 30 6554 0200 20 | • 2,0 | 1,00 | 20 | 6 | 1,92 | 4 | 60 | 3,0 | 70,00 | 21,31 | 21,92 | 23,28 | 24,82 |
| 30 6554 0200 24 | • 2,0 | 1,00 | 24 | 6 | 1,92 | 6 | 60 | 3,0 | 70,00 | 25,73 | 26,38 | 27,69 | 29,14 |
| 30 6554 0200 30 | • 2,0 | 1,00 | 30 | 6 | 1,92 | 6 | 60 | 3,0 | 70,00 | 31,90 | 32,67 | 34,30 | 36,11 |
| 30 6554 0300 09 | • 3,0 | 1,50 | 9 | 6 | 2,90 | 4 | 60 | 3,5 | 79,00 | 9,99 | 10,26 | 10,83 | 11,48 |
| 30 6554 0300 14 | • 3,0 | 1,50 | 14 | 6 | 2,90 | 4 | 60 | 3,5 | 79,00 | 15,15 | 15,57 | 16,48 | 17,51 |
| 30 6554 0300 18 | • 3,0 | 1,50 | 18 | 6 | 2,90 | 4 | 60 | 3,5 | 79,00 | 19,26 | 19,81 | 20,99 | 22,34 |
| 30 6554 0300 24 | • 3,0 | 1,50 | 24 | 6 | 2,90 | 4 | 60 | 3,5 | 79,00 | 25,45 | 26,17 | 27,76 | 29,58 |
| 30 6554 0300 30 | • 3,0 | 1,50 | 30 | 6 | 2,90 | 4 | 60 | 3,5 | 79,00 | 31,62 | 32,53 | 34,54 | - |

Alternative 30 6551 - Schaft / Shank 3 mm auf Seite / on page 124

Alternative 30 6553 bis / until Ø2,0 - Schaft / Shank 4 mm auf Seite / on page 128

1



2



3



4



5



6



7



8



9



Index

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PCD - CVD - MCD - ND

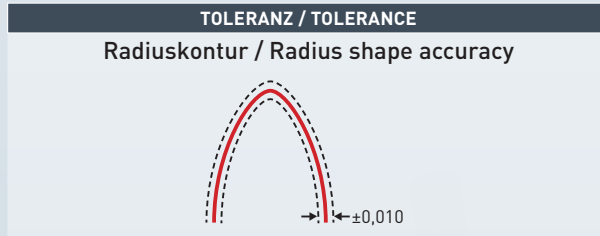
30 6557

Diamantbeschichteter VHM High Efficient Finishing Parabelfräser
Diamond coated solid carbide high efficient finishing parabola end mill



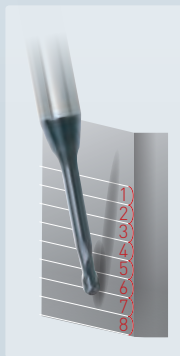
GRAPHIT
graphite

GFK-CFK
GFRP-CFRP



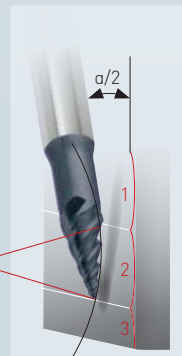
Weltneuheit für die Graphitbearbeitung
World first for graphite processing

Konventionelle Bearbeitung
Conventional processing



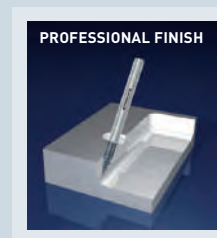
VHM Kugelfräser
- Geringe Zustellung in ap
Solid carbide ball end mill
- Small stepover in ap

Neue innovative Bearbeitungsstrategie
New innovative machining strategy



High Efficient Finishing Parabelfräser für 5 Achsen
Zerspanung mit 45° Spirale und 4 Schneiden
- bis zu 90-fach bessere Oberflächen
- bis zu 90% kürzere Bearbeitungszeiten
- wirtschaftliche Bearbeitung durch hohe Zustellung in ap
- Reduzierung kostenintensiver Poliervorgänge

High efficient finishing parabola end mill for 5-axis
machining with 45° spiral and 4 cutting edges
- up to 90 times higher surface quality
- up to 90% shorter machining time
- efficient processing through high stepover in ap
- reduction of cost intensive polishing processes



Wir empfehlen die Fräser mit dem Anstellwinkel $a/2$ einzusetzen.
We recommend to use the end mills with work angle $a/2$.

| | |
|-------------------------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| 45° | |
| HSC High-Speed-Cutting | |
| DCC 0318 | |
| Air | |

Schnittdaten
Cutting data



1212

Zeichnungen
Drawings



DXF/STEP

| Art. | d1 | r1 | r3 | a/2 | r2 | l2 | l3 | l4 | l1 | d3 | d4 | d2 | z | € |
|-----------------------|-------|------|-------|--------|----|-------|------|------|-----|-----|------|----|---|--------|
| 30 6557 0250 0125 10 | • 1,0 | 0,50 | 12,5 | 10,17° | 4 | 4,68 | 10,0 | 13,5 | 50 | 2,4 | 2,5 | 4 | 4 | 85,00 |
| 30 6557 0500 350 175 | • 1,0 | 0,50 | 350 | 12,60° | 4 | 9,50 | 17,5 | 19,9 | 70 | - | 5 | 6 | 4 | 106,00 |
| 30 6557 0375 01875 15 | • 1,5 | 0,75 | 18,75 | 10,19° | 4 | 7,01 | 15,0 | 16,3 | 50 | 3,6 | 3,75 | 4 | 4 | 92,00 |
| 30 6557 0500 025 20 | • 2,0 | 1,00 | 25 | 10,18° | 4 | 9,35 | 20,0 | 22,8 | 60 | 4,8 | 5 | 6 | 4 | 104,00 |
| 30 6557 0700 350 175 | • 2,0 | 1,00 | 350 | 13,39° | 4 | 11,50 | 17,5 | 19,9 | 80 | - | 7 | 8 | 4 | 150,00 |
| 30 6557 0750 0375 30 | • 3,0 | 1,50 | 37,5 | 10,18° | 4 | 14,03 | 30,0 | 31,8 | 80 | 7,3 | 7,5 | 8 | 4 | 152,00 |
| 30 6557 1000 050 40 | • 4,0 | 2,00 | 50 | 10,18° | 4 | 18,70 | 40,0 | 45,2 | 100 | 9,5 | 10 | 12 | 4 | 233,00 |
| 30 6557 0900 350 175 | • 4,0 | 2,00 | 350 | 12,16° | 4 | 13,50 | 17,5 | 23,6 | 100 | - | 9 | 12 | 4 | 228,00 |



VHM-3D-Radiusfräser/Schaftfräser, CAD/CAM, passend für Maschinen von Zirkonzahn

Solid carbide 3D ball nose and corner chamfer end mills, HSC, CAD/CAM, suitable for machines from Zirkonzahn



30 6561-5TEC

GRAPHIT
graphite

ZIRKONIUM
ZIRCONIUM

Zr O₂
Zirkonoxid
gepresst
Zircon pressed

Zr O₂
Zirkonoxid
gehüpft
Zircon hiped

MICRO GRAIN CLEAN KARNASCH NORM

SPEZIAL Form HA

HSC High-Speed-Cutting

DCC 0318

Schnittdaten
Cutting data

1222

| Art. | d1 | r/f | l3 | d2 h6 | d3 | d4 | l4 | l5 | l6 | l2 | l1 | € |
|-------------------|-------|------|------|----------|-------|-----|------|------|------|----|----|-------|
| 30 6561 0050-5TEC | • 0,5 | 0,25 | - | 3 | 1,045 | 2,8 | 9,45 | 20,0 | 27,4 | 3 | 51 | 55,00 |
| 30 6561 0100-5TEC | • 1,0 | 0,5 | 12,0 | 3 | 0,9 | 2,8 | 20,0 | 27,4 | - | 6 | 57 | 60,00 |
| 30 6561 0150-5TEC | • 1,5 | f | 17,5 | 3 | 1,3 | 2,8 | 27,4 | - | - | 5 | 57 | 60,00 |
| 30 6561 0200-5TEC | • 2,0 | 1,0 | 18,0 | 3 | 1,8 | 2,8 | 27,4 | - | - | 10 | 57 | 60,00 |

Zirkonium

Mehr Details finden Sie unter www.karnasch.tools

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GERMANY

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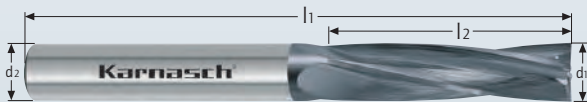


29 0305

Diamantbeschichteter Vollhartmetall Schlichtfräser "UGT"
Diamond coated solid carbide finishing cutter, "UGT"



GRAPHIT
graphite



MICRO
GRAIN

KARNASCH
NORM

SPEZIAL
SPECIAL

DIN 6535
Form HA



HSC
HPC



DCA-06
PLUS



COMPO-
SITES

GFK
GFRP

CFK
CFRP

AFK
Aramid

FR 4

Empfohlene Schnittdaten
Recommended cutting data

| | GFK GFRP | CFK CFRP |
|-----------|-------------|-------------|
| Vc m/min. | 100-180 | 100-180 |
| f/U mm | 0,3-0,5 | 0,2-0,4 |

Optimale Bearbeitungsdaten müssen während der Einlaufphase ermittelt werden.
Optimal machining data must be determined during the run in phase.

| Art. | d1 | l2 | d2 | l1 | Z | € |
|--------------------|--------|----|------|-----|---|--------|
| 29 0305 0300 10 04 | • 3,0 | 10 | 4 | 40 | 4 | 101,00 |
| 29 0305 0400 15 04 | • 4,0 | 15 | 6 | 50 | 4 | 125,00 |
| 29 0305 0500 15 04 | • 5,0 | 15 | 6 | 50 | 4 | 125,00 |
| 29 0305 0600 15 04 | • 6,0 | 15 | 6 | 50 | 4 | 125,00 |
| 29 0305 0600 25 04 | • 6,0 | 25 | 6 | 64 | 4 | 142,00 |
| 29 0305 0635 26 04 | • 6,35 | 26 | 6,35 | 64 | 4 | 159,00 |
| 29 0305 0800 15 04 | • 8,0 | 15 | 8 | 60 | 4 | 159,00 |
| 29 0305 0800 30 04 | • 8,0 | 30 | 8 | 76 | 4 | 178,00 |
| 29 0305 0953 30 04 | • 9,53 | 30 | 9,53 | 64 | 4 | 205,00 |
| 29 0305 1000 20 04 | • 10,0 | 20 | 10 | 73 | 4 | 195,00 |
| 29 0305 1000 40 04 | • 10,0 | 40 | 10 | 93 | 4 | 221,00 |
| 29 0305 1200 20 04 | • 12,0 | 20 | 12 | 73 | 4 | 216,00 |
| 29 0305 1200 40 04 | • 12,0 | 40 | 12 | 96 | 4 | 246,00 |
| 29 0305 1600 20 04 | • 16,0 | 20 | 16 | 80 | 4 | 174,00 |
| 29 0305 1600 20 06 | • 16,0 | 20 | 16 | 80 | 6 | 180,60 |
| 29 0305 2000 20 04 | • 20,0 | 20 | 20 | 80 | 4 | 234,60 |
| 29 0305 2000 20 08 | • 20,0 | 20 | 20 | 80 | 8 | 246,00 |
| 29 0305 2000 42 08 | • 20,0 | 42 | 20 | 105 | 8 | 278,40 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Schnittdaten
Cutting data

Zeichnungen
Drawings



134

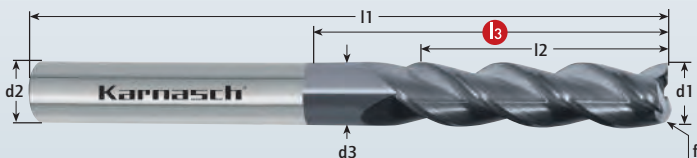
DXF/STEP

30 6572

Diamantbeschichteter Vollhartmetall Schruppfräser, gerade Stirn mit Eckfase
Diamond coated solid carbide roughing end mills with a chamfer



GRAPHIT
graphite



MICRO
GRAIN

KARNASCH
NORM

ITX

DIN 6535
Form HA



HSC
HPC



DCC
0318



GFK-CFK
GFRP-CFRP

PA66
GF30

PVDF
GF30

PEEK
GF30

PEEK
CF30

GF
GF25

PVDF
GF25

ZIRKON
OXID
ZIRCONIA



| | | |
|-----|--------------|-----------------|
| d1* | Ø 3,0 - 6,0 | -0,002 / -0,022 |
| d1* | Ø 8,0 - 16,0 | -0,002 / -0,032 |
| d1* | Ø 20 | -0,002 / -0,037 |

| Art. | d1* | f | l2 | l3 | d2 h5 | d3 | l1 | Z | € |
|----------------------|--------|------|-----|----|-------|-----|-----|---|--------|
| 30 6572 0300 005 10 | • 3,0 | 0,05 | 10 | - | 4 | - | 50 | 3 | 76,00 |
| 30 6572 0300 005 20 | • 3,0 | 0,05 | 20 | - | 4 | - | 60 | 3 | 87,00 |
| 30 6572 0300 005 30 | • 3,0 | 0,05 | 30 | - | 4 | - | 75 | 3 | 94,00 |
| 30 6572 0300 005 35 | • 3,0 | 0,05 | 35 | 50 | 4 | 2,8 | 100 | 3 | 103,00 |
| 30 6572 0400 005 10 | • 4,0 | 0,05 | 10 | - | 6 | - | 50 | 3 | 91,00 |
| 30 6572 0400 005 20 | • 4,0 | 0,05 | 20 | - | 6 | - | 60 | 3 | 102,00 |
| 30 6572 0400 005 30 | • 4,0 | 0,05 | 30 | - | 6 | - | 75 | 3 | 110,00 |
| 30 6572 0400 005 40 | • 4,0 | 0,05 | 40 | 50 | 6 | 3,8 | 100 | 3 | 120,00 |
| 30 6572 0500 005 20 | • 5,0 | 0,05 | 20 | - | 6 | - | 60 | 3 | 110,00 |
| 30 6572 0500 005 30 | • 5,0 | 0,05 | 30 | - | 6 | - | 75 | 3 | 119,00 |
| 30 6572 0500 005 40 | • 5,0 | 0,05 | 40 | 50 | 6 | 4,8 | 100 | 3 | 129,00 |
| 30 6572 0600 005 30 | • 6,0 | 0,05 | 30 | - | 6 | - | 75 | 3 | 117,00 |
| 30 6572 0600 005 40 | • 6,0 | 0,05 | 40 | 50 | 6 | 5,8 | 100 | 3 | 134,00 |
| 30 6572 0800 005 30 | • 8,0 | 0,05 | 30 | - | 8 | - | 75 | 3 | 144,00 |
| 30 6572 0800 005 40 | • 8,0 | 0,05 | 40 | 60 | 8 | 7,8 | 120 | 3 | 163,00 |
| 30 6572 1000 005 30 | • 10,0 | 0,05 | 30 | - | 10 | - | 75 | 4 | 179,00 |
| 30 6572 1000 005 40 | • 10,0 | 0,05 | 40 | - | 10 | - | 100 | 4 | 193,00 |
| 30 6572 1000 005 60 | • 10,0 | 0,05 | 60 | - | 10 | - | 120 | 4 | 242,00 |
| 30 6572 1200 005 45 | • 12,0 | 0,05 | 45 | - | 12 | - | 100 | 4 | 213,00 |
| 30 6572 1200 005 75 | • 12,0 | 0,05 | 75 | - | 12 | - | 120 | 4 | 258,00 |
| 30 6572 1600 005 45 | • 16,0 | 0,05 | 45 | - | 16 | - | 100 | 4 | 209,40 |
| 30 6572 1600 005 75 | • 16,0 | 0,05 | 75 | - | 16 | - | 150 | 4 | 258,00 |
| 30 6572 2000 005 075 | • 20,0 | 0,05 | 75 | - | 20 | - | 150 | 4 | 373,80 |
| 30 6572 2000 005 110 | • 20,0 | 0,05 | 110 | - | 20 | - | 180 | 4 | 576,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Schnittdaten
Cutting data

Zeichnungen
Drawings



1238

DXF/STEP

Diamantbeschichteter Vollhartmetall Schruppfräser, Eckradius
Diamond coated solid carbide roughing end mills with corner radius



T O P

30 6573

GRAPHIT
graphite

GFK-CFK
GFRP-CFRP

PA66
GF30

PVDF
GF30

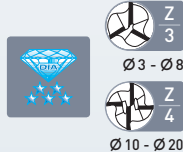
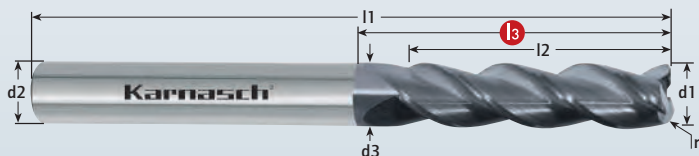
PEEK
GF30

PEEK
CF30

GF
GF25

PVDF
GF25

ZIRKON
OXID
ZIRCONIA



Zeichnungen
Drawings



DXF/STEP

MICRO GRAIN KARNASCH NORM

ITX DIN 6535 Form HA

40°

HSC HPC

DCC 0318

d1* Ø 3,0 - 6,0 -0,002 / -0,022
d1* Ø 8,0 - 16,0 -0,002 / -0,032
d1* Ø 20 -0,002 / -0,037

| Art. | d1* | r | l2 | l3 | d2 h5 | d3 | l1 | Z | € |
|----------------------|--------|-----|-----|----|-------|-----|-----|---|--------|
| 30 6573 0300 030 10 | • 3,0 | 0,3 | 10 | - | 4 | - | 50 | 3 | 76,00 |
| 30 6573 0300 030 20 | • 3,0 | 0,3 | 20 | - | 4 | - | 60 | 3 | 87,00 |
| 30 6573 0300 030 30 | • 3,0 | 0,3 | 30 | - | 4 | - | 75 | 3 | 94,00 |
| 30 6573 0300 030 35 | • 3,0 | 0,3 | 35 | 50 | 4 | 2,8 | 100 | 3 | 103,00 |
| 30 6573 0400 030 10 | • 4,0 | 0,3 | 10 | - | 6 | - | 50 | 3 | 91,00 |
| 30 6573 0400 030 20 | • 4,0 | 0,3 | 20 | - | 6 | - | 60 | 3 | 102,00 |
| 30 6573 0400 030 30 | • 4,0 | 0,3 | 30 | - | 6 | - | 75 | 3 | 110,00 |
| 30 6573 0400 030 40 | • 4,0 | 0,3 | 40 | 50 | 6 | 3,8 | 100 | 3 | 120,00 |
| 30 6573 0500 030 20 | • 5,0 | 0,3 | 20 | - | 6 | - | 60 | 3 | 110,00 |
| 30 6573 0500 030 30 | • 5,0 | 0,3 | 30 | - | 6 | - | 75 | 3 | 119,00 |
| 30 6573 0500 030 40 | • 5,0 | 0,3 | 40 | 50 | 6 | 4,8 | 100 | 3 | 129,00 |
| 30 6573 0600 030 30 | • 6,0 | 0,3 | 30 | - | 6 | - | 75 | 3 | 117,00 |
| 30 6573 0600 030 40 | • 6,0 | 0,3 | 40 | 50 | 6 | 5,8 | 100 | 3 | 134,00 |
| 30 6573 0800 050 30 | • 8,0 | 0,5 | 30 | - | 8 | - | 75 | 3 | 144,00 |
| 30 6573 0800 050 40 | • 8,0 | 0,5 | 40 | 60 | 8 | 7,8 | 120 | 3 | 163,00 |
| 30 6573 1000 050 30 | • 10,0 | 0,5 | 30 | - | 10 | - | 75 | 4 | 179,00 |
| 30 6573 1000 050 40 | • 10,0 | 0,5 | 40 | - | 10 | - | 100 | 4 | 193,00 |
| 30 6573 1000 050 60 | • 10,0 | 0,5 | 60 | - | 10 | - | 120 | 4 | 242,00 |
| 30 6573 1200 050 45 | • 12,0 | 0,5 | 45 | - | 12 | - | 100 | 4 | 213,00 |
| 30 6573 1200 050 75 | • 12,0 | 0,5 | 75 | - | 12 | - | 120 | 4 | 258,00 |
| 30 6573 1600 100 45 | • 16,0 | 1,0 | 45 | - | 16 | - | 100 | 4 | 209,40 |
| 30 6573 1600 100 75 | • 16,0 | 1,0 | 75 | - | 16 | - | 150 | 4 | 258,00 |
| 30 6573 2000 100 055 | • 20,0 | 1,0 | 55 | - | 20 | - | 100 | 4 | 298,80 |
| 30 6573 2000 100 075 | • 20,0 | 1,0 | 75 | - | 20 | - | 150 | 4 | 373,80 |
| 30 6573 2000 100 110 | • 20,0 | 1,0 | 110 | - | 20 | - | 180 | 4 | 576,00 |

Test 1
Werkstoff / Work material
Graphit / Graphite
Tool Ø10x40 r = 0,5
Vorschlichten / Semi finishing
Vc = 267 m/min
n = 8500 min⁻¹
Vf = 3000 m/min
fz = 0,088 mm
ap = 40 mm
ae = 2 mm

Test 2
Werkstoff / Work material
Graphit / Graphite
Tool Ø10x40 r=0,5
Schlichten / Finishing
Vc = 361 m/min
n = 11500 min⁻¹
Vf = 3000 m/min
fz = 0,065 mm
ap = 40 mm
ae = 2,5 mm

Schnittdaten
Cutting data

Film
Movie

1238

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Diamantbeschichteter Vollhartmetall Graphit Schruppfräser, Kugelstirn
Diamond coated solid carbide 3D ball nose roughing end mills



T O P

30 6574

GRAPHIT
graphite

GFK-CFK
GFRP-CFRP

PA66
GF30

PVDF
GF30

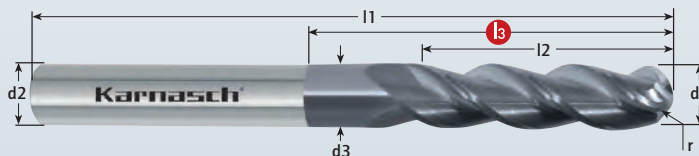
PEEK
GF30

PEEK
CF30

GF
GF25

PVDF
GF25

ZIRKON
OXID
ZIRCONIA



Zeichnungen
Drawings

DXF/STEP

MICRO GRAIN KARNASCH NORM

ITX DIN 6535 Form HA

40°

HSC HPC

DCC 0318

d1* Ø 3,0 - 6,0 -0,002 / -0,022
d1* Ø 8,0 - 16,0 -0,002 / -0,032
d1* Ø 20 -0,002 / -0,037

| Art. | d1* | r | l2 | l3 | d2 h5 | d3 | l1 | Z | € |
|------------------|--------|------|-----|----|-------|-----|-----|---|--------|
| 30 6574 0300 010 | • 3,0 | 1,5 | 10 | - | 4 | - | 50 | 3 | 76,00 |
| 30 6574 0300 020 | • 3,0 | 1,5 | 20 | - | 4 | - | 60 | 3 | 87,00 |
| 30 6574 0300 030 | • 3,0 | 1,5 | 30 | - | 4 | - | 75 | 3 | 94,00 |
| 30 6574 0300 035 | • 3,0 | 1,5 | 35 | 50 | 4 | 2,8 | 100 | 3 | 103,00 |
| 30 6574 0400 010 | • 4,0 | 2,0 | 10 | - | 6 | - | 50 | 3 | 91,00 |
| 30 6574 0400 020 | • 4,0 | 2,0 | 20 | - | 6 | - | 60 | 3 | 102,00 |
| 30 6574 0400 030 | • 4,0 | 2,0 | 30 | - | 6 | - | 75 | 3 | 110,00 |
| 30 6574 0400 040 | • 4,0 | 2,0 | 40 | 50 | 6 | 3,8 | 100 | 3 | 120,00 |
| 30 6574 0500 020 | • 5,0 | 2,5 | 20 | - | 6 | - | 60 | 3 | 110,00 |
| 30 6574 0500 030 | • 5,0 | 2,5 | 30 | - | 6 | - | 75 | 3 | 119,00 |
| 30 6574 0500 040 | • 5,0 | 2,5 | 40 | 50 | 6 | 4,8 | 100 | 3 | 129,00 |
| 30 6574 0600 030 | • 6,0 | 3,0 | 30 | - | 6 | - | 75 | 3 | 117,00 |
| 30 6574 0600 040 | • 6,0 | 3,0 | 40 | 50 | 6 | 5,8 | 100 | 3 | 134,00 |
| 30 6574 0800 030 | • 8,0 | 4,0 | 30 | - | 8 | - | 75 | 3 | 144,00 |
| 30 6574 0800 040 | • 8,0 | 4,0 | 40 | 60 | 8 | 7,8 | 120 | 3 | 163,00 |
| 30 6574 1000 030 | • 10,0 | 5,0 | 30 | - | 10 | - | 75 | 4 | 179,00 |
| 30 6574 1000 040 | • 10,0 | 5,0 | 40 | - | 10 | - | 100 | 4 | 193,00 |
| 30 6574 1000 060 | • 10,0 | 5,0 | 60 | - | 10 | - | 120 | 4 | 242,00 |
| 30 6574 1200 045 | • 12,0 | 6,0 | 45 | - | 12 | - | 100 | 4 | 213,00 |
| 30 6574 1200 075 | • 12,0 | 6,0 | 75 | - | 12 | - | 120 | 4 | 258,00 |
| 30 6574 1600 045 | • 16,0 | 8,0 | 45 | - | 16 | - | 100 | 4 | 209,40 |
| 30 6574 1600 075 | • 16,0 | 8,0 | 75 | - | 16 | - | 150 | 4 | 258,00 |
| 30 6574 2000 055 | • 20,0 | 10,0 | 55 | - | 20 | - | 100 | 4 | 298,80 |
| 30 6574 2000 075 | • 20,0 | 10,0 | 75 | - | 20 | - | 150 | 4 | 373,80 |
| 30 6574 2000 110 | • 20,0 | 10,0 | 110 | - | 20 | - | 180 | 4 | 576,00 |

Schnittdaten
Cutting data

Zeichnungen
Drawings

1238

DXF/STEP

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



5

6

7

8

9

Index

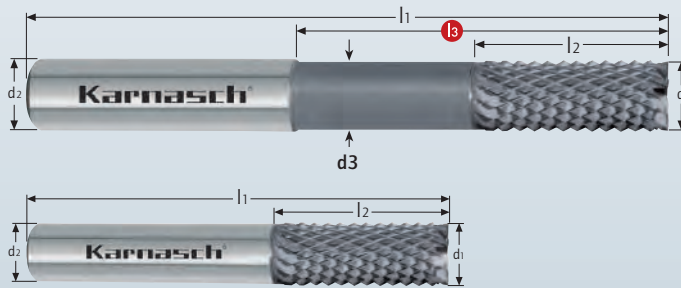
30 6591

T O P
★ ★ ★

Diamantbeschichteter Schruppfräser < 7×D Schnitttiefe, HSC
Diamond coated roughing end mills, < 7×D cutting depth, HSC



- GRAPHIT** graphite **PEEK** CF30
- Aluminium** > 6% Si **GF** GF25
- GFK-CFK** GFRP-CFRP **PVDF** GF25
- Aramid fiber** AFK-SFK **kurz-spanend** short chip
- Hybridstoffe** hybrid materials **FR 4**
- Schichtstoffe** Laminates
- ZIRKON OXID** ZIRCONIA
- PVDF** GF30
- PEEK** GF30



- MICRO GRAIN** KARNASCH NORM
- SPEZIAL** SPECIAL **DIN 6535** Form HA
- HSC** High-Speed-Cutting
- DCA-06**
- Air**

| Test | Reale Schnittdaten Real cutting data |
|------------------------------|---|
| Werkstoff / Work material | Graphit / Graphite |
| | Tool Ø 12,0 |
| | Vc= 320 m/min |
| | n= 8500 min ⁻¹ |
| | Vf= 4000 mm/min |
| | ap= 10 mm |
| | ae= 3 mm |

| Art. | d1 +0/-0,12 | l1 | l2 | l3 | d2 h6 | d3 | Z | € |
|------------------|-------------|-----|----|----|-------|------|---|--------|
| 30 6591 0300 050 | • 3,0 | 50 | 13 | - | 3 | - | 3 | 54,00 |
| 30 6591 0400 050 | • 4,0 | 50 | 16 | - | 4 | - | 4 | 71,00 |
| 30 6591 0600 063 | • 6,0 | 63 | 19 | - | 6 | - | 5 | 96,00 |
| 30 6591 0600 100 | • 6,0 | 100 | 19 | 45 | 6 | 5,5 | 5 | 113,00 |
| 30 6591 0800 063 | • 8,0 | 63 | 25 | - | 8 | - | 6 | 126,00 |
| 30 6591 0800 100 | • 8,0 | 100 | 25 | 55 | 8 | 7,5 | 6 | 148,00 |
| 30 6591 1000 072 | • 10,0 | 72 | 25 | - | 10 | - | 7 | 153,00 |
| 30 6591 1000 100 | • 10,0 | 100 | 25 | 60 | 10 | 9,5 | 7 | 188,00 |
| 30 6591 1200 083 | • 12,0 | 83 | 30 | - | 12 | - | 8 | 208,00 |
| 30 6591 1200 100 | • 12,0 | 100 | 30 | 60 | 12 | 11,5 | 8 | 252,00 |

Schnittdaten Cutting data **i** 1223

Film Movie **▶**

Zeichnungen Drawings **📄** DXF/STEP

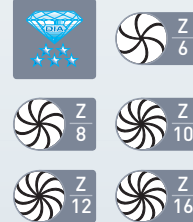
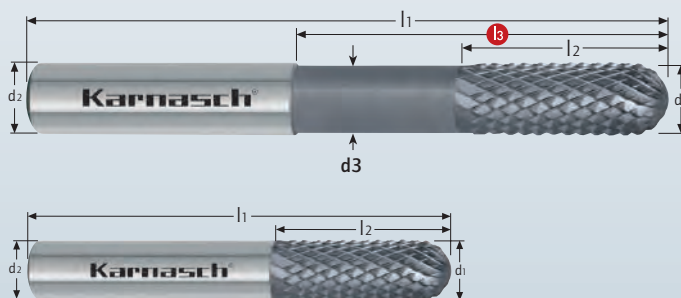
30 6592

T O P
★ ★ ★

Diamantbeschichteter Schruppfräser < 7×D Schnitttiefe, HSC
Diamond coated roughing end mills, < 7×D cutting length, HSC



- GRAPHIT** graphite **PEEK** CF30
- Aluminium** > 6% Si **GF** GF25
- GFK-CFK** GFRP-CFRP **PVDF** GF25
- Aramid fiber** AFK-SFK **kurz-spanend** short chip
- Hybridstoffe** hybrid materials **FR 4**
- Schichtstoffe** Laminates
- ZIRKON OXID** ZIRCONIA
- PVDF** GF30
- PEEK** GF30



- MICRO GRAIN** KARNASCH NORM
- SPEZIAL** SPECIAL **DIN 6535** Form HA
- HSC** High-Speed-Cutting
- DCA-06**
- Air**

| Art. | d1 +0/-0,12 | r | l1 | l2 | l3 | d2 h6 | d3 | Z | € |
|------------------|-------------|-----|-----|----|----|-------|------|----|--------|
| 30 6592 0300 050 | • 3,0 | 1,5 | 50 | 13 | - | 3 | - | 6 | 57,00 |
| 30 6592 0400 050 | • 4,0 | 2,0 | 50 | 16 | - | 4 | - | 8 | 75,00 |
| 30 6592 0600 063 | • 6,0 | 3,0 | 63 | 19 | - | 6 | - | 10 | 101,00 |
| 30 6592 0600 100 | • 6,0 | 3,0 | 100 | 19 | 45 | 6 | 5,5 | 10 | 116,00 |
| 30 6592 0800 063 | • 8,0 | 4,0 | 63 | 25 | - | 8 | - | 12 | 131,00 |
| 30 6592 0800 100 | • 8,0 | 4,0 | 100 | 25 | 55 | 8 | 7,5 | 12 | 156,00 |
| 30 6592 1000 072 | • 10,0 | 5,0 | 72 | 25 | - | 10 | - | 12 | 161,00 |
| 30 6592 1000 100 | • 10,0 | 5,0 | 100 | 25 | 60 | 10 | 9,5 | 12 | 197,00 |
| 30 6592 1200 083 | • 12,0 | 6,0 | 83 | 30 | - | 12 | - | 16 | 220,00 |
| 30 6592 1200 100 | • 12,0 | 6,0 | 100 | 30 | 60 | 12 | 11,5 | 16 | 265,00 |

Schnittdaten Cutting data **i** 1223

Zeichnungen Drawings **📄** DXF/STEP

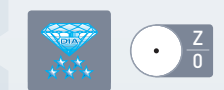
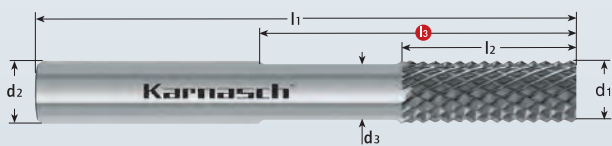
Schruppfräser < 7xD Schnitttiefe, HSC
Diamond coated roughing end mills, < 7xD cutting depth, HSC



T O P
★ ★ ★

30 6593

- GRAPHIT
graphite
- Aluminium
> 6% Si
- GFK-CFK
GFRP-CFRP
- kurz-
spanend
short chip
- ZIRKON
OXID
ZIRCONIA
- FR 4



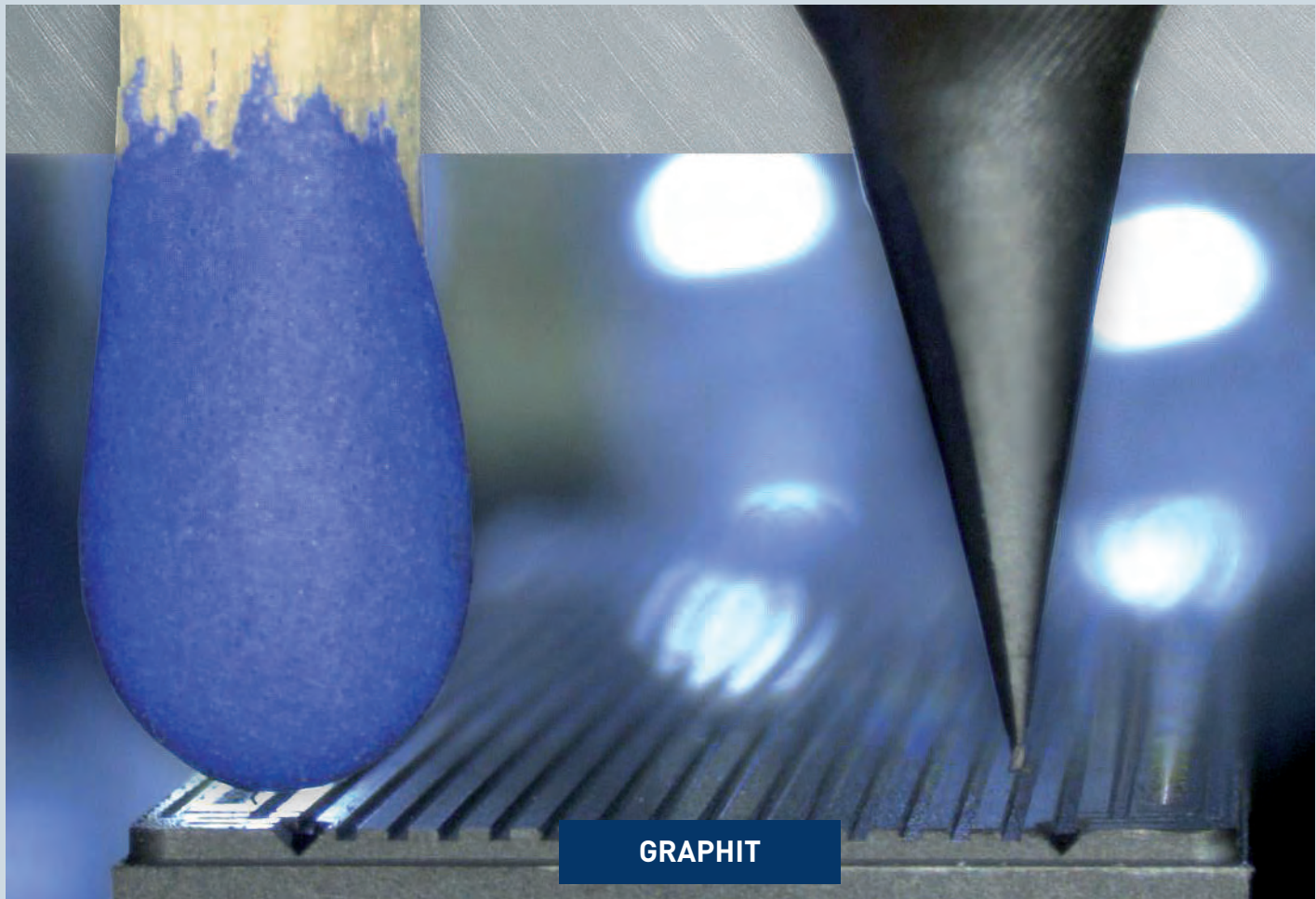
| | |
|--------------------|----------------------------------|
| MICRO GRAIN | KARNASCH NORM |
| DIACUT | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | DCA-06 |
| | |

| Art. | d1 +0/-0,12 | l1 | l3 | l2 | d3 | d2 h6 | € |
|-----------------|-------------|----|----|----|------|-------|-------|
| 30 6593 0300 45 | 3,0 | 45 | - | 10 | - | 3 | 15,00 |
| 30 6593 0400 45 | 4,0 | 45 | - | 10 | - | 4 | 19,80 |
| 30 6593 0600 58 | 6,0 | 58 | - | 15 | - | 6 | 30,00 |
| 30 6593 0600 95 | 6,0 | 95 | 40 | 15 | 5,5 | 6 | 35,40 |
| 30 6593 0800 58 | 8,0 | 58 | - | 20 | - | 8 | 42,60 |
| 30 6593 0800 95 | 8,0 | 95 | 50 | 20 | 7,5 | 8 | 49,80 |
| 30 6593 1000 65 | 10,0 | 65 | - | 20 | - | 10 | 55,20 |
| 30 6593 1000 95 | 10,0 | 95 | 50 | 20 | 9,5 | 10 | 58,80 |
| 30 6593 1200 75 | 12,0 | 75 | - | 20 | - | 12 | 65,40 |
| 30 6593 1200 92 | 12,0 | 92 | 50 | 20 | 11,5 | 12 | 69,00 |

⊘ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.
Nachfolgewerkzeug / Replacement article 30 6591

Schnittdaten
Cutting data

1223



- 1
 - 2
 - 3
 - 4
 - 5
 - 6
 - 7
 - 8
 - 9
- Index

30 6632

PROFESSIONAL

CBN Eckenradius High-End Micro Schaftfräser < 6xD Schnitttiefe, Schaft 4 mm / 6 mm
CBN micro end mills with corner radius < 6xD cutting depth, shank 4 mm / 6 mm



VANADIS 4
Extra
Superclean

PULVER-
METALLE
> 60 HRC
powder metals

HRC
< 72

HRC
< 65

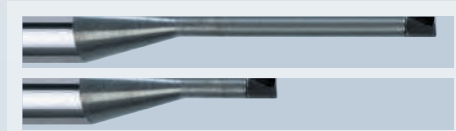
HRC
< 60

NI-
ALLOYS
< 900 N/mm²

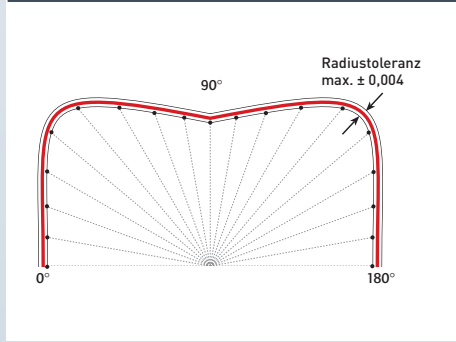
GJL

GJS

GTW
GTS



TOLERANZ / TOLERANCE



d1* = Ø 0,3 - Ø 6,0 tol 0 / -0,01

| | |
|--------------------|---------------------|
| CBN MICRO-GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| 30° | HHC HSC HPC |
| CBN | |

Schnittdaten
Cutting data



1228-1229

Zeichnungen
Drawings



DXF/STEP



| Art. | d1* | r ± 0,004 | l3 | d2 h5 | d3 | l1 | l2 | Z | € |
|----------------------|-----|-----------|-----|-------|------|----|-----|---|--------|
| 30 6632 0040 004 02 | 0,4 | 0,04 | 2 | 6 | 0,36 | 50 | 0,4 | 2 | 64,20 |
| 30 6632 0040 005 | 0,4 | 0,05 | - | 4 | 0,38 | 48 | 0,3 | 2 | 64,20 |
| 30 6632 0040 005 015 | 0,4 | 0,05 | 1,5 | 4 | 0,38 | 48 | 0,3 | 2 | 126,00 |
| 30 6632 0050 005 015 | 0,5 | 0,05 | 1,5 | 4 | 0,48 | 48 | 0,4 | 2 | 123,00 |
| 30 6632 0050 005 020 | 0,5 | 0,05 | 2 | 4 | 0,48 | 48 | 0,4 | 2 | 123,00 |
| 30 6632 0050 005 03 | 0,5 | 0,05 | 3 | 6 | 0,48 | 50 | 0,5 | 2 | 68,40 |
| 30 6632 0050 005 030 | 0,5 | 0,05 | 3 | 4 | 0,48 | 48 | 0,4 | 2 | 135,00 |
| 30 6632 0050 005 040 | 0,5 | 0,05 | 4 | 4 | 0,48 | 48 | 0,4 | 2 | 135,00 |
| 30 6632 0050 005 050 | 0,5 | 0,05 | 5 | 4 | 0,48 | 48 | 0,4 | 2 | 135,00 |
| 30 6632 0060 005 030 | 0,6 | 0,05 | 3 | 4 | 0,58 | 48 | 0,5 | 2 | 135,00 |
| 30 6632 0060 005 040 | 0,6 | 0,05 | 4 | 4 | 0,58 | 48 | 0,5 | 2 | 135,00 |
| 30 6632 0060 005 060 | 0,6 | 0,05 | 6 | 4 | 0,58 | 48 | 0,5 | 2 | 135,00 |
| 30 6632 0080 008 01 | 0,8 | 0,08 | 1 | 6 | 0,77 | 50 | 0,8 | 2 | 56,40 |
| 30 6632 0080 010 020 | 0,8 | 0,10 | 2 | 4 | 0,77 | 48 | 0,6 | 2 | 54,00 |
| 30 6632 0080 010 040 | 0,8 | 0,10 | 4 | 4 | 0,77 | 48 | 0,6 | 2 | 111,00 |
| 30 6632 0080 010 060 | 0,8 | 0,10 | 6 | 4 | 0,77 | 48 | 0,6 | 2 | 111,00 |
| 30 6632 0080 020 040 | 0,8 | 0,20 | 4 | 4 | 0,77 | 48 | 0,6 | 2 | 111,00 |
| 30 6632 0080 020 060 | 0,8 | 0,20 | 6 | 4 | 0,77 | 48 | 0,6 | 2 | 111,00 |
| 30 6632 0100 010 040 | 1,0 | 0,10 | 4 | 4 | 0,95 | 48 | 0,7 | 2 | 111,00 |
| 30 6632 0100 010 060 | 1,0 | 0,10 | 6 | 4 | 0,95 | 48 | 0,7 | 2 | 111,00 |
| 30 6632 0100 010 080 | 1,0 | 0,10 | 8 | 4 | 0,95 | 48 | 0,7 | 2 | 111,00 |
| 30 6632 0100 010 100 | 1,0 | 0,10 | 10 | 4 | 0,95 | 48 | 0,7 | 2 | 111,00 |
| 30 6632 0120 010 040 | 1,2 | 0,10 | 4 | 4 | 1,15 | 48 | 0,7 | 2 | 119,00 |
| 30 6632 0120 010 060 | 1,2 | 0,10 | 6 | 4 | 1,15 | 48 | 0,7 | 2 | 119,00 |
| 30 6632 0120 010 080 | 1,2 | 0,10 | 8 | 4 | 1,15 | 48 | 0,7 | 2 | 119,00 |
| 30 6632 0120 010 100 | 1,2 | 0,10 | 10 | 4 | 1,15 | 48 | 0,7 | 2 | 119,00 |



PROFESSIONAL



30 6632

| Art. | d1* | r ± 0,004 | l3 | d2 h5 | d3 | l1 | l2 | Z | € |
|----------------------|-------|-----------|----|-------|------|----|-----|---|--------|
| 30 6632 0120 012 02 | % 1,2 | 0,12 | 2 | 6 | 1,15 | 50 | 1,2 | 2 | 60,60 |
| 30 6632 0120 012 04 | % 1,2 | 0,12 | 4 | 6 | 1,15 | 50 | 1,2 | 2 | 60,60 |
| 30 6632 0120 012 05 | % 1,2 | 0,12 | 5 | 6 | 1,15 | 50 | 1,2 | 2 | 60,60 |
| 30 6632 0120 012 06 | % 1,2 | 0,12 | 6 | 6 | 1,15 | 50 | 1,2 | 2 | 60,60 |
| 30 6632 0150 015 02 | % 1,5 | 0,15 | 2 | 6 | 1,45 | 50 | 1,5 | 2 | 60,60 |
| 30 6632 0150 015 03 | % 1,5 | 0,15 | 3 | 6 | 1,45 | 50 | 1,5 | 2 | 60,60 |
| 30 6632 0150 015 07 | % 1,5 | 0,15 | 7 | 6 | 1,45 | 50 | 1,5 | 2 | 60,60 |
| 30 6632 0150 015 08 | % 1,5 | 0,15 | 8 | 6 | 1,45 | 50 | 1,5 | 2 | 60,60 |
| 30 6632 0150 020 | % 1,5 | 0,20 | - | 4 | 1,44 | 48 | 0,8 | 2 | 60,60 |
| 30 6632 0150 020 020 | % 1,5 | 0,20 | 2 | 4 | 1,44 | 48 | 0,8 | 2 | 60,60 |
| 30 6632 0150 020 040 | • 1,5 | 0,20 | 4 | 4 | 1,44 | 48 | 0,8 | 2 | 119,00 |
| 30 6632 0150 020 060 | • 1,5 | 0,20 | 6 | 4 | 1,44 | 48 | 0,8 | 2 | 119,00 |
| 30 6632 0150 020 080 | • 1,5 | 0,20 | 8 | 4 | 1,44 | 48 | 0,8 | 2 | 119,00 |
| 30 6632 0150 020 100 | • 1,5 | 0,20 | 10 | 4 | 1,44 | 48 | 0,8 | 2 | 119,00 |
| 30 6632 0200 020 | % 2,0 | 0,20 | - | 4 | 1,92 | 50 | 0,9 | 2 | 64,80 |
| 30 6632 0200 020 060 | • 2,0 | 0,20 | 6 | 4 | 1,92 | 50 | 0,9 | 2 | 128,00 |
| 30 6632 0200 020 08 | % 2,0 | 0,20 | 8 | 6 | 1,95 | 50 | 2,0 | 2 | 64,80 |
| 30 6632 0200 020 080 | • 2,0 | 0,20 | 8 | 4 | 1,92 | 50 | 0,9 | 2 | 128,00 |
| 30 6632 0200 020 09 | % 2,0 | 0,20 | 9 | 6 | 1,95 | 50 | 2,0 | 2 | 64,80 |
| 30 6632 0200 020 10 | % 2,0 | 0,20 | 10 | 6 | 1,95 | 50 | 2,0 | 2 | 64,80 |
| 30 6632 0200 020 100 | • 2,0 | 0,20 | 10 | 4 | 1,92 | 50 | 0,9 | 2 | 128,00 |
| 30 6632 0200 020 12 | % 2,0 | 0,20 | 12 | 6 | 1,95 | 50 | 2,0 | 2 | 64,80 |
| 30 6632 0300 030 060 | • 3,0 | 0,30 | 6 | 6 | 2,90 | 66 | 1,2 | 2 | 206,00 |
| 30 6632 0300 030 100 | • 3,0 | 0,30 | 10 | 6 | 2,90 | 66 | 1,2 | 2 | 206,00 |
| 30 6632 0300 030 160 | • 3,0 | 0,30 | 16 | 6 | 2,90 | 66 | 1,2 | 2 | 206,00 |
| 30 6632 0300 030 200 | • 3,0 | 0,30 | 20 | 6 | 2,90 | 66 | 1,2 | 2 | 206,00 |
| 30 6632 0400 050 060 | • 4,0 | 0,50 | 6 | 6 | 3,90 | 66 | 1,5 | 2 | 237,00 |
| 30 6632 0400 050 100 | • 4,0 | 0,50 | 10 | 6 | 3,90 | 66 | 1,5 | 2 | 237,00 |
| 30 6632 0400 050 160 | • 4,0 | 0,50 | 16 | 6 | 3,90 | 66 | 1,5 | 2 | 237,00 |
| 30 6632 0600 050 | • 6,0 | 0,50 | - | 6 | 5,90 | 83 | 3,0 | 2 | 368,00 |
| 30 6632 0600 050 150 | • 6,0 | 0,50 | 15 | 6 | 5,90 | 83 | 3,0 | 2 | 368,00 |

Neu in spiralisierter Ausführung / New in spiralled design

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

KARNASCH Micro-Tools für den Formenbau.
KARNASCH Micro-Tools for mould construction.

MICROTOOL MANUFACTURE

**HOCHLEISTUNG
BIS INS KLEINSTE DETAIL**

High performance in smallest detail



30 6633

PROFESSIONAL
★ ★ ★

CBN 3D High-End Micro Schaftfräser < 10xD Schnitttiefe, Schaft 4 mm / 6 mm
CBN 3D High-end micro end mill < 10xD cutting depth, shank 4 mm / 6 mm



VANADIS 4
Extra
Superclean

PULVER-
METALLE
> 60 HRC
powder metals

HRC
< 72

HRC
< 65

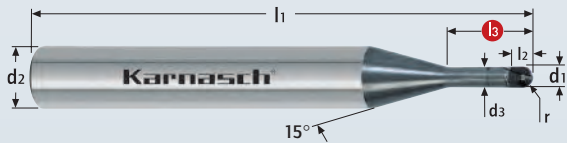
HRC
< 60

NI-CO
ALLOYS
> 900 N/mm²

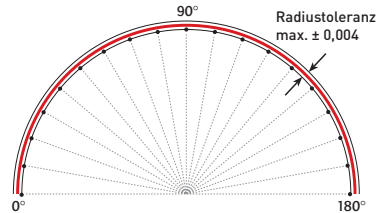
GJL

GJS

GTW
GTS



TOLERANZ / TOLERANCE



d1* = Ø 0,2 - Ø 6,0 tol 0 / -0,01

CBN
MICRO-GRAIN

KARNASCH
NORM

SPEZIAL
SPECIAL

DIN 6535
Form HA



HHC
HSC
HPC



CBN



Schnittdaten
Cutting data

Zeichnungen
Drawings



1230-1231

DXF/STEP



| Art. | d1* | r ± 0,004 | l3 | d2 h5 | d3 | l1 | l2 | € |
|------------------|-------|-----------|-----|-------|------|----|-----|--------|
| 30 6633 0020 002 | • 0,2 | 0,10 | - | 4 | 0,18 | 48 | 0,2 | 123,00 |
| 30 6633 0030 003 | • 0,3 | 0,15 | - | 4 | 0,28 | 48 | 0,3 | 118,00 |
| 30 6633 0030 005 | • 0,3 | 0,15 | - | 4 | 0,28 | 48 | 0,5 | 130,00 |
| 30 6633 0040 003 | % 0,4 | 0,20 | - | 4 | 0,38 | 48 | 0,3 | 58,20 |
| 30 6633 0040 015 | • 0,4 | 0,20 | 1,5 | 4 | 0,38 | 48 | 0,3 | 115,00 |
| 30 6633 0040 020 | • 0,4 | 0,20 | 2 | 4 | 0,38 | 48 | 0,3 | 115,00 |
| 30 6633 0040 03 | % 0,4 | 0,20 | 3 | 6 | 0,38 | 50 | 0,5 | 64,80 |
| 30 6633 0040 030 | • 0,4 | 0,20 | 3 | 4 | 0,38 | 48 | 0,3 | 127,00 |
| 30 6633 0040 04 | % 0,4 | 0,20 | 4 | 6 | 0,38 | 50 | 0,5 | 64,80 |
| 30 6633 0040 040 | • 0,4 | 0,20 | 4 | 4 | 0,38 | 48 | 0,3 | 127,00 |
| 30 6633 0040 050 | • 0,4 | 0,20 | 5 | 4 | 0,38 | 48 | 0,3 | 127,00 |
| 30 6633 0040 060 | • 0,4 | 0,20 | 6 | 4 | 0,38 | 48 | 0,3 | 127,00 |
| 30 6633 0050 01 | % 0,5 | 0,25 | 1 | 6 | 0,48 | 50 | 0,5 | 57,00 |
| 30 6633 0050 015 | • 0,5 | 0,25 | 1,5 | 4 | 0,48 | 48 | 0,4 | 112,00 |
| 30 6633 0050 02 | % 0,5 | 0,25 | 2 | 6 | 0,48 | 50 | 0,5 | 57,00 |
| 30 6633 0050 020 | • 0,5 | 0,25 | 2 | 4 | 0,48 | 48 | 0,4 | 112,00 |
| 30 6633 0050 030 | • 0,5 | 0,25 | 3 | 4 | 0,48 | 48 | 0,4 | 125,00 |
| 30 6633 0050 04 | % 0,5 | 0,25 | 4 | 6 | 0,48 | 50 | 0,5 | 63,60 |
| 30 6633 0050 040 | • 0,5 | 0,25 | 4 | 4 | 0,48 | 48 | 0,4 | 125,00 |
| 30 6633 0050 05 | % 0,5 | 0,25 | 5 | 6 | 0,48 | 50 | 0,5 | 63,60 |
| 30 6633 0050 050 | • 0,5 | 0,25 | 5 | 4 | 0,48 | 48 | 0,4 | 125,00 |
| 30 6633 0050 060 | • 0,5 | 0,25 | 6 | 4 | 0,48 | 48 | 0,4 | 125,00 |
| 30 6633 0050 080 | • 0,5 | 0,25 | 8 | 4 | 0,48 | 48 | 0,4 | 125,00 |
| 30 6633 0060 015 | • 0,6 | 0,30 | 1,5 | 4 | 0,58 | 48 | 0,5 | 112,00 |
| 30 6633 0060 02 | % 0,6 | 0,30 | 2 | 6 | 0,58 | 50 | 0,6 | 57,00 |
| 30 6633 0060 020 | • 0,6 | 0,30 | 2 | 4 | 0,58 | 48 | 0,5 | 112,00 |
| 30 6633 0060 030 | • 0,6 | 0,30 | 3 | 4 | 0,58 | 48 | 0,5 | 125,00 |
| 30 6633 0060 040 | • 0,6 | 0,30 | 4 | 4 | 0,58 | 48 | 0,5 | 125,00 |
| 30 6633 0060 050 | • 0,6 | 0,30 | 5 | 4 | 0,58 | 48 | 0,5 | 125,00 |
| 30 6633 0060 06 | % 0,6 | 0,30 | 6 | 6 | 0,58 | 50 | 0,6 | 63,60 |
| 30 6633 0060 060 | • 0,6 | 0,30 | 6 | 4 | 0,58 | 48 | 0,5 | 125,00 |
| 30 6633 0060 080 | • 0,6 | 0,30 | 8 | 4 | 0,58 | 48 | 0,5 | 125,00 |
| 30 6633 0060 100 | • 0,6 | 0,30 | 10 | 4 | 0,58 | 48 | 0,5 | 125,00 |
| 30 6633 0080 040 | • 0,8 | 0,40 | 4 | 4 | 0,77 | 48 | 0,6 | 111,00 |
| 30 6633 0080 05 | % 0,8 | 0,40 | 5 | 6 | 0,77 | 50 | 0,8 | 56,40 |
| 30 6633 0080 06 | % 0,8 | 0,40 | 6 | 6 | 0,77 | 50 | 0,8 | 56,40 |
| 30 6633 0080 060 | • 0,8 | 0,40 | 6 | 4 | 0,77 | 48 | 0,6 | 111,00 |
| 30 6633 0080 07 | % 0,8 | 0,40 | 7 | 6 | 0,77 | 50 | 0,8 | 56,40 |
| 30 6633 0080 08 | % 0,8 | 0,40 | 8 | 6 | 0,77 | 50 | 0,8 | 56,40 |
| 30 6633 0080 080 | • 0,8 | 0,40 | 8 | 4 | 0,77 | 48 | 0,6 | 111,00 |
| 30 6633 0080 100 | • 0,8 | 0,40 | 10 | 4 | 0,77 | 48 | 0,6 | 111,00 |



PROFESSIONAL



30 6633

| Art. | d1* | r ± 0,004 | l3 | d2 h5 | d3 | l1 | l2 | € |
|------------------|-------|-----------|-----|-------|------|----|-----|--------|
| 30 6633 0100 040 | • 1,0 | 0,50 | 4 | 4 | 0,95 | 48 | 0,7 | 111,00 |
| 30 6633 0100 050 | • 1,0 | 0,50 | 5 | 4 | 0,95 | 48 | 0,7 | 111,00 |
| 30 6633 0100 060 | • 1,0 | 0,50 | 6 | 4 | 0,95 | 48 | 0,7 | 111,00 |
| 30 6633 0100 080 | • 1,0 | 0,50 | 8 | 4 | 0,95 | 48 | 0,7 | 111,00 |
| 30 6633 0100 10 | % 1,0 | 0,50 | 10 | 6 | 0,95 | 50 | 1,0 | 56,40 |
| 30 6633 0100 100 | • 1,0 | 0,50 | 10 | 4 | 0,95 | 48 | 0,7 | 111,00 |
| 30 6633 0100 120 | • 1,0 | 0,50 | 12 | 4 | 0,95 | 48 | 0,7 | 111,00 |
| 30 6633 0100 160 | • 1,0 | 0,50 | 16 | 4 | 0,95 | 48 | 0,7 | 111,00 |
| 30 6633 0120 015 | % 1,2 | 0,60 | 1,5 | 4 | 1,15 | 48 | 0,8 | 60,60 |
| 30 6633 0120 02 | % 1,2 | 0,60 | 2 | 6 | 1,15 | 50 | 1,2 | 60,60 |
| 30 6633 0120 020 | % 1,2 | 0,60 | 2 | 4 | 1,15 | 48 | 0,8 | 60,60 |
| 30 6633 0120 03 | % 1,2 | 0,60 | 3 | 6 | 1,15 | 50 | 1,2 | 60,60 |
| 30 6633 0120 030 | % 1,2 | 0,60 | 3 | 4 | 1,15 | 48 | 0,8 | 60,60 |
| 30 6633 0120 04 | % 1,2 | 0,60 | 4 | 6 | 1,15 | 50 | 1,2 | 60,60 |
| 30 6633 0120 040 | • 1,2 | 0,60 | 4 | 4 | 1,15 | 48 | 0,8 | 119,00 |
| 30 6633 0120 05 | % 1,2 | 0,60 | 5 | 6 | 1,15 | 50 | 1,2 | 60,60 |
| 30 6633 0120 06 | % 1,2 | 0,60 | 6 | 6 | 1,15 | 50 | 1,2 | 60,60 |
| 30 6633 0120 060 | • 1,2 | 0,60 | 6 | 4 | 1,15 | 48 | 0,8 | 119,00 |
| 30 6633 0120 07 | % 1,2 | 0,60 | 7 | 6 | 1,15 | 50 | 1,2 | 60,60 |
| 30 6633 0120 08 | % 1,2 | 0,60 | 8 | 6 | 1,15 | 50 | 1,2 | 60,60 |
| 30 6633 0120 080 | • 1,2 | 0,60 | 8 | 4 | 1,15 | 48 | 0,8 | 119,00 |
| 30 6633 0120 10 | % 1,2 | 0,60 | 10 | 6 | 1,15 | 50 | 1,2 | 60,60 |
| 30 6633 0120 100 | • 1,2 | 0,60 | 10 | 4 | 1,15 | 48 | 0,8 | 119,00 |
| 30 6633 0120 12 | % 1,2 | 0,60 | 12 | 6 | 1,15 | 50 | 1,2 | 60,60 |
| 30 6633 0120 120 | • 1,2 | 0,60 | 12 | 4 | 1,15 | 48 | 0,8 | 119,00 |
| 30 6633 0120 160 | • 1,2 | 0,60 | 16 | 4 | 1,15 | 48 | 0,8 | 119,00 |
| 30 6633 0150 040 | • 1,5 | 0,75 | 4 | 4 | 1,44 | 48 | 1,0 | 119,00 |
| 30 6633 0150 05 | % 1,5 | 0,75 | 5 | 6 | 1,45 | 50 | 1,5 | 56,40 |
| 30 6633 0150 060 | • 1,5 | 0,75 | 6 | 4 | 1,44 | 48 | 1,0 | 119,00 |
| 30 6633 0150 080 | • 1,5 | 0,75 | 8 | 4 | 1,44 | 48 | 1,0 | 119,00 |
| 30 6633 0150 10 | % 1,5 | 0,75 | 10 | 6 | 1,45 | 50 | 1,5 | 60,60 |
| 30 6633 0150 100 | • 1,5 | 0,75 | 10 | 4 | 1,44 | 48 | 1,0 | 119,00 |
| 30 6633 0150 12 | % 1,5 | 0,75 | 12 | 6 | 1,45 | 50 | 1,5 | 60,60 |
| 30 6633 0150 120 | • 1,5 | 0,75 | 12 | 4 | 1,44 | 48 | 1,0 | 119,00 |
| 30 6633 0150 140 | • 1,5 | 0,75 | 14 | 4 | 1,44 | 48 | 1,0 | 119,00 |
| 30 6633 0150 15 | % 1,5 | 0,75 | 15 | 6 | 1,45 | 50 | 1,5 | 60,60 |
| 30 6633 0150 160 | • 1,5 | 0,75 | 16 | 4 | 1,44 | 48 | 1,0 | 119,00 |
| 30 6633 0150 180 | • 1,5 | 0,75 | 18 | 4 | 1,44 | 48 | 1,0 | 119,00 |
| 30 6633 0200 012 | % 2,0 | 1,00 | - | 4 | 1,92 | 50 | 1,2 | 64,80 |
| 30 6633 0200 040 | • 2,0 | 1,00 | 4 | 4 | 1,92 | 50 | 1,2 | 128,00 |
| 30 6633 0200 060 | • 2,0 | 1,00 | 6 | 4 | 1,92 | 50 | 1,2 | 128,00 |
| 30 6633 0200 080 | • 2,0 | 1,00 | 8 | 4 | 1,92 | 50 | 1,2 | 128,00 |
| 30 6633 0200 100 | • 2,0 | 1,00 | 10 | 4 | 1,92 | 50 | 1,2 | 128,00 |
| 30 6633 0200 120 | • 2,0 | 1,00 | 12 | 4 | 1,92 | 50 | 1,2 | 128,00 |
| 30 6633 0200 140 | • 2,0 | 1,00 | 14 | 4 | 1,92 | 50 | 1,2 | 128,00 |
| 30 6633 0200 160 | • 2,0 | 1,00 | 16 | 4 | 1,92 | 50 | 1,2 | 128,00 |
| 30 6633 0200 18 | % 2,0 | 1,00 | 18 | 6 | 1,95 | 50 | 2,0 | 64,80 |
| 30 6633 0200 180 | • 2,0 | 1,00 | 18 | 4 | 1,92 | 50 | 1,2 | 128,00 |
| 30 6633 0200 20 | % 2,0 | 1,00 | 20 | 6 | 1,95 | 50 | 2,0 | 64,80 |
| 30 6633 0300 060 | • 3,0 | 1,50 | 6 | 6 | 2,90 | 66 | 1,8 | 206,00 |
| 30 6633 0300 080 | • 3,0 | 1,50 | 8 | 6 | 2,90 | 66 | 1,8 | 206,00 |
| 30 6633 0300 100 | • 3,0 | 1,50 | 10 | 6 | 2,90 | 66 | 1,8 | 206,00 |
| 30 6633 0300 120 | • 3,0 | 1,50 | 12 | 6 | 2,90 | 66 | 1,8 | 206,00 |
| 30 6633 0300 15 | % 3,0 | 1,50 | 15 | 6 | 2,95 | 60 | 3,0 | 105,00 |
| 30 6633 0300 160 | • 3,0 | 1,50 | 16 | 6 | 2,90 | 66 | 1,8 | 206,00 |
| 30 6633 0300 20 | % 3,0 | 1,50 | 20 | 6 | 2,95 | 60 | 3,0 | 105,00 |
| 30 6633 0300 200 | • 3,0 | 1,50 | 20 | 6 | 2,90 | 66 | 1,8 | 206,00 |
| 30 6633 0400 060 | • 4,0 | 2,00 | 6 | 6 | 3,90 | 66 | 2,4 | 237,00 |
| 30 6633 0400 080 | • 4,0 | 2,00 | 8 | 6 | 3,90 | 66 | 2,4 | 237,00 |
| 30 6633 0400 100 | • 4,0 | 2,00 | 10 | 6 | 3,90 | 66 | 2,4 | 237,00 |
| 30 6633 0400 120 | • 4,0 | 2,00 | 12 | 6 | 3,90 | 66 | 2,4 | 237,00 |
| 30 6633 0400 160 | • 4,0 | 2,00 | 16 | 6 | 3,90 | 66 | 2,4 | 237,00 |
| 30 6633 0400 200 | • 4,0 | 2,00 | 20 | 6 | 3,90 | 66 | 2,4 | 237,00 |
| 30 6633 0600 035 | • 6,0 | 3,00 | - | 6 | 5,90 | 83 | 3,5 | 368,00 |
| 30 6633 0600 100 | • 6,0 | 3,00 | 10 | 6 | 5,90 | 83 | 3,5 | 368,00 |
| 30 6633 0600 200 | • 6,0 | 3,00 | 20 | 6 | 5,90 | 83 | 3,5 | 368,00 |

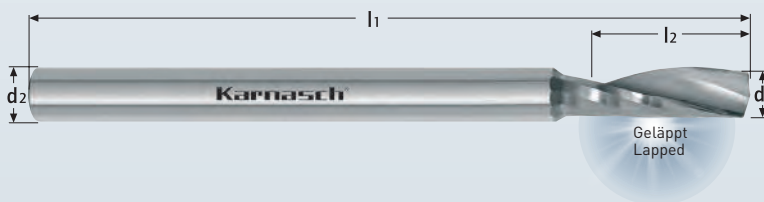
* Neu in spiralisierter Ausführung / New in spiralled design

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



29 1652

Vollhartmetall Einzahnfräser, rechtsspirale – rechtsschneidend, ziehender Schnitt
Solid carbide one-tooth end mill, right spiral – right cutting, drawing cut (upcut)



| | |
|----------------------|---------------------|
| d1* = Ø ≤ 3,0 | tol -0,000 / -0,040 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |

| | |
|---------------------------|----------------------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | 30° |
| | HSC High-Speed-Cutting |
| | GELÄPPT LAPPED |
| | Air |

- 1 Acryl
Acrylic
- PMMA
GS
- PE
PP
- PA
- PS
- ABS
- PC
PET
PPE
- PMMA
XT
- MAKROLON
- Wachs
Wax

| Art. | d1* | l2 | d2 h6 | l1 | Z | € |
|-------------------------|---------|------|-------|-----|---|--------|
| 29 1652 0010 003 03 030 | • 0,10 | 0,3 | 3 | 30 | 1 | 46,00 |
| 29 1652 0020 006 03 030 | • 0,20 | 0,6 | 3 | 30 | 1 | 35,00 |
| 29 1652 0030 010 03 030 | • 0,30 | 1,0 | 3 | 30 | 1 | 30,00 |
| 29 1652 0040 010 03 030 | • 0,40 | 1,0 | 3 | 30 | 1 | 30,00 |
| 29 1652 0050 015 03 030 | • 0,50 | 1,5 | 3 | 30 | 1 | 27,00 |
| 29 1652 0060 030 03 030 | • 0,60 | 3,0 | 3 | 30 | 1 | 27,00 |
| 29 1652 0080 050 03 030 | • 0,80 | 5,0 | 3 | 30 | 1 | 27,00 |
| 29 1652 0100 040 03 030 | • 1,00 | 4,0 | 3 | 30 | 1 | 27,00 |
| 29 1652 0150 060 03 030 | • 1,50 | 6,0 | 3 | 30 | 1 | 27,00 |
| 29 1652 0200 060 03 030 | • 2,00 | 6,0 | 3 | 30 | 1 | 27,00 |
| 29 1652 0200 060 04 050 | • 2,00 | 6,0 | 4 | 50 | 1 | 33,00 |
| 29 1652 0200 060 06 050 | • 2,00 | 6,0 | 6 | 50 | 1 | 38,00 |
| 29 1652 0200 080 03 030 | • 2,00 | 8,0 | 3 | 30 | 1 | 27,00 |
| 29 1652 0200 110 03 038 | • 2,00 | 11,0 | 3 | 38 | 1 | 33,00 |
| 29 1652 0300 060 03 030 | • 3,00 | 6,0 | 3 | 30 | 1 | 27,00 |
| 29 1652 0300 060 06 050 | • 3,00 | 6,0 | 6 | 50 | 1 | 41,00 |
| 29 1652 0300 110 03 038 | • 3,00 | 11,0 | 3 | 38 | 1 | 33,00 |
| 29 1652 0300 110 04 050 | • 3,00 | 11,0 | 4 | 50 | 1 | 41,00 |
| 29 1652 0300 110 06 050 | • 3,00 | 11,0 | 6 | 50 | 1 | 45,00 |
| 29 1652 0300 220 03 050 | • 3,00 | 22,0 | 3 | 50 | 1 | 37,00 |
| 29 1652 0300 220 06 060 | • 3,00 | 22,0 | 6 | 60 | 1 | 47,00 |
| 29 1652 0400 080 04 050 | • 4,00 | 8,0 | 4 | 50 | 1 | 36,00 |
| 29 1652 0400 080 06 050 | • 4,00 | 8,0 | 6 | 50 | 1 | 42,00 |
| 29 1652 0400 120 04 050 | • 4,00 | 12,0 | 4 | 50 | 1 | 36,00 |
| 29 1652 0400 120 06 050 | • 4,00 | 12,0 | 6 | 50 | 1 | 42,00 |
| 29 1652 0400 140 04 050 | • 4,00 | 14,0 | 4 | 50 | 1 | 36,00 |
| 29 1652 0400 140 06 050 | • 4,00 | 14,0 | 6 | 50 | 1 | 42,00 |
| 29 1652 0400 220 04 050 | • 4,00 | 22,0 | 4 | 50 | 1 | 39,00 |
| 29 1652 0400 220 06 050 | • 4,00 | 22,0 | 6 | 50 | 1 | 45,00 |
| 29 1652 0400 320 04 064 | • 4,00 | 32,0 | 4 | 64 | 1 | 41,00 |
| 29 1652 0500 120 06 050 | • 5,00 | 12,0 | 6 | 50 | 1 | 44,00 |
| 29 1652 0500 160 06 050 | • 5,00 | 16,0 | 6 | 50 | 1 | 44,00 |
| 29 1652 0500 220 06 050 | • 5,00 | 22,0 | 6 | 50 | 1 | 44,00 |
| 29 1652 0600 120 06 050 | • 6,00 | 12,0 | 6 | 50 | 1 | 42,00 |
| 29 1652 0600 220 06 050 | • 6,00 | 22,0 | 6 | 50 | 1 | 44,00 |
| 29 1652 0600 220 06 058 | • 6,00 | 22,0 | 6 | 58 | 1 | 45,00 |
| 29 1652 0600 320 06 064 | • 6,00 | 32,0 | 6 | 64 | 1 | 50,00 |
| 29 1652 0600 420 06 075 | • 6,00 | 42,0 | 6 | 75 | 1 | 55,00 |
| 29 1652 0600 320 06 100 | • 6,00 | 32,0 | 6 | 100 | 1 | 56,00 |
| 29 1652 0800 220 08 064 | • 8,00 | 22,0 | 8 | 64 | 1 | 53,00 |
| 29 1652 0800 320 08 064 | • 8,00 | 32,0 | 8 | 64 | 1 | 58,00 |
| 29 1652 0800 420 08 075 | • 8,00 | 42,0 | 8 | 75 | 1 | 67,00 |
| 29 1652 0800 420 08 100 | • 8,00 | 42,0 | 8 | 100 | 1 | 73,00 |
| 29 1652 0800 550 08 100 | • 8,00 | 55,0 | 8 | 100 | 1 | 77,00 |
| 29 1652 1000 220 10 064 | • 10,00 | 22,0 | 10 | 64 | 1 | 78,00 |
| 29 1652 1000 320 10 075 | • 10,00 | 32,0 | 10 | 75 | 1 | 84,00 |
| 29 1652 1000 550 10 100 | • 10,00 | 55,0 | 10 | 100 | 1 | 96,00 |
| 29 1652 1000 750 10 120 | • 10,00 | 75,0 | 10 | 120 | 1 | 108,00 |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1265 | DXF/STEP |

Vollhartmetall Einzahnfräser, linksspirale – rechtsschneidend, schiebender Schnitt
Solid carbide one-tooth end mill, left spiral – right cutting, pushing cut (down cut)



29 1654

- Acryl
Acrylic
- PMMA
GS
- PE
PP
- PA
- PS
- ABS
- PC
PET
PPE
- PMMA
XT
- MAKROLON
- Wachs
Wax



| | |
|----------------------|---------------------|
| d1* = Ø 3,0 | tol -0,000 / -0,040 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |

| Art. | d1* | l2 | d2 h6 | l3 | l1 | Z | € |
|------------------------|--------|----|-------|----|-----|---|-------|
| 29 1654 0100 04 03 040 | • 1,0 | 4 | 3 | - | 40 | 1 | 31,00 |
| 29 1654 0150 06 03 040 | • 1,5 | 6 | 3 | - | 40 | 1 | 31,00 |
| 29 1654 0200 03 03 050 | • 2,0 | 3 | 3 | - | 50 | 1 | 33,00 |
| 29 1654 0200 06 06 050 | • 2,0 | 6 | 6 | - | 50 | 1 | 35,00 |
| 29 1654 0200 08 03 040 | • 2,0 | 8 | 3 | - | 40 | 1 | 37,00 |
| 29 1654 0300 04 03 050 | • 3,0 | 4 | 3 | - | 50 | 1 | 33,00 |
| 29 1654 0300 06 03 050 | • 3,0 | 6 | 3 | - | 50 | 1 | 33,00 |
| 29 1654 0300 10 03 030 | • 3,0 | 10 | 3 | - | 30 | 1 | 34,00 |
| 29 1654 0300 10 03 060 | • 3,0 | 10 | 3 | - | 60 | 1 | 35,00 |
| 29 1654 0300 12 06 050 | • 3,0 | 12 | 6 | - | 50 | 1 | 40,00 |
| 29 1654 0300 15 08 075 | • 3,0 | 15 | 8 | - | 75 | 1 | 50,00 |
| 29 1654 0300 18 08 100 | • 3,0 | 18 | 8 | - | 100 | 1 | 57,00 |
| 29 1654 0400 05 04 050 | • 4,0 | 5 | 4 | - | 50 | 1 | 36,00 |
| 29 1654 0400 08 04 040 | • 4,0 | 8 | 4 | - | 40 | 1 | 36,00 |
| 29 1654 0400 14 06 050 | • 4,0 | 14 | 6 | - | 50 | 1 | 39,00 |
| 29 1654 0400 18 08 075 | • 4,0 | 18 | 8 | - | 75 | 1 | 48,00 |
| 29 1654 0400 20 04 060 | • 4,0 | 20 | 4 | - | 60 | 1 | 38,00 |
| 29 1654 0400 22 08 100 | • 4,0 | 22 | 8 | - | 100 | 1 | 60,00 |
| 29 1654 0500 06 06 050 | • 5,0 | 6 | 6 | - | 50 | 1 | 41,00 |
| 29 1654 0500 10 06 040 | • 5,0 | 10 | 6 | - | 40 | 1 | 42,00 |
| 29 1654 0500 16 06 050 | • 5,0 | 16 | 6 | - | 50 | 1 | 42,00 |
| 29 1654 0500 22 06 060 | • 5,0 | 22 | 6 | - | 60 | 1 | 43,00 |
| 29 1654 0500 25 08 075 | • 5,0 | 25 | 8 | - | 75 | 1 | 49,00 |
| 29 1654 0500 25 08 100 | • 5,0 | 25 | 8 | - | 100 | 1 | 60,00 |
| 29 1654 0500 30 06 070 | • 5,0 | 30 | 6 | - | 70 | 1 | 44,00 |
| 29 1654 0600 07 06 050 | • 6,0 | 7 | 6 | - | 50 | 1 | 37,00 |
| 29 1654 0600 18 06 050 | • 6,0 | 18 | 6 | - | 50 | 1 | 37,00 |
| 29 1654 0600 20 06 060 | • 6,0 | 20 | 6 | - | 60 | 1 | 39,00 |
| 29 1654 0600 20 06 100 | • 6,0 | 20 | 6 | 40 | 100 | 1 | 40,00 |
| 29 1654 0600 25 06 065 | • 6,0 | 25 | 6 | - | 65 | 1 | 41,00 |
| 29 1654 0600 25 08 075 | • 6,0 | 25 | 8 | - | 75 | 1 | 48,00 |
| 29 1654 0600 40 06 080 | • 6,0 | 40 | 6 | - | 80 | 1 | 42,00 |
| 29 1654 0600 30 08 100 | • 6,0 | 30 | 8 | - | 100 | 1 | 55,00 |
| 29 1654 0800 10 08 050 | • 8,0 | 10 | 8 | - | 50 | 1 | 52,00 |
| 29 1654 0800 20 08 050 | • 8,0 | 20 | 8 | - | 50 | 1 | 55,00 |
| 29 1654 0800 20 08 060 | • 8,0 | 20 | 8 | - | 60 | 1 | 56,00 |
| 29 1654 0800 20 08 100 | • 8,0 | 20 | 8 | 40 | 100 | 1 | 65,00 |
| 29 1654 0800 35 08 100 | • 8,0 | 35 | 8 | - | 100 | 1 | 70,00 |
| 29 1654 1000 25 10 070 | • 10,0 | 25 | 10 | - | 70 | 1 | 72,00 |
| 29 1654 1000 25 10 120 | • 10,0 | 25 | 10 | 50 | 120 | 1 | 89,00 |
| 29 1654 1000 32 | • 10,0 | 32 | 10 | - | 75 | 1 | 48,00 |
| 29 1654 1000 35 10 090 | • 10,0 | 35 | 10 | - | 90 | 1 | 81,00 |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| | |
|--------------------|---------------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | GELÄPPT LAPPED |
| | Air |

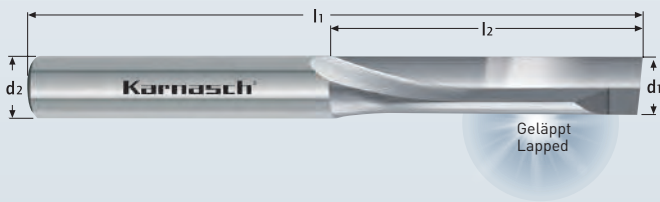
| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1265 | DXF/STEP |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

29 1661

Vollhartmetall Einzahnfräser, gerade genutet, rechtsschneidend
Solid carbide one-tooth end mill, straight fluted – right cutting



| | |
|----------------------|---------------------|
| d1* = Ø ≤ 3,0 | tol -0,000 / -0,040 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |

| Art. | d1* | l2 | d2 h6 | l1 | € |
|---------------------|--------|----|-------|-----|-------|
| 29 1661 0100 04 040 | • 1,0 | 4 | 3 | 40 | 25,00 |
| 29 1661 0150 06 040 | • 1,5 | 6 | 3 | 40 | 25,00 |
| 29 1661 0200 03 050 | • 2,0 | 3 | 3 | 50 | 26,00 |
| 29 1661 0200 06 050 | • 2,0 | 6 | 6 | 50 | 35,00 |
| 29 1661 0200 08 040 | • 2,0 | 8 | 3 | 40 | 25,00 |
| 29 1661 0250 09 040 | • 2,5 | 9 | 3 | 40 | 25,00 |
| 29 1661 0300 06 040 | • 3,0 | 6 | 3 | 40 | 25,00 |
| 29 1661 0300 10 030 | • 3,0 | 10 | 3 | 30 | 24,00 |
| 29 1661 0300 10 060 | • 3,0 | 10 | 3 | 60 | 26,00 |
| 29 1661 0300 12 050 | • 3,0 | 12 | 6 | 50 | 35,00 |
| 29 1661 0300 15 075 | • 3,0 | 15 | 8 | 75 | 46,00 |
| 29 1661 0300 18 100 | • 3,0 | 18 | 8 | 100 | 52,00 |
| 29 1661 0400 05 050 | • 4,0 | 5 | 4 | 50 | 31,00 |
| 29 1661 0400 08 040 | • 4,0 | 8 | 4 | 40 | 31,00 |
| 29 1661 0400 14 050 | • 4,0 | 14 | 6 | 50 | 38,00 |
| 29 1661 0400 18 075 | • 4,0 | 18 | 8 | 75 | 46,00 |
| 29 1661 0400 20 060 | • 4,0 | 20 | 4 | 60 | 32,00 |
| 29 1661 0400 22 100 | • 4,0 | 22 | 8 | 100 | 52,00 |
| 29 1661 0400 30 070 | • 4,0 | 30 | 4 | 70 | 33,00 |
| 29 1661 0500 06 050 | • 5,0 | 6 | 5 | 50 | 38,00 |
| 29 1661 0500 10 040 | • 5,0 | 10 | 5 | 40 | 38,00 |
| 29 1661 0500 16 050 | • 5,0 | 16 | 6 | 50 | 39,00 |
| 29 1661 0500 22 060 | • 5,0 | 22 | 5 | 60 | 39,00 |
| 29 1661 0500 25 075 | • 5,0 | 25 | 8 | 75 | 46,00 |
| 29 1661 0500 25 100 | • 5,0 | 25 | 8 | 100 | 52,00 |
| 29 1661 0500 30 070 | • 5,0 | 30 | 5 | 70 | 41,00 |
| 29 1661 0600 07 050 | • 6,0 | 7 | 6 | 50 | 38,00 |
| 29 1661 0600 18 050 | • 6,0 | 18 | 6 | 50 | 39,00 |
| 29 1661 0600 20 060 | • 6,0 | 20 | 6 | 60 | 41,00 |
| 29 1661 0600 25 065 | • 6,0 | 25 | 6 | 65 | 42,00 |
| 29 1661 0600 25 075 | • 6,0 | 25 | 8 | 75 | 46,00 |
| 29 1661 0600 30 100 | • 6,0 | 30 | 8 | 100 | 52,00 |
| 29 1661 0600 40 080 | • 6,0 | 40 | 6 | 80 | 44,00 |
| 29 1661 0800 09 050 | • 8,0 | 9 | 8 | 50 | 46,00 |
| 29 1661 0800 20 050 | • 8,0 | 20 | 8 | 50 | 45,00 |
| 29 1661 0800 20 060 | • 8,0 | 20 | 8 | 60 | 47,00 |
| 29 1661 0800 30 075 | • 8,0 | 30 | 8 | 75 | 51,00 |
| 29 1661 0800 35 100 | • 8,0 | 35 | 8 | 100 | 57,00 |
| 29 1661 1000 25 070 | • 10,0 | 25 | 10 | 70 | 81,00 |
| 29 1661 1000 35 090 | • 10,0 | 35 | 10 | 90 | 87,00 |

| | |
|------------------------|-------------------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | GELÄPPT LAPPED |
| | |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1265 | DXF/STEP |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

Vollhartmetall Einzahnfräser mit Radius, rechtsspirale – rechtsschneidend, Hochglanz-finish
Solid carbide one-tooth end mill with corner radius, right spiral – right cutting, mirror finish



29 1658

- PMMA GS
- PMMA XT
- MAKROLON
- Wachs Wax



| | |
|---------------------------|----------------------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| 30° | Z=1 |
| | HSC High-Speed-Cutting |
| | GELÄPPT LAPPED |
| | Air |

| Art. | d1 | r | l2 | d2 h5 | l1 | € |
|-----------------|------|-----|----|-------|----|-------|
| 29 1658 0200 06 | • 2 | 1,0 | 6 | 6 | 60 | 51,00 |
| 29 1658 0300 09 | • 3 | 1,5 | 9 | 6 | 60 | 50,00 |
| 29 1658 0400 12 | • 4 | 2,0 | 12 | 6 | 60 | 49,00 |
| 29 1658 0500 15 | • 5 | 2,5 | 15 | 6 | 60 | 57,00 |
| 29 1658 0600 18 | • 6 | 3,0 | 18 | 6 | 70 | 55,00 |
| 29 1658 0800 24 | • 8 | 4,0 | 24 | 8 | 80 | 63,00 |
| 29 1658 1000 30 | • 10 | 5,0 | 30 | 10 | 80 | 73,00 |

Technik: Keine Schartigkeit bei 50-facher Vergrößerung (< Rz 0,5)
Technology: No chipping at 50-times magnification (< Rz 0,5)

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1265 | DXF/STEP |

30 7425 Für Inox / For Inox

**MAXIMALE STABILITÄT
DURCH 3-FASEN-SCHLIFF**
Maximum stability through
triple-bevel grinding

**SEHR GLATTE OBERFLÄCHE
DURCH NEU ENTWICKELTE
BESCHICHTUNG Tcx³**
Extremely smooth surface
through our new developed
Tcx³-coating

**UNGLEICHTEILUNG
FÜR HOHE LAUFRIEHE**
Unequal pitch for a smooth
cutting

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

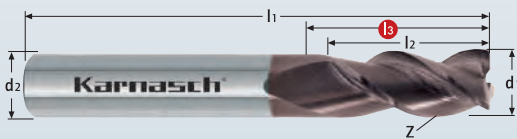
30 7415

Vollhartmetall HPC Schaftfräser für exotisches Material
Solid carbide HPC end mills for exotic materials



- INOX**
stainless steel
< 900 N/mm²
ferritic
- INOX**
stainless steel
> 900 N/mm²
martensitic
- INOX**
stainless steel
< 900 N/mm²
austenitic
- NI-ALLOYS**
< 900 N/mm²
- NI-CO ALLOYS**
> 900 N/mm²
- TITAN TITANIUM**
< 1100 N/mm²
- HARDOX**
- INCONEL**
- MONEL**

- NIMONIC**
- TITAN**
titanium
- kurz-spanend**
short chip
- lang-spanend**
long chip
- Schruppen**
roughing
- Schrupp-schlicht**
semifinishing
- Schlichten**
finishing



| | |
|-----------------------|---------------------|
| d1* = Ø 3,0 | tol -0,014 / -0,028 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,020 / -0,038 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,025 / -0,047 |
| d1* = Ø 12,0 - Ø 16,0 | tol -0,032 / -0,059 |
| d1* = Ø 20,0 | tol -0,040 / -0,073 |

| Art. | d1* | l3 | l2 | d2 h5 | d3 | l1 | Z | € |
|-----------------|------|----|----|-------|------|-----|---|--------|
| 30 7415 0300 15 | • 3 | 15 | 8 | 6 | 2,8 | 57 | 3 | 45,00 |
| 30 7415 0400 15 | • 4 | 15 | 11 | 6 | 3,8 | 57 | 3 | 45,00 |
| 30 7415 0500 20 | • 5 | 20 | 12 | 6 | 4,8 | 57 | 3 | 45,00 |
| 30 7415 0600 20 | • 6 | 20 | 12 | 6 | 5,8 | 57 | 3 | 45,00 |
| 30 7415 0800 27 | • 8 | 27 | 20 | 8 | 7,8 | 63 | 3 | 59,00 |
| 30 7415 1000 32 | • 10 | 32 | 22 | 10 | 9,8 | 72 | 3 | 90,00 |
| 30 7415 1200 38 | • 12 | 38 | 26 | 12 | 11,8 | 83 | 3 | 114,00 |
| 30 7415 1600 45 | • 16 | 45 | 32 | 16 | 15,7 | 92 | 3 | 102,60 |
| 30 7415 2000 55 | • 20 | 55 | 38 | 20 | 19,7 | 104 | 3 | 181,80 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

- MICRO GRAIN** DIN 6527 K
- SPEZIAL SPECIAL** DIN 6535 Form HA
- 45° f 45°
- HPC**
- INOX F²**
- OIL Emul MMKS

Schnittdaten Cutting data | Zeichnungen Drawings

1203 | DXF/STEP

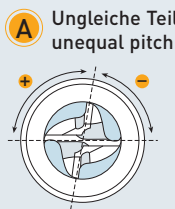
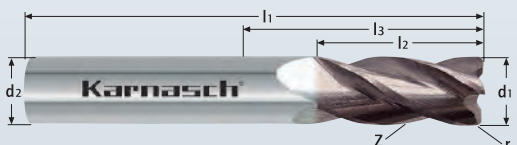
30 7421

Vollhartmetall Schaftfräser mit Eckenradius für exotisches Material
Solid carbide end mills with corner radius for exotic materials



- INOX**
stainless steel
< 900 N/mm²
ferritic
- INOX**
stainless steel
> 900 N/mm²
martensitic
- INOX**
stainless steel
< 900 N/mm²
austenitic
- NI-ALLOYS**
< 900 N/mm²
- NI-CO ALLOYS**
> 900 N/mm²
- TITAN TITANIUM**
< 1100 N/mm²
- HARDOX**
- INCONEL**
- MONEL**

- NIMONIC**
- TITAN**
titanium
- kurz-spanend**
short chip
- lang-spanend**
long chip
- Schruppen**
roughing
- Schrupp-schlicht**
semifinishing
- Schlichten**
finishing



| Art. | d1 e8 | r ± 0,003 | l3 | l2 | d2 h6 | d3 | l1 | Z | € |
|-----------------|-------|-----------|----|----|-------|------|-----|---|--------|
| 30 7421 0800 10 | • 8 | 1,0 | 29 | 22 | 8 | 7,8 | 70 | 4 | 54,60 |
| 30 7421 1400 10 | • 14 | 1,0 | 42 | 30 | 14 | 13,8 | 83 | 4 | 87,60 |
| 30 7421 1400 30 | • 14 | 3,0 | 42 | 30 | 14 | 13,8 | 83 | 4 | 87,60 |
| 30 7421 1800 10 | • 18 | 1,0 | 45 | 35 | 18 | 17,8 | 93 | 4 | 113,40 |
| 30 7421 1800 30 | • 18 | 3,0 | 45 | 35 | 18 | 17,8 | 93 | 4 | 113,40 |
| 30 7421 2000 10 | • 20 | 1,0 | 50 | 40 | 20 | 19,8 | 105 | 4 | 124,20 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.
Nachfolgewerkzeug / Replacement article 30 7425

- MICRO GRAIN** DIN 6527 L
- SPEZIAL SPECIAL** DIN 6535 Form HA
- DIFF.
- EXOTIC**
- HXP-7**
- OIL Emul MMKS

Schnittdaten Cutting data

1227

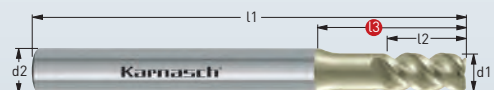
VHM-Schaftfräser „GOLDWIN“ mit Eckenradius für **INOX** 2.1 – 2.2 – 2.3 – 2.4 – 4.1 – 4.2 – 4.3 – 5.1 – 5.2 – 5.3
Solid carbide end mills "GOLDWIN" with corner radius for **INOX**



30 7425

INOX
stainless steel
< 900 N/mm²
ferritic

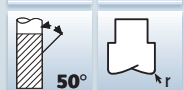
Schichten
finishing
▼▼▼



| | |
|-------------------|----------------|
| d1* Ø 3,0 | 0,000 / -0,025 |
| d1* Ø 4,0 - 6,0 | 0,000 / -0,030 |
| d1* Ø 8,0 - 10,0 | 0,000 / -0,036 |
| d1* Ø 12,0 - 16,0 | 0,000 / -0,043 |
| d1* Ø 20,0 | 0,000 / -0,052 |

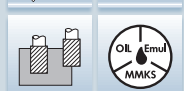
MICRO GRAIN CLEAN **DIN 6527 L**

SPEZIAL **DIN 6535/Form HA**
SPEZIAL **DIN 6535/Form HB**



HSC HPC

Tcx³



INOX
stainless steel
> 900 N/mm²
martensitic

INOX
stainless steel
< 900 N/mm²
austenitic

NI-CO ALLOYS
> 900 N/mm²

NI-ALLOYS
< 900 N/mm²

kurz-spanend
short chip

lang-spanend
long chip

Schruppen
roughing

Schrupp-schlicht
semifinishing

| Art. | d1* | r | l2 | l3 | d2 h5 | d3 | l1 | Z | € |
|---------------------|------|-----|----|----|-------|------|----|---|--------|
| 30 7425 0200 020 04 | • 2 | 0,2 | 4 | 9 | 6 | 1,8 | 57 | 3 | 66,00 |
| 30 7425 0300 030 06 | • 3 | 0,3 | 6 | 12 | 6 | 2,8 | 57 | 3 | 66,00 |
| 30 7425 0400 050 08 | • 4 | 0,5 | 8 | 16 | 6 | 3,8 | 57 | 3 | 63,00 |
| 30 7425 0500 050 10 | • 5 | 0,5 | 10 | 16 | 6 | 4,8 | 57 | 3 | 63,00 |
| 30 7425 0600 050 12 | • 6 | 0,5 | 12 | 21 | 6 | 5,8 | 57 | 4 | 61,00 |
| 30 7425 0800 050 16 | • 8 | 0,5 | 16 | 27 | 8 | 7,7 | 63 | 4 | 67,00 |
| 30 7425 0800 100 16 | • 8 | 1,0 | 16 | 27 | 8 | 7,7 | 63 | 4 | 67,00 |
| 30 7425 0800 200 16 | • 8 | 2,0 | 16 | 27 | 8 | 7,7 | 63 | 4 | 67,00 |
| 30 7425 1000 050 20 | • 10 | 0,5 | 20 | 32 | 10 | 9,6 | 72 | 4 | 90,00 |
| 30 7425 1000 100 20 | • 10 | 1,0 | 20 | 32 | 10 | 9,6 | 72 | 4 | 90,00 |
| 30 7425 1000 200 20 | • 10 | 2,0 | 20 | 32 | 10 | 9,6 | 72 | 4 | 90,00 |
| 30 7425 1200 050 24 | • 12 | 0,5 | 24 | 36 | 12 | 11,5 | 83 | 4 | 114,00 |
| 30 7425 1200 100 24 | • 12 | 1,0 | 24 | 36 | 12 | 11,5 | 83 | 4 | 114,00 |
| 30 7425 1200 200 24 | • 12 | 2,0 | 24 | 36 | 12 | 11,5 | 83 | 4 | 114,00 |
| 30 7425 1200 300 24 | • 12 | 3,0 | 24 | 36 | 12 | 11,5 | 83 | 4 | 114,00 |

Schaft / Shank < Ø 10 = HA / Schaft / Shank > Ø 12 = HB

| Test 1 | Reale Schnittdaten Real cutting data |
|----------------------|--|
| Material / Workpiece | Inconel 939 Ø 16 r=2 Vc = 40 m/min Vf = 300 mm/min fz = 0,08 mm ap = 31 mm ae = 1 mm |
| Test 2 | Reale Schnittdaten Real cutting data |
| Material / Workpiece | 1.4313 (X3CrNiMo13-4) Ø 8 r = 0,5 n = 4800 min ⁻¹ Vf = 1200 mm/min fz = 0,063 mm ap = 10 mm ae = 0,8 mm |

Schnittdaten Cutting data **i** 1216-1219

Film Movie **▶**

Zeichnungen Drawings **📄** DXF/STEP

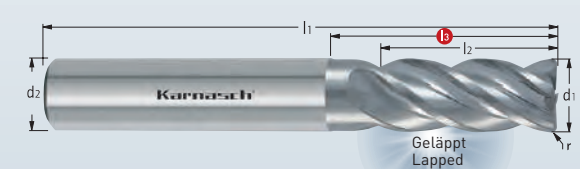
High-Performance VHM-Schaftfräser, für **TITAN** 4.1 – 4.2 – 4.3 – 5.1 – 5.2 – 5.3
High performance solid carbide end mills for **TITANIUM**



30 7428

TITAN
titanium

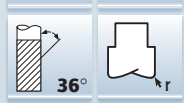
Schichten
finishing
▼▼▼



| | |
|-----------------------|---------------------|
| d1* = Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| d1* = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,070 |
| d1* = Ø 20,0 | tol -0,000 / -0,084 |

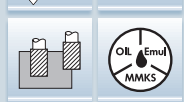
MICRO GRAIN CLEAN **DIN 6527 L**

SPEZIAL **DIN 6535 Form HA**



HSC HPC

GELÄPFT LAPPED



TITAN
titanium
< 1200 N/mm²

TITAN GRADE 1
TITANIUM GRADE 1

TITAN GRADE 2
TITANIUM GRADE 2

TITAN GRADE 3
TITANIUM GRADE 3

TITAN GRADE 4
TITANIUM GRADE 4

TITAN GRADE 5
TITANIUM GRADE 5

TITAN GRADE 12
TITANIUM GRADE 12

Schruppen
roughing

| Art. | d1* | r | l2 | l3 | l1 | d2 | Z | € |
|--------------------|--------|-----|----|----|-----|----|---|--------|
| 30 7428 0600 01 13 | • 6,0 | 0,1 | 13 | 20 | 57 | 6 | 4 | 49,00 |
| 30 7428 0600 05 13 | • 6,0 | 0,5 | 13 | 20 | 57 | 6 | 4 | 49,00 |
| 30 7428 0600 10 13 | • 6,0 | 1,0 | 13 | 20 | 57 | 6 | 4 | 49,00 |
| 30 7428 0800 02 21 | • 8,0 | 0,2 | 19 | 25 | 63 | 8 | 4 | 56,00 |
| 30 7428 0800 05 21 | • 8,0 | 0,5 | 19 | 25 | 63 | 8 | 4 | 56,00 |
| 30 7428 0800 10 21 | • 8,0 | 1,0 | 19 | 25 | 63 | 8 | 4 | 56,00 |
| 30 7428 1000 02 22 | • 10,0 | 0,2 | 22 | 30 | 72 | 10 | 4 | 81,00 |
| 30 7428 1000 05 22 | • 10,0 | 0,5 | 22 | 30 | 72 | 10 | 4 | 81,00 |
| 30 7428 1000 10 22 | • 10,0 | 1,0 | 22 | 30 | 72 | 10 | 4 | 81,00 |
| 30 7428 1200 02 26 | • 12,0 | 0,2 | 26 | 36 | 83 | 12 | 4 | 111,00 |
| 30 7428 1200 05 26 | • 12,0 | 0,5 | 26 | 36 | 83 | 12 | 4 | 111,00 |
| 30 7428 1200 10 26 | • 12,0 | 1,0 | 26 | 36 | 83 | 12 | 4 | 111,00 |
| 30 7428 1600 05 36 | % 16,0 | 0,5 | 36 | 42 | 92 | 16 | 4 | 111,00 |
| 30 7428 1600 10 36 | % 16,0 | 1,0 | 36 | 42 | 92 | 16 | 4 | 111,00 |
| 30 7428 1600 20 36 | % 16,0 | 2,0 | 36 | 42 | 92 | 16 | 4 | 111,00 |
| 30 7428 2000 05 41 | % 20,0 | 0,5 | 41 | 55 | 104 | 20 | 4 | 159,00 |
| 30 7428 2000 10 41 | % 20,0 | 1,0 | 41 | 55 | 104 | 20 | 4 | 159,00 |
| 30 7428 2000 20 41 | % 20,0 | 2,0 | 41 | 55 | 104 | 20 | 4 | 159,00 |

| Test | Reale Schnittdaten Real cutting data |
|---------------------------|---|
| Werkstoff / Work material | TiAl6V4 Tool Ø 12 x 26 r 1,0 Vc = 50 m/min n = 1400 min ⁻¹ Vf = 320 mm/min fz = 0,06 mm ae = 12 mm ap = 12 mm |

Schnittdaten Cutting data **i** 1239

Zeichnungen Drawings **📄** DXF/STEP

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



30 7431

Vollhartmetall Innenschruppfräser für exotisches Material
Solid carbide roughing end mills for exotic materials, patented cutting geometry

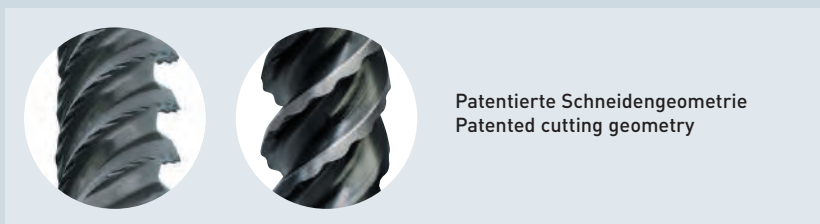


- INOX**
stainless steel
< 900 N/mm²
ferritic
- INOX**
stainless steel
> 900 N/mm²
martensitic
- INOX**
stainless steel
< 900 N/mm²
austenitic
- NI-ALLOYS**
< 900 N/mm²
- NI-CO ALLOYS**
> 900 N/mm²
- HARDOX**
- INCONEL**
- HASTELLOY**
- MONEL**

- NIMONIC**
- NICKEL**
< 500 N/mm²
- kurz-spanend**
short chip
- lang-spanend**
long chip



| | | | |
|----------------------|---------------------|-----------------------|---------------------|
| d1* = Ø 4,0 - Ø 6,0 | tol -0,030 / -0,105 | d1* = Ø 12,0 - Ø 18,0 | tol -0,050 / -0,160 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,040 / -0,130 | d1* = Ø 20,0 - Ø 25,0 | tol -0,065 / -0,195 |



| Art. | d1* | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|-----------------|------|----|-------|------|-----|----|---|--------|
| 30 7431 0400 13 | • 4 | 13 | 6 | 3,9 | 57 | 8 | 4 | 77,00 |
| 30 7431 0500 15 | • 5 | 15 | 6 | 4,9 | 57 | 10 | 4 | 86,00 |
| 30 7431 0600 17 | • 6 | 17 | 6 | 5,9 | 57 | 12 | 4 | 84,00 |
| 30 7431 0800 21 | • 8 | 21 | 8 | 7,5 | 65 | 16 | 4 | 95,00 |
| 30 7431 1000 25 | • 10 | 25 | 10 | 9,5 | 72 | 20 | 4 | 104,00 |
| 30 7431 1200 30 | • 12 | 30 | 12 | 11,5 | 85 | 24 | 4 | 123,00 |
| 30 7431 1600 36 | % 16 | 36 | 16 | 15,5 | 92 | 32 | 5 | 121,80 |
| 30 7431 2000 45 | % 20 | 45 | 20 | 19,5 | 104 | 40 | 6 | 186,00 |
| 30 7431 2500 55 | % 25 | 55 | 25 | 24,0 | 150 | 50 | 6 | 336,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| | |
|------------------------|---------------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HPC |
| | INOX F² |
| | |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1236 | DXF/STEP |

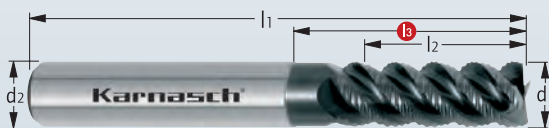
30 7432

Vollhartmetall Innen- und Außenschruppfräser für exotisches Material
Solid carbide roughing end mills for exotic materials, patented cutting geometry



- INOX**
stainless steel
< 900 N/mm²
ferritic
- INOX**
stainless steel
> 900 N/mm²
martensitic
- INOX**
stainless steel
< 900 N/mm²
austenitic
- NI-ALLOYS**
< 900 N/mm²
- NI-CO ALLOYS**
> 900 N/mm²
- TITAN TITANIUM**
< 1100 N/mm²
- INCONEL**
- HASTELLOY**
- MONEL**

- NIMONIC**
- TITAN titanium**
- NICKEL**
< 500 N/mm²
- kurz-spanend**
short chip
- lang-spanend**
long chip
- Schruppen**
roughing



| | | | |
|----------------------|---------------------|-----------------------|---------------------|
| d1* = Ø 6,0 | tol -0,030 / -0,078 | d1* = Ø 12,0 - Ø 16,0 | tol -0,050 / -0,120 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,040 / -0,098 | d1* = Ø 20,0 - Ø 25,0 | tol -0,065 / -0,149 |



| Art. | d1* | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|-----------------|------|----|-------|------|-----|----|---|--------|
| 30 7432 0600 21 | • 6 | 21 | 6 | 5,8 | 57 | 16 | 4 | 84,00 |
| 30 7432 0800 27 | • 8 | 27 | 8 | 7,7 | 70 | 22 | 4 | 96,00 |
| 30 7432 1000 30 | • 10 | 30 | 10 | 9,7 | 72 | 25 | 4 | 105,00 |
| 30 7432 1200 38 | • 12 | 38 | 12 | 11,5 | 85 | 28 | 4 | 129,00 |
| 30 7432 1600 45 | % 16 | 45 | 16 | 15,5 | 92 | 35 | 5 | 145,20 |
| 30 7432 2000 55 | % 20 | 55 | 20 | 19,5 | 104 | 40 | 5 | 216,00 |
| 30 7432 2500 65 | % 25 | 65 | 25 | 24,0 | 125 | 50 | 5 | 364,80 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| | |
|------------------------|---------------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HPC |
| | INOX F² |
| | |

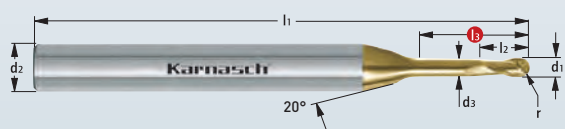
| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1236 | DXF/STEP |

VHM-3D-Radiusfräser Z=2 Cobalt-Chrom Titan-Titanlegierungen
Solid carbide 3D, 2 teeth ball nose end mills, cobalt-chromium-titanium-titanium alloys



31 6840

- INOX**
stainless steel
< 900 N/mm²
ferritic
- INOX**
stainless steel
> 900 N/mm²
martensitic
- INOX**
stainless steel
< 900 N/mm²
austenitic
- NI-ALLOYS**
< 900 N/mm²
- NI-CO ALLOYS**
> 900 N/mm²
- TITAN TITANIUM**
< 1100 N/mm²
- HARDOX**
- INCONEL**
- MONEL**



| Art. | d1 -0,01 | r ±0,005 | l3 | d2 h5 | d3 | l1 | l2 | Z | € |
|--------------------|----------|----------|----|-------|------|----|-----|---|-------|
| 31 6840 0100 08 03 | • 1,0 | 0,5 | 8 | 3 | 0,95 | 45 | 1,0 | 2 | 48,00 |
| 31 6840 0100 08 04 | • 1,0 | 0,5 | 8 | 4 | 0,95 | 45 | 1,0 | 2 | 49,00 |
| 31 6840 0100 08 06 | • 1,0 | 0,5 | 8 | 6 | 0,95 | 45 | 1,0 | 2 | 54,00 |
| 31 6840 0200 12 03 | • 2,0 | 1,0 | 12 | 3 | 1,92 | 45 | 2,0 | 2 | 48,00 |
| 31 6840 0200 12 04 | • 2,0 | 1,0 | 12 | 4 | 1,92 | 45 | 2,0 | 2 | 50,00 |
| 31 6840 0200 12 06 | • 2,0 | 1,0 | 12 | 6 | 1,92 | 45 | 2,0 | 2 | 54,00 |
| 31 6840 0300 14 03 | • 3,0 | 1,5 | 14 | 3 | 2,90 | 45 | 3,0 | 2 | 48,00 |
| 31 6840 0300 14 04 | • 3,0 | 1,5 | 14 | 4 | 2,90 | 45 | 3,0 | 2 | 50,00 |
| 31 6840 0300 14 06 | • 3,0 | 1,5 | 14 | 6 | 2,90 | 45 | 3,0 | 2 | 54,00 |

| Werkstoffgruppe Material group | Schruppen Roughing Ø 3,0 | | Schruppen Roughing Ø 2,0 | | Schlichten Finishing Ø 1,0 | |
|---|--------------------------------|----------------------------|--------------------------------|----------------------------|----------------------------------|----------------------------|
| | Vc m/min | Vf mm/min | Vc m/min | Vf mm/min | Vc m/min | Vf mm/min |
| Cobalt-Chrom Titan Titanlegierung Titanium alloy | 200 | 1.650 | 200 | 1.870 | 100 | 1.250 |
| | | n min ⁻¹ 20.800 | | n min ⁻¹ 31.200 | | n min ⁻¹ 31.200 |
| | | fz mm 0,04 | | fz mm 0,03 | | fz mm 0,02 |
| | | ap mm 0,06 | | ap mm 0,06 | | ap mm 0,06 |
| | ae mm 1,50 | | ae mm 1,00 | | ae mm 0,50 | |

MICRO GRAIN CLEAN-34 KARNASCH NORM

SPEZIAL SPECIAL Form HA

30°

HSC HHC

Tcx³

Air

Schnittdaten Cutting data

Zeichnungen Drawings

i 149

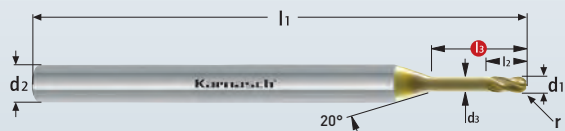
DXF/STEP

VHM-3D-Radiusfräser, 4-Schneiden-Zentrumschnitt, Cobalt-Chrom Titan-Titanlegierungen
Solid carbide 3D, 4 teeth ball nose end mills, cobalt-chromium-titanium-titanium alloys



31 6868

- INOX**
stainless steel
< 900 N/mm²
ferritic
- INOX**
stainless steel
> 900 N/mm²
martensitic
- INOX**
stainless steel
< 900 N/mm²
austenitic
- NI-ALLOYS**
< 900 N/mm²
- NI-CO ALLOYS**
> 900 N/mm²
- TITAN TITANIUM**
< 1100 N/mm²
- HARDOX**
- INCONEL**
- MONEL**



| Art. | d1 -0,01 | r ±0,005 | l3 | d2 h5 | d3 | l1 | l2 | Z | € |
|--------------------|----------|----------|----|-------|------|----|-----|---|-------|
| 31 6868 0100 08 03 | • 1,0 | 0,5 | 8 | 3 | 0,95 | 45 | 1,5 | 4 | 40,00 |
| 31 6868 0100 08 04 | • 1,0 | 0,5 | 8 | 4 | 0,95 | 45 | 1,5 | 4 | 42,00 |
| 31 6868 0100 08 06 | • 1,0 | 0,5 | 8 | 6 | 0,95 | 45 | 1,5 | 4 | 44,00 |
| 31 6868 0200 12 03 | • 2,0 | 1,0 | 12 | 3 | 1,92 | 45 | 3,0 | 4 | 39,00 |
| 31 6868 0200 12 04 | • 2,0 | 1,0 | 12 | 4 | 1,92 | 45 | 3,0 | 4 | 40,00 |
| 31 6868 0200 12 06 | • 2,0 | 1,0 | 12 | 6 | 1,92 | 45 | 3,0 | 4 | 43,00 |
| 31 6868 0300 14 03 | • 3,0 | 1,5 | 14 | 3 | 2,90 | 45 | 4,0 | 4 | 39,00 |
| 31 6868 0300 14 04 | • 3,0 | 1,5 | 14 | 4 | 2,90 | 45 | 4,0 | 4 | 40,00 |
| 31 6868 0300 14 06 | • 3,0 | 1,5 | 14 | 6 | 2,90 | 45 | 4,0 | 4 | 43,00 |
| 31 6868 0400 08 06 | • 4,0 | 2,0 | 8 | 6 | 3,90 | 45 | 5,0 | 4 | 45,00 |

| Werkstoffgruppe Material group | Schruppen Roughing Ø 3,0 | | Schruppen Roughing Ø 2,0 | | Schlichten Finishing Ø 1,0 | |
|---|--------------------------------|----------------------------|--------------------------------|----------------------------|----------------------------------|----------------------------|
| | Vc m/min | Vf mm/min | Vc m/min | Vf mm/min | Vc m/min | Vf mm/min |
| Cobalt-Chrom Titan Titanlegierung Titanium alloy | 200 | 3.300 | 200 | 3.750 | 100 | 2.500 |
| | | n min ⁻¹ 20.800 | | n min ⁻¹ 31.200 | | n min ⁻¹ 31.200 |
| | | fz mm 0,04 | | fz mm 0,03 | | fz mm 0,02 |
| | | ap mm 0,06 | | ap mm 0,06 | | ap mm 0,06 |
| | ae mm 1,50 | | ae mm 1,00 | | ae mm 0,50 | |

MICRO GRAIN CLEAN-34 KARNASCH NORM

SPEZIAL SPECIAL Form HA

30°

HSC HHC

Tcx³

Air

Schnittdaten Cutting data

Zeichnungen Drawings

i 149

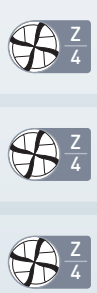
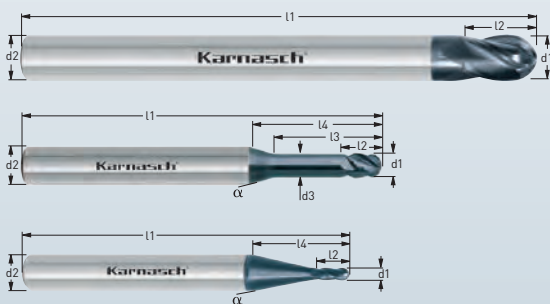
DXF/STEP

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

30 7485

EXPERT

Vollhartmetall 3D-Radiusfräser FOURWIN, 4 Schneiden-Zentrumschnitt, für **TITAN** 4.1 - 4.2 - 4.3 - 5.1 - 5.2 - 5.3 - 6.1 - 6.2
Solid carbide 3D ball nose end mills FOURWIN, for **TITANIUM**, 4 cutting edges - centre cutting



TOLERANZ / TOLERANCE
tol. r = ±0,004

d1* = Ø 1,5 - Ø 3,0 tol -0,006 / -0,020
d1* = Ø 4,0 - Ø 6,0 tol -0,010 / -0,028
d1* = Ø 8,0 - Ø 10,0 tol -0,013 / -0,035
d1* = Ø 12,0 tol -0,016 / -0,043

MICRO GRAIN KARNASCH NORM
N/M DIN 6535 Form HA
45°
HSC HPC
TI-X²

| Art. | d1* | r ± 0,004 | l3 | l4 | d2 h5 | d3 | l1 | l2 | α | Z | € |
|--------------------|--------|-----------|------|----|-------|-----|-----|------|-----|---|--------|
| 30 7485 0150 08 55 | • 1,5 | 0,75 | 8,0 | 20 | 6 | 1,4 | 55 | 2,5 | 12° | 4 | 49,00 |
| 30 7485 0200 05 55 | • 2,0 | 1,0 | - | - | 6 | - | 55 | 4 | 12° | 4 | 49,00 |
| 30 7485 0200 08 55 | • 2,0 | 1,0 | 8,0 | 20 | 6 | 1,8 | 55 | 3,0 | 12° | 4 | 50,00 |
| 30 7485 0200 08 00 | • 2,0 | 1,0 | - | - | 6 | - | 80 | 4 | 12° | 4 | 66,00 |
| 30 7485 0250 10 55 | • 2,5 | 1,25 | 10,0 | 20 | 6 | 2,3 | 55 | 3,25 | 12° | 4 | 49,00 |
| 30 7485 0300 05 55 | • 3,0 | 1,5 | - | - | 6 | - | 55 | 5 | 12° | 4 | 49,00 |
| 30 7485 0300 10 55 | • 3,0 | 1,5 | 10,0 | 20 | 6 | 2,8 | 55 | 3,5 | 12° | 4 | 50,00 |
| 30 7485 0300 14 55 | • 3,0 | 1,5 | 10,0 | 20 | 6 | 2,8 | 55 | 3,5 | 12° | 4 | 50,00 |
| 30 7485 0300 18 55 | • 3,0 | 1,5 | 18,0 | 20 | 6 | 2,8 | 55 | 3,5 | 12° | 4 | 51,00 |
| 30 7485 0300 08 00 | • 3,0 | 1,5 | - | - | 6 | - | 80 | 5 | 12° | 4 | 66,00 |
| 30 7485 0400 12 55 | • 4,0 | 2,0 | 12,0 | 20 | 6 | 3,8 | 55 | 4 | 12° | 4 | 50,00 |
| 30 7485 0400 16 55 | • 4,0 | 2,0 | 16,0 | 20 | 6 | 3,8 | 55 | 4 | 12° | 4 | 50,00 |
| 30 7485 0400 05 55 | • 4,0 | 2,0 | - | - | 6 | - | 55 | 8 | 12° | 4 | 49,00 |
| 30 7485 0400 08 00 | • 4,0 | 2,0 | - | - | 6 | - | 80 | 8 | 12° | 4 | 66,00 |
| 30 7485 0500 05 55 | • 5,0 | 2,5 | - | - | 6 | - | 55 | 9 | 12° | 4 | 49,00 |
| 30 7485 0500 08 00 | • 5,0 | 2,5 | - | - | 6 | - | 80 | 9 | 12° | 4 | 66,00 |
| 30 7485 0600 05 55 | • 6,0 | 3,0 | - | - | 6 | - | 55 | 10 | - | 4 | 47,00 |
| 30 7485 0600 10 00 | • 6,0 | 3,0 | - | - | 6 | - | 100 | 10 | - | 4 | 65,00 |
| 30 7485 0800 06 00 | • 8,0 | 4,0 | - | - | 8 | - | 60 | 12 | - | 4 | 59,00 |
| 30 7485 0800 10 00 | • 8,0 | 4,0 | - | - | 8 | - | 100 | 12 | - | 4 | 80,00 |
| 30 7485 1000 06 80 | • 10,0 | 5,0 | - | - | 10 | - | 68 | 14 | - | 4 | 78,00 |
| 30 7485 1000 10 00 | • 10,0 | 5,0 | - | - | 10 | - | 100 | 14 | - | 4 | 101,00 |
| 30 7485 1200 07 55 | • 12,0 | 6,0 | - | - | 12 | - | 75 | 16 | - | 4 | 105,00 |
| 30 7485 1200 10 00 | • 12,0 | 6,0 | - | - | 12 | - | 100 | 16 | - | 4 | 132,00 |

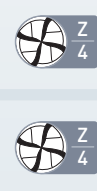
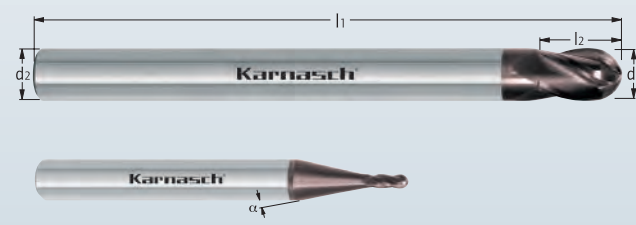
Schnittdaten Cutting data
Zeichnungen Drawings
1232-1233 DXF/STEP

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

30 7486

EXPERT

Vollhartmetall 3D-Radiusfräser für exotisches Material
Solid carbide 3D ball nose end mills, exotic materials



TOLERANZ / TOLERANCE
tol. r = ±0,004

d1* = Ø 1,5 - Ø 3,0 tol -0,006 / -0,020
d1* = Ø 4,0 - Ø 6,0 tol -0,010 / -0,028
d1* = Ø 8,0 - Ø 10,0 tol -0,013 / -0,035
d1* = Ø 12,0 tol -0,016 / -0,043

MICRO GRAIN KARNASCH NORM
N/M DIN 6535 Form HA
30°
HSC HPC
INOX F²

| Art. | d1* | r ± 0,004 | l1 | l2 | d2 h5 | α | Z | € |
|--------------------|--------|-----------|-----|----|-------|-----|---|-------|
| 30 7486 0200 08 00 | % 2,0 | 1,0 | 80 | 4 | 6 | 12° | 4 | 36,60 |
| 30 7486 0300 08 00 | % 3,0 | 1,5 | 80 | 5 | 6 | 12° | 4 | 36,00 |
| 30 7486 0500 10 00 | % 5,0 | 2,5 | 100 | 9 | 6 | 12° | 4 | 34,80 |
| 30 7486 0800 10 00 | % 8,0 | 4,0 | 100 | 12 | 8 | - | 4 | 43,80 |
| 30 7486 1000 10 00 | % 10,0 | 5,0 | 100 | 14 | 10 | - | 4 | 55,80 |
| 30 7486 1200 07 55 | % 12,0 | 6,0 | 75 | 16 | 12 | - | 4 | 57,00 |
| 30 7486 1200 10 00 | % 12,0 | 6,0 | 100 | 16 | 12 | - | 4 | 72,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.
Nachfolgewerkzeug / Replacement article
30 7485 = TITAN, Z4
30 7487 = VA, Z4

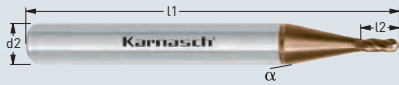
Schnittdaten Cutting data
1227

Index

Vollhartmetall 3D-Radiusfräser FOURWIN 4 Schneiden-Zentrumschnitt, für **INOX** 2.1 - 2.2 - 2.3 - 2.4
 Solid carbide 3D ball nose end mills FOURWIN for Inox, 4 cutting edges - centre cutting

EXPERT
 ★ ★ ★

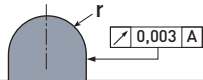
30 7487
INOX

INOX
 stainless steel
 > 900 N/mm²
 martensitic

INOX
 stainless steel
 < 900 N/mm²
 ferritic

INOX
 stainless steel
 < 900 N/mm²
 austenitic

TOLERANZ / TOLERANCE

tol. r = ±0,004



d1* = Ø 2,0 - Ø 3,0 tol -0,006 / -0,020

d1* = Ø 4,0 - Ø 6,0 tol -0,010 / -0,028

d1* = Ø 8,0 - Ø 10,0 tol -0,013 / -0,035

d1* = Ø 12,0 tol -0,016 / -0,043

STAHL
 steel
 < 1100 N/mm²
Schruppen
 roughing

Schlichten
 finishing

| Art. | d1* | r ± 0,004 | l1 | l2 | d2 h5 | α | Z | € |
|------------------|--------|-----------|-----|----|-------|-----|---|--------|
| 30 7487 0200 055 | • 2,0 | 1,0 | 55 | 4 | 6 | 12° | 4 | 49,00 |
| 30 7487 0200 080 | • 2,0 | 1,0 | 80 | 4 | 6 | 12° | 4 | 69,00 |
| 30 7487 0300 055 | • 3,0 | 1,5 | 55 | 5 | 6 | 12° | 4 | 48,00 |
| 30 7487 0300 080 | • 3,0 | 1,5 | 80 | 5 | 6 | 12° | 4 | 67,00 |
| 30 7487 0400 055 | • 4,0 | 2,0 | 55 | 8 | 6 | 12° | 4 | 48,00 |
| 30 7487 0400 080 | • 4,0 | 2,0 | 80 | 8 | 6 | 12° | 4 | 66,00 |
| 30 7487 0500 055 | • 5,0 | 2,5 | 55 | 9 | 6 | 12° | 4 | 48,00 |
| 30 7487 0500 080 | • 5,0 | 2,5 | 80 | 9 | 6 | 12° | 4 | 65,00 |
| 30 7487 0600 055 | • 6,0 | 3,0 | 55 | 10 | 6 | - | 4 | 48,00 |
| 30 7487 0600 100 | • 6,0 | 3,0 | 100 | 10 | 6 | - | 4 | 64,00 |
| 30 7487 0800 060 | • 8,0 | 4,0 | 60 | 12 | 8 | - | 4 | 60,00 |
| 30 7487 0800 100 | • 8,0 | 4,0 | 100 | 12 | 8 | - | 4 | 80,00 |
| 30 7487 1000 068 | • 10,0 | 5,0 | 68 | 14 | 10 | - | 4 | 79,00 |
| 30 7487 1000 100 | • 10,0 | 5,0 | 100 | 14 | 10 | - | 4 | 103,00 |
| 30 7487 1200 075 | • 12,0 | 6,0 | 75 | 16 | 12 | - | 4 | 106,00 |
| 30 7487 1200 100 | • 12,0 | 6,0 | 100 | 16 | 12 | - | 4 | 131,00 |

MICRO GRAIN
KARNASCH NORM
N/M
DIN 6535 Form HA

HSC HPC

INOX HP

 Schnittdaten
 Cutting data

 Zeichnungen
 Drawings


1234-1235

DXF/STEP



5 6000A

5 6001B

Vollhartmetall-Kreissägeblätter
Solid carbide circular saw blades

Preise siehe Seite 1064-1067
Prices see page 1064-1067

**Alu-
minium**
TITAN
TITANIUM
< 1100 N/mm²

Aluminium
< 6% Si
Kunststoff
plastic

MESSING
brass
THERMO-
PLAST
THERMO-
PLASTICS

Kupfer
copper
DURO-
PLASTE
DURO-
PLASTICS

HRC
< 60
Kevlar

STAHL
steel
< 1400 N/mm²
Plexiglas
acrylic glass

GG/G
cast iron

INOX
stainless steel
< 900 N/mm²
ferritic

INOX
stainless steel
> 900 N/mm²
martensitic

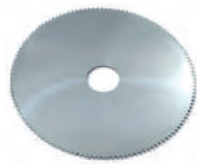
INOX
stainless steel
< 900 N/mm²
austenitic

NI-
ALLOYS
< 900 N/mm²

NI-CO
ALLOYS
> 900 N/mm²

TITAN
TITANIUM
< 1100 N/mm²

INCONEL
HASTELLOY
TITANIUM



| | | | | | | |
|----------------|---|--|--|--|--|--|
| MICRO GRAIN | A | | | | | |
| DIN 1837 | | | | | | |



| | | | | | | |
|----------------|---|--|-------------|--|--|--|
| MICRO GRAIN | B | | | | | |
| DIN 1838 | | | < 45 HRC | | | |



1



2



3



4



5



6



7



8



9

Index

Zähnezahl-Tabelle für Vollhartmetall-Kreissägeblätter ähnlich DIN 1837 A
 Number of teeth-table for solid carbide circular saw blades similar DIN 1837 A



5 6000A

| Ø mm/±0,1 Bohrung/Bore H7 Blattstärke/Blade thickness ±0,01 | 15 | 20 | 25 | 30 | 40 | 50 | 63 | 80 | 100 | 125 | 150 | 160 | 200 |
|--|-------------------------------------|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 5 | 5 | 8 | 8 | 10 | 13 | 16 | 22 | 22 | 22 | 32 | 32 | 32 |
| | Anzahl der Zähne Number of teeth | | | | | | | | | | | | |
| • 0,10 | 64 | 80 | 80 | 100 | 128 | | | | | | | | |
| • 0,15 | 64 | 80 | 80 | 100 | 128 | | | | | | | | |
| • 0,20 | 64 | 80 | 80 | 100 | 128 | 128 | 160 | | | | | | |
| • 0,25 | 64 | 64 | 80 | 100 | 100 | 128 | 128 | | | | | | |
| • 0,30 | 64 | 64 | 80 | 80 | 100 | 128 | 128 | 160 | | | | | |
| • 0,35 | 64 | 64 | 64 | 80 | 100 | 100 | 128 | 160 | | | | | |
| • 0,40 | 64 | 64 | 64 | 80 | 100 | 100 | 128 | 160 | | | | | |
| • 0,45 | 48 | 48 | 64 | 80 | 80 | 100 | 128 | 128 | | | | | |
| • 0,50 | 48 | 48 | 64 | 80 | 80 | 100 | 128 | 128 | 160 | | | | |
| • 0,60 | 48 | 48 | 64 | 64 | 80 | 100 | 100 | 128 | 160 | 160 | | | |
| • 0,70 | 48 | 48 | 48 | 64 | 80 | 80 | 100 | 128 | 128 | 160 | | | |
| • 0,80 | 40 | 40 | 48 | 64 | 80 | 80 | 100 | 128 | 128 | 160 | | | |
| • 0,90 | 40 | 40 | 48 | 64 | 64 | 80 | 100 | 100 | 128 | 160 | | | |
| • 1,00 | 40 | 40 | 48 | 64 | 64 | 80 | 100 | 100 | 128 | 160 | 150 | 160 | |
| • 1,10 | 40 | 40 | 48 | 48 | 64 | 80 | 80 | 100 | 128 | 128 | | | |
| • 1,20 | 40 | 40 | 48 | 48 | 64 | 80 | 80 | 100 | 128 | 128 | 150 | 160 | 200 |
| • 1,30 | 40 | 40 | 40 | 48 | 64 | 64 | 80 | 100 | 100 | | | | |
| • 1,40 | 40 | 40 | 40 | 48 | 64 | 64 | 80 | 100 | 100 | 128 | | | |
| • 1,50 | 40 | 40 | 40 | 48 | 64 | 64 | 80 | 100 | 100 | 128 | 150 | 160 | 160 |
| • 1,60 | 40 | 40 | 40 | 48 | 64 | 64 | 80 | 100 | 100 | 128 | 150 | 160 | 160 |
| • 1,70 | 40 | 32 | 40 | 48 | 48 | 64 | 80 | 80 | 100 | | | | |
| • 1,80 | 40 | 32 | 40 | 48 | 48 | 64 | 80 | 80 | 100 | 128 | 128 | 128 | 160 |
| • 1,90 | 40 | 32 | 40 | 48 | 48 | 64 | 80 | 80 | 100 | | | | |
| • 2,00 | 40 | 32 | 40 | 48 | 48 | 64 | 80 | 80 | 100 | 128 | 128 | 128 | 160 |
| • 2,50 | 40 | 32 | 40 | 40 | 48 | 64 | 64 | 80 | 100 | 100 | 128 | 128 | 160 |
| • 3,00 | 40 | 32 | 32 | 40 | 48 | 48 | 64 | 80 | 80 | 100 | 128 | 128 | 128 |
| • 3,50 | 24 | 24 | 32 | 40 | 40 | 48 | 64 | 64 | 80 | 100 | | | |
| • 4,00 | 24 | 24 | 32 | 40 | 40 | 48 | 64 | 64 | 80 | 100 | 100 | 100 | 128 |
| • 5,00 | 24 | 24 | 32 | 32 | 40 | 48 | 48 | 64 | 80 | 100 | | | |
| • 6,00 | 24 | 24 | 24 | 32 | 40 | 40 | 48 | 64 | 64 | 100 | | | |

Zähnezahl-Tabelle für Vollhartmetall-Kreissägeblätter ähnlich DIN 1838 B
 Number of teeth-table for solid carbide circular saw blades similar DIN 1838 B



5 6001B

| Ø mm/±0,1 Bohrung/Bore H7 Blattstärke/Blade thickness ±0,01 | 15 | 20 | 25 | 30 | 40 | 50 | 63 | 80 | 100 | 125 | | | |
|--|-------------------------------------|----|----|----|----|----|----|----|-----|-----|--|--|--|
| | 5 | 5 | 8 | 8 | 10 | 13 | 16 | 22 | 22 | 22 | | | |
| | Anzahl der Zähne Number of teeth | | | | | | | | | | | | |
| • 0,20 | 20 | 20 | 20 | 30 | 40 | | | | | | | | |
| • 0,25 | 20 | 20 | 20 | 30 | 40 | | | | | | | | |
| • 0,30 | 20 | 20 | 20 | 30 | 40 | | | | | | | | |
| • 0,40 | 20 | 20 | 20 | 30 | 40 | 48 | 64 | | | | | | |
| • 0,50 | 20 | 20 | 20 | 30 | 40 | 48 | 64 | | | | | | |
| • 0,60 | 20 | 20 | 20 | 30 | 40 | 48 | 48 | 64 | 80 | | | | |
| • 0,70 | 20 | 20 | 20 | 30 | 40 | 40 | 48 | 64 | 64 | | | | |
| • 0,80 | 20 | 20 | 20 | 24 | 32 | 40 | 48 | 64 | 64 | 80 | | | |
| • 0,90 | 20 | 20 | 20 | 24 | 32 | 40 | 48 | 48 | 64 | 80 | | | |
| • 1,00 | 20 | 20 | 20 | 24 | 32 | 40 | 48 | 48 | 64 | 80 | | | |
| • 1,20 | 20 | 20 | 20 | 24 | 32 | 40 | 40 | 48 | 64 | 64 | | | |
| • 1,50 | 20 | 20 | 20 | 24 | 32 | 32 | 40 | 48 | 48 | 64 | | | |
| • 1,60 | 20 | 20 | 20 | 24 | 32 | 32 | 40 | 48 | 48 | 64 | | | |
| • 1,80 | 20 | 20 | 20 | 24 | 24 | 32 | 40 | 40 | 48 | 64 | | | |
| • 2,00 | 20 | 20 | 20 | 24 | 24 | 32 | 40 | 40 | 48 | 64 | | | |
| • 2,50 | 20 | 20 | 20 | 24 | 24 | 32 | 32 | 40 | 48 | 48 | | | |
| • 3,00 | 20 | 20 | 20 | 24 | 24 | 24 | 32 | 40 | 40 | 48 | | | |
| • 4,00 | 20 | 20 | 20 | 24 | 20 | 24 | 32 | 32 | 40 | 48 | | | |
| • 5,00 | 20 | 20 | 20 | 24 | 20 | 24 | 24 | 32 | 40 | 40 | | | |
| • 6,00 | 20 | 20 | 20 | 24 | 20 | 20 | 24 | 32 | 32 | 40 | | | |

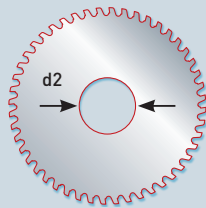
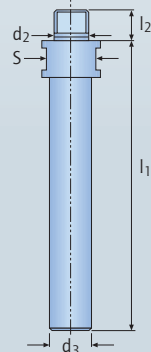
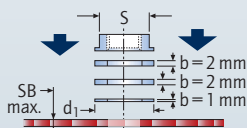


5 6100

Kreissägeblätter Aufnahmehalter – "Vorderseitige Aufspannung" Circular saw blade retainer – front side securing



HSS



d2 = Sägeblattbohrung / Saw blade bore
d1 = Flanschdurchmesser / Flange diameter
d3 = Schaftdurchmesser / Shank diameter

| Art. | d2 h6 | d3 h6 | d1 | l1 | l2 | SB max. | S | € |
|------------------|-------|-------|-----|-----|------|---------|----|---|
| 5 6100 03 05 | • 3 | 5 | 5 | 60 | 8,0 | 3 | 4 | |
| 5 6100 05 06 | • 5 | 6 | 10 | 70 | 10,0 | 6 | 8 | |
| 5 6100 05 06 075 | • 5 | 6 | 7,5 | 70 | 7,0 | 3 | 6 | |
| 5 6100 05 10 | • 5 | 10 | 10 | 80 | 10,0 | 6 | 8 | |
| 5 6100 06 10 | • 6 | 10 | 12 | 80 | 10,5 | 6 | 10 | |
| 5 6100 08 10 | • 8 | 10 | 15 | 80 | 10,0 | 6 | 13 | |
| 5 6100 08 12 | • 8 | 12 | 15 | 90 | 11,0 | 6 | 13 | |
| 5 6100 10 06 | • 10 | 6 | 18 | 80 | 10,5 | 6 | 15 | |
| 5 6100 10 10 | • 10 | 10 | 18 | 80 | 10,5 | 6 | 15 | |
| 5 6100 10 16 | • 10 | 16 | 18 | 100 | 11,5 | 6 | 15 | |
| 5 6100 13 16 | • 13 | 16 | 22 | 110 | 12,0 | 6 | 19 | |
| 5 6100 16 10 | • 16 | 10 | 22 | 80 | 8,0 | 3 | 19 | |
| 5 6100 16 20 | • 16 | 20 | 26 | 120 | 13,0 | 6 | 22 | |
| 5 6100 22 16 | • 22 | 16 | 32 | 120 | 13,0 | 6 | 27 | |

Abstandsringe / Distance ring

| Art. | d2 | d1 | b | € |
|------------------|------|-----|---|---|
| 5 6110 05 03 01 | • 3 | 5 | 1 | |
| 5 6110 05 03 02 | • 3 | 5 | 2 | |
| 5 6110 10 05 01 | • 5 | 10 | 1 | |
| 5 6110 10 05 02 | • 5 | 10 | 2 | |
| 5 6110 075 05 01 | • 5 | 7,5 | 1 | |
| 5 6110 075 05 02 | • 5 | 7,5 | 2 | |
| 5 6110 12 06 01 | • 6 | 12 | 1 | |
| 5 6110 12 06 02 | • 6 | 12 | 2 | |
| 5 6110 15 08 01 | • 8 | 15 | 1 | |
| 5 6110 15 08 02 | • 8 | 15 | 2 | |
| 5 6110 18 10 01 | • 10 | 18 | 1 | |
| 5 6110 18 10 02 | • 10 | 18 | 2 | |
| 5 6110 22 13 01 | • 13 | 22 | 1 | |
| 5 6110 22 13 02 | • 13 | 22 | 2 | |
| 5 6110 22 16 01 | • 16 | 22 | 1 | |
| 5 6110 22 16 02 | • 16 | 22 | 2 | |
| 5 6110 26 16 01 | • 16 | 26 | 1 | |
| 5 6110 26 16 02 | • 16 | 26 | 2 | |
| 5 6110 32 22 01 | • 22 | 32 | 1 | |
| 5 6110 32 22 02 | • 22 | 32 | 2 | |

Mutter / Nut

| Art. | d2 | d1 | S | € |
|--------------|------|-----|----|---|
| 5 6111 03 04 | • 3 | 4 | 4 | |
| 5 6111 05 08 | • 5 | 10 | 8 | |
| 5 6111 05 06 | • 5 | 7,5 | 6 | |
| 5 6111 06 10 | • 6 | 12 | 10 | |
| 5 6111 08 13 | • 8 | 15 | 13 | |
| 5 6111 10 15 | • 10 | 18 | 15 | |
| 5 6111 13 19 | • 13 | 22 | 19 | |
| 5 6111 16 19 | • 16 | 22 | 19 | |
| 5 6111 16 22 | • 16 | 26 | 22 | |
| 5 6111 22 27 | • 22 | 32 | 27 | |

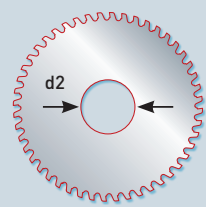
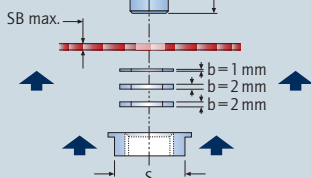
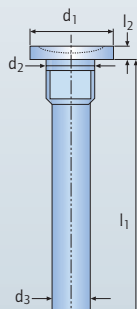
Preise siehe Seite 1080
Prices see page 1080

5 6101

Kreissägeblätter Aufnahmehalter – "Rückseitige Aufspannung" Circular saw blades retainer – rear side securing



HSS



| Art. | d2 h6 | d3 h6 | d1 | l1 | l2 | SB max. | S | € |
|--------------|-------|-------|----|-----|-----|---------|----|---|
| 5 6101 05 04 | • 5 | 4 | 10 | 50 | 2,0 | 6 | 8 | |
| 5 6101 06 05 | • 6 | 5 | 12 | 60 | 2,0 | 6 | 10 | |
| 5 6101 08 06 | • 8 | 6 | 15 | 70 | 2,0 | 6 | 13 | |
| 5 6101 08 07 | • 8 | 7 | 15 | 80 | 2,0 | 6 | 13 | |
| 5 6101 10 06 | • 10 | 6 | 18 | 70 | 2,5 | 6 | 15 | |
| 5 6101 10 08 | • 10 | 8 | 18 | 90 | 2,5 | 6 | 15 | |
| 5 6101 13 10 | • 13 | 10 | 22 | 110 | 2,5 | 6 | 19 | |
| 5 6101 16 12 | • 16 | 12 | 26 | 120 | 2,5 | 6 | 22 | |

Abstandsringe / Distance ring

| Art. | d2 | d1 | b | € |
|-----------------|------|----|---|---|
| 5 6120 10 05 01 | • 5 | 10 | 1 | |
| 5 6120 10 05 02 | • 5 | 10 | 2 | |
| 5 6120 12 06 01 | • 6 | 12 | 1 | |
| 5 6120 12 06 02 | • 6 | 12 | 2 | |
| 5 6120 15 08 01 | • 8 | 15 | 1 | |
| 5 6120 15 08 02 | • 8 | 15 | 2 | |
| 5 6120 18 10 01 | • 10 | 18 | 1 | |
| 5 6120 18 10 02 | • 10 | 18 | 2 | |
| 5 6120 22 13 01 | • 13 | 22 | 1 | |
| 5 6120 22 13 02 | • 13 | 22 | 2 | |
| 5 6120 26 16 01 | • 16 | 26 | 1 | |
| 5 6120 26 16 02 | • 16 | 26 | 2 | |

Mutter / Nut

| Art. | d2 | d1 | S | € |
|--------------|------|----|----|---|
| 5 6121 05 08 | • 5 | 10 | 8 | |
| 5 6121 06 10 | • 6 | 12 | 10 | |
| 5 6121 08 13 | • 8 | 15 | 13 | |
| 5 6121 10 15 | • 10 | 18 | 15 | |
| 5 6121 13 19 | • 13 | 22 | 19 | |
| 5 6121 16 22 | • 16 | 26 | 22 | |

Preise siehe Seite 1080
Prices see page 1080

d2 = Sägeblattbohrung / Saw blade bore
d1 = Flanschdurchmesser / Flange diameter
d3 = Schaftdurchmesser / Shank diameter

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

TECHNISCHE INFORMATION zu VHM-Kreissägeblätter
TECHNICAL INFORMATION on slitting saws solid carbide

5 6000A

5 6001B

Kühlung:

Wir empfehlen beim Einsatz von Vollhartmetallwerkzeugen eine besonders kräftige Kühlung. Unzureichend oder unregelmäßig arbeitende Kühlung begünstigt das Entstehen von Rissen im Werkzeug oder kann zum Bruch führen. Im Zweifelsfalle mit fetter Emulsion oder mit Schneidöl arbeiten.

Keine Regel ohne Ausnahme: Grauguss wird normalerweise trocken zerspannt, ebenfalls wird Kunststoff trocken gesägt. Gelegentlich wird Pressluft oder Wasser verwendet. Bei Magnesiumlegierungen ist Vorsicht geboten. In Verbindung mit Wasser besteht Explosionsgefahr. Aus diesem Grund wird hier trocken gesägt.

Vorschub:

Der allgemeine Richtwert für den Vorschub je Zahn liegt zwischen 0,005 mm für sehr harte Werkstoffe und 0,05 mm für weiche NE-Metalle. Bei durchschnittlich hartem Material wird man mit ca. 0,01 mm pro Zahn beginnen – also wesentlich langsamer als bei HSS – und je nach Ergebnis den Vorschub etwas reduzieren oder erhöhen. Die Wahl des Vorschubes wird von vielen nicht berechenbaren Faktoren beeinflusst. Die Zerspanbarkeit des Werkstoffes spielt ebenso eine Rolle, wie Drehzahl, Vorschubart, Werkstückspannung und Maschinenzustand. Die Anzahl der Zähne im Eingriff, Sägendurchmesser und Breite sind weitere Einflussfaktoren. Aus diesen Gründen können wir Ihnen nur allgemeine Richtwerte angeben. Je nach Einsatzbedingungen können diese Werte sowohl höher als auch niedriger liegen. Speziell bei Karnasch Vollhartmetallwerkzeugen bringt ein kleiner Vorschub und eine feine Zahnteilung eine besonders feine Schnittfläche. Bei den verschiedenen Werkstoffen kann man von den in der Tabelle aufgeführten Vorschubwerten pro Zahn ausgehen. Multipliziert mit der Zähnezahl des verwendeten Sägeblatts und der Drehzahl ergibt sich dann der auf der Maschine einzustellende Vorschub in mm/min.

Für NE-Metalle kann, sofern auf der Maschine vorhanden, auch Sprühöl-Schmierung verwendet werden: oder Art.: 60 1150 (Mecut spray).

Cooling:

We recommend using highly effective cooling when cutting with solid carbide tools. If the cooling is not sufficient or is irregular in nature, this can cause fractures in the tools or even result in complete failure. When in doubt, use water-oil emulsions or cutting oil.

Exception: Grey cast iron is usually machined while dry and plastics are also cut dry. Occasionally, compressed air or water may be used. Exercise caution with magnesium alloys. Magnesium may explode if it comes into contact with water. Therefore, always cut magnesium alloys while they are dry.

Feed rates:

As a guideline, use a feed rate per saw tooth of 0.005 mm for very hard materials and 0.05 mm for softer non-ferrous metals. For a metal of typical hardness, start with approx. 0.01 mm per tooth – i.e., much slower than with high speed steel. Depending on the results you achieve, you can reduce or increase the feed rate slightly. Your choice of feed rate is affected by many unpredictable factors. The machinability of the material plays a role as does the speed, feed type, workpiece clamping and the state of your machines and tools. Additional factors include the number of saw teeth that are engaged at any given moment, the saw diameter and saw width. Therefore it is only possible to provide approximate values. Depending on the machining conditions, you may have to increase or decrease this value. When using Karnasch solid carbide tools in particular, lower feed rates and finer tooth pitches will result in improved cutting surfaces. Depending on the material being processed, start with the feed rate given in the table below. Multiplying the number of teeth with the speed gives the feed rate to be set on your machine in mm/min.

For non-ferrous metals, you can also use spray oil lubrication if this is available on the machine being used: or type: 60 1150 (Mecut spray).

| Werkstoffe Material | Kühl/Schmierstoffe Coolant/lubricant | Schnittgeschwindigkeit Cutting speed | Richtwerte/Vorschub Sz (mm / Zahn) Suggested feed rate Sz (mm / tooth) |
|--|--|---|---|
| Stähle bis 600 N/mm ² (Automatenstahl) Steels with up to 600 N/mm ² (free-cutting steel) | Emulsion / Mischverhältnis 1:20 Emulsion / Mixture ratio 1:20 | 150 m/min. | 0,010 – 0,030 mm |
| Stähle von 600 bis 1000 N/mm ² (Baustahl) Steels from 600 to 1000 N/mm ² (structural steel) | Emulsion / Mischverhältnis 1:15 Emulsion / Mixture ratio 1:15 | 120 m/min. | 0,005 – 0,020 mm |
| Nichtrostende Stähle Stainless steel | Emulsion / Mischverhältnis 1:10 Emulsion / Mixture ratio 1:10 | 80 m/min. | 0,005 – 0,015 mm |
| Hochlegierte Stähle High-alloyed steel | Emulsion / Mischverhältnis 1:10 Emulsion / Mixture ratio 1:10 | 70 m/min. | 0,005 – 0,010 mm |
| Titan Titanium | Schneidöl Cutting oil | 60 m/min. | 0,003 – 0,005 mm |
| Grauguss über 220 HB Grey cast iron harder than 220 HB | Trocken Dry | 100 m/min. | 0,005 – 0,010 mm |
| Kupferlegierungen Copper alloys | Emulsion Emulsion | 300 m/min. | 0,020 – 0,040 mm |
| Messinglegierungen Brass alloys | Sprühölkühlung / Emulsion Spray oil cooling / Emulsion | 500 m/min. | 0,010 – 0,040 mm |
| Aluminium Aluminum | Sprühölkühlung / Emulsion Spray oil cooling / Emulsion | 1000 – 2000 m/min. | 0,010 – 0,040 mm |

Vorschub pro Zahn: Sz (mm / Zahn)
Feed per tooth: Sz (mm / tooth)

Vorschub: S (mm / min)
Feed rate: S (mm / min)

$$S_z = \frac{S}{Z \cdot n}$$

$$S = S_z \cdot Z \cdot n$$

S = Vorschub (mm / min.)
S = feed (mm / min.)

S_z = Vorschub pro Zahn (mm / Zahn)
S_z = feed per tooth (mm / tooth)

Z = Zähnezahl
Z = number of teeth

Z = Zähnezahl
Z = number of teeth

n = Drehzahl (1 / min.)
n = speed (rpm)

n = Drehzahl (1 / min.)
n = speed (rpm)

Alle angegebenen Werte sind nur als Richtwerte zu betrachten.
All of the given values are only intended as a guideline.



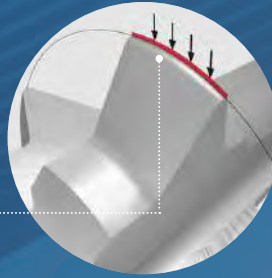
VHM-GEWINDEWIRBLER · GEWINDEFÄSER · GEWINDEBOHRER

SOLID CARBIDE WHIRLING THREAD CUTTERS · THREAD MILLS · TAPS

Logarithmisch hinterschliffen



Logarithmical relief ground



Das macht den Unterschied –
klein im Detail, groß in der Performance.
That makes the different –
small details, maximum performance.



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- 3
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- 8
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1.2

KONTAKT | CONTACT

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CNC TOOLS DIVISION

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INHALTSVERZEICHNIS · TABLE OF CONTENTS

| Art. | VHM-Gewindewirbler / solid carbide thread mill | Material | | HSC high-speed cutting | Alu- minium | Aluminium < 6% Si | Aluminium < 12% Si | MESSING brass | Kupfer copper |
|---------|--|---|---|------------------------------|----------------|----------------------|-----------------------|------------------|------------------|
| 23 1760 | M0,6 - M3 |  |  | 160 | ✓ | ✓ | ✓ | ✓ | ✓ |
| 23 1764 | M0,6 - M3 |  |  | 160 | ✓ | | | | |
| 23 1768 | M0,6 - M3 |  |  | 161 | ✓ | | | | |
| 23 1800 | M3 - M8 |  |  | 163 | ✓ | | | | |

| Art. | VHM-Gewindewirbler / solid carbide thread mill | Material | | HSC high-speed cutting | HPC | COMPO- SITES | PVDF GF30 | PA66 GF30 | PTFE CF25 |
|---------|--|---|---|------------------------------|-----|-----------------|--------------|--------------|--------------|
| 23 2005 | M4 - M12 |  |  | 164 | | ✓ | ✓ | ✓ | ✓ |
| 23 2006 | M4 - M12 |  |  | 164 | | ✓ | ✓ | ✓ | ✓ |

| Art. | VHM-Gewindewirbler / solid carbide thread mill | Material | | HSC high-speed cutting | HRC < 52 | HRC 50-70 | STAHL steel | INOX Edelstahl STAINLESS STEEL | INCONEL HASTELLOY TITANIUM |
|---------|--|---|---|------------------------------|-------------|--------------|----------------|--------------------------------------|----------------------------------|
| 22 2025 | M3 - M12 |  |  | 165 | | ✓ | | | |
| 22 2215 | MF8 - MF12 |  |  | 165 | | ✓ | | | |
| 22 2239 | G1/8 - G1/4 |  |  | 166 | | ✓ | | | |

- Lagerware / Stock tool
- Keine Lagerware, Lieferzeit und Preis auf Anfrage
No stock tool. Price and delivery on request
- ◻ Lieferzeit kurzfristig da Rohlinglager vorhanden
Short delivery deadline possible then blanks are on stock available

- ⊘ Sonderpreis. Solange Vorrat reicht. Rückgabe nicht möglich.
Special price. While stocks last. Return not possible.
- ⌚ 2-3 Arbeitstage Lieferzeit / 2-3 work days delivery time



| Gold gold | NE METALLE non-ferrous | STAHL steel | STAHL steel < 1400 N/mm² | HRC < 52 | HRC < 70 | INOX Edelstahl STAINLESS STEEL | INCONEL HASTELLOY TITANIUM | GJL | GJS | GTW GTS | GRAPHIT graphite | Kunststoff plastic | COMPO- SITES | DIN 6535 Form HA |
|--------------|------------------------------|----------------|--------------------------------|-------------|-------------|--------------------------------------|----------------------------------|-----|-----|------------|---------------------|-----------------------|-----------------|---------------------|
| ✓ | ✓ | | | | | | ✓ | | | | | ✓ | | ✓ |
| | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| | | | | | | | | | | | ✓ | | ✓ | ✓ |
| | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | |

| POM GF25 | PF-31 | PA-66 | PE-HD | Kevlar | Gold Silber Kupfer Gold/Silver/Copper | Schicht- stoffe Laminates | DIN 6535 Form HA |
|-------------|-------|-------|-------|--------|--|---------------------------------|---------------------|
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |

| GJL | GJS | GTW GTS | NE METALLE non-ferrous | GRAPHIT graphite | COMPO- SITES | kurz- spanend short chip | OHNE INNEN- KÜHLUNG without interior cooling |
|-----|-----|------------|------------------------------|---------------------|-----------------|--------------------------------|---|
| ✓ | ✓ | ✓ | | | | ✓ | ✓ |
| ✓ | ✓ | ✓ | | | | ✓ | ✓ |
| ✓ | ✓ | ✓ | | | | ✓ | ✓ |



23 1760

VHM-Gewindewirbler, LogTop Poliert. Keine Gratbildung da überschneidend, Logarithmisch hinterschliffen
Solid carbide thread mill, LogTop polished. No burr formation. Logarithmical relief ground, because of intersecting



- 1 Aluminium
- Aluminium < 6% Si
- Aluminium < 12% Si
- 2 MESSING brass
- Kupfer copper
- 3 INCONEL HASTELLOY TITANIUM
- Gold gold
- Kunststoff plastic



MICRO TOOL Z 3 Z 4 Z 6
M 0,6 - M 0,9 M 1 - M 1,7 M 2 - M 3

| Gewinde Thread | Ø Kernbohrung Core hole |
|----------------|-------------------------|
| M 0.6 | 0.450 |
| M 0.7 | 0.525 |
| M 0.8 | 0.600 |
| M 0.9 | 0.675 |
| M 1.0 × 0.25 | 0.750 |
| M 1.1 × 0.25 | 0.800 |
| M 1.2 × 0.25 | 0.950 |
| M 1.4 × 0.30 | 1.100 |
| M 1.6 × 0.35 | 1.250 |
| M 1.7 × 0.35 | 1.350 |
| M 1.8 × 0.35 | 1.450 |
| M 2.0 × 0.40 | 1.600 |
| M 2.3 × 0.40 | 1.900 |
| M 2.5 × 0.45 | 2.050 |
| M 2.6 × 0.45 | 2.150 |
| M 3.0 × 0.50 | 2.500 |



| Art. | M | Stg | × D | l2 | l1 | d1 ±0,03 | d3 | d2 h5 | Z | Gewindegröße Throat milling size | € |
|-------------|---------|-------|-----|-----|----|----------|------|-------|---|----------------------------------|--------|
| 23 1760 006 | ● M 0.6 | 0,15 | 2,5 | 1,5 | 45 | 0,41 | 0,20 | 4 | 3 | M 0.6 | 126,00 |
| 23 1760 007 | ● M 0.7 | 0,175 | 2,5 | 1,8 | 45 | 0,48 | 0,24 | 4 | 3 | M 0.7 | 120,00 |
| 23 1760 008 | ● M 0.8 | 0,20 | 2,2 | 1,8 | 45 | 0,56 | 0,28 | 4 | 3 | M 0.8 | 115,00 |
| 23 1760 009 | ● M 0.9 | 0,225 | 2,3 | 2,1 | 45 | 0,63 | 0,33 | 4 | 3 | M 0.9 | 110,00 |
| 23 1760 010 | ● M 1 | 0,25 | 2,6 | 2,7 | 45 | 0,72 | 0,34 | 4 | 4 | M 1 - M 1.1 | 107,00 |
| 23 1760 012 | ● M 1.2 | 0,25 | 2,2 | 2,7 | 45 | 0,92 | 0,54 | 4 | 4 | M 1.2 | 107,00 |
| 23 1760 014 | ● M 1.4 | 0,30 | 2,2 | 3,2 | 45 | 1,05 | 0,60 | 4 | 4 | M 1.4 | 107,00 |
| 23 1760 016 | ● M 1.6 | 0,35 | 2,3 | 3,8 | 45 | 1,20 | 0,68 | 4 | 4 | M 1.6 | 107,00 |
| 23 1760 017 | ● M 1.7 | 0,35 | 2,1 | 3,8 | 45 | 1,30 | 0,78 | 4 | 4 | M 1.7 - M 1.8 | 107,00 |
| 23 1760 020 | ● M 2 | 0,40 | 2,5 | 5,1 | 45 | 1,50 | 0,90 | 4 | 6 | M 2 - M 2.3 | 118,00 |
| 23 1760 025 | ● M 2.5 | 0,45 | 2,2 | 5,7 | 45 | 1,95 | 1,26 | 4 | 6 | M 2.5 - M 2.6 | 118,00 |
| 23 1760 030 | ● M 3 | 0,50 | 2,1 | 6,3 | 45 | 2,36 | 1,60 | 4 | 6 | M 3 | 123,00 |

MICRO GRAIN KARNASCH NORM

M DIN 6535 Form HA

0°

60°

HSC High-Speed-Cutting

NHC 7000

OIL Emul MMKS

Schnittdaten Cutting data
Zeichnungen Drawings

i **1270** **DXF/STEP**

23 1764

VHM-Gewindewirbler, LogTop Stahl. Keine Gratbildung da überschneidend, Logarithmisch hinterschliffen
Solid carbide thread mill, LogTop steel. No burr formation. Logarithmical relief ground, because of intersecting



- HRC < 70
- 6 STAHL steel < 1400 N/mm²
- INOX stainless steel < 900 N/mm² ferritic
- INOX stainless steel > 900 N/mm² martensitic
- INOX stainless steel < 900 N/mm² austenitic
- INCONEL HASTELLOY TITANIUM
- GTW GTS
- GJL
- GJS



MICRO TOOL Z 3 Z 4 Z 6
M 0,6 - M 0,9 M 1 - M 1,7 M 2 - M 3

| Gewinde Thread | Ø Kernbohrung Core hole |
|----------------|-------------------------|
| M 0.6 | 0.450 |
| M 0.7 | 0.525 |
| M 0.8 | 0.600 |
| M 0.9 | 0.675 |
| M 1.0 × 0.25 | 0.750 |
| M 1.1 × 0.25 | 0.800 |
| M 1.2 × 0.25 | 0.950 |
| M 1.4 × 0.30 | 1.100 |
| M 1.6 × 0.35 | 1.250 |
| M 1.7 × 0.35 | 1.350 |
| M 1.8 × 0.35 | 1.450 |
| M 2.0 × 0.40 | 1.600 |
| M 2.3 × 0.40 | 1.900 |
| M 2.5 × 0.45 | 2.050 |
| M 2.6 × 0.45 | 2.150 |
| M 3.0 × 0.50 | 2.500 |



Test 1 Reale Schnittdaten Real cutting data
Werkstoff / Material: 1.2083 52 HRC
23 1764 M2,5
n= 9.000 min⁻¹
fz= 0,007 mm
Standzeit/Tool life: 100 Gewinde/Threads

Test 2 Reale Schnittdaten Real cutting data
Werkstoff / Material: 1.4301
23 1764 M1,2
n= 26.000 min⁻¹
fz= 0,005 mm
Standzeit/Tool life: 240 Gewinde/Threads

MICRO GRAIN KARNASCH NORM

M DIN 6535 Form HA

0°

60°

HSC High-Speed-Cutting

NANO Spin

OIL Emul MMKS

Schnittdaten Cutting data
Zeichnungen Drawings

i **1270** **DXF/STEP**

| Art. | M | Stg | × D | l2 | l1 | d1 ±0,03 | d3 | d2 h5 | Z | Gewindegröße Throat milling size | € |
|-------------|---------|-------|-----|-----|----|----------|------|-------|---|----------------------------------|--------|
| 23 1764 006 | ● M 0.6 | 0,15 | 2,5 | 1,5 | 45 | 0,41 | 0,20 | 4 | 3 | M 0.6 | 126,00 |
| 23 1764 007 | ● M 0.7 | 0,175 | 2,5 | 1,8 | 45 | 0,48 | 0,24 | 4 | 3 | M 0.7 | 120,00 |
| 23 1764 008 | ● M 0.8 | 0,20 | 2,2 | 1,8 | 45 | 0,56 | 0,28 | 4 | 3 | M 0.8 | 115,00 |
| 23 1764 009 | ● M 0.9 | 0,225 | 2,3 | 2,1 | 45 | 0,63 | 0,33 | 4 | 3 | M 0.9 | 110,00 |
| 23 1764 010 | ● M 1 | 0,25 | 2,6 | 2,7 | 45 | 0,72 | 0,34 | 4 | 4 | M 1 - M 1.1 | 107,00 |
| 23 1764 012 | ● M 1.2 | 0,25 | 2,2 | 2,7 | 45 | 0,92 | 0,54 | 4 | 4 | M 1.2 | 107,00 |
| 23 1764 014 | ● M 1.4 | 0,30 | 2,2 | 3,2 | 45 | 1,05 | 0,60 | 4 | 4 | M 1.4 | 107,00 |
| 23 1764 016 | ● M 1.6 | 0,35 | 2,3 | 3,8 | 45 | 1,20 | 0,68 | 4 | 4 | M 1.6 | 107,00 |
| 23 1764 017 | ● M 1.7 | 0,35 | 2,1 | 3,8 | 45 | 1,30 | 0,78 | 4 | 4 | M 1.7 - M 1.8 | 107,00 |
| 23 1764 020 | ● M 2 | 0,40 | 2,5 | 5,1 | 45 | 1,50 | 0,90 | 4 | 6 | M 2 - M 2.3 | 118,00 |
| 23 1764 025 | ● M 2.5 | 0,45 | 2,2 | 5,7 | 45 | 1,95 | 1,26 | 4 | 6 | M 2.5 - M 2.6 | 118,00 |
| 23 1764 030 | ● M 3 | 0,50 | 2,1 | 6,3 | 45 | 2,36 | 1,60 | 4 | 6 | M 3 | 123,00 |

VHM-Gewindewirbler, LogTop Dia. Keine Gratbildung da überschneidend, Logarithmisch hinterschliften
Solid carbide thread mill, LogTop diamond. No burr formation. Logarithmical relief ground, because of intersecting



23 1768

| | |
|--|-----------------------------------|
| COMPO-SITES | TI-CFK TI-CFRP |
| GRAPHIT graphite | PA66 GF30 |
| GFK CFRP | PVDF GF30 |
| CFK CFRP | PEEK GF30 |
| Hybrid-stoffe hybrid materials | PEEK CF30 |
| CFK-ALU Composite CFRP-ALU Composites | ZIRKON OXID ZIRCONIA |
| Schicht-stoffe Laminates | |



| | |
|---------------|-----|
| | Z 3 |
| M 0,6 - M 0,9 | |
| | Z 4 |
| M 1 - M 1,7 | |
| | Z 6 |
| M 2 - M 3 | |

| Gewinde Thread | Ø Kernbohrung Ø Core hole |
|----------------|------------------------------|
| M 0.6 | 0.450 |
| M 0.7 | 0.525 |
| M 0.8 | 0.600 |
| M 0.9 | 0.675 |
| M 1.0 × 0.25 | 0.750 |
| M 1.1 × 0.25 | 0.800 |
| M 1.2 × 0.25 | 0.950 |
| M 1.4 × 0.30 | 1.100 |
| M 1.6 × 0.35 | 1.250 |
| M 1.7 × 0.35 | 1.350 |
| M 1.8 × 0.35 | 1.450 |
| M 2.0 × 0.40 | 1.600 |
| M 2.3 × 0.40 | 1.900 |
| M 2.5 × 0.45 | 2.050 |
| M 2.6 × 0.45 | 2.150 |
| M 3.0 × 0.50 | 2.500 |



| | |
|--------------------|-------------------------------|
| MICRO GRAIN | KARNASCH NORM |
| M | DIN 6535 Form HA |
| | |
| 60° | HSC High-Speed-Cutting |
| | DCC G |
| | Oil Emul MMKS |

| Art. | M | Stg | × D | l2 | l1 | d1 ±0,02 | d3 | d2 h5 | Z | Gewindegröße Threat milling size | € |
|-------------|---------|-------|-----|-----|----|----------|------|-------|---|-------------------------------------|--------|
| 23 1768 006 | ● M 0.6 | 0,15 | 2,5 | 1,5 | 45 | 0,41 | 0,20 | 4 | 3 | M 0.6 | 150,00 |
| 23 1768 007 | ● M 0.7 | 0,175 | 2,5 | 1,8 | 45 | 0,48 | 0,24 | 4 | 3 | M 0.7 | 143,00 |
| 23 1768 008 | ● M 0.8 | 0,20 | 2,2 | 1,8 | 45 | 0,56 | 0,28 | 4 | 3 | M 0.8 | 138,00 |
| 23 1768 009 | ● M 0.9 | 0,225 | 2,3 | 2,1 | 45 | 0,63 | 0,33 | 4 | 3 | M 0.9 | 134,00 |
| 23 1768 010 | ● M 1 | 0,25 | 2,6 | 2,7 | 45 | 0,72 | 0,34 | 4 | 4 | M 1 – M 1.1 | 130,00 |
| 23 1768 012 | ● M 1.2 | 0,25 | 2,2 | 2,7 | 45 | 0,92 | 0,54 | 4 | 4 | M 1.2 | 130,00 |
| 23 1768 014 | ● M 1.4 | 0,30 | 2,2 | 3,2 | 45 | 1,05 | 0,60 | 4 | 4 | M 1.4 | 133,00 |
| 23 1768 016 | ● M 1.6 | 0,35 | 2,3 | 3,8 | 45 | 1,20 | 0,68 | 4 | 4 | M 1.6 | 133,00 |
| 23 1768 017 | ● M 1.7 | 0,35 | 2,1 | 3,8 | 45 | 1,30 | 0,78 | 4 | 4 | M 1.7 – M 1.8 | 133,00 |
| 23 1768 020 | ● M 2 | 0,40 | 2,5 | 5,1 | 45 | 1,50 | 0,90 | 4 | 6 | M 2 – M 2.3 | 144,00 |
| 23 1768 025 | ● M 2.5 | 0,45 | 2,2 | 5,7 | 45 | 1,95 | 1,26 | 4 | 6 | M 2.5 – M 2.6 | 144,00 |
| 23 1768 030 | ● M 3 | 0,50 | 2,1 | 6,3 | 45 | 2,36 | 1,60 | 4 | 6 | M 3 | 149,00 |

Schnittdaten
Cutting data

Zeichnungen
Drawings

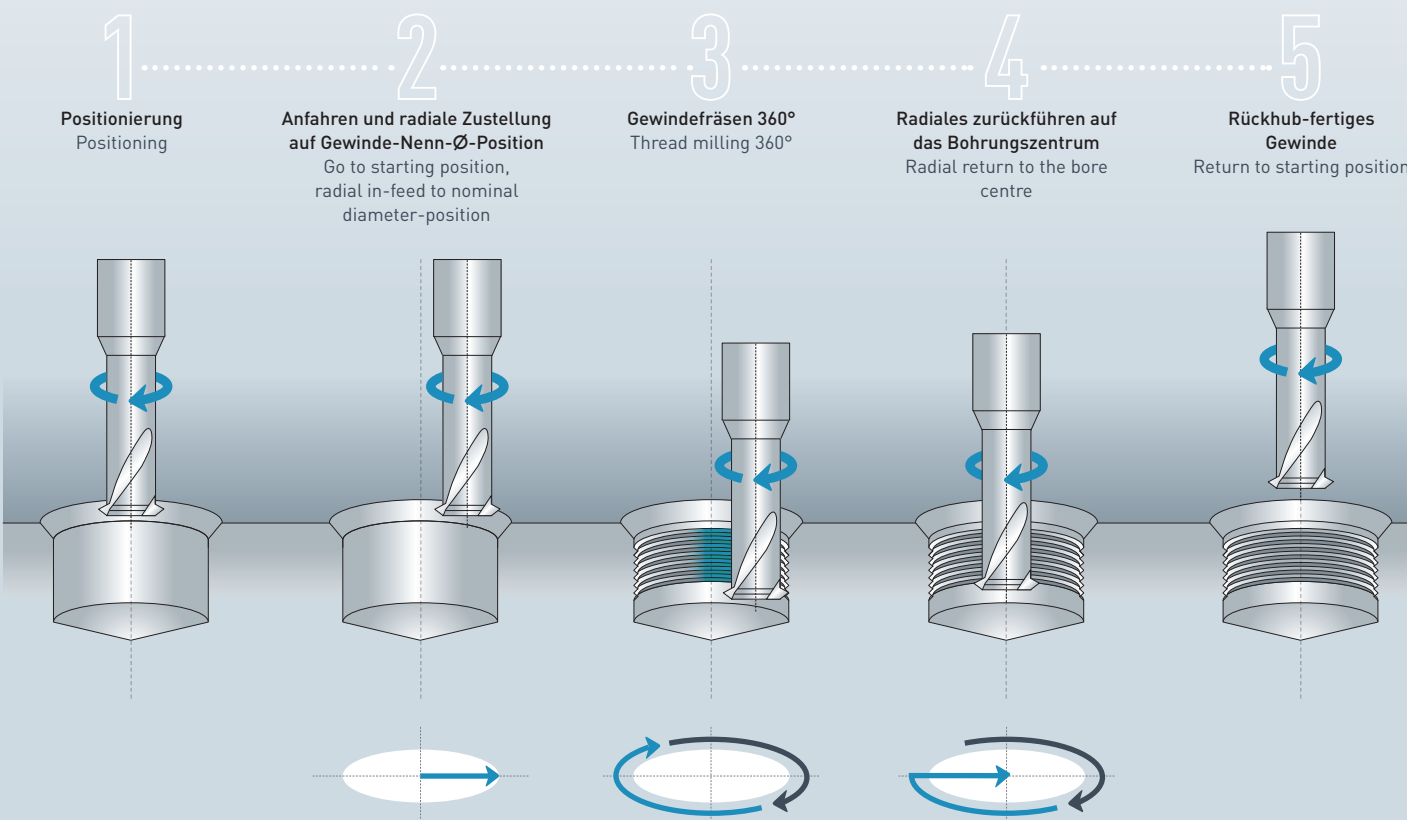


1270

DXF/STEP

Bearbeitungsfolge Einzahn-Gewindefräser
Processing sequence for single tooth thread milling cutter

23 1760 23 1764 23 1768



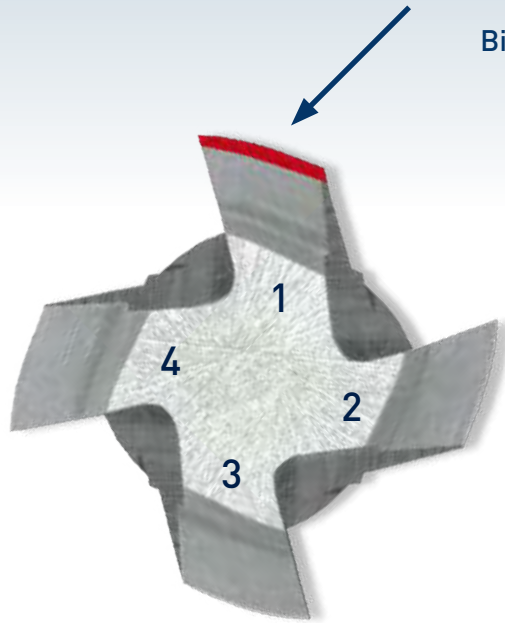
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

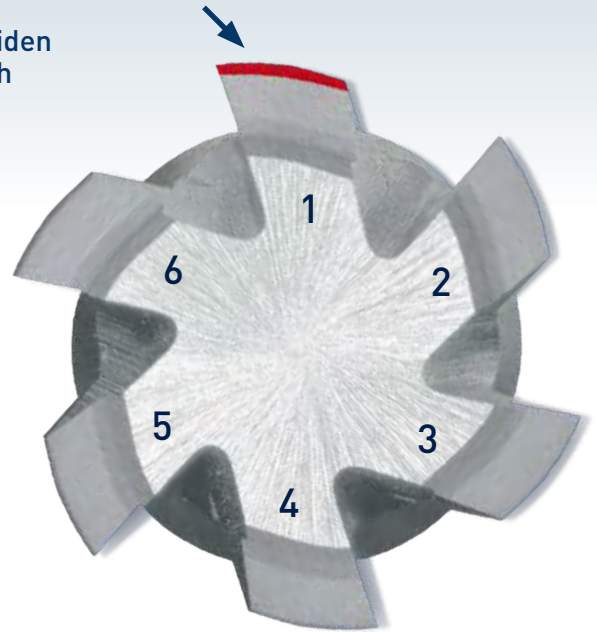
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- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

**Logarithmisch hinterschliffen
Logarithmical relief ground**

Bis zu 6 Schneiden
Up to 6 teeth



M1 - M1.7 Z=4



M2 - M3 Z=6

**Karnasch Gewindewirbler –
Technische Details**

Karnasch VHM-Gewindewirbler werden logarithmisch hinterschliffen, was zu einer beachtlichen Standzeiterhöhung führt. Durch den logarithmischen Hinterschliff bleiben der Spanwinkel und der Hinterschliff stabil, was zu einer erhöhten Prozesssicherheit führt.

Durch die spezielle Profilform bleibt das zu bearbeitende Gewinde maßgenau und verzugsfrei.

Die Hauptvorteile sind:

- Einsetzbar für die Hartmetallbearbeitung bis 80 HRC
- Spezielle Beschichtungen für die Bearbeitung verschiedener Materialien
- Keine Gratbildung
- Logarithmischer Hinterschliff
- Standardabmessungen ab unserem Lager lieferbar

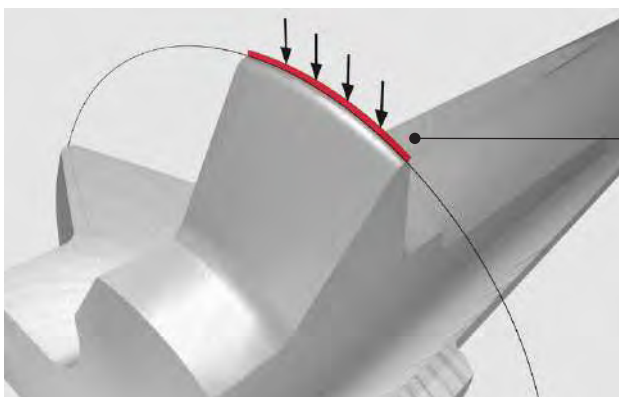
**Karnasch solid carbide whirling thread cutters –
Technical details**

Karnasch solid carbide thread mills are arc shaped logarithmically grinded this results in a significant higher tool life. Due to the logarithmic grinding the rake angle and relief remain stable, which leads to increased process reliability.

Due to our special profile shape we ensure, that the thread is free from distortions and stay dimensionally true.

The major advantages are:

- Suitable for cemented carbide up to 80 HRC
- Special coatings for machining different materials
- No burr formation
- Special logarithmic grinding
- Standard dimensions available from stock



Logarithmisch hinterschliffen
Logarithmical relief ground

VHM-Gewindefräser mit Innenkühlung, Logarithmisch hinterschliften
Solid carbide thread mill with interior cooling supply, logarithmical relief ground



23 1800

HRC < 70

STAHL
steel
< 1400 N/mm²

INOX
stainless steel
< 900 N/mm²
ferritic

INOX
stainless steel
> 900 N/mm²
martensitic

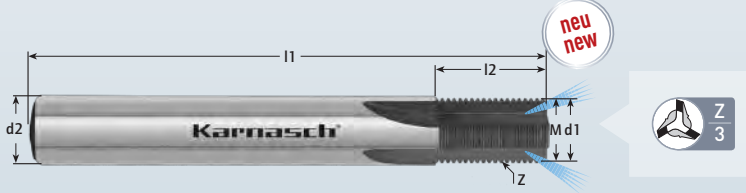
INOX
stainless steel
< 900 N/mm²
austenitic

**INCONEL
HASTELLOY
TITANIUM**

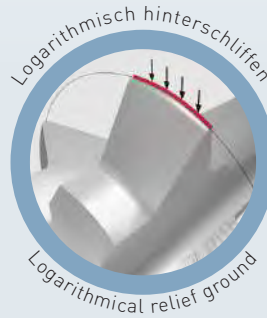
**GTW
GTS**

GJL

GJS



| Gewinde Thread | Ø Kernbohrung Ø Core hole |
|----------------|------------------------------|
| M 3 | 2,35 |
| M 4 | 3,25 |
| M 5 | 4,15 |
| M 6 | 4,90 |
| M 8 | 6,65 |



| | |
|--------------------|--------------------------|
| MICRO GRAIN | KARNASCH NORM |
| M | DIN 6535 Form HAK |
| | |
| | HSC HHC |
| | NANO Spin |
| | |

| Art. | M | Stg | x D | l2 | l1 | d1 | d2 h5 | Z | € |
|-------------|-------|------|-----|----|----|-----|-------|---|--------|
| 23 1800 030 | • M 3 | 0,50 | 2,3 | 5 | 50 | 2,1 | 4 | 3 | 117,00 |
| 23 1800 040 | • M 4 | 0,70 | 2,1 | 6 | 50 | 2,8 | 4 | 3 | 130,00 |
| 23 1800 050 | • M 5 | 0,80 | 2,2 | 8 | 50 | 3,6 | 4 | 3 | 155,00 |
| 23 1800 060 | • M 6 | 1,00 | 2,0 | 9 | 50 | 4,4 | 6 | 3 | 184,00 |
| 23 1800 080 | • M 8 | 1,25 | 2,0 | 12 | 50 | 5,8 | 6 | 3 | 226,00 |

Schnittdaten
Cutting data

Zeichnungen
Drawings



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Quality products for metalworking.

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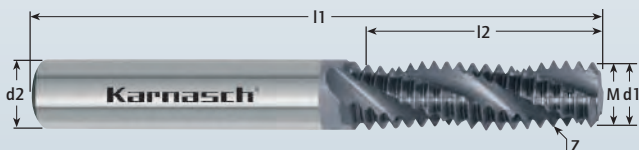
23 2005

Diamantbeschichteter Vollhartmetall Gewindefräser, spiralisiert 30° für Innengewinde ohne Innenkühlung, ohne Senkstufe, metrisches ISO-Gewinde DIN 13 – 2,5xD



Diamond coated solid carbide thread milling cutter, 30° spiral for internal threads, without internal cooling and without counter sunk stage, metric ISO-thread DIN 13 – 2,5xD

| | |
|--|----------------------------|
| COMPO-SITES | TI-CFK TI-CFRP |
| GRAPHIT graphite | PA66 GF30 |
| GFK GFRP | PVDF GF30 |
| CFK CFRP | PEEK GF30 |
| Hybrid- stoffe hybrid materials | PEEK CF30 |
| CFK-ALU Composite CFRP-ALU Composites | ZIRKON OXID ZIRCONIA |
| Schicht- stoffe Laminates | |



| | |
|--------------------|-------------------------------|
| DIAMANT DIAMOND | DIN 13 |
| M | DIN 6535 Form HA |
| | |
| | HSC High-Speed- Cutting |
| | DCC 0318 |
| | |

| Art. | M | Stg | x D | l2 | l1 | d1 | d2 h5 | Z | € |
|-------------------|--------|------|-------|-------|----|------|-------|---|--------|
| 23 2005 04 070 25 | • M 4 | 0,7 | 2,5xD | 10,85 | 55 | 3,15 | 6 | 3 | 163,00 |
| 23 2005 05 080 25 | • M 5 | 0,8 | 2,5xD | 13,15 | 55 | 4,00 | 6 | 3 | 166,00 |
| 23 2005 06 100 25 | • M 6 | 1,0 | 2,5xD | 16,50 | 55 | 4,80 | 6 | 3 | 172,00 |
| 23 2005 08 125 25 | • M 8 | 1,25 | 2,5xD | 21,80 | 55 | 6,00 | 6 | 3 | 183,00 |
| 23 2005 10 150 25 | • M 10 | 1,50 | 2,5xD | 26,20 | 65 | 8,00 | 8 | 3 | 218,00 |
| 23 2005 12 175 25 | • M 12 | 1,75 | 2,5xD | 30,60 | 75 | 9,90 | 10 | 4 | 257,00 |

PKD - CVD Gewindefräser kurzfristig lieferbar!

Schnittdaten
Cutting data

Zeichnungen
Drawings



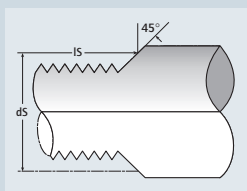
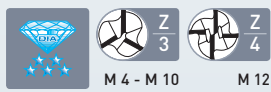
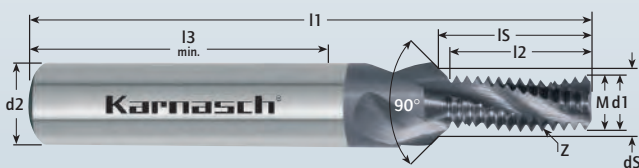
23 2006

Diamantbeschichteter Vollhartmetall-Gewindefräser, spiralisiert für Innengewinde ohne Innenkühlung, mit 90° Senkstufe, metrisches ISO-Gewinde DIN 13 – 2,0xD



Diamond coated solid carbide thread milling cutter, 30° spiral for internal threads, without internal cooling with 90° counter sunk stage, metric ISO-thread DIN 13 – 2,0xD

| | |
|--|----------------------------|
| COMPO-SITES | TI-CFK TI-CFRP |
| GRAPHIT graphite | PA66 GF30 |
| GFK GFRP | PVDF GF30 |
| CFK CFRP | PEEK GF30 |
| Hybrid- stoffe hybrid materials | PEEK CF30 |
| CFK-ALU Composite CFRP-ALU Composites | ZIRKON OXID ZIRCONIA |
| Schicht- stoffe Laminates | |



| | |
|--------------------|-------------------------------|
| DIAMANT DIAMOND | DIN 13 |
| M | DIN 6535 Form HA |
| | |
| | HSC High-Speed- Cutting |
| | DCC 0318 |
| | |

| Art. | M | Stg | x D | l2 | l3/min. | l1 | ds | ls | d1 | d2 h5 | Z | € |
|-------------------|--------|------|-------|-------|---------|----|------|------|------|-------|---|--------|
| 23 2006 04 070 20 | • M 4 | 0,7 | 2,0xD | 8,75 | 36 | 55 | 4,2 | 9,3 | 3,14 | 6 | 3 | 169,00 |
| 23 2006 05 080 20 | • M 5 | 0,8 | 2,0xD | 10,75 | 36 | 55 | 5,3 | 11,3 | 4,00 | 6 | 3 | 177,00 |
| 23 2006 06 100 20 | • M 6 | 1,0 | 2,0xD | 12,40 | 36 | 65 | 6,3 | 13,1 | 4,80 | 8 | 3 | 194,00 |
| 23 2006 08 125 20 | • M 8 | 1,25 | 2,0xD | 16,80 | 40 | 75 | 8,3 | 17,6 | 6,50 | 10 | 3 | 236,00 |
| 23 2006 10 150 20 | • M 10 | 1,50 | 2,0xD | 20,10 | 45 | 80 | 10,3 | 21,2 | 8,20 | 12 | 3 | 319,00 |
| 23 2006 12 175 20 | • M 12 | 1,75 | 2,0xD | 25,20 | 45 | 90 | 12,3 | 26,4 | 9,90 | 14 | 4 | 370,00 |

PKD - CVD Gewindefräser kurzfristig lieferbar!

Schnittdaten
Cutting data

Zeichnungen
Drawings



Vollhartmetall-Maschinengewindebohrer 50 - 63 HRC, < 1,5xD
Solid carbide machine taps, metric 50 - 63 HRC



22 2025

HRC
50-63

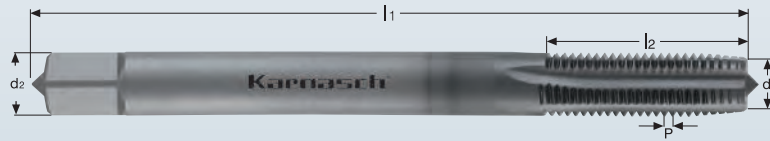
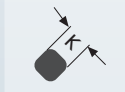
GJL

GJS

GTW
GTS

GRAPHIT
graphite

kurz-
spanend
short chip



Bearbeitungshinweis: Verwenden Sie ausschließlich Schneidpaste mit Hochdruckzusätzen wie Karnasch Art.-Nr. 60 1157 + 60 1159. Alternativ geeignetes Schneidöl, keine Emulsion.

Machining indication: Please use exclusively our cutting paste with the extreme pressure additive Karnasch art.-no. 60 1157 + 60 1159. Alternative suitable cutting oil, no emulsion.

Richtwerte für den Einsatz von VHM-Maschinengewindebohrern 50 - 63 HRC
Recommended cutting data for Micro Grain Maschine Taps 50 - 63 HRC

| | | |
|---------------------------------|---------------------------------|---------------------------------|
| 50 - 54 HRC Vc = 4 - 6 m/min | 55 - 59 HRC Vc = 3 - 5 m/min | 60 - 63 HRC Vc = 2 - 4 m/min |
|---------------------------------|---------------------------------|---------------------------------|

Vorausgesetzt werden stabile Maschinenverhältnisse. Wir empfehlen Synchronspindel. Keinesfalls von Hand schneiden. Prerequisite are stabil machines. Absolutely no manual use. We recommend Synchronspindl. Only with machine.

| | |
|--------------------|--------------------------|
| MICRO GRAIN | DIN 371 376 |
| M | ISO 2 6HX |
| 50-63 HRC | 4,5 x P Form D |
| | HHC |
| | XXM-1 |
| | |

| Art. | d1 Gewinde | P | l1 | l2 | d2 h6 | k | | € |
|------------|------------|------|----|----|-------|-----|-----|--------|
| 22 2025 03 | • M 3 | 0,5 | 56 | 14 | 3,5 | 2,7 | 2,6 | 193,00 |
| 22 2025 04 | • M 4 | 0,7 | 63 | 14 | 4,5 | 3,4 | 3,5 | 197,00 |
| 22 2025 05 | • M 5 | 0,8 | 70 | 20 | 6,0 | 4,9 | 4,4 | 205,00 |
| 22 2025 06 | • M 6 | 1,0 | 80 | 24 | 6,0 | 4,9 | 5,3 | 201,00 |
| 22 2025 08 | • M 8 | 1,25 | 90 | 24 | 8,0 | 6,2 | 7,1 | 216,00 |

Vollhartmetall-Maschinengewindebohrer Feingewinde 50 - 63 HRC, < 1,5xD
Solid carbide machine taps, metric fine thread 50 - 63 HRC



22 2215

HRC
50-63

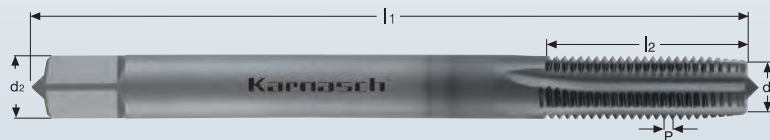
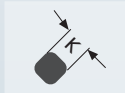
GJL

GJS

GTW
GTS

GRAPHIT
graphite

kurz-
spanend
short chip



Bearbeitungshinweis: Verwenden Sie ausschließlich Schneidpaste mit Hochdruckzusätzen wie Karnasch Art.-Nr. 60 1157 + 60 1159. Alternativ geeignetes Schneidöl, keine Emulsion.

Machining indication: Please use exclusively our cutting paste with the extreme pressure additive Karnasch art.-no. 60 1157 + 60 1159. Alternative suitable cutting oil, no emulsion.

Richtwerte für den Einsatz von VHM-Maschinengewindebohrern 50 - 63 HRC
Recommended cutting data for Micro Grain Maschine Taps 50 - 63 HRC

| | | |
|---------------------------------|---------------------------------|---------------------------------|
| 50 - 54 HRC Vc = 4 - 6 m/min | 55 - 59 HRC Vc = 3 - 5 m/min | 60 - 63 HRC Vc = 2 - 4 m/min |
|---------------------------------|---------------------------------|---------------------------------|

Vorausgesetzt werden stabile Maschinenverhältnisse. Wir empfehlen Synchronspindel. Keinesfalls von Hand schneiden. Prerequisite are stabil machines. Absolutely no manual use. We recommend Synchronspindl. Only with machine.

| | |
|--------------------|--------------------------|
| MICRO GRAIN | DIN 371 376 |
| MF | ISO 2 6HX |
| 50-63 HRC | 4,5 - P Form B |
| | HHC |
| | XXM-1 |
| | |

| Art. | d1 Gewinde | P | l1 | l2 | d2 | k | | € |
|--------------|------------|-----|-----|----|----|-----|------|--------|
| 22 2215 1215 | % M 12 | 1,5 | 100 | 18 | 9 | 7,0 | 10,8 | 390,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.



22 2239

Vollhartmetall-Whitworth Rohrgewinde-Gewindebohrer 50 - 63 HRC, < 1,5xD
Solid carbide Whitworth screw tap 50 - 63 HRC



HRC 50-63

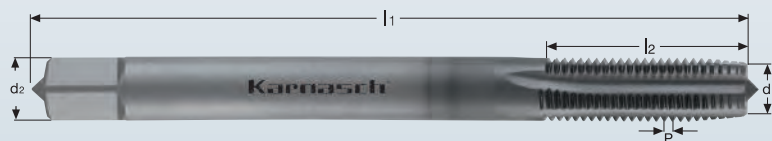
GJL

GJS

GTW GTS

GRAPHIT graphite

kurz-spanend short chip



Bearbeitungshinweis: Verwenden Sie ausschließlich Schneidpaste mit Hochdruckzusätzen wie Karnasch Art.-Nr. 60 1157 + 60 1159. Alternativ geeignetes Schneidöl, keine Emulsion.

Machining indication: Please use exclusively our cutting paste with the extreme pressure additive Karnasch art.-no. 60 1157 + 60 1159. Alternative suitable cutting oil, no emulsion.

Richtwerte für den Einsatz von VHM-Maschinengewindebohrern 50 - 63 HRC
Recommended cutting data for Micro Grain Maschine Taps 50 - 63 HRC

| | | |
|---------------------------------|---------------------------------|---------------------------------|
| 50 - 54 HRC Vc = 4 - 6 m/min | 55 - 59 HRC Vc = 3 - 5 m/min | 60 - 63 HRC Vc = 2 - 4 m/min |
|---------------------------------|---------------------------------|---------------------------------|

Vorausgesetzt werden stabile Maschinenverhältnisse. Wir empfehlen Synchronspindel. Keinesfalls von Hand schneiden. Prerequisite are stabil machines. Absolutely no manual use. We recommend Syncronspindel. Only with machine.

MICRO GRAIN

DIN 5156

G

ISO 228/BSP

HRC 50-63

4-5 x P
Form D



HHC



XXM-1



| Art. | d1 Gewinde | P | l1 | l2 | d2/h6 | k | Ø | € |
|-------------|------------|----|----|----|-------|-----|-----|--------|
| 22 2239 1/8 | % G 1/8 | 28 | 90 | 24 | 7 | 5,5 | 8,8 | 337,20 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

60 1159

60 1157

Schmierstoffe & Schneidöl
Lubricant & Cutting oil



125 g

Universal-SCHNEIDPASTE
Universal cutting paste

chlorfrei / silikonfrei
chlorine free / silicone free

60 1159



750 g

Universal-SCHNEIDPASTE
Universal cutting-paste

chlorfrei / silikonfrei
chlorine free / silicone free

60 1157

- Paste haftet am Werkzeug.
- Kein Tropfen und Umherspritzen.

Ideal zum Arbeiten in Zwangslagen wie z.B. „Überkopfeinsatz“ und bei Maschinen ohne Kühlmittleinrichtung.

Verwendung: Erhöht signifikant die Standzeiten und Oberflächengüte beim: Sägen, Fräsen, Gewindeschneiden, Reiben, Bohren, Drehen.

Zum Zerspanen aller Stähle sowie schwierigster Materialien wie Titan-, Mangan-, Stahlguss-, Chrom-Nickel oder Molybdän-Stählen.

Hervorragend auch für alle Nichteisenmetalle wie Alu, Kupfer, Messing.

- The paste sticks to the tool.
- No dripping or splashing

Ideal for working under difficult circumstances e.g. "Overhead use" and for machines without cooling device.

Application: Increases tool life and surface finish significantly when: sawing, milling, tapping, grinding, drilling.

For machining all kind of steels. Also excellent for extremely difficult materials such as titanium-, manganese-, cast steel-, chrome-nickel or molybdenum steels.

Also excellent for all non-ferrous metals such as aluminum, copper, brass.

| Art. | g/Dose | Stück/piece | € |
|---------|---------|-------------|------|
| 60 1159 | • 125 g | 1 | 6,95 |

| Art. | g/Dose | Stück/piece | € |
|---------|---------|-------------|-------|
| 60 1157 | • 750 g | 1 | 25,45 |

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1.3

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INHALTSVERZEICHNIS · TABLE OF CONTENTS

| Art. | Composites Tools | Material | | HSC highspeed cutting | HPC | COMPO- SITES | INCONEL | AFK Aramid | PVDF GF30 | Honey comb |
|----------|---|-----------------------------------|-------------|-----------------------------|-----|-----------------|---------|---------------|--------------|---------------|
| 11 1350 |  | PKD PCD | 223 | | ✓ | ✓ | | ✓ | ✓ | ✓ |
| 29 0060 |  | PKD PCD | 174 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| 29 0080A |  | MICRO GRAIN | 176 | | ✓ | ✓ | | ✓ | ✓ | ✓ |
| 29 0080B |  | MICRO GRAIN | 176 | | ✓ | | | | | ✓ |
| 29 0100 |  | MICRO GRAIN | 177 | | ✓ | | | | | |
| 29 0120 |  | MICRO GRAIN | 178- 179 | | ✓ | ✓ | | | ✓ | |
| 29 0121 |  | MICRO GRAIN | 180 | | ✓ | ✓ | | | ✓ | |
| 29 0122 |  | MICRO GRAIN | 181 | | ✓ | ✓ | | | ✓ | |
| 29 0200 |  | MICRO GRAIN | 182 | | | | | | | |
| 29 0210 |  | MICRO GRAIN | 183 | | | | | | | |
| 29 0250 |  | MICRO GRAIN | 184 | | | | | | | |
| 29 0260 |  | MICRO GRAIN | 185 | | | | | | | |
| 29 0305 |  | MICRO GRAIN | 188 | | ✓ | ✓ | | ✓ | ✓ | |
| 29 0412 |  | MICRO GRAIN | 188 | | ✓ | ✓ | | ✓ | ✓ | |
| 29 0416 |  | MICRO GRAIN | 189 | | ✓ | ✓ | | ✓ | ✓ | |
| 29 0417 |  | MICRO GRAIN | 189 | | ✓ | ✓ | | ✓ | ✓ | |
| 29 6811 |  | ND MKD MCD | 212 | ✓ | ✓ | | | | | |
| 29 6837 |  | MKD Mono Kristallin | 213 | ✓ | ✓ | | | | | |
| 29 6838 |  | MKD Mono Kristallin | 214 | ✓ | ✓ | | | | | |
| 29 6839 |  | MKD Mono Kristallin | 215 | ✓ | ✓ | | | | | |
| 29 6840 |  | MKD Mono Kristallin | 216 | ✓ | ✓ | | | | | |
| 29 6843 |  | MKD Mono Kristallin | 218 | ✓ | ✓ | | | | | |
| 29 1652 |  | SPEZIAL SPECIAL MICRO GRAIN | 190 | ✓ | ✓ | | | | | |

| PA66 GF30 | PTFE CF25 | POM GF25 | PF-31 | PEEK | PA-66 | PE-HD | Kevlar | Gold Silber Kupfer <small>Gold/Silver/Copper</small> | Schichtstoffe Laminates | Spiegelfinish Mirror finish | Aluminium > 12% Si | MIT INNENKÜHLUNG <small>with internal cooling</small> | ZIRKONIUM <small>ZIRCONIUM</small> | TITAN <small>Titanium</small> | C T | T C | C A | A C |
|-----------|-----------|----------|-------|------|-------|-------|--------|---|-------------------------|-----------------------------|--------------------|--|---------------------------------------|----------------------------------|-----|-----|-----|-----|
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | | | | | | | | |
| | | | | ✓ | ✓ | | ✓ | | | | | | | | | | | |
| | | | | | | | ✓ | | ✓ | | | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | | | | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | | | | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | | | | ✓ | | | | | | |
| | | | | | | | | | | | | | | | | | ✓ | ✓ |
| | | | | | | | | | | | | | | | ✓ | ✓ | | |
| | | | | | | | | | | | | | | | ✓ | ✓ | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | | ✓ | | | | | | |
| | | | | ✓ | | | | ✓ | | ✓ | | | | | | | | |
| | | | | ✓ | | | | ✓ | | ✓ | | | | | | | | |
| | | | | ✓ | | | | ✓ | | ✓ | | | | | | | | |
| | | | | ✓ | | | | ✓ | | ✓ | | | | | | | | |
| | | | | ✓ | | | | ✓ | | ✓ | | | | | | | | |
| | | | | ✓ | | | | ✓ | | ✓ | | | | | | | | |
| | | | | ✓ | | | | ✓ | | ✓ | | | | | | | | |

1 

2 

3 

4 

5 

6 

7 

8 

9 

INHALTSVERZEICHNIS · TABLE OF CONTENTS

| Art. | Composites Tools | Material | | HSC highspeed cutting | HPC | COMPO- SITES | INCONEL | AFK Aramid | PVDF GF30 | Honey comb |
|----------|--|-----------------------------------|-----|-----------------------------|-----|-----------------|---------|---------------|--------------|---------------|
| 29 1654 |  | SPEZIAL SPEZIAL MICRO-GRAIN | 191 | ✓ | ✓ | | | | | |
| 29 1658 |  | SPEZIAL SPEZIAL MICRO-GRAIN | 192 | ✓ | ✓ | | | | | |
| 29 1661 |  | SPEZIAL SPEZIAL MICRO-GRAIN | 193 | ✓ | ✓ | | | | | |
| 29 1751 |  | MICRO GRAIN | 194 | ✓ | | ✓ | | | | |
| 29 1752 |  | MICRO GRAIN | 194 | ✓ | | ✓ | | | | |
| 29 1753 |  | MICRO GRAIN | 195 | ✓ | | ✓ | | | | |
| 29 1761 |  | MICRO GRAIN | 196 | | ✓ | ✓ | | | | ✓ |
| 29 1762 |  | MICRO GRAIN | 196 | | ✓ | ✓ | | | | ✓ |
| 29 1763 |  | MICRO GRAIN | 197 | | ✓ | ✓ | | | | ✓ |
| 29 1771 |  | MICRO GRAIN | 197 | | ✓ | ✓ | | | ✓ | |
| 29 1783 |  | MICRO GRAIN | 198 | | ✓ | ✓ | | ✓ | ✓ | ✓ |
| 29 1784 |  | MICRO GRAIN | 198 | | ✓ | ✓ | | ✓ | ✓ | ✓ |
| 29 1790A |  | MICRO GRAIN | 199 | | ✓ | ✓ | | ✓ | ✓ | ✓ |
| 29 1790C |  | MICRO GRAIN | 199 | | | | | ✓ | | ✓ |
| 11 6001 |  | MICRO GRAIN | 200 | | | | | ✓ | | ✓ |
| 11 6002 |  | MICRO GRAIN | 200 | | | | | ✓ | | ✓ |
| 11 6003 |  | MICRO GRAIN | 200 | | | | | ✓ | | ✓ |
| 11 6004 |  | MICRO GRAIN | 200 | | | | | ✓ | | ✓ |
| 29 6521 |  | CVD | 202 | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| 29 6522 |  BEST SELLER | CVD | 203 | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| 29 6523 |  BEST SELLER | CVD | 204 | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| 29 6524 |  BEST SELLER | CVD | 205 | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| 29 6525 |  BEST SELLER | CVD | 205 | ✓ | ✓ | ✓ | | ✓ | ✓ | |



| PA66 GF30 | PTFE CF25 | POM GF25 | PF-31 | PEEK | PA-66 | PE-HD | Kevlar | Gold Silber Kupfer <small>Gold/Silver/Copper</small> | Schichtstoffe Laminates | Spiegelfinish Mirror finish | Aluminium > 12% Si | MIT INNEN KÜHLUNG <small>with interior cooling</small> | ZIRKONIUM <small>ZIRCONIUM</small> | TITAN <small>Titanium</small> | C T | T C | C A | A C |
|-----------|-----------|----------|-------|------|-------|-------|--------|---|-------------------------|-----------------------------|--------------------|---|---------------------------------------|----------------------------------|-----|-----|-----|-----|
| | | | | ✓ | | | | ✓ | | | | | | | | | | |
| | | | | ✓ | | | | ✓ | | | | | | | | | | |
| | | | | ✓ | | | | ✓ | | | | | | | | | | |
| | | | | ✓ | ✓ | ✓ | | ✓ | | | | | | | | | | |
| | | | | ✓ | ✓ | ✓ | | ✓ | | | | | | | | | | |
| | | | | ✓ | ✓ | ✓ | | ✓ | | | | | | | | | | |
| | ✓ | ✓ | | | | | | | | | | | | | | | | |
| | ✓ | ✓ | | | | | | | | | | | | | | | | |
| | ✓ | ✓ | | | | | | | | | | | | | | | | |
| ✓ | ✓ | ✓ | | | | | ✓ | | ✓ | | | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | | | | | | | | |
| | | | | | | | ✓ | | ✓ | | | | | | | | | |
| | | | | | | | ✓ | | ✓ | | | | | | | | | |
| | | | | | | | ✓ | | ✓ | | | | | | | | | |
| | | | | | | | ✓ | | ✓ | | | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | ✓ | ✓ | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | ✓ | ✓ | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | ✓ | ✓ | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | ✓ | ✓ | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | ✓ | ✓ | | | | |

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2

3

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5

6

7

8

9

INHALTSVERZEICHNIS · TABLE OF CONTENTS

| Art. | Composites Tools | Material | | HSC highspeed cutting | HPC | COMPO- SITES | INCONEL | AFK Aramid | PVDF GF30 | Honey comb |
|---------|--|---|-----|-----------------------------|-----|-----------------|---------|---------------|--------------|---------------|
| 29 6526 |  BEST SELLER | CVD | 206 | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| 29 6553 |  | CVD | 206 | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| 29 6562 |  | CVD | 207 | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| 29 6572 |  | CVD | 208 | ✓ | | ✓ | | ✓ | ✓ | |
| 29 6573 |  | CVD | 209 | ✓ | | ✓ | | ✓ | ✓ | |
| 29 6574 |  | CVD | 209 | ✓ | | ✓ | | ✓ | ✓ | |
| 29 6600 |  | CVD | 210 | | ✓ | ✓ | | ✓ | ✓ | |
| 29 6620 |  | ND Natur- diamant <small>(natural diamond)</small> | 211 | | ✓ | | | | | |
| 30 6522 |  BEST SELLER | PKD PCD | 219 | | ✓ | ✓ | | | ✓ | |
| 30 6523 |  BEST SELLER | PKD PCD | 220 | | ✓ | ✓ | | | ✓ | |
| 30 6524 |  BEST SELLER | PKD PCD | 221 | | ✓ | ✓ | | | ✓ | |
| 30 6528 |  | PKD PCD | 222 | | ✓ | ✓ | | | ✓ | |
| 30 6534 |  | PKD PCD | 222 | | ✓ | ✓ | | | ✓ | |
| 22 0415 |  | MICRO GRAIN | 174 | | ✓ | | | | ✓ | |
| 23 2005 |  | MICRO GRAIN | 175 | | ✓ | ✓ | | | ✓ | |
| 23 2006 |  | MICRO GRAIN | 175 | | ✓ | ✓ | | | ✓ | |
| 29 6510 |  | CVD | 202 | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| 22 0410 |  | MICRO GRAIN | 186 | | | | ✓ | | | |
| 22 0412 |  | MICRO GRAIN | 187 | | | | | | | |

- Lagerware / Stock tool
- Keine Lagerware, Lieferzeit und Preis auf Anfrage
No stock tool. Price and delivery on request
- ◻ Lieferzeit kurzfristig da Rohlinglager vorhanden
Short delivery deadline possible then blanks are on stock available

- ⊘ Sonderpreis. Solange Vorrat reicht. Rückgabe nicht möglich.
Special price. While stocks last. Return not possible.
- ⌚ 2-3 Arbeitstage Lieferzeit / 2-3 work days delivery time

| PA66 GF30 | PTFE CF25 | POM GF25 | PF-31 | PEEK | PA-66 | PE-HD | Kevlar | Gold Silber Kupfer <small>Gold/Silver/Copper</small> | Schichtstoffe Laminates | Spiegelfinish Mirror finish | Aluminium > 12% Si | MIT INNEN KÜHLUNG <small>with interior cooling</small> | ZIRKONIUM <small>ZIRCONIUM</small> | TITAN <small>Titanium</small> | | | | |
|-----------|-----------|----------|-------|------|-------|-------|--------|---|-------------------------|-----------------------------|--------------------|---|---------------------------------------|----------------------------------|--|--|--|--|
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | ✓ | ✓ | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | ✓ | ✓ | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | ✓ | ✓ | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | ✓ | ✓ | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | ✓ | ✓ | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | |
| | | | | ✓ | | | | ✓ | | ✓ | | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | | ✓ | | | ✓ | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | ✓ | ✓ | | | | |
| | | | | | | | | | | | | | | ✓ | | | | |



29 0060

PKD-Vollhartmetall-Micro-Hochleistungsbohrer
PCD equipped solid carbide high performance micro drill



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

| | |
|---|----------------------|
| COMPOSITES | Sandwich |
| Aramid fiber AFK-SFK | GF GF25 |
| Hybridstoffe <small>hybrid materials</small> | PVDF GF25 |
| CFK-ALU Composite CFRP-ALU Composites | GFK GFRP |
| Schichtstoffe Laminates | CFK CFRP |
| Kevlar | PMMA GS |
| PA66 GF30 | Aluminium < 12% Si |
| PVDF GF30 | Aluminium > 12% Si |
| PEEK GF30 | GRAPHIT graphite |
| PEEK CF30 | ZIRKON OXID ZIRCONIA |



| | |
|------------------------|-------------------------------|
| PKD PCD | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | POLIERT POLISHED |
| | |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h5 | € |
|------------------|--------|----|----|----|-------|--------|
| 29 0060 0080 080 | % 0,80 | 8 | 9 | 38 | 3 | 193,20 |
| 29 0060 0110 090 | % 1,10 | 9 | 10 | 38 | 3 | 193,20 |
| 29 0060 0120 090 | % 1,20 | 9 | 10 | 38 | 3 | 201,60 |
| 29 0060 0130 080 | % 1,30 | 8 | 10 | 38 | 3 | 201,60 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

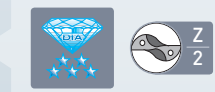
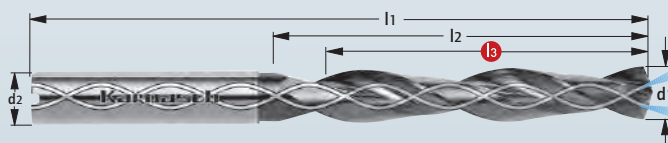
22 0415

Diamantbeschichtete VHM-Hochleistungsbohrer mit Innenkühlung
geeignet für Gewindefräser Art. 23 2005 / 23 2006



Diamond coated solid carbide high performance twist drill with internal cooling
suitable for thread milling cutter article 23 2005 / 23 2006

| | |
|---|----------------------|
| COMPOSITES | TI-CFK TI-CFRP |
| GRAPHIT graphite | PA66 GF30 |
| GFK GFRP | PVDF GF30 |
| CFK CFRP | PEEK GF30 |
| Hybridstoffe <small>hybrid materials</small> | PEEK CF30 |
| CFK-ALU Composite CFRP-ALU Composites | ZIRKON OXID ZIRCONIA |
| Schichtstoffe Laminates | |



| | |
|--------------------|---------------------------------|
| MICRO GRAIN | DIN 6537 |
| W | DIN 6535 Form HA |
| | |
| | HSC HPC |
| | DIAMANT DIAMOND DCC 0312 |
| | |

Richtwerte für den Einsatz von Karnasch diamantbeschichtete Hochleistungsbohrer
Recommended cutting data for twist drill with diamond coating

| Werkstoffgruppe Material group | Werkstoff Workpiece material | Schnittgeschwindigkeit Vc (m/min.) | VORSCHUB PRO UMDREHUNG (mm) | | |
|-----------------------------------|---------------------------------|---------------------------------------|-----------------------------|-------------|--------------|
| | | | Ø 3,0 - 5,0 | Ø 5,1 - 8,0 | Ø 8,1 - 12,0 |
| 14 | Graphit < Grad 10 | 250 | 0,10 - 0,20 | 0,15 - 0,25 | 0,30 - 0,45 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|---------------------|----|----|-----|-------|--------|
| 22 0415 0330 023 | % 3,3 / M4 x 0,7 | 23 | 28 | 66 | 6 | 51,60 |
| 22 0415 0680 043 | % 6,8 / M8 x 1,25 | 43 | 53 | 91 | 8 | 73,80 |
| 22 0415 0850 049 | % 8,5 / M10 x 1,50 | 49 | 61 | 103 | 10 | 85,20 |
| 22 0415 1030 056 | % 10,3 / M12 x 1,75 | 56 | 71 | 118 | 12 | 111,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Nachfolgewerkzeug / Replacement article 29 0120 + 29 0121 + 29 0122 auf Seite / on page 178-181

Schnittdaten
Cutting data

174

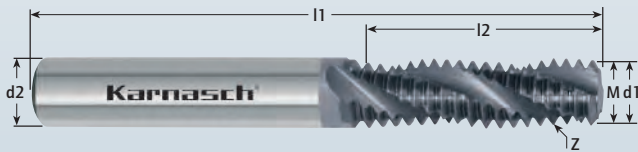
Diamantbeschichteter Vollhartmetall Gewindefräser, spiralisiert 30° für Innengewinde ohne Innenkühlung, ohne Senkstufe, metrisches ISO-Gewinde DIN 13 – 2,5xD



23 2005

Diamond coated solid carbide thread milling cutter, 30° spiral for internal threads, without internal cooling, without sunk stage, metric ISO-thread DIN13 – 2,5xD

| | |
|--|---------------------------------------|
| COMPO-SITES | TI-CFK <i>TI-CFRP</i> |
| GRAPHIT <i>graphite</i> | PA66 GF30 |
| GFK <i>GFRP</i> | PVDF GF30 |
| CFK <i>CFRP</i> | PEEK GF30 |
| Hybrid-stoffe <i>hybrid materials</i> | PEEK CF30 |
| CFK-ALU <i>Composite CFRP-ALU Composites</i> | ZIRKON OXID <i>ZIRCONIA</i> |
| Schicht-stoffe <i>Laminates</i> | |



| | |
|--------------------|---|
| MICRO GRAIN | DIN 13 |
| M | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | DCC 0318 |
| | |

| Art. | M | Stg | x D | l2 | l1 | d1 | d2 h5 | Z | € |
|-------------------|--------|------|-------|-------|----|------|-------|---|--------|
| 23 2005 04 070 25 | • M 4 | 0,7 | 2,5xD | 10,85 | 55 | 3,15 | 6 | 3 | 163,00 |
| 23 2005 05 080 25 | • M 5 | 0,8 | 2,5xD | 13,15 | 55 | 4,00 | 6 | 3 | 166,00 |
| 23 2005 06 100 25 | • M 6 | 1,0 | 2,5xD | 16,50 | 55 | 4,80 | 6 | 3 | 172,00 |
| 23 2005 08 125 25 | • M 8 | 1,25 | 2,5xD | 21,80 | 55 | 6,00 | 6 | 3 | 183,00 |
| 23 2005 10 150 25 | • M 10 | 1,50 | 2,5xD | 26,20 | 65 | 8,00 | 8 | 3 | 218,00 |
| 23 2005 12 175 25 | • M 12 | 1,75 | 2,5xD | 30,60 | 75 | 9,90 | 10 | 4 | 257,00 |

PKD - CVD Gewindefräser kurzfristig lieferbar!

Schnittdaten Cutting data

Zeichnungen Drawings

1271

DXF/STEP

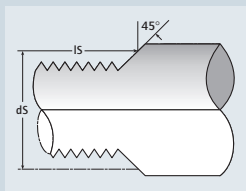
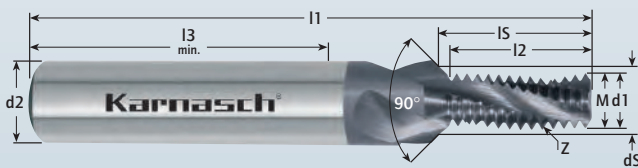
Diamantbeschichteter Vollhartmetall-Gewindefräser, spiralisiert für Innengewinde ohne Innenkühlung, mit 90° Senkstufe, metrisches ISO-Gewinde DIN 13 – 2,0xD



23 2006

Diamond coated solid carbide thread milling cutter, 30° spiral for internal threads, without internal cooling, with 90° counter sunk stage, metric ISO-thread DIN 13 – 2,0xD

| | |
|--|---------------------------------------|
| COMPO-SITES | TI-CFK <i>TI-CFRP</i> |
| GRAPHIT <i>graphite</i> | PA66 GF30 |
| GFK <i>GFRP</i> | PVDF GF30 |
| CFK <i>CFRP</i> | PEEK GF30 |
| Hybrid-stoffe <i>hybrid materials</i> | PEEK CF30 |
| CFK-ALU <i>Composite CFRP-ALU Composites</i> | ZIRKON OXID <i>ZIRCONIA</i> |
| Schicht-stoffe <i>Laminates</i> | |



| | |
|--------------------|---|
| MICRO GRAIN | DIN 13 |
| M | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | DCC 0318 |
| | |

| Art. | M | Stg | x D | l2 | l3/min. | l1 | ds | ls | d1 | d2 h5 | Z | € |
|-------------------|--------|------|-------|-------|---------|----|------|------|------|-------|---|--------|
| 23 2006 04 070 20 | • M 4 | 0,7 | 2,0xD | 8,75 | 36 | 55 | 4,2 | 9,3 | 3,14 | 6 | 3 | 169,00 |
| 23 2006 05 080 20 | • M 5 | 0,8 | 2,0xD | 10,75 | 36 | 55 | 5,3 | 11,3 | 4,00 | 6 | 3 | 177,00 |
| 23 2006 06 100 20 | • M 6 | 1,0 | 2,0xD | 12,40 | 40 | 75 | 6,3 | 13,1 | 4,80 | 8 | 3 | 194,00 |
| 23 2006 08 125 20 | • M 8 | 1,25 | 2,0xD | 16,80 | 40 | 75 | 8,3 | 17,6 | 6,50 | 10 | 3 | 236,00 |
| 23 2006 10 150 20 | • M 10 | 1,50 | 2,0xD | 20,10 | 45 | 80 | 10,3 | 21,2 | 8,20 | 12 | 3 | 319,00 |
| 23 2006 12 175 20 | • M 12 | 1,75 | 2,0xD | 25,20 | 45 | 90 | 12,3 | 26,4 | 9,90 | 14 | 4 | 370,00 |

PKD - CVD Gewindefräser kurzfristig lieferbar!

Schnittdaten Cutting data

Zeichnungen Drawings

1271

DXF/STEP

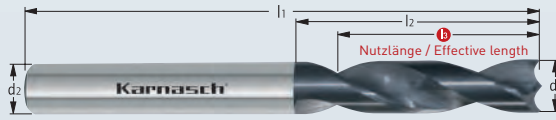


29 0080 A 29 0080 B

Vollhartmetall-Hochleistungsbohrer GFK/CFK
Solid carbide twist drill GFK/CFK

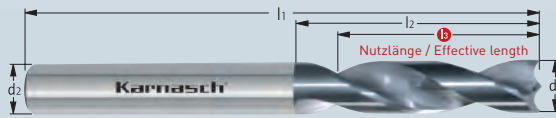


| | | |
|----------------------------------|--|--------------|
| COMPOSITES | CFK-ALU Composite CFRP-ALU Composites | PVDF GF30 |
| GFK-CFK GFRP-CFRP | Schichtstoffe Laminates | PEEK GF30 |
| THERMOPLAST THERMOPLASTICS | Kevlar | PEEK CF30 |
| DUROPLASTE DUROPLASTICS | AL/TI | GF GF25 |
| Aramid fiber AFK-SFK | TI-CFK TI-CFRP | PVDF GF25 |
| Hybridstoffe hybrid materials | PA66 GF30 | |



| | |
|-------------------------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | Form HA |
| 30° | |
| HSC High-Speed-Cutting | |
| DCA-06 Polished | |
| Air | |

| | | |
|-----------------------|--|----------------------------|
| GFK-CFK GFRP-CFRP | CFK-ALU Composite CFRP-ALU Composites | Kevlar |
| Kunststoff plastic | Schichtstoffe Laminates | Plexiglas acrylic glass |



Schnittdaten
Cutting data

Zeichnungen
Drawings



| d1 | l3 | l2 | l1 | d2 h5 | Art. | DIAMANT DIAMOND DCA-06 | | POLIERT POLISHED | |
|--------|----|----|-----|-------|-------------------|------------------------|-------------------|------------------|---|
| | | | | | | 29 0080 A | € | 29 0080 B | € |
| • 3,0 | 12 | 16 | 45 | 3,0 | 29 0080A 0300 012 | 48,00 | 29 0080B 0300 012 | 27,00 | |
| • 3,2 | 14 | 18 | 50 | 3,2 | 29 0080A 0320 014 | 61,00 | 29 0080B 0320 014 | 27,00 | |
| • 3,3 | 14 | 18 | 50 | 3,2 | - | - | 29 0080B 0330 014 | 27,00 | |
| • 3,5 | 15 | 20 | 50 | 3,5 | 29 0080A 0350 015 | 61,00 | 29 0080B 0350 015 | 27,00 | |
| • 3,7 | 15 | 20 | 52 | 3,7 | - | - | 29 0080B 0370 015 | 27,00 | |
| • 4,0 | 17 | 22 | 55 | 4,0 | 29 0080A 0400 017 | 61,00 | 29 0080B 0400 017 | 27,00 | |
| • 4,2 | 17 | 22 | 55 | 4,2 | - | - | 29 0080B 0420 017 | 32,00 | |
| • 4,5 | 18 | 25 | 57 | 4,5 | 29 0080A 0450 018 | 80,00 | 29 0080B 0450 018 | 32,00 | |
| • 4,7 | 18 | 24 | 58 | 4,7 | - | - | 29 0080B 0470 018 | 39,00 | |
| • 5,0 | 20 | 25 | 62 | 5,0 | 29 0080A 0500 020 | 87,00 | 29 0080B 0500 020 | 39,00 | |
| • 5,3 | 20 | 26 | 62 | 5,3 | - | - | 29 0080B 0530 020 | 39,00 | |
| • 5,5 | 20 | 28 | 65 | 5,5 | 29 0080A 0550 020 | 94,00 | 29 0080B 0550 020 | 46,00 | |
| • 5,8 | 20 | 28 | 66 | 5,8 | - | - | 29 0080B 0580 020 | 46,00 | |
| • 6,0 | 20 | 28 | 65 | 6,0 | 29 0080A 0600 020 | 94,00 | 29 0080B 0600 020 | 46,00 | |
| • 6,5 | 22 | 30 | 70 | 6,5 | 29 0080A 0650 022 | 116,00 | 29 0080B 0650 022 | 50,00 | |
| • 7,0 | 25 | 33 | 75 | 7,0 | 29 0080A 0700 025 | 122,00 | 29 0080B 0700 025 | 56,00 | |
| • 7,5 | 25 | 33 | 74 | 7,5 | - | - | 29 0080B 0750 025 | 56,00 | |
| • 8,0 | 27 | 36 | 80 | 8,0 | 29 0080A 0800 027 | 133,00 | 29 0080B 0800 027 | 67,00 | |
| • 8,5 | 27 | 36 | 80 | 8,5 | 29 0080A 0850 027 | 149,00 | 29 0080B 0850 027 | 74,00 | |
| • 9,0 | 30 | 40 | 85 | 9,0 | 29 0080A 0900 030 | 154,00 | 29 0080B 0900 030 | 78,00 | |
| • 9,5 | 30 | 37 | 84 | 9,5 | - | - | 29 0080B 0950 030 | 86,00 | |
| • 10,0 | 32 | 42 | 90 | 10,0 | 29 0080A 1000 032 | 166,00 | 29 0080B 1000 032 | 90,00 | |
| • 10,5 | 32 | 42 | 90 | 10,5 | - | - | 29 0080B 1050 032 | 102,00 | |
| • 11,0 | 34 | 47 | 95 | 11,0 | - | - | 29 0080B 1100 034 | 116,00 | |
| • 11,5 | 34 | 47 | 95 | 11,5 | - | - | 29 0080B 1150 034 | 129,00 | |
| • 12,0 | 35 | 50 | 100 | 12,0 | 29 0080A 1200 035 | 216,00 | 29 0080B 1200 035 | 129,00 | |
| • 13,0 | 35 | 50 | 100 | 13,0 | - | - | 29 0080B 1300 035 | 129,00 | |
| • 14,0 | 37 | 54 | 105 | 14,0 | - | - | 29 0080B 1400 037 | 129,00 | |
| • 15,0 | 38 | 56 | 110 | 15,0 | - | - | 29 0080B 1500 038 | 129,00 | |
| • 16,0 | 38 | 58 | 115 | 16,0 | - | - | 29 0080B 1600 038 | 129,00 | |

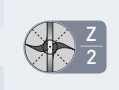
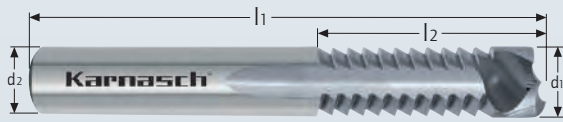
| d1 tol. | 29 0080 A | 29 0080 B |
|---------|-----------------------------------|-----------------------------------|
| | Bohrertoleranz Drill tolerance | Bohrertoleranz Drill tolerance |
| > 3,0 | + 0,005 | + 0,000 |
| 6,0 | - 0,008 | - 0,012 |
| > 6,0 | + 0,005 | + 0,000 |
| 10,0 | - 0,010 | - 0,015 |
| > 10,0 | + 0,005 | + 0,000 |
| 14,0 | - 0,012 | - 0,018 |

Kombi-Fräser mit Bohrspitze für Faser-Verbundwerkstoffe
Combination milling cutter with drill bit for composites



29 0100

- Honey comb
- Kevlar
- Aramid fiber AFK-SFK
- Schichtstoffe Laminates
- Kunststoff plastic



| Art. | d1 | Inch | l2 | l1 | € |
|--------------|---------|-------|----|----|--------|
| 29 0100 0476 | % 4,76 | 3/16" | 25 | 75 | 66,00 |
| 29 0100 0500 | % 5,00 | | 25 | 75 | 87,00 |
| 29 0100 0600 | % 6,00 | | 30 | 75 | 87,00 |
| 29 0100 0635 | % 6,35 | 1/4" | 30 | 75 | 87,60 |
| 29 0100 0800 | % 8,00 | | 30 | 75 | 96,60 |
| 29 0100 0952 | % 9,52 | 3/8" | 30 | 75 | 109,20 |
| 29 0100 1000 | % 10,00 | | 30 | 75 | 118,80 |
| 29 0100 1200 | % 12,00 | | 30 | 75 | 141,60 |
| 29 0100 1270 | % 12,70 | 1/2" | 30 | 75 | 154,20 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Bearbeitungshinweise: Die Arbeitstemperatur darf 60° Celsius nicht überschreiten um ein Erweichen der Harzbindung zu vermeiden. Ideal ist Pressluftkühlung mit Absaugung.

Processing instruction: The work temperature must not exceed 60° Celsius in order to avoid the resin melting.

| | |
|-----------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| HPC | POLIERT POLISHED |
| BOHREN/FÄSEN | Air |

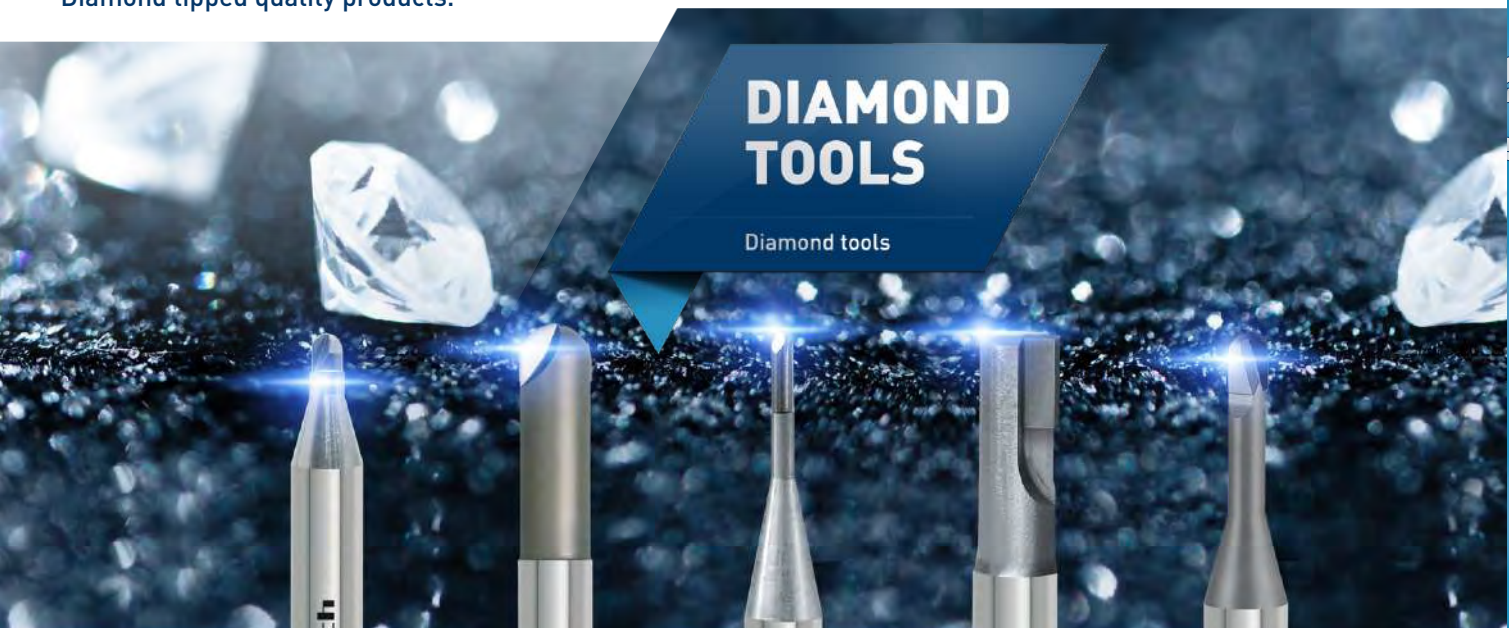
Schnittdaten
Cutting data

177

| Werkstoffgruppe Material group | Werkstoff Workpiece material | Vc Bohren Vc Drill | f Bohren f Drill | Vf Fräsen Vf Mill | Vc Fräsen Vc Mill |
|-----------------------------------|---------------------------------|-----------------------|---------------------|----------------------|----------------------|
| 11.3 | AFK / BFK / GFK | 125 m/min | 0,08 - 0,15 mm | 600 - 1500 m/min | 250 - 400 m/min |
| | CFK / KEFLAR | 150 m/min | 0,10 - 0,18 mm | 800 - 2000 m/min | 300 - 500 m/min |

Diamantbestückte Qualitätsprodukte.
Diamond tipped quality products.

Karnasch®
PROFESSIONAL TOOLS



DIAMOND TOOLS

Diamond tools



CBN



PKD
PCD



Naturdiamant
Natural Diamond
ND



Monokristallin Diamant
Monocrystalline
diamond MCD



CVD /
Diamant Beschichtung
Diamond coating

PKD/PCD **EXTREME**

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

29 0120

Diamantbeschichtete VHM-Hochleistungsbohrer für CFK/GFK – multidirektional – mit 90° Spitzwinkel vermeidet Delamination
 Diamond-coated solid-carbide drill for CFRP/GFRP – multidirectional – with 90° tip angle, prevents delamination



GRAPHIT
graphite

COMPOSITES

CFK
CFRP

GFK
GFRP

PEEK
CF30

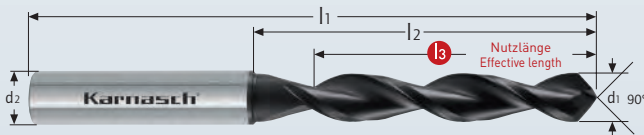
PEEK
GF30

GF
GF25

PVDF
GF25

ZIRKON
OXID
ZIRCONIA

FR 4



MICRO GRAIN KARNASCH NORM

MF DIN 6535 Form HA



Composites

DCC 0318



Empfohlene Schnittdaten / Recommended cutting data

| Werkstoffgruppe Material group | WERKSTOFF WORKPIECE MATERIAL | vc m/min | f mm/U | | | | |
|-----------------------------------|------------------------------------|----------|-------------|-------------|-------------|-------------|---------------|
| | | | Ø <3 | Ø 3,0 - 4,9 | Ø 5,0 - 7,9 | Ø 8,0 - 9,9 | Ø 10,0 - 12,0 |
| 8.3 | GFK / CFK Composites | 160 | 0,02 - 0,03 | 0,04 | 0,05 | 0,07 | 0,1 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|---------|-----|-----|----|-------|--------|
| 29 0120 0050 0045 | • 0,5 | 4,5 | 5,5 | 55 | 3 | 67,00 |
| 29 0120 0060 0045 | • 0,6 | 4,5 | 5,5 | 55 | 3 | 67,00 |
| 29 0120 0070 0045 | • 0,7 | 4,5 | 5,5 | 55 | 3 | 67,00 |
| 29 0120 0080 0045 | • 0,8 | 4,5 | 5,5 | 55 | 3 | 67,00 |
| 29 0120 0090 0045 | • 0,9 | 4,5 | 5,5 | 55 | 3 | 67,00 |
| 29 0120 0100 005 | • 1,0 | 5 | 8 | 55 | 3 | 67,00 |
| 29 0120 0110 008 | • 1,1 | 8 | 12 | 55 | 3 | 67,00 |
| 29 0120 0120 008 | • 1,2 | 8 | 12 | 55 | 3 | 67,00 |
| 29 0120 0130 008 | • 1,3 | 8 | 12 | 55 | 3 | 67,00 |
| 29 0120 0140 008 | • 1,4 | 8 | 12 | 55 | 3 | 67,00 |
| 29 0120 0150 008 | • 1,5 | 8 | 12 | 55 | 3 | 67,00 |
| 29 0120 0160 011 | • 1,6 | 11 | 16 | 68 | 3 | 71,00 |
| 29 0120 0170 011 | • 1,7 | 11 | 16 | 68 | 3 | 71,00 |
| 29 0120 0180 011 | • 1,8 | 11 | 16 | 68 | 3 | 71,00 |
| 29 0120 0190 011 | • 1,9 | 11 | 16 | 68 | 3 | 71,00 |
| 29 0120 0200 011 | • 2,0 | 11 | 16 | 68 | 3 | 71,00 |
| 29 0120 0210 014 | • 2,1 | 14 | 20 | 74 | 3 | 73,00 |
| 29 0120 0220 014 | • 2,2 | 14 | 20 | 74 | 3 | 73,00 |
| 29 0120 0230 014 | • 2,3 | 14 | 20 | 74 | 3 | 73,00 |
| 29 0120 0240 014 | • 2,4 | 14 | 20 | 74 | 3 | 73,00 |
| 29 0120 0250 014 | • 2,5 | 14 | 20 | 74 | 3 | 73,00 |
| 29 0120 0260 016 | • 2,6 | 16 | 23 | 81 | 3 | 75,00 |
| 29 0120 0270 016 | • 2,7 | 16 | 23 | 81 | 3 | 75,00 |
| 29 0120 0280 016 | • 2,8 | 16 | 23 | 81 | 3 | 75,00 |
| 29 0120 0290 016 | • 2,9 | 16 | 23 | 81 | 3 | 75,00 |
| 29 0120 0300 023 | • 3,0 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0310 023 | • 3,1 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 03175 023 | • 3,175 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0320 023 | • 3,2 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0330 023 | • 3,3 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0340 023 | • 3,4 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0350 023 | • 3,5 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0360 023 | • 3,6 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0370 023 | • 3,7 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0380 023 | • 3,8 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0390 023 | • 3,9 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0400 029 | • 4,0 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0410 029 | • 4,1 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0420 029 | • 4,2 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0430 029 | • 4,3 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0440 029 | • 4,4 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0450 029 | • 4,5 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0460 029 | • 4,6 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0470 029 | • 4,7 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 04763 029 | • 4,763 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0480 029 | • 4,8 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0490 029 | • 4,9 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0500 035 | • 5,0 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0510 035 | • 5,1 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0520 035 | • 5,2 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0530 035 | • 5,3 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0540 035 | • 5,4 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0550 035 | • 5,5 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0560 035 | • 5,6 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0570 035 | • 5,7 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0580 035 | • 5,8 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0590 035 | • 5,9 | 35 | 44 | 82 | 6 | 129,00 |

Schnittdaten
Cutting data

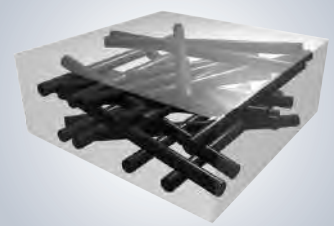
178

Film
Movie

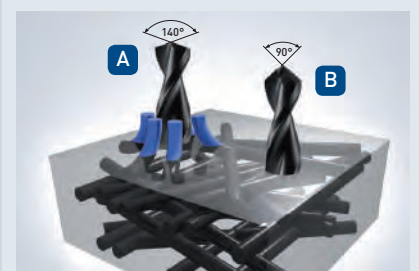
Zeichnungen
Drawings

DXF/STEP

MULTIDIREKTIONAL



Chaotische Ausrichtung des Faserverlaufs
Chaotic alignment of fibre progress



A Delamination und Gratbildung mit konventionellen Bohrern.
B Sauberer Bohrungsaustritt durch optimierte Führungsfase des Bohrwerkzeuges.

Diamantbeschichtete VHM-Hochleistungsbohrer für CFK/GFK – multidirektional – mit 90° Spitzwinkel vermeidet Delamination
 Diamond-coated solid-carbide drill for CFRP/GFRP – multidirectional – with 90° tip angle, prevents delamination

29 0120

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|---------|----|----|-----|-------|--------|
| 29 0120 0600 035 | • 6,0 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0610 043 | • 6,1 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0620 043 | • 6,2 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0630 043 | • 6,3 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0635 043 | • 6,350 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0640 043 | • 6,4 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0650 043 | • 6,5 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0660 043 | • 6,6 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0670 043 | • 6,7 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0680 043 | • 6,8 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0690 043 | • 6,9 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0700 043 | • 7,0 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0710 043 | • 7,1 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0720 043 | • 7,2 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0730 043 | • 7,3 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0740 043 | • 7,4 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0750 043 | • 7,5 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0760 043 | • 7,6 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0770 043 | • 7,7 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0780 043 | • 7,8 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0790 043 | • 7,9 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 07938 043 | • 7,938 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0800 043 | • 8,0 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0810 049 | • 8,1 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0820 049 | • 8,2 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0830 049 | • 8,3 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0840 049 | • 8,4 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0850 049 | • 8,5 | 49 | 61 | 103 | 10 | 231,00 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|----------|----|----|-----|-------|--------|
| 29 0120 0860 049 | • 8,6 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0870 049 | • 8,7 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0880 049 | • 8,8 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0890 049 | • 8,9 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0900 049 | • 9,0 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0910 049 | • 9,1 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0920 049 | • 9,2 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0930 049 | • 9,3 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0940 049 | • 9,4 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0950 049 | • 9,5 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 09525 049 | • 9,525 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0960 049 | • 9,6 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0970 049 | • 9,7 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0980 049 | • 9,8 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0990 049 | • 9,9 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 1000 049 | • 10,0 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 1010 056 | • 10,1 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1020 056 | • 10,2 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1030 056 | • 10,3 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1040 056 | • 10,4 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1050 056 | • 10,5 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1060 056 | • 10,6 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1070 056 | • 10,7 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1080 056 | • 10,8 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1090 056 | • 10,9 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1100 056 | • 11,0 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 11111 056 | • 11,111 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1200 056 | • 12,0 | 56 | 71 | 118 | 12 | 251,00 |

1



2



3



4



5



6



7



8



9



CFK-Bohrertest
CFK drill test



Karnasch Art. 29 0120 – 6,0 mm
Bohrungseintritt / drill entry
Material: CFK / CFRP

Schnittdaten / cutting data
Vc = 160 m/min
Vf = 850 mm/min
n(s) = 8493 min⁻¹
fz = 0,1 mm
ap = 20 mm



Karnasch Art. 29 0120 – 6,0 mm
Bohrungsausritt / drill exit
Material: CFK / CFRP

Vergrößerung / Magnification: 30x



CVD Bohrer 6,0 mm
Mitbewerber / competitor
Bohrungseintritt / drill entry
Material: CFK / CFRP

Schnittdaten / cutting data
Vc = 160 m/min
Vf = 850 mm/min
n(s) = 8493 min⁻¹
fz = 0,1 mm
ap = 20 mm



CVD Bohrer 6,0 mm
Mitbewerber / competitor
Bohrungsausritt / drill exit
Material: CFK / CFRP

Vergrößerung / Magnification: 30x

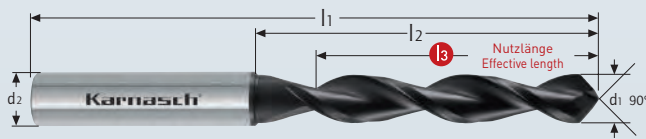


29 0121

Diamantbeschichtete VHM-Hochleistungsbohrer für CFK/GFK – unidirektional – mit 90° Spitzwinkel
vermeidet Delamination

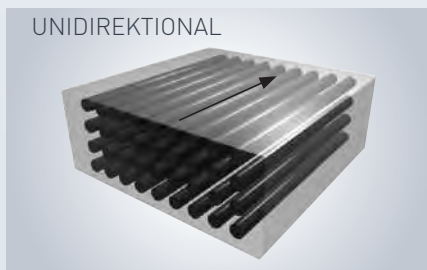


Diamond-coated solid-carbide drill for CFRP/GFRP – unidirectional – with 90° tip angle,
prevents delamination

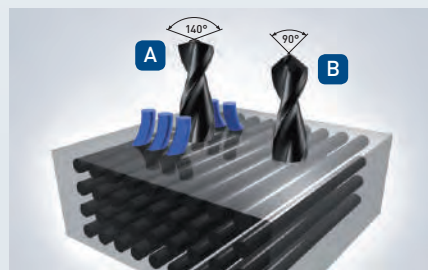


Empfohlene Schnittdaten / Recommended cutting data

| Werkstoffgruppe Material group | WERKSTOFF WORKPIECE MATERIAL | vc m/min | f mm/U | | | |
|-----------------------------------|------------------------------------|----------|-------------|-------------|-------------|---------------|
| | | | Ø 2,8 - 4,9 | Ø 5,0 - 7,9 | Ø 8,0 - 9,9 | Ø 10,0 - 12,0 |
| 8.3 | GFK / CFK Composites | 160 | 0,04 | 0,05 | 0,07 | 0,1 |



UNIDIREKTIONAL
Faserverlauf in eine Richtung
Fibre progress in one direction



A Delamination und Gratbildung mit konventionellen Bohrern.
B Sauberer Bohrungsaustritt durch optimierte Führungsfase des Bohrwerkzeuges.

| | |
|--------------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| MF | DIN 6535 Form HA |
| | |
| | Composites |
| | DCC 0318 |
| | Air |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 180 | DXF/STEP |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|---------|----|----|----|-------|--------|
| 29 0121 0280 019 | • 2,8 | 19 | 24 | 66 | 6 | 171,00 |
| 29 0121 0290 019 | • 2,9 | 19 | 24 | 66 | 6 | 171,00 |
| 29 0121 0300 023 | • 3,0 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0310 023 | • 3,1 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 03175 023 | • 3,175 | 23 | 28 | 66 | 6 | 174,00 |
| 29 0121 0320 023 | • 3,2 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0330 023 | • 3,3 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0340 023 | • 3,4 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0350 023 | • 3,5 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0360 023 | • 3,6 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0370 023 | • 3,7 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0380 023 | • 3,8 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0390 023 | • 3,9 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0400 029 | • 4,0 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0410 029 | • 4,1 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0420 029 | • 4,2 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0430 029 | • 4,3 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0440 029 | • 4,4 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0450 029 | • 4,5 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0460 029 | • 4,6 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0470 029 | • 4,7 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 04763 029 | • 4,763 | 29 | 36 | 74 | 6 | 177,00 |
| 29 0121 0480 029 | • 4,8 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0490 029 | • 4,9 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0500 035 | • 5,0 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0510 035 | • 5,1 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0520 035 | • 5,2 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0530 035 | • 5,3 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0540 035 | • 5,4 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0550 035 | • 5,5 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0560 035 | • 5,6 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0570 035 | • 5,7 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0580 035 | • 5,8 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0590 035 | • 5,9 | 35 | 44 | 82 | 6 | 185,00 |



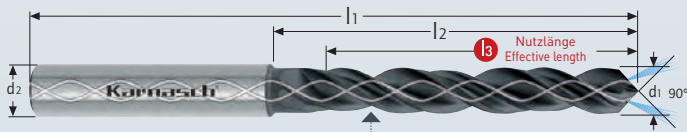
Diamantbeschichtete VHM-Hochleistungsbohrer mit Innenkühlung für CFK/GFK – unidirektional – mit 90° Spitzwinkel vermeidet Delamination



29 0122

Diamond-coated solid-carbide drill with interior cooling for CFRP/GFRP – unidirectional – with 90° tip angle, prevents delamination

| | |
|---------------------|----------------------------|
| GRAPHIT graphite | PVDF GF25 |
| COMPO- SITES | ZIRKON OXID ZIRCONIA |
| CFK CFRP | FR 4 |
| GFK GFRP | |
| PEEK CF30 | |
| PEEK GF30 | |
| GF GF25 | |



Durch 2 Führungsphasen ist eine sehr hohe Präzision der Bohrungen möglich, bei gleichzeitiger Vermeidung von Delamination.

With 2 guide chamfer is a very high precision of the holes possible, by avoiding of delamination.

Empfohlene Schnittdaten / Recommended cutting data

| Werkstoffgruppe Material group | WERKSTOFF WORKPIECE MATERIAL | vc m/min | f mm/U | | | |
|-----------------------------------|------------------------------------|----------|-------------|-------------|-------------|---------------|
| | | | Ø 3,0 - 4,9 | Ø 5,0 - 7,9 | Ø 8,0 - 9,9 | Ø 10,0 - 12,0 |
| 8.3 | GFK / CFK Composites | 160 | 0,04 | 0,05 | 0,07 | 0,1 |

Schnittdaten
Cutting data

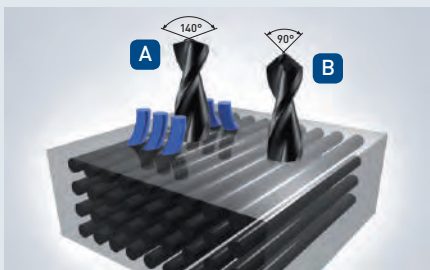
Zeichnungen
Drawings

i 181

DXF/STEP



UNIDIREKTIONAL
Faserverlauf in eine Richtung
Fibre progress in one direction



A Delamination und Gratbildung mit konventionellen Bohrern.
B Sauberer Bohrungsaustritt durch optimierte Führungsphase des Bohrwerkzeuges.

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|---------------|----|----|-----|-------|--------|
| 29 0122 0600 035 | • 6,00 | 35 | 44 | 82 | 6 | 232,00 |
| 29 0122 0610 043 | • 6,10 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0620 043 | • 6,20 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0630 043 | • 6,30 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0635 043 | • 6,350 1/4" | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0640 043 | • 6,40 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0650 043 | • 6,50 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0660 043 | • 6,60 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0670 043 | • 6,70 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0680 043 | • 6,80 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0690 043 | • 6,90 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0700 043 | • 7,00 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0710 043 | • 7,10 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0720 043 | • 7,20 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0730 043 | • 7,30 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0740 043 | • 7,40 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0750 043 | • 7,50 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0760 043 | • 7,60 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0770 043 | • 7,70 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0780 043 | • 7,80 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0790 043 | • 7,90 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 07938 043 | • 7,938 5/16" | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0800 043 | • 8,00 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0810 049 | • 8,10 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0820 049 | • 8,20 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0830 049 | • 8,30 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0840 049 | • 8,40 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0850 049 | • 8,50 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0860 049 | • 8,60 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0870 049 | • 8,70 | 49 | 61 | 103 | 10 | 351,00 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|----------------|----|----|-----|-------|--------|
| 29 0122 0880 049 | • 8,80 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0890 049 | • 8,90 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0900 049 | • 9,00 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0910 049 | • 9,10 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0920 049 | • 9,20 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0930 049 | • 9,30 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0940 049 | • 9,40 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0950 049 | • 9,50 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 09525 049 | • 9,525 3/8" | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0960 049 | • 9,60 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0970 049 | • 9,70 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0980 049 | • 9,80 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0990 049 | • 9,90 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 1000 049 | • 10,00 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 1010 056 | • 10,10 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1020 056 | • 10,20 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1030 056 | • 10,30 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1040 056 | • 10,40 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1050 056 | • 10,50 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1060 056 | • 10,60 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1070 056 | • 10,70 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1080 056 | • 10,80 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1090 056 | • 10,90 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1100 056 | • 11,00 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1111 056 | • 11,111 7/16" | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1150 056 | • 11,50 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1180 056 | • 11,8 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1200 056 | • 12,0 | 56 | 71 | 118 | 12 | 391,00 |

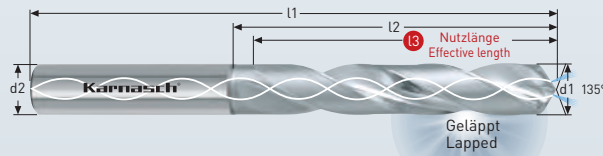


29 0200

CNC-Stack-Drill, VHM-Hochleistungsbohrer mit Innenkühlung CFK/ALU – ALU/CFK
Solid carbide Stack-drill with interior cooling for CFRP/GFRP-Alu – Alu-CFRP/GFRP



| | |
|--|----------------------|
| | CFK/GFK - CFRP/GFRP |
| | Aluminium - Aluminum |
| | Aluminium - Aluminum |
| | CFK/GFK - CFRP/GFRP |



| | |
|------------------------|-----------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HAK |
| | |
| | HSC HPC |
| | GELÄPPT LAPPED |
| | MMKS |



| | |
|---------------------------|------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 1253 | |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|---------|----|----|----|-------|--------|
| 29 0200 0300 023 | • 3,0 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0310 023 | • 3,1 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0320 023 | • 3,2 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0330 023 | • 3,3 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0340 023 | • 3,4 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0350 023 | • 3,5 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0360 023 | • 3,6 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0370 023 | • 3,7 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0380 029 | • 3,8 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0390 029 | • 3,9 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0400 029 | • 4,0 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0410 029 | • 4,1 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 04176 029 | • 4,176 | 29 | 36 | 74 | 6 | 117,00 |
| 29 0200 0420 029 | • 4,2 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0430 029 | • 4,3 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0440 029 | • 4,4 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0450 029 | • 4,5 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0460 029 | • 4,6 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0470 029 | • 4,7 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0480 029 | • 4,8 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 04837 029 | • 4,837 | 29 | 36 | 74 | 6 | 117,00 |
| 29 0200 0490 035 | • 4,9 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0500 035 | • 5,0 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0510 035 | • 5,1 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0520 035 | • 5,2 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0530 035 | • 5,3 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0540 035 | • 5,4 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0550 035 | • 5,5 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 05550 035 | • 5,55 | 35 | 44 | 82 | 6 | 120,00 |
| 29 0200 05565 035 | • 5,565 | 35 | 44 | 82 | 6 | 120,00 |
| 29 0200 0560 035 | • 5,6 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0570 035 | • 5,7 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0580 035 | • 5,8 | 35 | 44 | 82 | 6 | 120,00 |
| 29 0200 0590 035 | • 5,9 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0600 035 | • 6,0 | 35 | 44 | 82 | 6 | 128,00 |
| 29 0200 0610 043 | • 6,1 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0620 043 | • 6,2 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0630 043 | • 6,3 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 06365 043 | • 6,365 | 43 | 53 | 91 | 8 | 129,00 |
| 29 0200 0640 043 | • 6,4 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0650 043 | • 6,5 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0660 043 | • 6,6 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0670 043 | • 6,7 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0680 043 | • 6,8 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0690 043 | • 6,9 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0700 043 | • 7,0 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0710 043 | • 7,1 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0720 043 | • 7,2 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0730 043 | • 7,3 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0740 043 | • 7,4 | 43 | 53 | 91 | 8 | 128,00 |

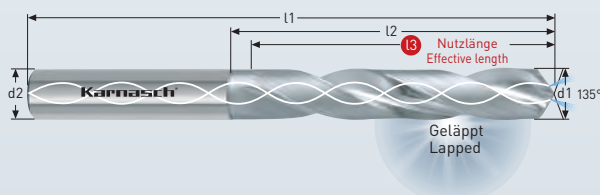
| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|----------|----|----|-----|-------|--------|
| 29 0200 0750 043 | • 7,5 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0760 043 | • 7,6 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0770 043 | • 7,7 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0780 043 | • 7,8 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0790 043 | • 7,9 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 07953 043 | • 7,953 | 43 | 53 | 91 | 8 | 129,00 |
| 29 0200 0800 043 | • 8,0 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0810 049 | • 8,1 | 49 | 61 | 103 | 10 | 185,00 |
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| 29 0200 0830 049 | • 8,3 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0840 049 | • 8,4 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0850 049 | • 8,5 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0860 049 | • 8,6 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0870 049 | • 8,7 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0880 049 | • 8,8 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0890 049 | • 8,9 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0900 049 | • 9,0 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0910 049 | • 9,1 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0920 049 | • 9,2 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0930 049 | • 9,3 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0940 049 | • 9,4 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0950 049 | • 9,5 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 09540 049 | • 9,540 | 49 | 61 | 103 | 10 | 187,00 |
| 29 0200 0960 049 | • 9,6 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0970 049 | • 9,7 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0980 049 | • 9,8 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0990 049 | • 9,9 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 1000 049 | • 10,0 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 1010 056 | • 10,1 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1020 056 | • 10,2 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1030 056 | • 10,3 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1040 056 | • 10,4 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1050 056 | • 10,5 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1060 056 | • 10,6 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1070 056 | • 10,7 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1080 056 | • 10,8 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1090 056 | • 10,9 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1100 056 | • 11,0 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1110 056 | • 11,1 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 11133 056 | • 11,133 | 56 | 71 | 118 | 12 | 259,00 |
| 29 0200 1120 056 | • 11,2 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1130 056 | • 11,3 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1140 056 | • 11,4 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1150 056 | • 11,5 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1160 056 | • 11,6 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1170 056 | • 11,7 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1180 056 | • 11,8 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1190 056 | • 11,9 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1200 056 | • 12,0 | 56 | 71 | 118 | 12 | 256,00 |

CNC-Stack-Drill, VHM-Hochleistungsbohrer mit Innenkühlung CFK/TITAN – TITAN/CFK
Solid carbide Stack-drill with interior cooling for CFRP/GFRP-Titan – Titan-CFRP/GFRP



29 0210

| | |
|----------|---------------------|
| C | CFK/GFK - CFRP/GFRP |
| T | Titan - Titanium |
| T | Titan - Titanium |
| C | CFK/GFK - CFRP/GFRP |



| | |
|------------------------|-------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HAK |
| 34° | 135° |
| HSC HPC | |
| GELÄPFT LAPPED | |
| MMKS | |



Für den Einsatz auf CNC-Maschinen.

For the use on CNC-machines.

| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| i | ▶ |
| 1253 | |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|---------|-----------|----|----|-------|--------|
| 29 0210 0300 023 | • 3,0 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0310 023 | • 3,1 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0320 023 | • 3,2 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0330 023 | • 3,3 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0340 023 | • 3,4 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0350 023 | • 3,5 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0360 023 | • 3,6 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0370 023 | • 3,7 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0380 029 | • 3,8 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0390 029 | • 3,9 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0400 029 | • 4,0 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0410 029 | • 4,1 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 04176 029 | • 4,176 | 29 | 36 | 74 | 6 | 124,00 |
| 29 0210 0420 029 | • 4,2 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0430 029 | • 4,3 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0440 029 | • 4,4 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0450 029 | • 4,5 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0460 029 | • 4,6 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0470 029 | • 4,7 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0480 029 | • 4,8 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 04837 029 | • 4,837 | 29 | 36 | 74 | 6 | 124,00 |
| 29 0210 0490 035 | • 4,9 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0500 035 | • 5,0 | 35 | 44 | 82 | 6 | 125,00 |
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| 29 0210 0520 035 | • 5,2 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0530 035 | • 5,3 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0540 035 | • 5,4 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0550 035 | • 5,5 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0555 035 | • 5,55 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 05565 035 | • 5,565 | 35 | 44 | 82 | 6 | 127,00 |
| 29 0210 0560 035 | • 5,6 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0570 035 | • 5,7 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0580 035 | • 5,8 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0590 035 | • 5,9 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0600 035 | • 6,0 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0610 043 | • 6,1 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0620 043 | • 6,2 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0630 043 | • 6,3 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 06365 043 | • 6,365 | 43 | 53 | 91 | 8 | 136,00 |
| 29 0210 0640 043 | • 6,4 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0650 043 | • 6,5 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0660 043 | • 6,6 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0670 043 | • 6,7 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0680 043 | • 6,8 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0690 043 | • 6,9 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0700 043 | • 7,0 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0710 043 | • 7,1 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0720 043 | • 7,2 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0730 043 | • 7,3 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0740 043 | • 7,4 | 43 | 53 | 91 | 8 | 134,00 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|----------|-----------|----|-----|-------|--------|
| 29 0210 0750 043 | • 7,5 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0760 043 | • 7,6 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0770 043 | • 7,7 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0780 043 | • 7,8 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0790 043 | • 7,9 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 07953 043 | • 7,953 | 43 | 53 | 91 | 8 | 136,00 |
| 29 0210 0800 043 | • 8,0 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0810 049 | • 8,1 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0820 049 | • 8,2 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0830 049 | • 8,3 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0840 049 | • 8,4 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0850 049 | • 8,5 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0860 049 | • 8,6 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0870 049 | • 8,7 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0880 049 | • 8,8 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0890 049 | • 8,9 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0900 049 | • 9,0 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0910 049 | • 9,1 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0920 049 | • 9,2 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0930 049 | • 9,3 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0940 049 | • 9,4 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0950 049 | • 9,5 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 09540 049 | • 9,54 | 49 | 61 | 103 | 10 | 195,00 |
| 29 0210 0960 049 | • 9,6 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0970 049 | • 9,7 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0980 049 | • 9,8 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0990 049 | • 9,9 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 1000 049 | • 10,0 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 1010 056 | • 10,1 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1020 056 | • 10,2 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1030 056 | • 10,3 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1040 056 | • 10,4 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1050 056 | • 10,5 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1060 056 | • 10,6 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1070 056 | • 10,7 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1080 056 | • 10,8 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1090 056 | • 10,9 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1100 056 | • 11,0 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1110 056 | • 11,1 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 11133 056 | • 11,133 | 56 | 71 | 118 | 12 | 272,00 |
| 29 0210 1120 056 | • 11,2 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1130 056 | • 11,3 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1140 056 | • 11,4 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1150 056 | • 11,5 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1160 056 | • 11,6 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1170 056 | • 11,7 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1180 056 | • 11,8 | 56 | 71 | 118 | 12 | 269,00 |
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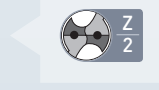
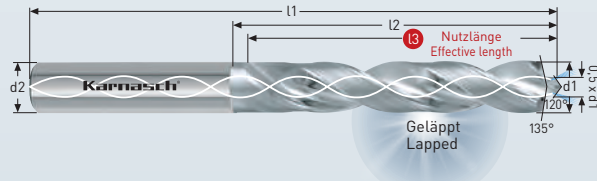
Index

29 0250

ROBO-Stack-Drill, VHM-Hochleistungsbohrer mit Innenkühlung CFK/ALU - ALU/CFK
Solid carbide ROBO-Stack-drill with interior cooling for CFRP/GFRP-Alu - Alu-CFRP/GFRP



- CFK/GFK - CFRP/GFRP
- Aluminium - Aluminum
- Aluminium - Aluminum
- CFK/GFK - CFRP/GFRP



MICRO GRAIN KARNASCH NORM

SPEZIAL DIN 6535 Form HAK
SPECIAL

34° 135°

HSC HPC

GELÄPPT LAPPED

MMKS



Schnittdaten Cutting data [i](#) 1253

Film Movie [▶](#)

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|----------|----|----|-----|-------|--------|
| 29 0250 0800 043 | • 8,0 | 43 | 53 | 91 | 8 | 142,00 |
| 29 0250 0810 049 | • 8,1 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0820 049 | • 8,2 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0830 049 | • 8,3 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0840 049 | • 8,4 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0850 049 | • 8,5 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0860 049 | • 8,6 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0870 049 | • 8,7 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0880 049 | • 8,8 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0890 049 | • 8,9 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0900 049 | • 9,0 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0910 049 | • 9,1 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0920 049 | • 9,2 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0930 049 | • 9,3 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0940 049 | • 9,4 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0950 049 | • 9,5 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0954 049 | • 9,54 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0960 049 | • 9,6 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0970 049 | • 9,7 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0980 049 | • 9,8 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0990 049 | • 9,9 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 1000 049 | • 10,0 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 1010 056 | • 10,1 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1020 056 | • 10,2 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1030 056 | • 10,3 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1040 056 | • 10,4 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1050 056 | • 10,5 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1060 056 | • 10,6 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1070 056 | • 10,7 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1080 056 | • 10,8 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1090 056 | • 10,9 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1100 056 | • 11,0 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1110 056 | • 11,1 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 11133 056 | • 11,133 | 56 | 71 | 118 | 12 | 287,00 |
| 29 0250 1120 056 | • 11,2 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1130 056 | • 11,3 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1140 056 | • 11,4 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1150 056 | • 11,5 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1160 056 | • 11,6 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1170 056 | • 11,7 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1180 056 | • 11,8 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1190 056 | • 11,9 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1200 056 | • 12,0 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1210 060 | • 12,1 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1220 060 | • 12,2 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1230 060 | • 12,3 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1240 060 | • 12,4 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1250 060 | • 12,5 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1260 060 | • 12,6 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1270 060 | • 12,7 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1272 060 | • 12,72 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1280 060 | • 12,8 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1290 060 | • 12,9 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1300 060 | • 13,0 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1310 060 | • 13,1 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1320 060 | • 13,2 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1330 060 | • 13,3 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1340 060 | • 13,4 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1350 060 | • 13,5 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1360 060 | • 13,6 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1370 060 | • 13,7 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1380 060 | • 13,8 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1390 060 | • 13,9 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1400 060 | • 14,0 | 60 | 77 | 124 | 14 | 380,00 |

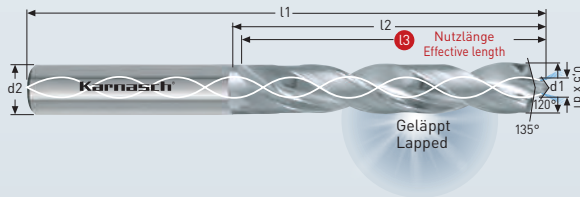
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|-------------------|----------|----|-----|-----|-------|--------|
| 29 0250 1410 063 | • 14,1 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1420 063 | • 14,2 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 14295 063 | • 14,295 | 63 | 83 | 133 | 16 | 476,00 |
| 29 0250 1430 063 | • 14,3 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1440 063 | • 14,4 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1450 063 | • 14,5 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1460 063 | • 14,6 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1470 063 | • 14,7 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1480 063 | • 14,8 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1490 063 | • 14,9 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1500 063 | • 15,0 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1510 063 | • 15,1 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1520 063 | • 15,2 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1530 063 | • 15,3 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1540 063 | • 15,4 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1550 063 | • 15,5 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1560 063 | • 15,6 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1570 063 | • 15,7 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1580 063 | • 15,8 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 15882 063 | • 15,882 | 63 | 83 | 133 | 16 | 476,00 |
| 29 0250 1590 063 | • 15,9 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1600 063 | • 16,0 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1610 071 | • 16,1 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1620 071 | • 16,2 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1630 071 | • 16,3 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1640 071 | • 16,4 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1650 071 | • 16,5 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1660 071 | • 16,6 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1670 071 | • 16,7 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1680 071 | • 16,8 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1690 071 | • 16,9 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1700 071 | • 17,0 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1710 071 | • 17,1 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1720 071 | • 17,2 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1730 071 | • 17,3 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1740 071 | • 17,4 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1750 071 | • 17,5 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1760 071 | • 17,6 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1770 071 | • 17,7 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1780 071 | • 17,8 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1790 071 | • 17,9 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1800 071 | • 18,0 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1810 077 | • 18,1 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1820 077 | • 18,2 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1830 077 | • 18,3 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1840 077 | • 18,4 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1850 077 | • 18,5 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1860 077 | • 18,6 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1870 077 | • 18,7 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1880 077 | • 18,8 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1890 077 | • 18,9 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1900 077 | • 19,0 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 19065 077 | • 19,065 | 77 | 101 | 153 | 20 | 775,00 |
| 29 0250 1910 077 | • 19,1 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1920 077 | • 19,2 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1930 077 | • 19,3 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1940 077 | • 19,4 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1950 077 | • 19,5 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1960 077 | • 19,6 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1970 077 | • 19,7 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1980 077 | • 19,8 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1990 077 | • 19,9 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 2000 077 | • 20,0 | 77 | 101 | 153 | 20 | 763,00 |

ROBO-Stack-Drill, VHM-Hochleistungsbohrer mit Innenkühlung CFK/TITAN – TITAN/CFK
Solid carbide ROBO-Stack-drill with interior cooling for CFRP/GFRP-Titan – Titan-CFRP/GFRP



29 0260

| | |
|----------|---------------------|
| C | CFK/GFK - CFRP/GFRP |
| T | Titan - Titanium |
| T | Titan - Titanium |
| C | CFK/GFK - CFRP/GFRP |



Schnittdaten Cutting data [i](#) 1253

Film Movie [▶](#)

MICRO GRAIN KARNASCH NORM

SPEZIAL DIN 6535 Form HAK

HSC HPC

GELÄPPT LAPPED

MMKS

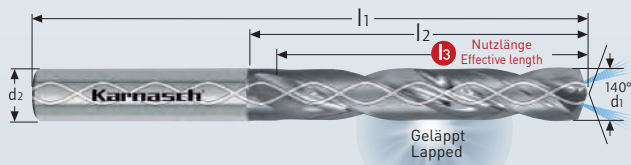
| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|---------|----|----|-----|-------|--------|
| 29 0260 0800 043 | • 8,0 | 43 | 53 | 91 | 8 | 150,00 |
| 29 0260 0810 049 | • 8,1 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0820 049 | • 8,2 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0830 049 | • 8,3 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0840 049 | • 8,4 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0850 049 | • 8,5 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0860 049 | • 8,6 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0870 049 | • 8,7 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0880 049 | • 8,8 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0890 049 | • 8,9 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0900 049 | • 9,0 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0910 049 | • 9,1 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0920 049 | • 9,2 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0930 049 | • 9,3 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0940 049 | • 9,4 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0950 049 | • 9,5 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0954 049 | • 9,54 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0960 049 | • 9,6 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0970 049 | • 9,7 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0980 049 | • 9,8 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0990 049 | • 9,9 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 1000 049 | • 10,0 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 1010 056 | • 10,1 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1020 056 | • 10,2 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1030 056 | • 10,3 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1040 056 | • 10,4 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1050 056 | • 10,5 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1060 056 | • 10,6 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1070 056 | • 10,7 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1080 056 | • 10,8 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1090 056 | • 10,9 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1100 056 | • 11,0 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1110 056 | • 11,1 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1113 056 | • 11,13 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1120 056 | • 11,2 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1130 056 | • 11,3 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1140 056 | • 11,4 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1150 056 | • 11,5 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1160 056 | • 11,6 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1170 056 | • 11,7 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1180 056 | • 11,8 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1190 056 | • 11,9 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1200 056 | • 12,0 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1210 060 | • 12,1 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1220 060 | • 12,2 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1230 060 | • 12,3 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1240 060 | • 12,4 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1250 060 | • 12,5 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1260 060 | • 12,6 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1270 060 | • 12,7 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1272 060 | • 12,72 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1280 060 | • 12,8 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1290 060 | • 12,9 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1300 060 | • 13,0 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1310 060 | • 13,1 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1320 060 | • 13,2 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1330 060 | • 13,3 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1340 060 | • 13,4 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1350 060 | • 13,5 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1360 060 | • 13,6 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1370 060 | • 13,7 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1380 060 | • 13,8 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1390 060 | • 13,9 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1400 060 | • 14,0 | 60 | 77 | 124 | 14 | 398,00 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|----------|----|-----|-----|-------|--------|
| 29 0260 1410 063 | • 14,1 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1420 063 | • 14,2 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 14295 063 | • 14,295 | 63 | 83 | 133 | 16 | 499,00 |
| 29 0260 1430 063 | • 14,3 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1440 063 | • 14,4 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1450 063 | • 14,5 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1460 063 | • 14,6 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1470 063 | • 14,7 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1480 063 | • 14,8 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1490 063 | • 14,9 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1500 063 | • 15,0 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1510 063 | • 15,1 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1520 063 | • 15,2 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1530 063 | • 15,3 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1540 063 | • 15,4 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1550 063 | • 15,5 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1560 063 | • 15,6 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1570 063 | • 15,7 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1580 063 | • 15,8 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 15882 063 | • 15,882 | 63 | 83 | 133 | 16 | 499,00 |
| 29 0260 1590 063 | • 15,9 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1600 063 | • 16,0 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1610 071 | • 16,1 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1620 071 | • 16,2 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1630 071 | • 16,3 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1640 071 | • 16,4 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1650 071 | • 16,5 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1660 071 | • 16,6 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1670 071 | • 16,7 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1680 071 | • 16,8 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1690 071 | • 16,9 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1700 071 | • 17,0 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1710 071 | • 17,1 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1720 071 | • 17,2 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1730 071 | • 17,3 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1740 071 | • 17,4 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1750 071 | • 17,5 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1760 071 | • 17,6 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1770 071 | • 17,7 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1780 071 | • 17,8 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1790 071 | • 17,9 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1800 071 | • 18,0 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1810 077 | • 18,1 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1820 077 | • 18,2 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1830 077 | • 18,3 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1840 077 | • 18,4 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1850 077 | • 18,5 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1860 077 | • 18,6 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1870 077 | • 18,7 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1880 077 | • 18,8 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1890 077 | • 18,9 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1900 077 | • 19,0 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 19065 077 | • 19,065 | 77 | 101 | 153 | 20 | 810,00 |
| 29 0260 1910 077 | • 19,1 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1920 077 | • 19,2 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1930 077 | • 19,3 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1940 077 | • 19,4 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1950 077 | • 19,5 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1960 077 | • 19,6 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1970 077 | • 19,7 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1980 077 | • 19,8 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1990 077 | • 19,9 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 2000 077 | • 20,0 | 77 | 101 | 153 | 20 | 798,00 |



22 0410

VHM-Hochleistungsbohrer mit Innenkühlung für INCONEL
Solid carbide high performance twist drill with interior cooling for INCONEL



| | |
|------------------------|--------------------------|
| MICRO GRAIN | DIN 6537 5xD |
| SPEZIAL SPECIAL | DIN 6535 Form HAK |
| | |
| | HSC HPC |
| | GELÄPPT LAPPED |
| | |

Empfohlene Schnittdaten / Recommended cutting data

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit Closeness | Schnittgeschwindigkeit Cutting speed Vc m/min | Vorschub pro Umdrehung Feed per revolution mm | | |
|-----------------------------------|---|--|---|---|-------------|-------------|
| | | | | Ø3 - Ø5 | Ø5 - Ø8 | Ø8 - Ø12 |
| 5.1 5.2 5.3 | Nickel 100% Nickel-Legierung / Nickel alloy Nickel-Legierung / Nickel alloy | <900 N/mm ² >900 N/mm ² | 25-35 | 0,04 - 0,09 | 0,06 - 0,16 | 0,13 - 0,22 |

Schnittdaten Cutting data 186

Zeichnungen Drawings DXF/STEP

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|----|-------|--------|
| 22 0410 0300 023 | • 3,0 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0410 0320 023 | • 3,2 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0410 0330 023 | • 3,3 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0410 0340 023 | • 3,4 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0410 0350 023 | • 3,5 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0410 0370 023 | • 3,7 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0410 0380 029 | • 3,8 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0410 0390 029 | • 3,9 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0410 0400 029 | • 4,0 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0410 0420 029 | • 4,2 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0410 0430 029 | • 4,3 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0410 0450 029 | • 4,5 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0410 0465 029 | • 4,65 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0410 0480 035 | • 4,8 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0500 035 | • 5,0 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0510 035 | • 5,1 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0520 035 | • 5,2 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0530 035 | • 5,3 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0540 035 | • 5,4 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0550 035 | • 5,5 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0555 035 | • 5,55 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0560 035 | • 5,6 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0570 035 | • 5,7 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0580 035 | • 5,8 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0600 035 | • 6,0 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0610 043 | • 6,1 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0620 043 | • 6,2 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0630 043 | • 6,3 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0640 043 | • 6,4 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0650 043 | • 6,5 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0660 043 | • 6,6 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0670 043 | • 6,7 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0680 043 | • 6,8 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0690 043 | • 6,9 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0700 043 | • 7,0 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0710 043 | • 7,1 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0720 043 | • 7,2 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0730 043 | • 7,3 | 43 | 53 | 91 | 8 | 134,00 |

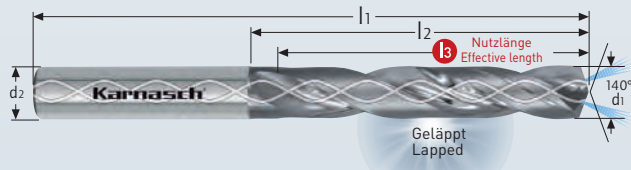
| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|-----|-------|--------|
| 22 0410 0740 043 | • 7,4 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0750 043 | • 7,5 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0760 043 | • 7,6 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0780 043 | • 7,8 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0790 043 | • 7,9 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0800 043 | • 8,0 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0810 049 | • 8,1 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0820 049 | • 8,2 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0830 049 | • 8,3 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0840 049 | • 8,4 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0850 049 | • 8,5 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0860 049 | • 8,6 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0870 049 | • 8,7 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0880 049 | • 8,8 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0890 049 | • 8,9 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0900 049 | • 9,0 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0910 049 | • 9,1 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0920 049 | • 9,2 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0930 049 | • 9,3 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0950 049 | • 9,5 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0960 049 | • 9,6 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0970 049 | • 9,7 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0980 049 | • 9,8 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 1000 049 | • 10,0 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 1010 056 | • 10,1 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1020 056 | • 10,2 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1030 056 | • 10,3 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1050 056 | • 10,5 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1060 056 | • 10,6 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1070 056 | • 10,7 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1080 056 | • 10,8 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1090 056 | • 10,9 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1100 056 | • 11,0 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1120 056 | • 11,2 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1150 056 | • 11,5 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1180 056 | • 11,8 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1200 056 | • 12,0 | 56 | 69 | 116 | 12 | 276,00 |

VHM-Hochleistungsbohrer mit Innenkühlung für **TITAN**
 Solid carbide high performance twist drill with interior cooling for **TITANIUM**



22 0412

- TITAN titanium
- TITAN titanium < 1200 N/mm²
- TITAN GRADE 1 TITANIUM GRADE 1
- TITAN GRADE 2 TITANIUM GRADE 2
- TITAN GRADE 3 TITANIUM GRADE 3
- TITAN GRADE 4 TITANIUM GRADE 4
- TITAN GRADE 5 TITANIUM GRADE 5
- TITAN GRADE 12 TITANIUM GRADE 12



| | |
|------------------------|--------------------------|
| MICRO GRAIN | DIN 6537 5xD |
| SPEZIAL SPEZIAL | DIN 6535 Form HAK |
| | |
| | HSC HPC |
| | GELÄPFT LAPPED |
| | |

Empfohlene Schnittdaten / Recommended cutting data

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit Closeness | Schnitt- geschwindigkeit Cutting speed Vc m/min | Vorschub pro Umdrehung Feed per revolution mm | | |
|-----------------------------------|---|--|--|---|-------------|-------------|
| | | | | Ø3 - Ø5 | Ø5 - Ø8 | Ø8 - Ø12 |
| 4.1 4.2 4.3 | Reintitan / Pure Titanium 3.7105-3.7115-3.7124 3.7154-3.7164-3.7124 | <900 N/mm ² >900 N/mm ² | 30-45 | 0,10 - 0,17 | 0,14 - 0,26 | 0,20 - 0,40 |

Schnittdaten
Cutting data

Zeichnungen
Drawings

187

DXF/STEP

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|----|-------|--------|
| 22 0412 0300 023 | • 3,0 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0412 0320 023 | • 3,2 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0412 0330 023 | • 3,3 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0412 0340 023 | • 3,4 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0412 0350 023 | • 3,5 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0412 0370 023 | • 3,7 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0412 0380 029 | • 3,8 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0412 0390 029 | • 3,9 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0412 0400 029 | • 4,0 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0412 0420 029 | • 4,2 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0412 0430 029 | • 4,3 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0412 0450 029 | • 4,5 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0412 0465 029 | • 4,65 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0412 0480 035 | • 4,8 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0500 035 | • 5,0 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0510 035 | • 5,1 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0520 035 | • 5,2 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0530 035 | • 5,3 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0540 035 | • 5,4 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0550 035 | • 5,5 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0555 035 | • 5,55 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0560 035 | • 5,6 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0570 035 | • 5,7 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0580 035 | • 5,8 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0600 035 | • 6,0 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0610 043 | • 6,1 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0620 043 | • 6,2 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0630 043 | • 6,3 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0640 043 | • 6,4 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0650 043 | • 6,5 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0660 043 | • 6,6 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0670 043 | • 6,7 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0680 043 | • 6,8 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0690 043 | • 6,9 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0700 043 | • 7,0 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0710 043 | • 7,1 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0720 043 | • 7,2 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0730 043 | • 7,3 | 43 | 53 | 91 | 8 | 134,00 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|-----|-------|--------|
| 22 0412 0740 043 | • 7,4 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0750 043 | • 7,5 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0760 043 | • 7,6 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0780 043 | • 7,8 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0790 043 | • 7,9 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0800 043 | • 8,0 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0810 049 | • 8,1 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0820 049 | • 8,2 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0830 049 | • 8,3 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0840 049 | • 8,4 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0850 049 | • 8,5 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0860 049 | • 8,6 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0870 049 | • 8,7 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0880 049 | • 8,8 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0890 049 | • 8,9 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0900 049 | • 9,0 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0910 049 | • 9,1 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0920 049 | • 9,2 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0930 049 | • 9,3 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0950 049 | • 9,5 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0960 049 | • 9,6 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0970 049 | • 9,7 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0980 049 | • 9,8 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 1000 049 | • 10,0 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 1010 056 | • 10,1 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1020 056 | • 10,2 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1030 056 | • 10,3 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1050 056 | • 10,5 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1060 056 | • 10,6 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1070 056 | • 10,7 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1080 056 | • 10,8 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1090 056 | • 10,9 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1100 056 | • 11,0 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1120 056 | • 11,2 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1150 056 | • 11,5 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1180 056 | • 11,8 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1200 056 | • 12,0 | 56 | 69 | 116 | 12 | 276,00 |

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29 0305

EXPERT

★ ★ ★

Diamantbeschichteter Vollhartmetall Schlichtfräser "UGT"
Diamond coated solid carbide finishing cutter, "UGT"



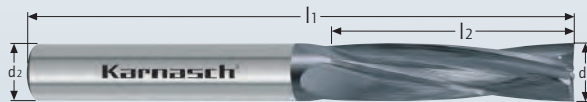
COMPOSITES
AFK
Aramid

GFK
GFRP

GRAPHIT
graphite

CFK
CFRP

FR 4



| Empfohlene Schnittdaten Recommended cutting data | GFK GFRP | CFK CFRP |
|---|-------------|-------------|
| Vc m/min. | 100-180 | 100-180 |
| f/U mm | 0,3-0,5 | 0,2-0,4 |

Optimale Bearbeitungsdaten müssen während der Einlaufphase ermittelt werden.
Optimal machining data must be determined during the run in phase.

MICRO GRAIN KARNASCH NORM

SPEZIAL DIN 6535 Form HA SPECIAL

15°

HSC
HPC

DCA-06 PLUS

Air

| Art. | d1 | l2 | d2 | l1 | Z | € |
|--------------------|--------|----|------|-----|---|--------|
| 29 0305 0300 10 04 | • 3,0 | 10 | 4 | 40 | 4 | 101,00 |
| 29 0305 0400 15 04 | • 4,0 | 15 | 6 | 50 | 4 | 125,00 |
| 29 0305 0500 15 04 | • 5,0 | 15 | 6 | 50 | 4 | 125,00 |
| 29 0305 0600 15 04 | • 6,0 | 15 | 6 | 50 | 4 | 125,00 |
| 29 0305 0600 25 04 | • 6,0 | 25 | 6 | 64 | 4 | 142,00 |
| 29 0305 0635 26 04 | • 6,35 | 26 | 6,35 | 64 | 4 | 159,00 |
| 29 0305 0800 15 04 | • 8,0 | 15 | 8 | 60 | 4 | 159,00 |
| 29 0305 0800 30 04 | • 8,0 | 30 | 8 | 76 | 4 | 178,00 |
| 29 0305 0953 30 04 | • 9,53 | 30 | 9,53 | 64 | 4 | 205,00 |
| 29 0305 1000 20 04 | • 10,0 | 20 | 10 | 73 | 4 | 195,00 |
| 29 0305 1000 40 04 | • 10,0 | 40 | 10 | 93 | 4 | 221,00 |
| 29 0305 1200 20 04 | • 12,0 | 20 | 12 | 73 | 4 | 216,00 |
| 29 0305 1200 40 04 | • 12,0 | 40 | 12 | 96 | 4 | 246,00 |
| 29 0305 1600 20 04 | % 16,0 | 20 | 16 | 80 | 4 | 174,00 |
| 29 0305 1600 20 06 | % 16,0 | 20 | 16 | 80 | 6 | 180,60 |
| 29 0305 2000 20 04 | % 20,0 | 20 | 20 | 80 | 4 | 234,60 |
| 29 0305 2000 20 08 | % 20,0 | 20 | 20 | 80 | 8 | 246,00 |
| 29 0305 2000 42 08 | % 20,0 | 42 | 20 | 105 | 8 | 278,40 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Schnittdaten Cutting data

Zeichnungen Drawings

188

DXF/STEP

29 0412

Diamantbeschichteter Vollhartmetall Typ „V“ Fräser für gratfreies Fräsen an Ober- und Unterkante von faserverstärkten Kunststoffen



Diamond-coated solid-carbide type "V" end mill for burr-free milling of upper and lower edge of fibre-reinforced plastics

COMPOSITES
PEEK
CF30

GFK
GFRP

Honey comb

PVDF
GF25

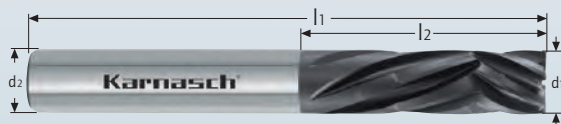
POM
GF25

PA-66

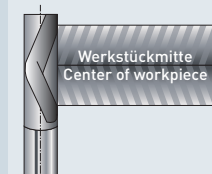
CFK
CFRP

PEEK
GF30

PTFE
CF25



| | |
|-----------------------|---------------------|
| d1* = Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| d1* = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,070 |



Die gleichzeitig ziehende und schiebende Anordnung der Schneiden verhindert Delamination.
Concurrent drawing and pushing blade alignment prevents delamination.

| Art. | d1* | l2 | d2 h5 | l1 | Z | € |
|-----------------|------|----|-------|-----|---|--------|
| 29 0412 0600 16 | • 6 | 16 | 6 | 58 | 4 | 120,00 |
| 29 0412 0600 21 | • 6 | 21 | 6 | 65 | 4 | 128,00 |
| 29 0412 0800 22 | • 8 | 22 | 8 | 70 | 6 | 146,00 |
| 29 0412 0800 28 | • 8 | 28 | 8 | 85 | 6 | 163,00 |
| 29 0412 1000 25 | • 10 | 25 | 10 | 72 | 6 | 185,00 |
| 29 0412 1000 32 | • 10 | 32 | 10 | 85 | 6 | 217,00 |
| 29 0412 1200 28 | • 12 | 28 | 12 | 85 | 6 | 236,00 |
| 29 0412 1200 36 | • 12 | 36 | 12 | 92 | 6 | 260,00 |
| 29 0412 1600 35 | % 16 | 35 | 16 | 92 | 6 | 241,20 |
| 29 0412 1600 48 | % 16 | 48 | 16 | 110 | 6 | 276,60 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

MICRO GRAIN KARNASCH NORM

SPEZIAL DIN 6535 Form HA SPECIAL

HPC

DCC031 impuls

Air

Schnittdaten Cutting data

Zeichnungen Drawings

1268

DXF/STEP

Diamantbeschichteter Vollhartmetall Typ „VR“ Fräser für gratfreies Fräsen an Ober- und Unterseite von faserverstärkten Kunststoffen **ohne Innenkühlung**



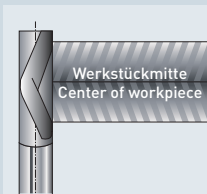
29 0416

Diamond-coated solid-carbide type "VR" end mill for burr-free milling upper and lower edges in fibre-reinforced plastics **without inner cooling**

| | |
|---------------------|---------------------|
| COMPO-SITES | CFK CFRP |
| GFK GFRP | PEEK GF30 |
| PVDF GF25 | PTFE CF25 |
| POM GF25 | PEEK CF30 |
| PA-66 | Honey comb |



| | |
|----------------------|---------------------|
| d1* = Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| d1* = Ø 12,0 | tol -0,000 / -0,070 |



Die gleichzeitig ziehende und schiebende Anordnung der Schneiden verhindert Delamination.
Concurrent drawing and pushing blade alignment prevents delamination.

| Art. | d1* | l2 | d2 h5 | l1 | Z | € |
|-----------------|------|----|-------|----|---|--------|
| 29 0416 0600 16 | • 6 | 16 | 6 | 58 | 4 | 124,00 |
| 29 0416 0800 22 | • 8 | 22 | 8 | 70 | 6 | 154,00 |
| 29 0416 1000 25 | • 10 | 25 | 10 | 72 | 6 | 203,00 |
| 29 0416 1200 28 | • 12 | 28 | 12 | 85 | 6 | 244,00 |

| | |
|---------------------------|----------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HPC |
| | DCC031 impuls |
| | |

Schnittdaten
Cutting data

Zeichnungen
Drawings



Diamantbeschichteter Vollhartmetall Typ „VRK“ Fräser für gratfreies Fräsen an Ober- und Unterseite von faserverstärkten Kunststoffen **mit Innenkühlung**



29 0417

Diamond-coated solid-carbide type "VRK" end mill for burr-free milling upper and lower edges in fibre-reinforced plastics **with inner cooling**

| | |
|---------------------|---------------------|
| COMPO-SITES | CFK CFRP |
| GFK GFRP | PEEK GF30 |
| PVDF GF25 | PTFE CF25 |
| POM GF25 | PEEK CF30 |
| PA-66 | Honey comb |



| | |
|----------------------|---------------------|
| d1* = Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| d1* = Ø 12,0 | tol -0,000 / -0,070 |



Die gleichzeitig ziehende und schiebende Anordnung der Schneiden verhindert Delamination.
Concurrent drawing and pushing blade alignment prevents delamination.

| Art. | d1* | l2 | d2 h5 | l1 | Z | € |
|-----------------|------|----|-------|----|---|--------|
| 29 0417 0600 16 | • 6 | 16 | 6 | 58 | 4 | 179,00 |
| 29 0417 0800 22 | • 8 | 22 | 8 | 70 | 6 | 240,00 |
| 29 0417 1000 25 | • 10 | 25 | 10 | 72 | 6 | 305,00 |
| 29 0417 1200 28 | • 12 | 28 | 12 | 85 | 6 | 369,00 |

| | |
|---------------------------|----------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HAK |
| | |
| | HPC |
| | DCC031 impuls |
| | |

Schnittdaten
Cutting data

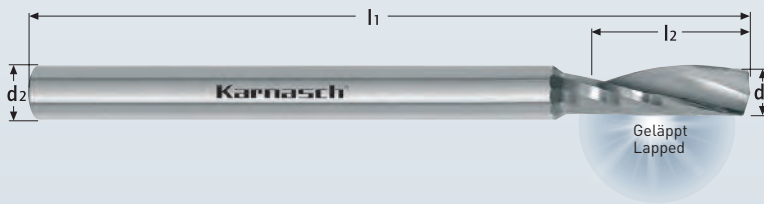
Zeichnungen
Drawings



- 1
- 2
- 3
- 4
- 5
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- 7
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29 1652

Vollhartmetall Einzahnfräser, rechtsspirale – rechtsschneidend, ziehender Schnitt
Solid carbide one-tooth end mill, right spiral – right cutting, drawing cut (upcut)



| | |
|----------------------|---------------------|
| d1* = Ø ≤ 3,0 | tol -0,000 / -0,040 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |

| | |
|---------------------------|----------------------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | 30° |
| | HSC High-Speed-Cutting |
| | GELÄPPT LAPPED |
| | Air |

| Art. | d1* | l2 | d2 h6 | l1 | Z | € |
|-------------------------|---------|------|-------|-----|---|--------|
| 29 1652 0010 003 03 030 | • 0,10 | 0,3 | 3 | 30 | 1 | 46,00 |
| 29 1652 0020 006 03 030 | • 0,20 | 0,6 | 3 | 30 | 1 | 35,00 |
| 29 1652 0030 010 03 030 | • 0,30 | 1,0 | 3 | 30 | 1 | 30,00 |
| 29 1652 0040 010 03 030 | • 0,40 | 1,0 | 3 | 30 | 1 | 30,00 |
| 29 1652 0050 015 03 030 | • 0,50 | 1,5 | 3 | 30 | 1 | 27,00 |
| 29 1652 0060 030 03 030 | • 0,60 | 3,0 | 3 | 30 | 1 | 27,00 |
| 29 1652 0080 050 03 030 | • 0,80 | 5,0 | 3 | 30 | 1 | 27,00 |
| 29 1652 0100 040 03 030 | • 1,00 | 4,0 | 3 | 30 | 1 | 27,00 |
| 29 1652 0150 060 03 030 | • 1,50 | 6,0 | 3 | 30 | 1 | 27,00 |
| 29 1652 0200 060 03 030 | • 2,00 | 6,0 | 3 | 30 | 1 | 27,00 |
| 29 1652 0200 060 04 050 | • 2,00 | 6,0 | 4 | 50 | 1 | 33,00 |
| 29 1652 0200 060 06 050 | • 2,00 | 6,0 | 6 | 50 | 1 | 38,00 |
| 29 1652 0200 080 03 030 | • 2,00 | 8,0 | 3 | 30 | 1 | 27,00 |
| 29 1652 0200 110 03 038 | • 2,00 | 11,0 | 3 | 38 | 1 | 33,00 |
| 29 1652 0300 060 03 030 | • 3,00 | 6,0 | 3 | 30 | 1 | 27,00 |
| 29 1652 0300 060 06 050 | • 3,00 | 6,0 | 6 | 50 | 1 | 41,00 |
| 29 1652 0300 110 03 038 | • 3,00 | 11,0 | 3 | 38 | 1 | 33,00 |
| 29 1652 0300 110 04 050 | • 3,00 | 11,0 | 4 | 50 | 1 | 41,00 |
| 29 1652 0300 110 06 050 | • 3,00 | 11,0 | 6 | 50 | 1 | 45,00 |
| 29 1652 0300 220 03 050 | • 3,00 | 22,0 | 3 | 50 | 1 | 37,00 |
| 29 1652 0300 220 06 060 | • 3,00 | 22,0 | 6 | 60 | 1 | 47,00 |
| 29 1652 0400 080 04 050 | • 4,00 | 8,0 | 4 | 50 | 1 | 36,00 |
| 29 1652 0400 080 06 050 | • 4,00 | 8,0 | 6 | 50 | 1 | 42,00 |
| 29 1652 0400 120 04 050 | • 4,00 | 12,0 | 4 | 50 | 1 | 36,00 |
| 29 1652 0400 120 06 050 | • 4,00 | 12,0 | 6 | 50 | 1 | 42,00 |
| 29 1652 0400 140 04 050 | • 4,00 | 14,0 | 4 | 50 | 1 | 36,00 |
| 29 1652 0400 140 06 050 | • 4,00 | 14,0 | 6 | 50 | 1 | 42,00 |
| 29 1652 0400 220 04 050 | • 4,00 | 22,0 | 4 | 50 | 1 | 39,00 |
| 29 1652 0400 220 06 050 | • 4,00 | 22,0 | 6 | 50 | 1 | 45,00 |
| 29 1652 0400 320 04 064 | • 4,00 | 32,0 | 4 | 64 | 1 | 41,00 |
| 29 1652 0500 120 06 050 | • 5,00 | 12,0 | 6 | 50 | 1 | 44,00 |
| 29 1652 0500 160 06 050 | • 5,00 | 16,0 | 6 | 50 | 1 | 44,00 |
| 29 1652 0500 220 06 050 | • 5,00 | 22,0 | 6 | 50 | 1 | 44,00 |
| 29 1652 0600 120 06 050 | • 6,00 | 12,0 | 6 | 50 | 1 | 42,00 |
| 29 1652 0600 220 06 050 | • 6,00 | 22,0 | 6 | 50 | 1 | 44,00 |
| 29 1652 0600 220 06 058 | • 6,00 | 22,0 | 6 | 58 | 1 | 45,00 |
| 29 1652 0600 320 06 064 | • 6,00 | 32,0 | 6 | 64 | 1 | 50,00 |
| 29 1652 0600 420 06 075 | • 6,00 | 42,0 | 6 | 75 | 1 | 55,00 |
| 29 1652 0600 320 06 100 | • 6,00 | 32,0 | 6 | 100 | 1 | 56,00 |
| 29 1652 0800 220 08 064 | • 8,00 | 22,0 | 8 | 64 | 1 | 53,00 |
| 29 1652 0800 320 08 064 | • 8,00 | 32,0 | 8 | 64 | 1 | 58,00 |
| 29 1652 0800 420 08 075 | • 8,00 | 42,0 | 8 | 75 | 1 | 67,00 |
| 29 1652 0800 420 08 100 | • 8,00 | 42,0 | 8 | 100 | 1 | 73,00 |
| 29 1652 0800 550 08 100 | • 8,00 | 55,0 | 8 | 100 | 1 | 77,00 |
| 29 1652 1000 220 10 064 | • 10,00 | 22,0 | 10 | 64 | 1 | 78,00 |
| 29 1652 1000 320 10 075 | • 10,00 | 32,0 | 10 | 75 | 1 | 84,00 |
| 29 1652 1000 550 10 100 | • 10,00 | 55,0 | 10 | 100 | 1 | 96,00 |
| 29 1652 1000 750 10 120 | • 10,00 | 75,0 | 10 | 120 | 1 | 108,00 |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1265 | DXF/STEP |

- 1
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- 3
- 4
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- 6
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Vollhartmetall Einzahnfräser, linksspirale – rechtsschneidend, schiebender Schnitt
Solid carbide one-tooth end mill, left spiral – right cutting, pushing cut (down cut)



29 1654

- Acryl
Acrylic
- PMMA
GS
- PE
PP
- PA
- SAN
- ABS
- PC
PET
PPE
- PMMA
XT
- MAKROLON
- Wachs
Wax



| | |
|----------------------|---------------------|
| d1* = Ø 3,0 | tol -0,000 / -0,040 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |

| | |
|------------------------|-------------------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | GELÄPPT LAPPED |
| | |

| Art. | d1* | l2 | d2 h6 | l3 | l1 | Z | € |
|------------------------|--------|----|-------|----|-----|---|-------|
| 29 1654 0100 04 03 040 | • 1,0 | 4 | 3 | - | 40 | 1 | 31,00 |
| 29 1654 0150 06 03 040 | • 1,5 | 6 | 3 | - | 40 | 1 | 31,00 |
| 29 1654 0200 03 03 050 | • 2,0 | 3 | 3 | - | 50 | 1 | 33,00 |
| 29 1654 0200 06 06 050 | • 2,0 | 6 | 6 | - | 50 | 1 | 35,00 |
| 29 1654 0200 08 03 040 | • 2,0 | 8 | 3 | - | 40 | 1 | 37,00 |
| 29 1654 0300 04 03 050 | • 3,0 | 4 | 3 | - | 50 | 1 | 33,00 |
| 29 1654 0300 06 03 050 | • 3,0 | 6 | 3 | - | 50 | 1 | 33,00 |
| 29 1654 0300 10 03 030 | • 3,0 | 10 | 3 | - | 30 | 1 | 34,00 |
| 29 1654 0300 10 03 060 | • 3,0 | 10 | 3 | - | 60 | 1 | 35,00 |
| 29 1654 0300 12 06 050 | • 3,0 | 12 | 6 | - | 50 | 1 | 40,00 |
| 29 1654 0300 15 08 075 | • 3,0 | 15 | 8 | - | 75 | 1 | 50,00 |
| 29 1654 0300 18 08 100 | • 3,0 | 18 | 8 | - | 100 | 1 | 57,00 |
| 29 1654 0400 05 04 050 | • 4,0 | 5 | 4 | - | 50 | 1 | 36,00 |
| 29 1654 0400 08 04 040 | • 4,0 | 8 | 4 | - | 40 | 1 | 36,00 |
| 29 1654 0400 14 06 050 | • 4,0 | 14 | 6 | - | 50 | 1 | 39,00 |
| 29 1654 0400 18 08 075 | • 4,0 | 18 | 8 | - | 75 | 1 | 48,00 |
| 29 1654 0400 20 04 060 | • 4,0 | 20 | 4 | - | 60 | 1 | 38,00 |
| 29 1654 0400 22 08 100 | • 4,0 | 22 | 8 | - | 100 | 1 | 60,00 |
| 29 1654 0500 06 06 050 | • 5,0 | 6 | 6 | - | 50 | 1 | 41,00 |
| 29 1654 0500 10 06 040 | • 5,0 | 10 | 6 | - | 40 | 1 | 42,00 |
| 29 1654 0500 16 06 050 | • 5,0 | 16 | 6 | - | 50 | 1 | 42,00 |
| 29 1654 0500 22 06 060 | • 5,0 | 22 | 6 | - | 60 | 1 | 43,00 |
| 29 1654 0500 25 08 075 | • 5,0 | 25 | 8 | - | 75 | 1 | 49,00 |
| 29 1654 0500 25 08 100 | • 5,0 | 25 | 8 | - | 100 | 1 | 60,00 |
| 29 1654 0500 30 06 070 | • 5,0 | 30 | 6 | - | 70 | 1 | 44,00 |
| 29 1654 0600 07 06 050 | • 6,0 | 7 | 6 | - | 50 | 1 | 37,00 |
| 29 1654 0600 18 06 050 | • 6,0 | 18 | 6 | - | 50 | 1 | 37,00 |
| 29 1654 0600 20 06 060 | • 6,0 | 20 | 6 | - | 60 | 1 | 39,00 |
| 29 1654 0600 20 06 100 | • 6,0 | 20 | 6 | 40 | 100 | 1 | 40,00 |
| 29 1654 0600 25 06 065 | • 6,0 | 25 | 6 | - | 65 | 1 | 41,00 |
| 29 1654 0600 25 08 075 | • 6,0 | 25 | 8 | - | 75 | 1 | 48,00 |
| 29 1654 0600 40 06 080 | • 6,0 | 40 | 6 | - | 80 | 1 | 42,00 |
| 29 1654 0600 30 08 100 | • 6,0 | 30 | 8 | - | 100 | 1 | 55,00 |
| 29 1654 0800 10 08 050 | • 8,0 | 10 | 8 | - | 50 | 1 | 52,00 |
| 29 1654 0800 20 08 050 | • 8,0 | 20 | 8 | - | 50 | 1 | 55,00 |
| 29 1654 0800 20 08 060 | • 8,0 | 20 | 8 | - | 60 | 1 | 56,00 |
| 29 1654 0800 20 08 100 | • 8,0 | 20 | 8 | 40 | 100 | 1 | 65,00 |
| 29 1654 0800 35 08 100 | • 8,0 | 35 | 8 | - | 100 | 1 | 70,00 |
| 29 1654 1000 25 10 070 | • 10,0 | 25 | 10 | - | 70 | 1 | 72,00 |
| 29 1654 1000 25 10 120 | • 10,0 | 25 | 10 | 50 | 120 | 1 | 89,00 |
| 29 1654 1000 32 | • 10,0 | 32 | 10 | - | 75 | 1 | 48,00 |
| 29 1654 1000 35 10 090 | • 10,0 | 35 | 10 | - | 90 | 1 | 81,00 |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1265 | DXF/STEP |

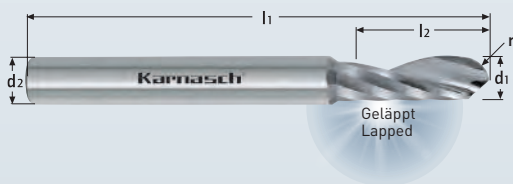
🔴 Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

29 1658

Vollhartmetall Einzahnfräser mit Radius, rechtsspirale – rechtsschneidend, Hochglanz-finish
Solid carbide one-tooth end mill with corner radius, right spiral – right cutting, mirror finish



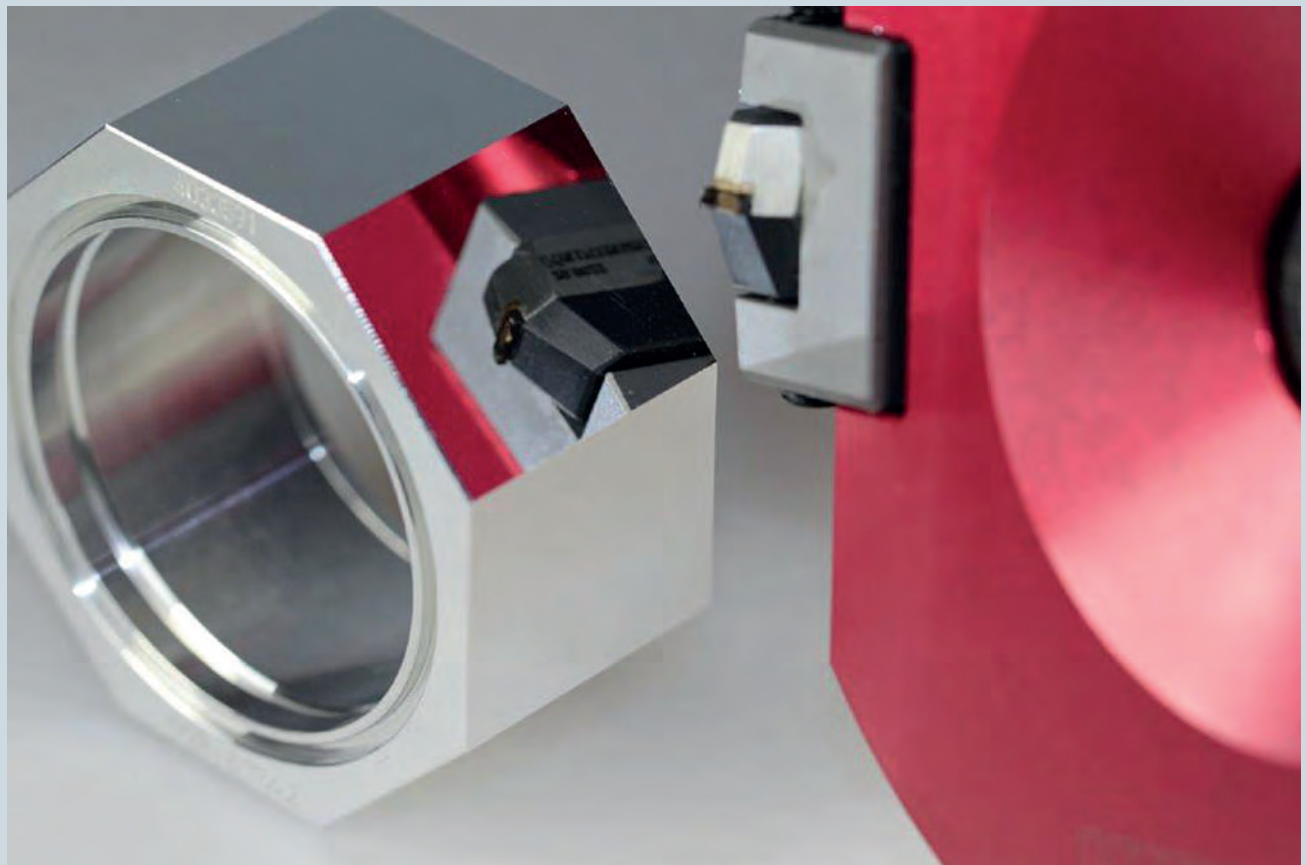
| Art. | d1 | r | l2 | d2 h5 | l1 | € |
|-----------------|------|-----|----|-------|----|-------|
| 29 1658 0200 06 | • 2 | 1,0 | 6 | 6 | 60 | 51,00 |
| 29 1658 0300 09 | • 3 | 1,5 | 9 | 6 | 60 | 50,00 |
| 29 1658 0400 12 | • 4 | 2,0 | 12 | 6 | 60 | 49,00 |
| 29 1658 0500 15 | • 5 | 2,5 | 15 | 6 | 60 | 57,00 |
| 29 1658 0600 18 | • 6 | 3,0 | 18 | 6 | 70 | 55,00 |
| 29 1658 0800 24 | • 8 | 4,0 | 24 | 8 | 80 | 63,00 |
| 29 1658 1000 30 | • 10 | 5,0 | 30 | 10 | 80 | 73,00 |

Technik: Keine Schartigkeit bei 50-facher Vergrößerung (< Rz 0,5)
Technology: No chipping at 50-times magnification (< Rz 0,5)

| | |
|------------------------|------------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | Z=1 |
| | HSC High-Speed-Cutting |
| | GELÄPPT LAPPED |
| | Air |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1265 | DXF/STEP |

MKD Hochglanz Messerkopf 29 6620 Seite 211
MCD mirror finish cutter head 29 6620 page 211



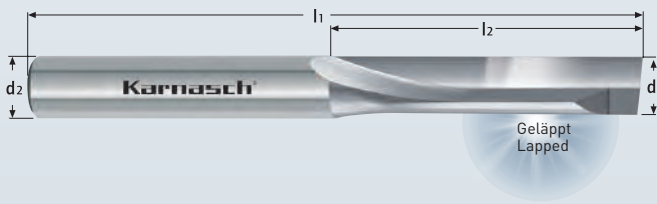
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- 3
- 4
- 5
- 6
- 7
- 8
- 9

Vollhartmetall Einzahnfräser, gerade genutet, rechtsschneidend
Solid carbide one-tooth end mill, straight fluted – right cutting



29 1661

- Acryl
Acrylic
- PMMA
GS
- PE
PP
- PA
- SAN
- ABS
- PC
PET
PPE
- PMMA
XT
- MAKROLON
- Wachs
Wax



| | |
|----------------------|---------------------|
| d1* = Ø 3,0 | tol -0,000 / -0,040 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |

| Art. | d1* | l2 | d2 h6 | l1 | € |
|---------------------|--------|----|-------|-----|-------|
| 29 1661 0100 04 040 | • 1,0 | 4 | 3 | 40 | 25,00 |
| 29 1661 0150 06 040 | • 1,5 | 6 | 3 | 40 | 25,00 |
| 29 1661 0200 03 050 | • 2,0 | 3 | 3 | 50 | 26,00 |
| 29 1661 0200 06 050 | • 2,0 | 6 | 6 | 50 | 35,00 |
| 29 1661 0200 08 040 | • 2,0 | 8 | 3 | 40 | 25,00 |
| 29 1661 0250 09 040 | • 2,5 | 9 | 3 | 40 | 25,00 |
| 29 1661 0300 06 040 | • 3,0 | 6 | 3 | 40 | 25,00 |
| 29 1661 0300 10 030 | • 3,0 | 10 | 3 | 30 | 24,00 |
| 29 1661 0300 10 060 | • 3,0 | 10 | 3 | 60 | 26,00 |
| 29 1661 0300 12 050 | • 3,0 | 12 | 6 | 50 | 35,00 |
| 29 1661 0300 15 075 | • 3,0 | 15 | 8 | 75 | 46,00 |
| 29 1661 0300 18 100 | • 3,0 | 18 | 8 | 100 | 52,00 |
| 29 1661 0400 05 050 | • 4,0 | 5 | 4 | 50 | 31,00 |
| 29 1661 0400 08 040 | • 4,0 | 8 | 4 | 40 | 31,00 |
| 29 1661 0400 14 050 | • 4,0 | 14 | 6 | 50 | 38,00 |
| 29 1661 0400 18 075 | • 4,0 | 18 | 8 | 75 | 46,00 |
| 29 1661 0400 20 060 | • 4,0 | 20 | 4 | 60 | 32,00 |
| 29 1661 0400 22 100 | • 4,0 | 22 | 8 | 100 | 52,00 |
| 29 1661 0400 30 070 | • 4,0 | 30 | 4 | 70 | 33,00 |
| 29 1661 0500 06 050 | • 5,0 | 6 | 5 | 50 | 38,00 |
| 29 1661 0500 10 040 | • 5,0 | 10 | 5 | 40 | 38,00 |
| 29 1661 0500 16 050 | • 5,0 | 16 | 6 | 50 | 39,00 |
| 29 1661 0500 22 060 | • 5,0 | 22 | 5 | 60 | 39,00 |
| 29 1661 0500 25 075 | • 5,0 | 25 | 8 | 75 | 46,00 |
| 29 1661 0500 25 100 | • 5,0 | 25 | 8 | 100 | 52,00 |
| 29 1661 0500 30 070 | • 5,0 | 30 | 5 | 70 | 41,00 |
| 29 1661 0600 07 050 | • 6,0 | 7 | 6 | 50 | 38,00 |
| 29 1661 0600 18 050 | • 6,0 | 18 | 6 | 50 | 39,00 |
| 29 1661 0600 20 060 | • 6,0 | 20 | 6 | 60 | 41,00 |
| 29 1661 0600 25 065 | • 6,0 | 25 | 6 | 65 | 42,00 |
| 29 1661 0600 25 075 | • 6,0 | 25 | 8 | 75 | 46,00 |
| 29 1661 0600 30 100 | • 6,0 | 30 | 8 | 100 | 52,00 |
| 29 1661 0600 40 080 | • 6,0 | 40 | 6 | 80 | 44,00 |
| 29 1661 0800 09 050 | • 8,0 | 9 | 8 | 50 | 46,00 |
| 29 1661 0800 20 050 | • 8,0 | 20 | 8 | 50 | 45,00 |
| 29 1661 0800 20 060 | • 8,0 | 20 | 8 | 60 | 47,00 |
| 29 1661 0800 30 075 | • 8,0 | 30 | 8 | 75 | 51,00 |
| 29 1661 0800 35 100 | • 8,0 | 35 | 8 | 100 | 57,00 |
| 29 1661 1000 25 070 | • 10,0 | 25 | 10 | 70 | 81,00 |
| 29 1661 1000 35 090 | • 10,0 | 35 | 10 | 90 | 87,00 |

| | |
|---------------------------|----------------------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | GELÄPPT LAPPED |
| | |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1265 | DXF/STEP |

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- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

29 1751

Vollhartmetall-Schrupp- und Schlichtfräser, 8 Frässhneiden / gerade Verzahnung
Solid carbide roughing and finishing cutter for CFRP / GFRP, 8 milling blades / straight teeth

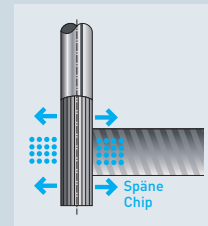


| | |
|---------------------|--------------------------|
| COMPOSITES | PA PE PI |
| PTFE FEP PVDF | ALUMINIUM non-ferrous |
| PA | Kupfer copper |
| PA-66 | |
| PE PP | |
| PMMA GS | |
| PMMA XT | |
| SAN | |
| Honey comb | |



| | | |
|-----|-------------------|---------------------|
| d1* | = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* | = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| d1* | = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,070 |
| d1* | = Ø 20,0 | tol -0,000 / -0,084 |

| Art. | d1* | l2 | d2 h6 | l1 | Z | € |
|-----------------|------|----|-------|-----|---|--------|
| 29 1751 0400 16 | • 4 | 16 | 6 | 60 | 8 | 98,00 |
| 29 1751 0500 18 | • 5 | 18 | 6 | 60 | 8 | 102,00 |
| 29 1751 0600 20 | • 6 | 20 | 6 | 60 | 8 | 106,00 |
| 29 1751 0600 25 | • 6 | 25 | 6 | 65 | 8 | 113,00 |
| 29 1751 0600 30 | • 6 | 30 | 6 | 75 | 8 | 118,00 |
| 29 1751 0600 50 | • 6 | 50 | 6 | 100 | 8 | 135,00 |
| 29 1751 0800 22 | • 8 | 22 | 8 | 63 | 8 | 116,00 |
| 29 1751 0800 32 | • 8 | 32 | 8 | 75 | 8 | 135,00 |
| 29 1751 0800 50 | • 8 | 50 | 8 | 100 | 8 | 155,00 |
| 29 1751 1000 32 | • 10 | 32 | 10 | 72 | 8 | 181,00 |
| 29 1751 1000 60 | • 10 | 60 | 10 | 120 | 8 | 210,00 |
| 29 1751 1200 32 | • 12 | 32 | 12 | 82 | 8 | 192,00 |
| 29 1751 1200 70 | • 12 | 70 | 12 | 120 | 8 | 264,00 |
| 29 1751 1600 36 | • 16 | 36 | 16 | 92 | 8 | 127,20 |
| 29 1751 1600 80 | • 16 | 80 | 16 | 150 | 8 | 199,80 |
| 29 1751 2000 45 | • 20 | 45 | 20 | 104 | 8 | 168,60 |
| 29 1751 2000 80 | • 20 | 80 | 20 | 150 | 8 | 262,80 |



| | |
|------------------|---------------|
| MICRO GRAIN | KARNASCH NORM |
| DIN 6535 Form HA | |
| HPC | |
| NHC 7000 | |
| Air | |

Schnittdaten Cutting data | Zeichnungen Drawings

1269 | DXF/STEP

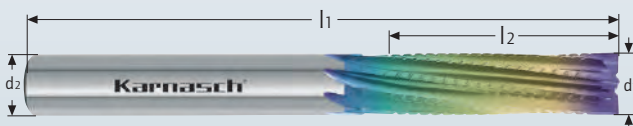
% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

29 1752

Vollhartmetall-Schrupp- und Schlichtfräser, 8 Frässhneiden / ziehender Schnitt
Solid carbide roughing and finishing cutter for CFRP/GFRP, 8 milling blades / drawing cut

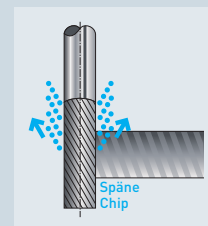


| | |
|---------------------|--------------------------|
| COMPOSITES | PA PE PI |
| PTFE FEP PVDF | ALUMINIUM non-ferrous |
| PA | Kupfer copper |
| PA-66 | |
| PE PP | |
| PMMA GS | |
| PMMA XT | |
| SAN | |
| Honey comb | |



| | | |
|-----|-------------------|---------------------|
| d1* | = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* | = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| d1* | = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,070 |
| d1* | = Ø 20,0 | tol -0,000 / -0,084 |

| Art. | d1* | l2 | d2 h6 | l1 | Z | € |
|-----------------|------|----|-------|-----|---|--------|
| 29 1752 0400 16 | • 4 | 16 | 6 | 60 | 8 | 98,00 |
| 29 1752 0500 18 | • 5 | 18 | 6 | 60 | 8 | 102,00 |
| 29 1752 0600 20 | • 6 | 20 | 6 | 60 | 8 | 106,00 |
| 29 1752 0600 25 | • 6 | 25 | 6 | 65 | 8 | 113,00 |
| 29 1752 0600 30 | • 6 | 30 | 6 | 75 | 8 | 118,00 |
| 29 1752 0600 50 | • 6 | 50 | 6 | 100 | 8 | 135,00 |
| 29 1752 0800 22 | • 8 | 22 | 8 | 63 | 8 | 116,00 |
| 29 1752 0800 32 | • 8 | 32 | 8 | 75 | 8 | 135,00 |
| 29 1752 0800 50 | • 8 | 50 | 8 | 100 | 8 | 155,00 |
| 29 1752 1000 32 | • 10 | 32 | 10 | 72 | 8 | 181,00 |
| 29 1752 1000 60 | • 10 | 60 | 10 | 120 | 8 | 210,00 |
| 29 1752 1200 32 | • 12 | 32 | 12 | 82 | 8 | 192,00 |
| 29 1752 1200 70 | • 12 | 70 | 12 | 120 | 8 | 264,00 |
| 29 1752 1600 36 | • 16 | 36 | 16 | 92 | 8 | 127,20 |
| 29 1752 1600 80 | • 16 | 80 | 16 | 150 | 8 | 199,80 |
| 29 1752 2000 45 | • 20 | 45 | 20 | 104 | 8 | 168,60 |
| 29 1752 2000 80 | • 20 | 80 | 20 | 150 | 8 | 262,80 |



| | |
|------------------|---------------|
| MICRO GRAIN | KARNASCH NORM |
| DIN 6535 Form HA | |
| HPC | |
| NHC 7000 | |
| Air | |

Schnittdaten Cutting data | Zeichnungen Drawings

1269 | DXF/STEP

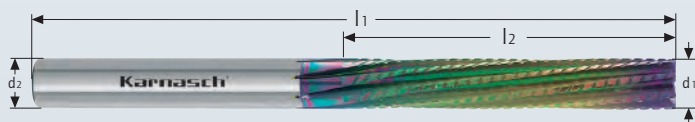
% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Vollhartmetall-Schrupp- und Schlichtfräser, 8 Frässchnitten / **schiebender Schnitt**
 Solid carbide roughing and finishing cutter for CFRP/GFRP, 8 milling blades / **pushing cut**



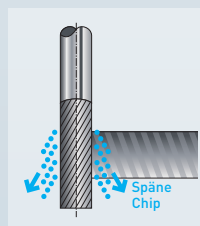
29 1753

- COMPO-SITES** **PA PE PI**
- PTFE FEP PVDF** **ALUMINIUM non-ferrous**
- PA** **Kupfer copper**
- PA-66**
- PE PP**
- PMMA GS**
- PMMA XT**
- SAN**
- Honey comb**



| | |
|--------------------------|---------------------|
| $d1^*$ = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| $d1^*$ = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| $d1^*$ = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,070 |
| $d1^*$ = Ø 20,0 | tol -0,000 / -0,084 |

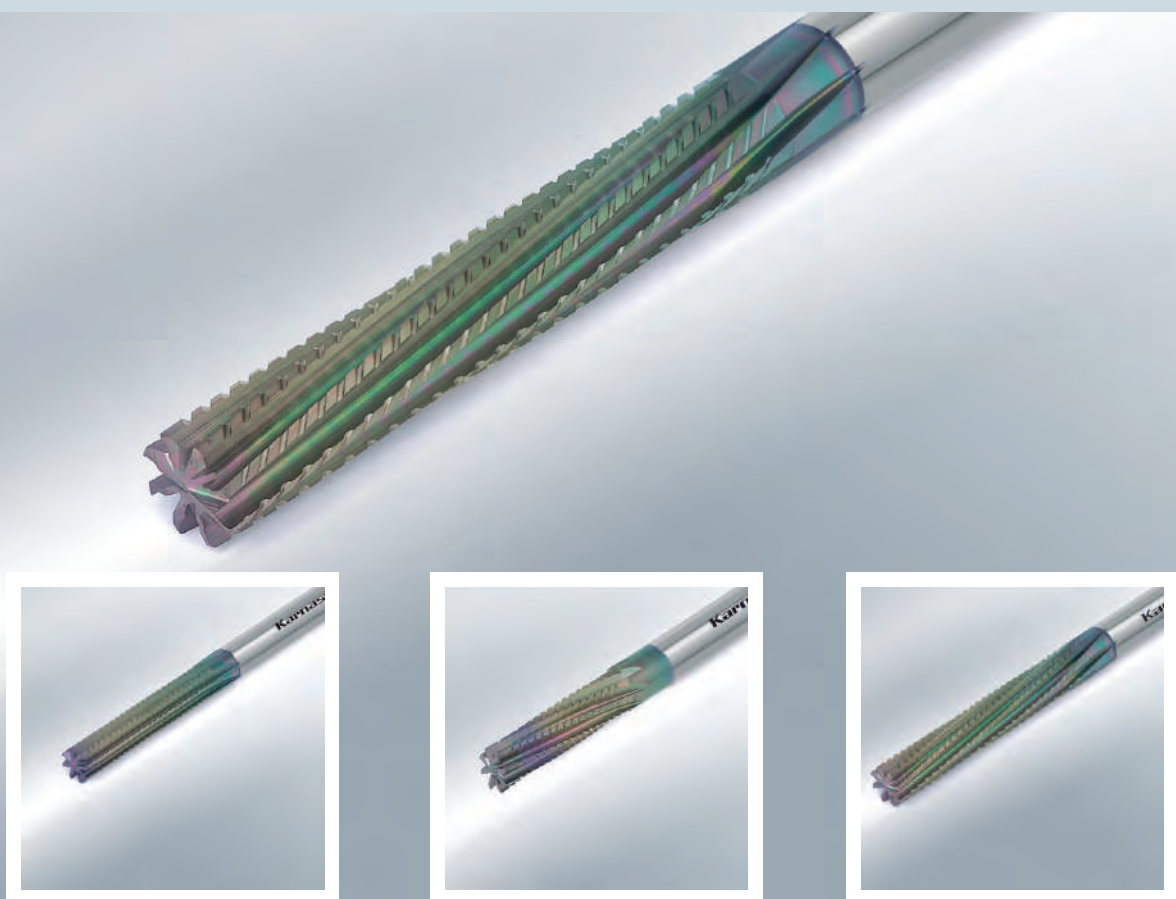
| Art. | $d1^*$ | $l2$ | $d2\ h6$ | $l1$ | Z | € |
|-----------------|--------|------|----------|------|---|--------|
| 29 1753 0400 16 | • 4 | 16 | 6 | 60 | 8 | 98,00 |
| 29 1753 0500 18 | • 5 | 18 | 6 | 60 | 8 | 102,00 |
| 29 1753 0600 20 | • 6 | 20 | 6 | 60 | 8 | 106,00 |
| 29 1753 0600 25 | • 6 | 25 | 6 | 65 | 8 | 113,00 |
| 29 1753 0600 30 | • 6 | 30 | 6 | 75 | 8 | 118,00 |
| 29 1753 0600 50 | • 6 | 50 | 6 | 100 | 8 | 135,00 |
| 29 1753 0800 22 | • 8 | 22 | 8 | 63 | 8 | 116,00 |
| 29 1753 0800 32 | • 8 | 32 | 8 | 75 | 8 | 135,00 |
| 29 1753 0800 50 | • 8 | 50 | 8 | 100 | 8 | 155,00 |
| 29 1753 1000 32 | • 10 | 32 | 10 | 72 | 8 | 181,00 |
| 29 1753 1000 60 | • 10 | 60 | 10 | 120 | 8 | 210,00 |
| 29 1753 1200 32 | • 12 | 32 | 12 | 82 | 8 | 192,00 |
| 29 1753 1200 70 | • 12 | 70 | 12 | 120 | 8 | 264,00 |
| 29 1753 1600 36 | • 16 | 36 | 16 | 92 | 8 | 127,20 |
| 29 1753 2000 45 | • 20 | 45 | 20 | 104 | 8 | 168,60 |
| 29 1753 2000 80 | • 20 | 80 | 20 | 150 | 8 | 262,80 |



| | |
|--------------------|-------------------------|
| MICRO GRAIN | KARNASCH NORM |
| | DIN 6535 Form HA |
| | |
| | HPC |
| | NHC 7000 |
| | Air |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1269 | DXF/STEP |

⊘ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
 Special price / sale article. While stocks last.



29 1751
Gerade genutet
Straight flute

29 1752
Rechtsspirale, rechtsschneidend
Rightspiral, rightcutting

29 1753
Linksspirale, rechtsschneidend
Leftspiral, rightcutting

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

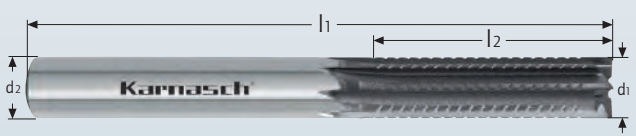
29 1761

Vollhartmetall-Schrupp- und Schlichtfräser für CFK-GFK, 8 Frässchnneiden, 4 Stirnschnneiden / **gerade Verzahnung**
 Solid carbide roughing and finishing cutter for CFRP-GFRP, 8 milling blades 4 cutting edges / **straight teeth**



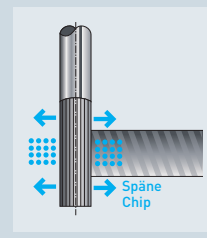
Index

- COMPOSITES** GRAPHIT graphite
- CFK CFRP** **FR 4**
- PVDF GF25**
- GF GF25**
- PEEK GF30**
- PA66 GF30**
- POM GF25**
- PVDF GF30**
- Honey comb**



| | |
|-----------------------|---------------------|
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| d1* = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,070 |
| d1* = Ø 20,0 | tol -0,000 / -0,084 |

| Art. | d1* | l2 | d2 h6 | l1 | Z | € |
|-----------------|------|----|-------|-----|---|--------|
| 29 1761 0400 16 | • 4 | 16 | 6 | 60 | 8 | 140,00 |
| 29 1761 0500 18 | • 5 | 18 | 6 | 60 | 8 | 144,00 |
| 29 1761 0600 20 | • 6 | 20 | 6 | 60 | 8 | 147,00 |
| 29 1761 0600 25 | • 6 | 25 | 6 | 65 | 8 | 155,00 |
| 29 1761 0600 30 | • 6 | 30 | 6 | 75 | 8 | 160,00 |
| 29 1761 0600 50 | • 6 | 50 | 6 | 100 | 8 | 177,00 |
| 29 1761 0800 22 | • 8 | 22 | 8 | 63 | 8 | 175,00 |
| 29 1761 0800 32 | • 8 | 32 | 8 | 75 | 8 | 193,00 |
| 29 1761 0800 50 | • 8 | 50 | 8 | 100 | 8 | 213,00 |
| 29 1761 1000 32 | • 10 | 32 | 10 | 72 | 8 | 248,00 |
| 29 1761 1000 60 | • 10 | 60 | 10 | 120 | 8 | 277,00 |
| 29 1761 1200 32 | • 12 | 32 | 12 | 82 | 8 | 269,00 |
| 29 1761 1200 70 | • 12 | 70 | 12 | 120 | 8 | 341,00 |
| 29 1761 1600 36 | % 16 | 36 | 16 | 92 | 8 | 205,20 |
| 29 1761 1600 80 | % 16 | 80 | 16 | 150 | 8 | 277,80 |
| 29 1761 2000 45 | % 20 | 45 | 20 | 104 | 8 | 264,00 |
| 29 1761 2000 80 | % 20 | 80 | 20 | 150 | 8 | 358,20 |



| | |
|--------------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| | DIN 6535 Form HA |
| | |
| | HPC |
| | DCC031 impuls |
| | |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1269 | DXF/STEP |

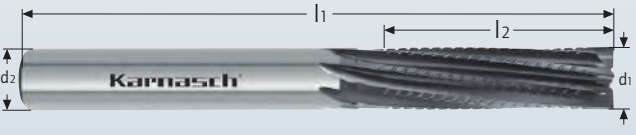
% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
 Special price / sale article. While stocks last.

29 1762

Vollhartmetall-Schrupp- und Schlichtfräser für CFK-GFK, 8 Frässchnneiden, 4 Stirnschnneiden / **ziehender Schnitt**
 Solid carbide roughing and finishing cutter for CFRP/GFRP, 8 milling blades 4 cutting edges / **drawing cut**

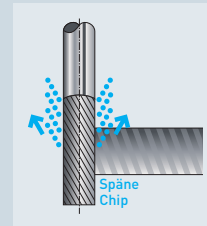


- COMPOSITES** GRAPHIT graphite
- CFK CFRP** **FR 4**
- PVDF GF25**
- GF GF25**
- PEEK GF30**
- PA66 GF30**
- POM GF25**
- PVDF GF30**
- Honey comb**



| | |
|-----------------------|---------------------|
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| d1* = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,070 |
| d1* = Ø 20,0 | tol -0,000 / -0,084 |

| Art. | d1* | l2 | d2 h6 | l1 | Z | € |
|-----------------|------|----|-------|-----|---|--------|
| 29 1762 0400 16 | • 4 | 16 | 6 | 60 | 8 | 140,00 |
| 29 1762 0500 18 | • 5 | 18 | 6 | 60 | 8 | 144,00 |
| 29 1762 0600 20 | • 6 | 20 | 6 | 60 | 8 | 147,00 |
| 29 1762 0600 25 | • 6 | 25 | 6 | 65 | 8 | 155,00 |
| 29 1762 0600 30 | • 6 | 30 | 6 | 75 | 8 | 160,00 |
| 29 1762 0600 50 | • 6 | 50 | 6 | 100 | 8 | 177,00 |
| 29 1762 0800 22 | • 8 | 22 | 8 | 63 | 8 | 175,00 |
| 29 1762 0800 32 | • 8 | 32 | 8 | 75 | 8 | 193,00 |
| 29 1762 0800 50 | • 8 | 50 | 8 | 100 | 8 | 213,00 |
| 29 1762 1000 32 | • 10 | 32 | 10 | 72 | 8 | 248,00 |
| 29 1762 1000 60 | • 10 | 60 | 10 | 120 | 8 | 277,00 |
| 29 1762 1200 32 | • 12 | 32 | 12 | 82 | 8 | 269,00 |
| 29 1762 1200 70 | • 12 | 70 | 12 | 120 | 8 | 341,00 |
| 29 1762 1600 36 | % 16 | 36 | 16 | 92 | 8 | 205,20 |
| 29 1762 1600 80 | % 16 | 80 | 16 | 150 | 8 | 277,80 |
| 29 1762 2000 45 | % 20 | 45 | 20 | 104 | 8 | 264,00 |
| 29 1762 2000 80 | % 20 | 80 | 20 | 150 | 8 | 358,20 |



| | |
|--------------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| | DIN 6535 Form HA |
| | |
| | HPC |
| | DCC031 impuls |
| | |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1269 | DXF/STEP |

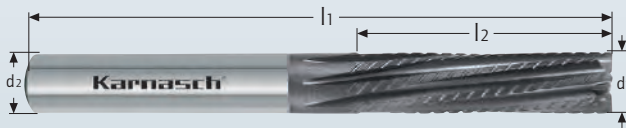
% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
 Special price / sale article. While stocks last.

Vollhartmetall-Schrupp- und Schlichtfräser für CFK-GFK, 8 Frässhneiden, 4 Stirnschnitten / **schiebender Schnitt**
 Solid carbide roughing and finishing cutter for CFRP-GFRP, 8 milling blades 4 cutting edges / **pushing cut**



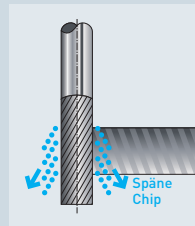
29 1763

- COMPO-SITES** GRAPHIT graphite
- CFK CFRP** **FR 4**
- PVDF GF25**
- GF GF25**
- PEEK GF30**
- PA66 GF30**
- POM GF25**
- PVDF GF30**
- Honey comb**



| | | |
|-----|-------------------|---------------------|
| d1* | = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,048 |
| d1* | = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,058 |
| d1* | = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,070 |
| d1* | = Ø 20,0 | tol -0,000 / -0,084 |

| Art. | d1* | l2 | d2 h6 | l1 | Z | € |
|-----------------|------|----|-------|-----|---|--------|
| 29 1763 0400 16 | • 4 | 16 | 6 | 60 | 8 | 140,00 |
| 29 1763 0500 18 | • 5 | 18 | 6 | 60 | 8 | 144,00 |
| 29 1763 0600 20 | • 6 | 20 | 6 | 60 | 8 | 147,00 |
| 29 1763 0600 25 | • 6 | 25 | 6 | 65 | 8 | 155,00 |
| 29 1763 0600 30 | • 6 | 30 | 6 | 75 | 8 | 160,00 |
| 29 1763 0600 50 | • 6 | 50 | 6 | 100 | 8 | 177,00 |
| 29 1763 0800 22 | • 8 | 22 | 8 | 63 | 8 | 175,00 |
| 29 1763 0800 32 | • 8 | 32 | 8 | 75 | 8 | 193,00 |
| 29 1763 0800 50 | • 8 | 50 | 8 | 100 | 8 | 213,00 |
| 29 1763 1000 32 | • 10 | 32 | 10 | 72 | 8 | 248,00 |
| 29 1763 1000 60 | • 10 | 60 | 10 | 120 | 8 | 277,00 |
| 29 1763 1200 32 | • 12 | 32 | 12 | 82 | 8 | 269,00 |
| 29 1763 1200 70 | • 12 | 70 | 12 | 120 | 8 | 341,00 |
| 29 1763 1600 36 | • 16 | 36 | 16 | 92 | 8 | 205,20 |
| 29 1763 1600 80 | • 16 | 80 | 16 | 150 | 8 | 277,80 |
| 29 1763 2000 45 | • 20 | 45 | 20 | 104 | 8 | 264,00 |
| 29 1763 2000 80 | • 20 | 80 | 20 | 150 | 8 | 358,20 |



| | |
|--------------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| | DIN 6535 Form HA |
| | |
| | HPC |
| | DCC031 impuls |
| | Air |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1269 | DXF/STEP |

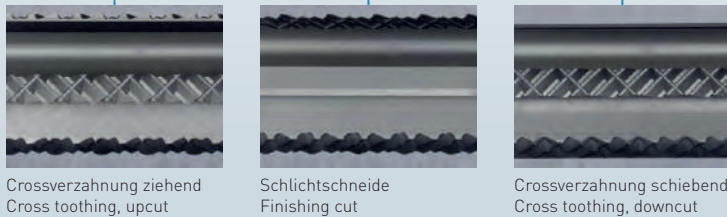
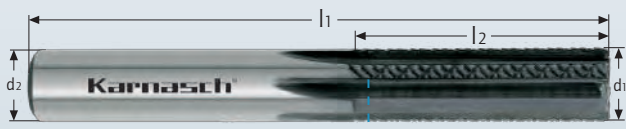
⚠ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
 Special price / sale article. While stocks last.

Diamantbeschichteter Composites Cross Finish Router
 Diamond coated Composites Cross Finish Router

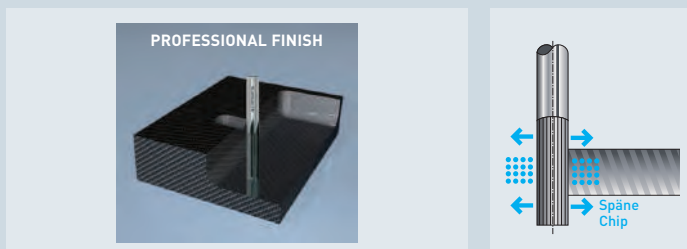


29 1771

- COMPO-SITES** GRAPHIT graphite
- CFK CFRP** **FR 4**
- PVDF GF25**
- GF GF25**
- PEEK GF30**
- PA66 GF30**
- POM GF25**
- PVDF GF30**



| Art. | d1 | f | l2 | d2 h5 | l1 | Z | € |
|-----------------|------|-----|----|-------|----|---|--------|
| 29 1771 0400 16 | • 4 | 0,1 | 16 | 6 | 57 | 4 | 129,00 |
| 29 1771 0600 22 | • 6 | 0,1 | 22 | 6 | 57 | 6 | 146,00 |
| 29 1771 0800 27 | • 8 | 0,2 | 27 | 8 | 63 | 6 | 188,00 |
| 29 1771 1000 30 | • 10 | 0,2 | 30 | 10 | 72 | 6 | 217,00 |



| | |
|--------------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| | DIN 6535 Form HA |
| | |
| | HPC |
| | DCA-06 PLUS |
| | Air |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1214 | DXF/STEP |

- 1
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- 4
- 5
- 6
- 7
- 8
- 9

Index

29 1783

Vollhartmetall-Router, Umfang- und Stirnfräser, rechtsschneidend, rechtsdrall, ziehender Schnitt
Solid carbide-router, circumference and head milling cutter, right-handed cutting, right-handed twist drawing cut



PA

Honey comb



| | | | |
|----------------------|---------------------|-----------------------|---------------------|
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,030 | d1* = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,043 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,036 | d1* = Ø 20,0 | tol -0,000 / -0,052 |

| Test | Reale Schnittdaten Real cutting data 29 1783 0600 19 |
|-------------------------|--|
| Werkstoff / Material | CFK n = 18.000 min ⁻¹ Vf = 1.800 mm/min |

| Test | Reale Schnittdaten Real cutting data 29 1783 0600 19 |
|-------------------------|--|
| Werkstoff / Material | Honeycomb n = 14.000 min ⁻¹ Vf = 3.000 mm/min |

| Art. | d1* | l2 | l1 | d2 h6 | € |
|-----------------|------|----|-----|-------|--------|
| 29 1783 0500 16 | 5,0 | 16 | 50 | 5 | 16,20 |
| 29 1783 0500 20 | 5,0 | 16 | 75 | 5 | 18,60 |
| 29 1783 0600 19 | 6,0 | 19 | 60 | 6 | 21,60 |
| 29 1783 1000 25 | 10,0 | 25 | 72 | 10 | 44,40 |
| 29 1783 1200 32 | 12,0 | 32 | 83 | 12 | 48,60 |
| 29 1783 2000 45 | 20,0 | 45 | 104 | 20 | 119,40 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| | |
|-------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| | DIN 6535 Form HA |
| | |
| | Composites |
| | POLIERT POLISHED |
| | |

Schnittdaten
Cutting data

1264

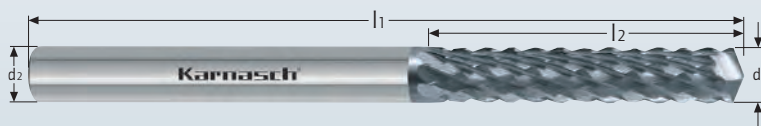
29 1784

Vollhartmetall-Router, Umfangfräser mit Bohrspitze, rechtsschneidend, rechtsdrall, ziehender Schnitt
Solid carbide-router circumference milling cutter with drill-point, right handed twist, drawing cut



COMPOSITES

PA



| | |
|-----------------------|---------------------|
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,030 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,036 |
| d1* = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,043 |
| d1* = Ø 20,0 | tol -0,000 / -0,052 |

| Art. | d1* | l2 | l1 | d2 h6 | € |
|-----------------|------|----|-----|-------|--------|
| 29 1784 0500 20 | 5,0 | 16 | 75 | 5 | 20,40 |
| 29 1784 0600 19 | 6,0 | 19 | 60 | 6 | 22,20 |
| 29 1784 0800 25 | 8,0 | 25 | 60 | 8 | 31,80 |
| 29 1784 1600 36 | 16,0 | 36 | 92 | 16 | 82,80 |
| 29 1784 2000 45 | 20,0 | 45 | 104 | 20 | 126,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| | |
|-------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| | DIN 6535 Form HA |
| | |
| | 135° |
| | Composites |
| | POLIERT POLISHED |
| | |

Schnittdaten
Cutting data

1264

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

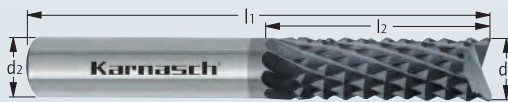
VHM-Carbonfräser, HSC
Carbon roughing end mills, HSC



29 1790A

29 1790C

| | | |
|----------------------------|--------------|----------------------|
| COMPO-SITES | PA66 GF30 | GF GF25 |
| GFK GFRP | PVDF GF30 | PVDF GF25 |
| CFK CFRP | PEEK GF30 | Aluminium > 6% Si |
| Aramid fiber AFK-SFK | PEEK CF30 | GRAPHIT graphite |



| | | |
|--|---------------------------------|----------------------------|
| COMPO-SITES | THERMO-PLAST THERMO-PLASTICS | Plexiglas acrylic glass |
| GFK GFRP | DURO-PLASTE DURO-PLASTICS | Acryl Acrylic |
| CFK CFRP | UREOL | PMMA GS |
| Kunststoff plastic | GMT | |
| CFK-ALU Composite CFRP-ALU Composites | Alu- minium | |



| | |
|----------------|---------------------------|
| MICRO GRAIN | KARNASCH NORM |
| DIACUT | Form HA |
| | |
| | |
| | HSC High-Speed-Cutting |
| | DCA-06 Polished |
| | Air |

Schnittdaten
Cutting data



DIAMANT
DIAMOND
DCA-06

POLIERT
POLISHED

29 1790 A

29 1790 C

| d1 | l2 | l1 | d2 h5 | Art. | € | Art. | € |
|------|------|----|-------|------|---|---------------|-------|
| 6,00 | 20,0 | 50 | 6 | - | - | 29 1790C 0600 | 23,40 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.
Nachfolgewerkzeug auf Seite 200 / Replacement article on page 200



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

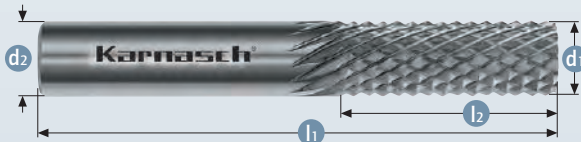
11 6001

11 6002

11 6003

11 6004

| COMPO-SITES | Schichtstoffe Laminates |
|---------------------------------------|-------------------------|
| GFK GFRP | Kevlar |
| CFK CFRP | AL/TI |
| Aramid fiber AFK-SFK | TI-CFK TI-CFRP |
| Hybridstoffe hybrid materials | GMT |
| CFK-ALU Composite CFRP-ALU Composites | SMC |



Toleranzen
Tolerances

d1
 Ø 1.6 mm, 2.4 mm
 = +0,00/-0,10
 Ø 3-12 mm
 = +0,00/-0,13

GFK, CFK

Für Kunststoffe, GFK, CFK, MMC

Routers for fiberglass, GFK, CFK

Schnittdaten
Cutting data



Film
Movie

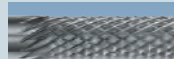


Diese Frässtifte sind geeignet zum Umrissfräsen, Besäumen, Nuten und Bohren der großen Bandbreite von Faserverstärkten Kunststoffen (Fiberglas, GFK, CFK). Weiterhin für MMC (Metal Matrix Composites = schwer zerspanbare abrasive Verbundstoffe wie z.B. Leiterplatten, Verbindungen wie Keramik mit Glasfaser, Graphit, Carbon.

Für CFK/GFK empfehlen wir unsere DCA-06 Diamantbeschichtung.

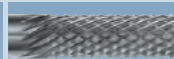
These routers are for contouring, grooving, drilling of a wide range of GFK, CFK, fiberglass reinforced plastics, as well as MMC (Metal Matrix Composites). MMC material such as printed circuit boards, composites such as ceramic with glass fiber, graphite, carbon etc.

We recommend for CFRP/GFRP our DCA-06 diamond coating.



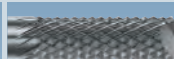
Ohne Stirnverzahnung

No end cut



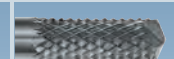
Mehrschneiden Stirnverzahnung

Burr end cut



Zweischneiden Stirnverzahnung

2-flute end mill cut



Bohrspitze 135°

Drill point 135°



| d1 | l2 | d2 | l1 | VHM solid | 11 6001 | | 11 6002 | | 11 6003 | | 11 6004 | |
|-------|-----|----|----|-----------|---------------|-------|-------------|-------|-------------|-------|---------------|-------|
| | | | | | Art. | € | Art. | € | Art. | € | Art. | € |
| • 1,6 | 5 | 3 | 38 | ✓ | % 11 6001 001 | 5,20 | 11 6002 001 | 11,30 | 11 6003 001 | 11,35 | 11 6004 001 | 12,05 |
| • 2,4 | 9,5 | 3 | 38 | ✓ | % 11 6001 003 | 5,50 | 11 6002 003 | 11,30 | 11 6003 003 | 12,25 | % 11 6004 003 | 7,20 |
| • 3 | 12 | 3 | 38 | ✓ | 11 6001 005 | 10,75 | 11 6002 005 | 11,40 | 11 6003 005 | 13,40 | 11 6004 005 | 13,40 |
| • 4 | 16 | 4 | 50 | ✓ | % 11 6001 010 | 8,30 | 11 6002 010 | 16,10 | 11 6003 010 | 18,00 | 11 6004 010 | 18,00 |
| • 4 | 16 | 6 | 50 | ✓ | % 11 6001 012 | 9,35 | 11 6002 012 | 19,25 | 11 6003 012 | 20,55 | 11 6004 012 | 21,40 |
| • 6 | 19 | 6 | 50 | ✓ | 11 6001 013 | 17,20 | 11 6002 013 | 19,25 | 11 6003 013 | 20,55 | 11 6004 013 | 21,40 |
| • 6 | 19 | 6 | 63 | ✓ | 11 6001 015 | 24,45 | 11 6002 015 | 26,90 | 11 6003 015 | 28,65 | 11 6004 015 | 28,65 |
| • 6 | 25 | 6 | 75 | ✓ | 11 6001 017 | 21,35 | 11 6002 017 | 23,20 | 11 6003 017 | 24,35 | 11 6004 017 | 25,15 |
| • 8 | 25 | 8 | 63 | ✓ | 11 6001 020 | 35,45 | 11 6002 020 | 37,40 | 11 6003 020 | 39,00 | 11 6004 020 | 39,00 |
| ○ 10 | 25 | 10 | 63 | ✓ | % 11 6001 025 | 25,05 | - | - | - | - | - | - |
| • 10 | 25 | 10 | 75 | ✓ | 11 6001 027 | 44,60 | 11 6002 027 | 48,40 | 11 6003 027 | 50,30 | 11 6004 027 | 52,25 |
| • 12 | 25 | 12 | 75 | ✓ | 11 6001 029 | 61,15 | 11 6002 029 | 67,30 | 11 6003 029 | 70,60 | 11 6004 029 | 73,85 |
| ○ 12 | 30 | 12 | 75 | ✓ | % 11 6001 030 | 35,80 | - | - | - | - | - | - |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

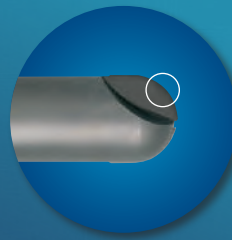
Die Schneide macht den Unterschied zwischen CVD, PKD Extreme und Diamantbeschichtung

29 6522

Ø 8,0 CVD-Schneide

CVD

Mit sehr scharfer Schneide, 99,9 % Diamant.
With a very sharp blade, 99.9 % Diamond.



Ø 8,0 CVD-Schneidkante
CVD-cutting edge

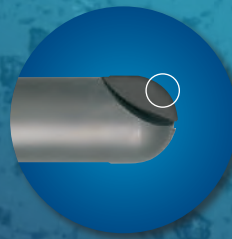
Objektiv Z 250 : 500x

30 6522

Ø 8,0 PKD-Schneide

PCD EXTREME

Poröse Struktur / scharfe Schneide.
Porous structure / sharp edge.



Ø 8,0 PKD Extreme-Schneidkante
PCD Extreme-cutting edge

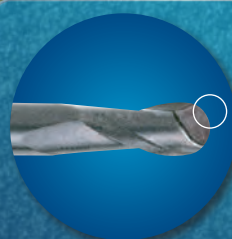
Objektiv Z 250 : 500x

30 6551

Ø 8,0 Diamantbeschichtung

DIAMOND COATED

Schneide ist verrundet.
Cutting edge is rounded.



Ø 8,0
Diamantbeschichtete Schneidkante
Diamond coated cutting edge

Objektiv Z 250 : 500x

1



2



3



4



5



6



7



8



9

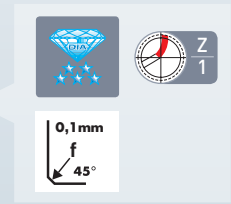
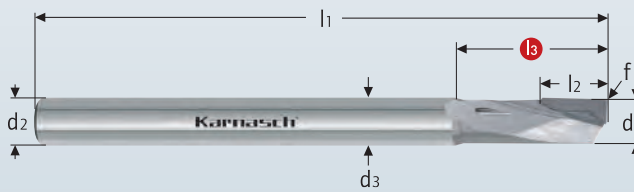


29 6510

CVD-Einzahnfräser, rechtsspirale – rechtsschneidend mit Innenkühlung
CVD one-tooth end mill, right spiral – right cutting with interior cooling



| | | |
|---|--|-------------------------|
| COMPOSITES | PE PP | Acryl Acrylic |
| GFK-CFK GFRP-CFRP | ZIRKONIUM ZIRCONIUM | |
| Aramid fiber AFK-SFK | GF GF25 | |
| Hybridstoffe hybrid materials | PVDF GF25 | |
| CFK-ALU Composite CFRP-ALU Composites | TITAN titanium | |
| Schichtstoffe Laminates | TITAN titanium < 1200 N/mm ² | |
| PA66 GF30 | Aluminium > 6% Si | |
| PVDF GF30 | MESSING brass | |
| PA | Kupfer copper | |



| | |
|---------------------------|------------------------------------|
| CVD | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | 99,9% Diamant Diamond |
| | |

| Art. | d1 h7 | f | l3 | l2 | d2 h6 | d3 | l1 | € |
|-----------------|-------|-----|----|----|-------|------|----|--------|
| 29 6510 0600 08 | 6,0 | 0,1 | 18 | 8 | 6 | 5,5 | 80 | 250,20 |
| 29 6510 0800 12 | 8,0 | 0,1 | 25 | 12 | 8 | 7,5 | 80 | 289,80 |
| 29 6510 1000 16 | 10,0 | 0,1 | 30 | 16 | 10 | 9,5 | 80 | 409,20 |
| 29 6510 1200 20 | 12,0 | 0,1 | 33 | 20 | 12 | 11,5 | 80 | 468,60 |

⚠ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Schnittdaten
Cutting data

Zeichnungen
Drawings

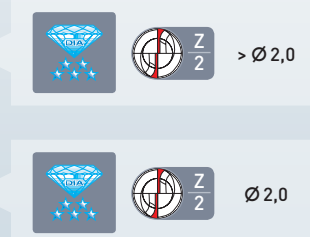
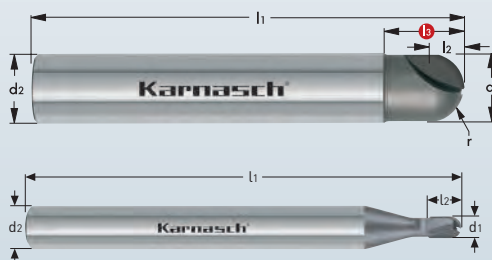


29 6521

CVD-3D-Radiusfräser mit Kugelstirn, extra kurz
CVD-3D-ball milling cutter, extra short high-speed-cutting



| | | |
|---|--|---|
| COMPOSITES | E.MAX FOR CAD/CAM TECHNOLOGY | KUNSTSTOFF-GRAPHIT plastic-graphite |
| GFK-CFK GFRP-CFRP | GF GF25 | Ampco |
| Aramid fiber AFK-SFK | PVDF GF25 | |
| Hybridstoffe hybrid materials | TITAN titanium | |
| CFK-ALU Composite CFRP-ALU Composites | TITAN titanium < 1200 N/mm ² | |
| Schichtstoffe Laminates | Aluminium > 6% Si | |
| PA66 GF30 | MESSING brass | |
| PVDF GF30 | Kupfer copper | |
| ZIRKONIUM ZIRCONIUM | STAHL-GRAPHIT steel-graphite | |



| | |
|---------------------------|------------------------------------|
| CVD | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | 99,9% Diamant Diamond |
| | |

| Art. | d1 h7 | r ± 0,005 | l3 | d2 h6 | l1 | l2 | Z | € |
|-----------------|-------|-----------|----|-------|----|-----|---|--------|
| 29 6521 0200 04 | 2 | 1,0 | - | 4 | 50 | 2,5 | 2 | 134,40 |
| 29 6521 0200 06 | 2 | 1,0 | - | 6 | 50 | 2,5 | 2 | 134,40 |
| 29 6521 0300 04 | 3 | 1,5 | - | 4 | 50 | 2,5 | 2 | 136,20 |
| 29 6521 0300 06 | 3 | 1,5 | - | 6 | 50 | 2,5 | 2 | 136,20 |
| 29 6521 0300 10 | 3 | 1,5 | 10 | 6 | 50 | 2,5 | 2 | 136,20 |
| 29 6521 0400 06 | 4 | 2,0 | - | 6 | 50 | 2,5 | 2 | 128,40 |
| 29 6521 0500 06 | 5 | 2,5 | - | 6 | 50 | 3,0 | 2 | 134,40 |
| 29 6521 0600 06 | 6 | 3,0 | - | 6 | 50 | 6,0 | 2 | 168,60 |
| 29 6521 0800 08 | 8 | 4,0 | - | 8 | 60 | 7,0 | 2 | 197,40 |
| 29 6521 1000 10 | 10 | 5,0 | - | 10 | 60 | 8,0 | 2 | 235,80 |
| 29 6521 1200 12 | 12 | 6,0 | - | 12 | 65 | 9,0 | 2 | 272,40 |

⚠ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Schnittdaten
Cutting data

Zeichnungen
Drawings

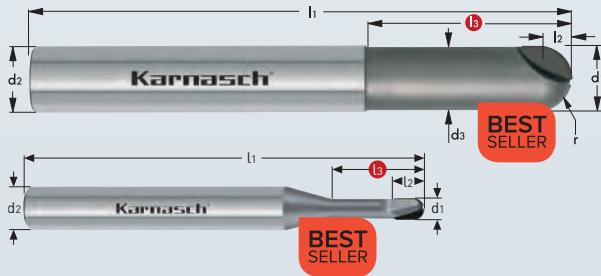


CVD-3D-Radiusfräser mit Kugelstirn
CVD-3D-ball milling cutter



29 6522

| | |
|--|--|
| COMPO-SITES | GF GF25 |
| GFK-CFK GFRP-CFRP | PVDF GF25 |
| Aramid fiber AFK-SFK | TITAN titanium |
| Hybrid-stoffe hybrid materials | TITAN titanium < 1200 N/mm² |
| CFK-ALU Composite CFRP-ALU Composites | Aluminium > 6% Si |
| Schicht-stoffe Laminates | MESSING brass |
| PA66 GF30 | Kupfer copper |
| PVDF GF30 | STAHL-GRAPHIT steel-graphite |
| ZIRKONIUM ZIRCONIUM | KUNSTSTOFF-GRAPHIT plastic-graphite |
| E.MAX FOR CAD/CAM TECHNOLOGY | Ampco |
| FR 4 | |



| | |
|----------------------|---------------------|
| d1* = Ø 3,0 | tol -0,000 / -0,010 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,012 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,015 |
| d1* = Ø 12,0 | tol -0,000 / -0,018 |

Bestseller – preisreduziert · Bestseller – price reduced

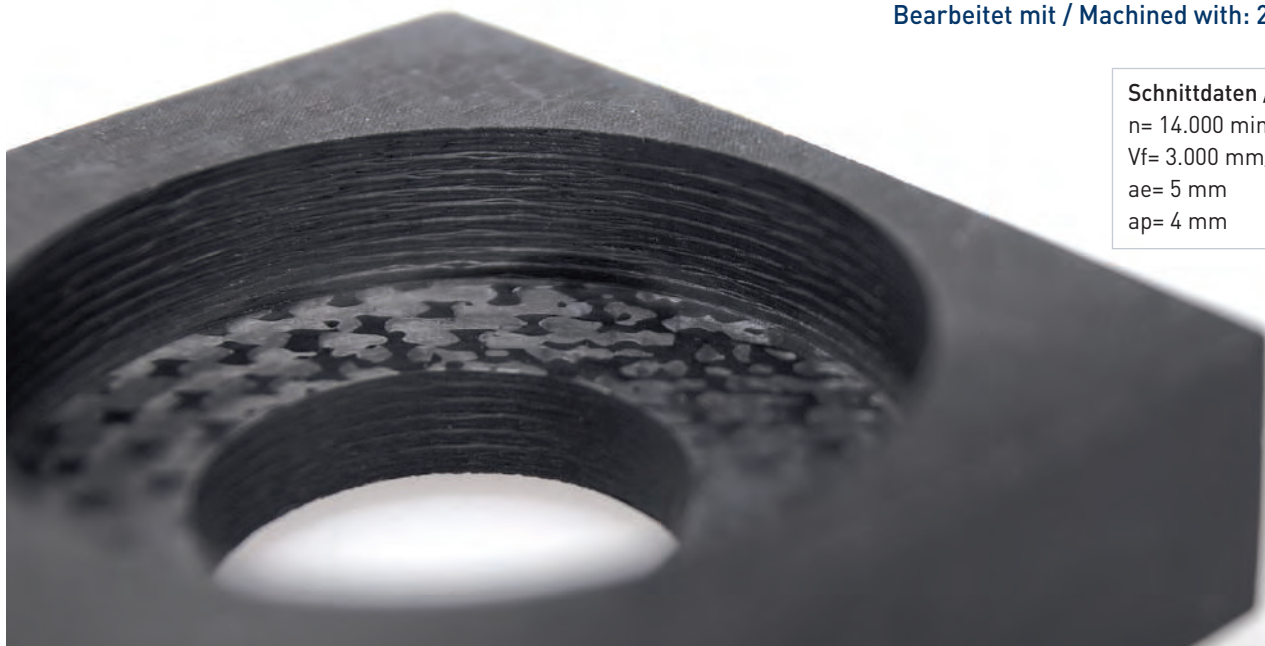
| Art. | d1* | r ± 0,005 | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|--------------------|------|-----------|----|-------|------|-----|-----|---|--------|
| 29 6522 0200 06 04 | • 2 | 1,0 | 6 | 4 | 1,92 | 50 | 2,5 | 2 | 203,00 |
| 29 6522 0200 08 04 | • 2 | 1,0 | 8 | 4 | 1,92 | 50 | 2,5 | 2 | 203,00 |
| 29 6522 0200 10 04 | • 2 | 1,0 | 10 | 4 | 1,92 | 50 | 2,5 | 2 | 203,00 |
| 29 6522 0200 06 06 | • 2 | 1,0 | 6 | 6 | 1,92 | 50 | 2,5 | 2 | 203,00 |
| 29 6522 0200 08 06 | • 2 | 1,0 | 8 | 6 | 1,92 | 50 | 2,5 | 2 | 203,00 |
| 29 6522 0200 10 06 | • 2 | 1,0 | 10 | 6 | 1,92 | 50 | 2,5 | 2 | 203,00 |
| 29 6522 0200 12 06 | • 2 | 1,0 | 12 | 6 | 1,92 | 50 | 2,5 | 2 | 203,00 |
| 29 6522 0300 06 04 | • 3 | 1,5 | 6 | 4 | 2,8 | 50 | 2,5 | 2 | 218,00 |
| 29 6522 0300 08 04 | • 3 | 1,5 | 8 | 4 | 2,8 | 50 | 2,5 | 2 | 218,00 |
| 29 6522 0300 10 04 | • 3 | 1,5 | 10 | 4 | 2,8 | 50 | 2,5 | 2 | 218,00 |
| 29 6522 0300 10 06 | • 3 | 1,5 | 10 | 6 | 2,8 | 75 | 2,5 | 2 | 218,00 |
| 29 6522 0300 15 06 | • 3 | 1,5 | 15 | 6 | 2,8 | 75 | 2,5 | 2 | 218,00 |
| 29 6522 0300 20 06 | • 3 | 1,5 | 20 | 6 | 2,8 | 75 | 2,5 | 2 | 218,00 |
| 29 6522 0400 10 06 | • 4 | 2,0 | 10 | 6 | 3,8 | 75 | 2,5 | 2 | 226,00 |
| 29 6522 0400 20 06 | • 4 | 2,0 | 20 | 6 | 3,8 | 75 | 2,5 | 2 | 226,00 |
| 29 6522 0400 30 06 | • 4 | 2,0 | 30 | 6 | 3,8 | 75 | 2,5 | 2 | 226,00 |
| 29 6522 0500 15 06 | • 5 | 2,5 | 15 | 6 | 4,6 | 75 | 3,0 | 2 | 232,00 |
| 29 6522 0500 25 06 | • 5 | 2,5 | 25 | 6 | 4,6 | 75 | 3,0 | 2 | 232,00 |
| 29 6522 0500 35 06 | • 5 | 2,5 | 35 | 6 | 4,6 | 75 | 3,0 | 2 | 232,00 |
| 29 6522 0600 20 06 | • 6 | 3,0 | 20 | 6 | 5,6 | 100 | 6,0 | 2 | 302,00 |
| 29 6522 0600 30 06 | • 6 | 3,0 | 30 | 6 | 5,6 | 100 | 6,0 | 2 | 302,00 |
| 29 6522 0600 40 06 | • 6 | 3,0 | 40 | 6 | 5,6 | 100 | 6,0 | 2 | 302,00 |
| 29 6522 0800 25 08 | • 8 | 4,0 | 25 | 8 | 7,4 | 100 | 7,0 | 2 | 377,00 |
| 29 6522 0800 40 08 | • 8 | 4,0 | 40 | 8 | 7,4 | 100 | 7,0 | 2 | 377,00 |
| 29 6522 1000 30 10 | • 10 | 5,0 | 30 | 10 | 9,6 | 100 | 8,0 | 2 | 428,00 |
| 29 6522 1000 50 10 | • 10 | 5,0 | 50 | 10 | 9,6 | 100 | 8,0 | 2 | 428,00 |
| 29 6522 1200 35 12 | • 12 | 6,0 | 35 | 12 | 11,6 | 105 | 9,0 | 2 | 504,00 |
| 29 6522 1200 60 12 | • 12 | 6,0 | 60 | 12 | 11,6 | 105 | 9,0 | 2 | 504,00 |

| | |
|----------------|-------------------------------|
| CVD | KARNASCH NORM |
| SPEZIAL | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | 99,9% Diamant Diamond |
| | |

Schnittdaten
Cutting data



Zeichnungen
Drawings



Material: CFK / CFRP
Bearbeitet mit / Machined with: 29 0526 Ø8,0x20

Schnittdaten / Cutting data:

n= 14.000 min⁻¹
Vf= 3.000 mm/min
ae= 5 mm
ap= 4 mm

Film
Movie



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

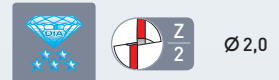
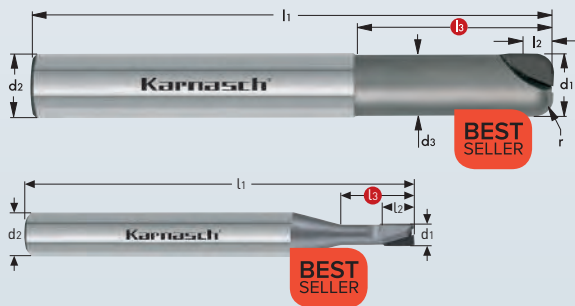
Index

29 6523

CVD-Schaftfräser mit Eckenradius
CVD-end mill with corner radius



| | |
|---|--|
| COMPOSITES | GF GF25 |
| GFK-CFK GFRP-CFRP | PVDF GF25 |
| Aramid fiber AFK-SFK | TITAN titanium |
| Hybridstoffe hybrid materials | TITAN titanium < 1200 N/mm ² |
| CFK-ALU Composite CFRP-ALU Composites | Aluminium > 6% Si |
| Schichtstoffe Laminates | MESSING brass |
| PA66 GF30 | Kupfer copper |
| PVDF GF30 | STAHL-GRAPHIT steel-graphite |
| ZIRKONIUM ZIRKONIUM | KUNSTSTOFF-GRAPHIT plastic-graphite |
| E.MAX FOR CAD/CAM TECHNOLOGY | Ampco |
| FR 4 | |



| | |
|----------------------|---------------------|
| d1* = Ø ≤ 3,0 | tol -0,000 / -0,010 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,012 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,015 |
| d1* = Ø 12,0 | tol -0,000 / -0,018 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1* | r ± 0,005 | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|---------------------|------|-----------|----|-------|------|-----|-----|---|--------|
| 29 6523 0200 020 04 | • 2 | 0,2 | 4 | 4 | 1,92 | 50 | 2,5 | 2 | 203,00 |
| 29 6523 0200 020 06 | • 2 | 0,2 | 6 | 4 | 1,92 | 50 | 2,5 | 2 | 203,00 |
| 29 6523 0200 020 08 | • 2 | 0,2 | 8 | 4 | 1,92 | 50 | 2,5 | 2 | 203,00 |
| 29 6523 0200 020 10 | • 2 | 0,2 | 10 | 4 | 1,92 | 50 | 2,5 | 2 | 203,00 |
| 29 6523 0300 030 10 | • 3 | 0,3 | 10 | 6 | 2,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6523 0300 030 15 | • 3 | 0,3 | 15 | 6 | 2,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6523 0300 030 20 | • 3 | 0,3 | 20 | 6 | 2,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6523 0300 050 10 | • 3 | 0,5 | 10 | 6 | 2,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6523 0300 050 15 | • 3 | 0,5 | 15 | 6 | 2,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6523 0300 050 20 | • 3 | 0,5 | 20 | 6 | 2,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6523 0400 030 10 | • 4 | 0,3 | 10 | 6 | 3,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6523 0400 030 20 | • 4 | 0,3 | 20 | 6 | 3,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6523 0400 030 30 | • 4 | 0,3 | 30 | 6 | 3,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6523 0400 050 10 | • 4 | 0,5 | 10 | 6 | 3,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6523 0400 050 20 | • 4 | 0,5 | 20 | 6 | 3,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6523 0400 050 30 | • 4 | 0,5 | 30 | 6 | 3,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6523 0500 030 15 | • 5 | 0,3 | 15 | 6 | 4,6 | 75 | 3,0 | 2 | 240,00 |
| 29 6523 0500 030 25 | • 5 | 0,3 | 25 | 6 | 4,6 | 75 | 3,0 | 2 | 240,00 |
| 29 6523 0500 030 35 | • 5 | 0,3 | 35 | 6 | 4,6 | 75 | 3,0 | 2 | 240,00 |
| 29 6523 0500 050 15 | • 5 | 0,5 | 15 | 6 | 4,6 | 75 | 3,0 | 2 | 240,00 |
| 29 6523 0500 050 25 | • 5 | 0,5 | 25 | 6 | 4,6 | 75 | 3,0 | 2 | 240,00 |
| 29 6523 0500 050 35 | • 5 | 0,5 | 35 | 6 | 4,6 | 75 | 3,0 | 2 | 240,00 |
| 29 6523 0600 030 20 | • 6 | 0,3 | 20 | 6 | 5,6 | 100 | 6,0 | 2 | 302,00 |
| 29 6523 0600 030 30 | • 6 | 0,3 | 30 | 6 | 5,6 | 100 | 6,0 | 2 | 302,00 |
| 29 6523 0600 030 40 | • 6 | 0,3 | 40 | 6 | 5,6 | 100 | 6,0 | 2 | 302,00 |
| 29 6523 0600 050 20 | • 6 | 0,5 | 20 | 6 | 5,6 | 100 | 6,0 | 2 | 302,00 |
| 29 6523 0600 050 30 | • 6 | 0,5 | 30 | 6 | 5,6 | 100 | 6,0 | 2 | 302,00 |
| 29 6523 0600 050 40 | • 6 | 0,5 | 40 | 6 | 5,6 | 100 | 6,0 | 2 | 302,00 |
| 29 6523 0600 100 20 | • 6 | 1,0 | 20 | 6 | 5,6 | 100 | 6,0 | 2 | 302,00 |
| 29 6523 0600 100 30 | • 6 | 1,0 | 30 | 6 | 5,6 | 100 | 6,0 | 2 | 302,00 |
| 29 6523 0600 100 40 | • 6 | 1,0 | 40 | 6 | 5,6 | 100 | 6,0 | 2 | 302,00 |
| 29 6523 0800 030 25 | • 8 | 0,3 | 25 | 8 | 7,6 | 100 | 7,0 | 2 | 377,00 |
| 29 6523 0800 030 40 | • 8 | 0,3 | 40 | 8 | 7,6 | 100 | 7,0 | 2 | 377,00 |
| 29 6523 0800 050 25 | • 8 | 0,5 | 25 | 8 | 7,6 | 100 | 7,0 | 2 | 377,00 |
| 29 6523 0800 050 40 | • 8 | 0,5 | 40 | 8 | 7,6 | 100 | 7,0 | 2 | 377,00 |
| 29 6523 0800 100 25 | • 8 | 1,0 | 25 | 8 | 7,6 | 100 | 7,0 | 2 | 377,00 |
| 29 6523 0800 100 40 | • 8 | 1,0 | 40 | 8 | 7,6 | 100 | 7,0 | 2 | 377,00 |
| 29 6523 1000 050 30 | • 10 | 0,5 | 30 | 10 | 9,6 | 100 | 8,0 | 2 | 428,00 |
| 29 6523 1000 050 50 | • 10 | 0,5 | 50 | 10 | 9,6 | 100 | 8,0 | 2 | 428,00 |
| 29 6523 1000 100 30 | • 10 | 1,0 | 30 | 10 | 9,6 | 100 | 8,0 | 2 | 428,00 |
| 29 6523 1000 100 50 | • 10 | 1,0 | 50 | 10 | 9,6 | 100 | 8,0 | 2 | 428,00 |
| 29 6523 1200 050 35 | • 12 | 0,5 | 35 | 12 | 11,6 | 105 | 9,0 | 2 | 504,00 |
| 29 6523 1200 050 60 | • 12 | 0,5 | 60 | 12 | 11,6 | 105 | 9,0 | 2 | 504,00 |
| 29 6523 1200 100 35 | • 12 | 1,0 | 35 | 12 | 11,6 | 105 | 9,0 | 2 | 504,00 |
| 29 6523 1200 100 60 | • 12 | 1,0 | 60 | 12 | 11,6 | 105 | 9,0 | 2 | 504,00 |

| | |
|----------------------------------|------------------------------------|
| CVD | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| HSC High-Speed-Cutting | 99,9% Diamant Diamond |
| | |

Schnittdaten Cutting data

Zeichnungen Drawings

1264

DXF/STEP

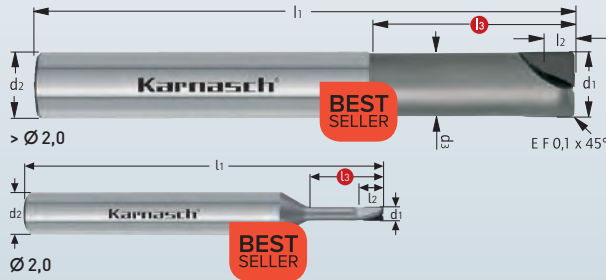
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

CVD-Schaftfräser, zylindrisch
CVD-end mills



29 6524

| | | |
|--|--|--|
| COMPO-SITES | E.MAX FOR CAD/CAM TECHNOLOGY | KUNSTSTOFF- GRAPHIT plastic-graphite |
| GFK-CFK GFRP-CFRP | GF GF25 | Ampco |
| Aramid fiber AFK-SFK | PVDF GF25 | FR 4 |
| Hybrid- stoffe hybrid materials | TITAN titanium | |
| CFK-ALU Composite CFRP-ALU Composites | TITAN titanium < 1200 N/mm ² | |
| Schicht- stoffe Laminates | Aluminium > 6% Si | |
| PA66 GF30 | MESSING brass | |
| PVDF GF30 | Kupfer copper | |
| ZIRKONIUM ZIRCONIUM | STAHL- GRAPHIT steel-graphite | |



| | |
|---------------------------|--------------------------------------|
| CVD | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | 45° x 0,1 |
| | HSC High-Speed- Cutting |
| | 99,9% Diamant Diamond |
| | DXF/STEP |

| | | | |
|---------------------|---------------------|-----------------------|---------------------|
| d1* = Ø ≤ 3,0 | tol -0,000 / -0,010 | d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,015 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,012 | d1* = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,018 |

Bestseller - preisreduziert · Bestseller - price reduced

| Art. | d1* | f ±0,02 | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|-----------------|------|---------|----|-------|------|-----|-----|---|--------|
| 29 6524 0200 04 | • 2 | 0,1 | 4 | 4 | 1,92 | 50 | 2,5 | 2 | 203,00 |
| 29 6524 0200 06 | • 2 | 0,1 | 6 | 4 | 1,92 | 50 | 2,5 | 2 | 203,00 |
| 29 6524 0200 08 | • 2 | 0,1 | 8 | 4 | 1,92 | 50 | 2,5 | 2 | 203,00 |
| 29 6524 0200 10 | • 2 | 0,1 | 10 | 4 | 1,92 | 50 | 2,5 | 2 | 203,00 |
| 29 6524 0300 10 | • 3 | 0,1 | 10 | 6 | 2,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6524 0300 15 | • 3 | 0,1 | 15 | 6 | 2,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6524 0300 20 | • 3 | 0,1 | 20 | 6 | 2,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6524 0400 10 | • 4 | 0,1 | 10 | 6 | 3,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6524 0400 20 | • 4 | 0,1 | 20 | 6 | 3,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6524 0400 30 | • 4 | 0,1 | 30 | 6 | 3,8 | 75 | 2,5 | 2 | 227,00 |
| 29 6524 0500 15 | • 5 | 0,1 | 15 | 6 | 4,6 | 75 | 3,0 | 2 | 240,00 |
| 29 6524 0500 25 | • 5 | 0,1 | 25 | 6 | 4,6 | 75 | 3,0 | 2 | 240,00 |
| 29 6524 0500 35 | • 5 | 0,1 | 35 | 6 | 4,6 | 75 | 3,0 | 2 | 240,00 |
| 29 6524 0600 20 | • 6 | 0,1 | 20 | 6 | 5,6 | 100 | 6,0 | 2 | 302,00 |
| 29 6524 0600 30 | • 6 | 0,1 | 30 | 6 | 5,6 | 100 | 6,0 | 2 | 302,00 |
| 29 6524 0600 40 | • 6 | 0,1 | 40 | 6 | 5,6 | 100 | 6,0 | 2 | 302,00 |
| 29 6524 0800 25 | • 8 | 0,1 | 25 | 8 | 7,4 | 100 | 7,0 | 2 | 377,00 |
| 29 6524 0800 40 | • 8 | 0,1 | 40 | 8 | 7,4 | 100 | 7,0 | 2 | 377,00 |
| 29 6524 1000 30 | • 10 | 0,1 | 30 | 10 | 9,6 | 100 | 8,0 | 2 | 428,00 |
| 29 6524 1000 50 | • 10 | 0,1 | 50 | 10 | 9,6 | 100 | 8,0 | 2 | 428,00 |
| 29 6524 1200 35 | • 12 | 0,1 | 35 | 12 | 11,6 | 105 | 9,0 | 2 | 504,00 |
| 29 6524 1200 60 | • 12 | 0,1 | 60 | 12 | 11,6 | 105 | 9,0 | 2 | 504,00 |



Zeichnungen
Drawings



Schnittdaten
Cutting data

| | |
|----------|------|
| i | 1264 |
|----------|------|

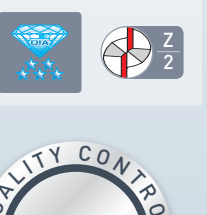
| | |
|---------------------------------|---|
| Test | Reale Schnittdaten Real cutting data 29 6524 Ø2,0x4 |
| Werkstoff / Material | VHM-G55 / Solid carbide G55 Finishen / Finishing n = 5.000 min ⁻¹ fz = 0,04 mm ae = 2 mm ap = 0,01 mm |

CVD-Schaftfräser, extra kurz
CVD-end mills



29 6525

| | | |
|--|--|--|
| COMPO-SITES | E.MAX FOR CAD/CAM TECHNOLOGY | KUNSTSTOFF- GRAPHIT plastic-graphite |
| GFK-CFK GFRP-CFRP | GF GF25 | Ampco |
| Aramid fiber AFK-SFK | PVDF GF25 | FR 4 |
| Hybrid- stoffe hybrid materials | TITAN titanium | |
| CFK-ALU Composite CFRP-ALU Composites | TITAN titanium < 1200 N/mm ² | |
| Schicht- stoffe Laminates | Aluminium > 6% Si | |
| PA66 GF30 | MESSING brass | |
| PVDF GF30 | Kupfer copper | |
| ZIRKONIUM ZIRCONIUM | STAHL- GRAPHIT steel-graphite | |



| | |
|---------------------------|--------------------------------------|
| CVD | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | 45° x 0,1 |
| | HSC High-Speed- Cutting |
| | 99,9% Diamant Diamond |
| | DXF/STEP |

| | |
|-----------------------|---------------------|
| d1* = Ø ≤ 3,0 | tol -0,000 / -0,010 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,012 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,015 |
| d1* = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,018 |

Bestseller - preisreduziert · Bestseller - price reduced

| Art. | d1* | f ±0,02 | l2 | d2 h6 | l1 | Z | € |
|-----------------|------|---------|----|-------|----|---|----------|
| 29 6525 0300 05 | • 3 | 0,1 | 5 | 6 | 50 | 2 | 235,00 |
| 29 6525 0400 10 | • 4 | 0,1 | 10 | 6 | 50 | 2 | 294,00 |
| 29 6525 0500 10 | • 5 | 0,1 | 10 | 6 | 50 | 2 | 341,00 |
| 29 6525 0500 20 | • 5 | 0,1 | 20 | 6 | 60 | 2 | 522,00 |
| 29 6525 0600 10 | • 6 | 0,1 | 10 | 6 | 50 | 2 | 364,00 |
| 29 6525 0600 20 | • 6 | 0,1 | 20 | 6 | 60 | 2 | 560,00 |
| 29 6525 0800 10 | • 8 | 0,1 | 10 | 8 | 50 | 2 | 446,00 |
| 29 6525 0800 20 | • 8 | 0,1 | 20 | 8 | 60 | 2 | 677,00 |
| 29 6525 1000 10 | • 10 | 0,1 | 10 | 10 | 55 | 2 | 522,00 |
| 29 6525 1000 20 | • 10 | 0,1 | 20 | 10 | 65 | 2 | 789,00 |
| 29 6525 1200 10 | • 12 | 0,1 | 10 | 12 | 60 | 2 | 574,00 |
| 29 6525 1200 20 | • 12 | 0,1 | 20 | 12 | 70 | 2 | 911,00 |
| 29 6525 1600 10 | • 16 | 0,1 | 10 | 16 | 65 | 2 | 636,00 |
| 29 6525 1600 20 | • 16 | 0,1 | 20 | 16 | 75 | 2 | 1.034,00 |



Schnittdaten
Cutting data

| | |
|----------|------|
| i | 1264 |
|----------|------|

Zeichnungen
Drawings

| | |
|--|-----------------|
| | DXF/STEP |
|--|-----------------|

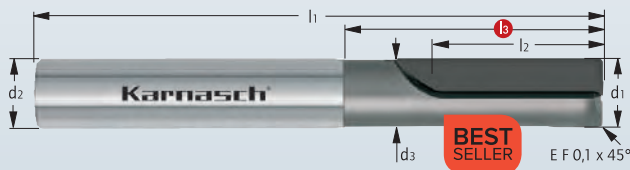


29 6526

CVD-Schaftfräser
CVD-end mills



| | | |
|---|---|--|
| COMPOSITES | E.MAX FOR CAD/CAM TECHNOLOGY | KUNSTSTOFF-GRAPHIT plastic-graphite |
| GFK-CFK GFRP-CFRP | GF GF25 | Ampco |
| Aramid fiber AFK-SFK | PVDF GF25 | FR 4 |
| Hybridstoffe hybrid materials | TITAN titanium | |
| CFK-ALU Composite CFRP-ALU Composites | TITAN titanium < 1200 N/mm ² | |
| Schichtstoffe Laminates | Aluminium > 6% Si | |
| PA66 GF30 | MESSING brass | |
| PVDF GF30 | Kupfer copper | |
| ZIRKONIUM ZIRCONIUM | STAHL-GRAPHIT steel-graphite | |



Zeichnungen
Drawings



| | | |
|-----|-------------------|---------------------|
| d1* | = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,012 |
| d1* | = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,015 |
| d1* | = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,018 |

Bestseller - preisreduziert · Bestseller - price reduced

| Art. | d1* | f ±0,02 | l2 | l3 | d2 h6 | d3 | l1 | Z | € |
|-----------------|------|---------|----|----|-------|------|-----|---|----------|
| 29 6526 0400 08 | • 4 | 0,1 | 8 | 10 | 6 | 3,9 | 50 | 2 | 292,00 |
| 29 6526 0400 15 | • 4 | 0,1 | 15 | 20 | 6 | 3,9 | 50 | 2 | 420,00 |
| 29 6526 0600 10 | • 6 | 0,1 | 10 | 15 | 6 | 5,8 | 65 | 2 | 364,00 |
| 29 6526 0600 15 | • 6 | 0,1 | 15 | 20 | 6 | 5,8 | 65 | 2 | 485,00 |
| 29 6526 0600 20 | • 6 | 0,1 | 20 | 25 | 6 | 5,8 | 65 | 2 | 515,00 |
| 29 6526 0800 10 | • 8 | 0,1 | 10 | 15 | 8 | 7,6 | 70 | 2 | 446,00 |
| 29 6526 0800 15 | • 8 | 0,1 | 15 | 20 | 8 | 7,6 | 70 | 2 | 574,00 |
| 29 6526 0800 20 | • 8 | 0,1 | 20 | 30 | 8 | 7,6 | 70 | 2 | 623,00 |
| 29 6526 1000 10 | • 10 | 0,1 | 10 | 15 | 10 | 9,6 | 85 | 2 | 522,00 |
| 29 6526 1000 15 | • 10 | 0,1 | 15 | 20 | 10 | 9,6 | 85 | 2 | 700,00 |
| 29 6526 1000 20 | • 10 | 0,1 | 20 | 30 | 10 | 9,6 | 85 | 2 | 789,00 |
| 29 6526 1200 10 | • 12 | 0,1 | 10 | 15 | 12 | 11,8 | 92 | 2 | 574,00 |
| 29 6526 1200 15 | • 12 | 0,1 | 15 | 20 | 12 | 11,8 | 92 | 2 | 779,00 |
| 29 6526 1200 20 | • 12 | 0,1 | 20 | 30 | 12 | 11,8 | 92 | 2 | 911,00 |
| 29 6526 1600 10 | • 16 | 0,1 | 10 | 30 | 16 | 15,8 | 92 | 2 | 636,00 |
| 29 6526 1600 15 | • 16 | 0,1 | 15 | 35 | 16 | 15,8 | 92 | 2 | 835,00 |
| 29 6526 1600 20 | • 16 | 0,1 | 20 | 40 | 16 | 15,8 | 102 | 2 | 1.034,00 |

CVD KARNASCH NORM

SPEZIAL DIN 6535 Form HA

HSC High-Speed-Cutting

99,9% Diamant Diamond

Schnittdaten Cutting data

Film Movie

1264

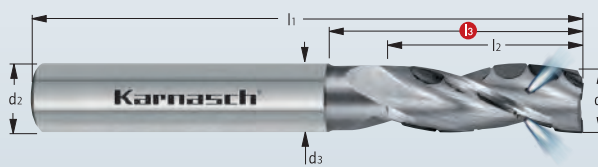
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29 6553

CVD-Igelfräser-UGT, Ungleichspirale mit Innenkühlung
CVD-spiked milling cutter - unequally split, non-symmetrical spirals with interior cooling



| | | |
|---|---|---------------------------|
| COMPOSITES | ZIRKONIUM ZIRCONIUM | lang-spanend long chip |
| GFK-CFK GFRP-CFRP | GF GF25 | Ampco |
| Aramid fiber AFK-SFK | TITAN titanium < 1200 N/mm ² | |
| Hybridstoffe hybrid materials | TITAN titanium | |
| CFK-ALU Composite CFRP-ALU Composites | GRAPHIT graphite | |
| Schichtstoffe Laminates | Aluminium > 6% Si | |
| PA66 GF30 | MESSING brass | |
| PVDF GF30 | Kupfer copper | |
| NIMONIC 105 | kurz-spanend short chip | |



| | | |
|-----|-------------------|---------------------|
| d1* | = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,022 |
| d1* | = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,027 |
| d1* | = Ø 20,0 | tol -0,000 / -0,033 |

| Art. | d1* | rp | l2 | l3 | d2 h6 | d3 | l1 | Z | € |
|---------------------|------|-----|----|----|-------|------|-----|---|----------|
| 29 6553 0800 020 15 | • 8 | 0,2 | 15 | 30 | 8 | 7,4 | 70 | 3 | 638,40 |
| 29 6553 0800 020 25 | • 8 | 0,2 | 25 | 40 | 8 | 7,4 | 80 | 3 | 815,40 |
| 29 6553 1000 020 20 | • 10 | 0,2 | 20 | 35 | 10 | 9,4 | 80 | 3 | 774,60 |
| 29 6553 1000 020 30 | • 10 | 0,2 | 30 | 45 | 10 | 9,4 | 85 | 3 | 979,80 |
| 29 6553 1200 020 20 | • 12 | 0,2 | 20 | 35 | 12 | 11,4 | 85 | 4 | 1.006,20 |
| 29 6553 1200 020 30 | • 12 | 0,2 | 30 | 45 | 12 | 11,4 | 90 | 4 | 1.307,40 |
| 29 6553 1600 030 20 | • 16 | 0,3 | 20 | 35 | 16 | 15,4 | 85 | 5 | 1.168,20 |
| 29 6553 1600 030 30 | • 16 | 0,3 | 30 | 45 | 16 | 15,4 | 95 | 5 | 1.412,40 |
| 29 6553 2000 030 20 | • 20 | 0,3 | 20 | 40 | 20 | 19,4 | 95 | 5 | 1.354,80 |
| 29 6553 2000 030 30 | • 20 | 0,3 | 30 | 50 | 20 | 19,4 | 105 | 5 | 1.604,40 |

CVD KARNASCH NORM

SPEZIAL DIN 6535 Form HAK

HSC HPC

99,9% Diamant Diamond

Schnittdaten Cutting data

1264

- 5
- 6
- 7
- 8
- 9

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

CVD-Schaftfräser – "up & down" Fräser
 CVD milling cutter – "up & down" end mill



29 6562

| | |
|---|--|
| COMPOSITES | NIMONIC 105 |
| GFK-CFK GFRP-CFRP | ZIRKONIUM ZIRCONIUM |
| Aramid fiber AFK-SFK | TITAN titanium < 1200 N/mm ² |
| Hybridstoffe hybrid materials | PVDF GF25 |
| CFK-ALU Composite CFRP-ALU Composites | PTFE CF25 |
| Schichtstoffe Laminates | Aluminium > 12% Si |
| PA66 GF30 | TITAN titanium |
| PVDF GF30 | kurzspanend short chip |
| Ampco | |



| | |
|---------------------------|------------------------------------|
| CVD | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| UGT | 45° x 0,1 |
| | up & down |
| | 99,9% Diamant Diamond |
| | |

| Art. | d1 h8 | l2 | l3 | d2 h6 | d3 | l1 | Z | € |
|-------------------|-------|----|----|-------|------|----|---|----------|
| 29 6562 0800 15 3 | 8 | 15 | 28 | 8 | 7,4 | 65 | 3 | 379,80 |
| 29 6562 0800 15 4 | 8 | 15 | 28 | 8 | 7,4 | 65 | 4 | 610,20 |
| 29 6562 0800 24 4 | 8 | 24 | 37 | 8 | 7,4 | 75 | 4 | 823,20 |
| 29 6562 1000 15 3 | 10 | 15 | 28 | 10 | 9,2 | 70 | 3 | 412,80 |
| 29 6562 1000 25 3 | 10 | 25 | 38 | 10 | 9,2 | 80 | 3 | 571,80 |
| 29 6562 1000 15 4 | 10 | 15 | 28 | 10 | 9,2 | 70 | 4 | 676,80 |
| 29 6562 1000 24 4 | 10 | 24 | 37 | 10 | 9,2 | 80 | 4 | 902,40 |
| 29 6562 1200 15 4 | 12 | 15 | 28 | 12 | 11,2 | 75 | 4 | 695,40 |
| 29 6562 1200 24 4 | 12 | 24 | 37 | 12 | 11,2 | 85 | 4 | 921,00 |
| 29 6562 1600 15 4 | 16 | 15 | 28 | 16 | 15,2 | 80 | 4 | 789,00 |
| 29 6562 1600 24 4 | 16 | 24 | 37 | 16 | 15,2 | 90 | 4 | 1.020,60 |

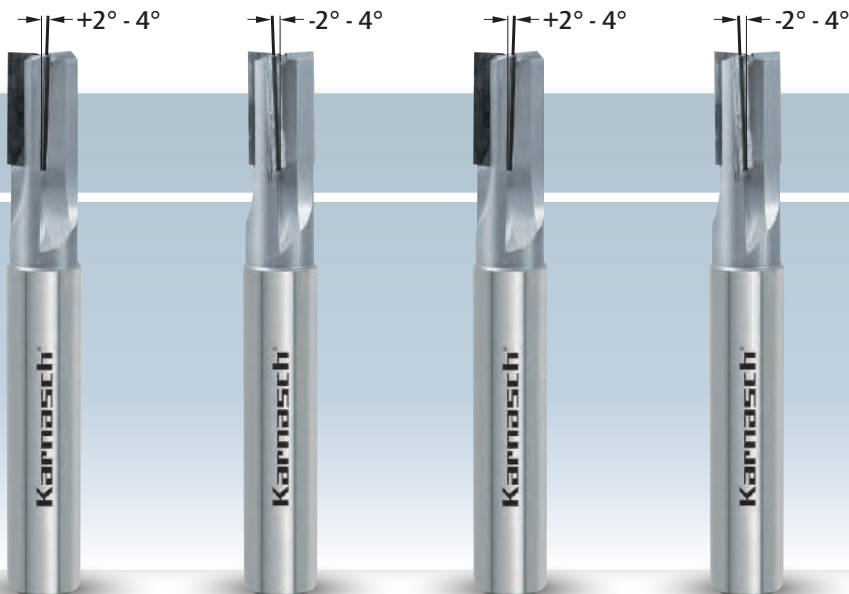
% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
 Special price / sale article. While stocks last.

Schnittdaten
 Cutting data



1264

Perfekte Ergebnisse mit Karnasch "up & down" Fräser Perfect result with Karnasch "up & down" end mill

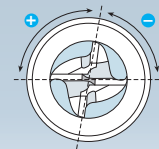


+2° - 4°
UP

-2° - 4°
DOWN

+2° - 4°
UP

-2° - 4°
DOWN



Ungleiche Teilung + "up & down"
 Unequal pitch + "up & down"

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

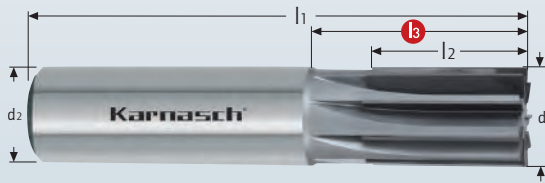
Index

29 6572

CVD-Vielzahn-Konturfräser – high end superfinish
CVD multiple-tooth-contour mill – high-end superfinish



| | | |
|--|--|--|
| COMPOSITES | E.MAX FOR CAD/CAM TECHNOLOGY | KUNSTSTOFF-GRAPHIT plastic-graphite |
| GFK-CFK GFRP-CFRP | GF GF25 | Ampco |
| Aramid fiber AFK-SFK | PVDF GF25 | FR 4 |
| Hybridstoffe hybrid materials | TITAN titanium | |
| CFK-ALU Composite CFRP-ALU Composites | TITAN titanium < 1200 N/mm ² | |
| Schichtstoffe Laminates | Aluminium > 6% Si | |
| PA66 GF30 | MESSING brass | |
| PVDF GF30 | Kupfer copper | |
| ZIRKONIUM ZIRCONIUM | STAHL-GRAPHIT steel-graphite | |



| | | |
|-----|-------------------|---------------------|
| d1* | = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,022 |
| d1* | = Ø 12,0 - Ø 16,0 | tol -0,000 / -0,027 |



| | |
|---------------------------------|-------------------------|
| CVD | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| UGT | 45° x 0,1 |
| HSC High-Speed-Cutting | |
| 99,9% Diamant Diamond | |

| Art. | d1* | l2 | l3 | d2 h6 | d3 | l1 | Z | € |
|--------------------|-----|----|----|-------|------|----|---|----------|
| 29 6572 0800 10 05 | 8 | 10 | 18 | 8 | 7,4 | 55 | 5 | 451,20 |
| 29 6572 0800 20 05 | 8 | 20 | 28 | 8 | 7,4 | 65 | 5 | 675,00 |
| 29 6572 1000 12 05 | 10 | 12 | 20 | 10 | 9,2 | 60 | 5 | 498,00 |
| 29 6572 1000 22 05 | 10 | 22 | 30 | 10 | 9,2 | 70 | 5 | 726,00 |
| 29 6572 1200 15 07 | 12 | 15 | 23 | 12 | 11,2 | 70 | 7 | 811,20 |
| 29 6572 1200 25 07 | 12 | 25 | 33 | 12 | 11,2 | 80 | 7 | 1.146,60 |
| 29 6572 1600 25 07 | 16 | 25 | 33 | 16 | 15,7 | 80 | 7 | 1.136,40 |
| 29 6572 1600 25 09 | 16 | 25 | 33 | 16 | 15,2 | 80 | 9 | 1.407,00 |

⊘ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Schnittdaten
Cutting data



Qualitätsprodukte für die Composites Bearbeitung.
Quality products for machining composites.

Karnasch®
PROFESSIONAL TOOLS

CHEMICAL VAPOUR DEPOSITION (CVD)

REVOLUTIONIERT DIE BEARBEITUNG IN DER
LUFT-, RAUMFAHRT- & AUTOMOBILINDUSTRIE

Revolutionize the machining in aerospace
and automobile industry



- BIS 1,0 MM DIAMANTSTÄRKE
- EXTREM SCHARFE SCHNEIDEN DURCH LASERVERFAHREN
- HOCHGENAUE SCHNEIDKANTENTOLERANZ VON MAX. 1µ
- STANDZEITENERHÖHUNG BIS ZU 300%

- UP TO 1,0 MM DIAMOND THICKNESS
- EXTREME SHARP CUTTING EDGE BY THE USE OF LASER PROCESS
- HIGH-PRECISION CUTTING EDGE TOLERANCE OF MAX. 1µ
- INCREASE OF TOOL LIFE UP TO 300%

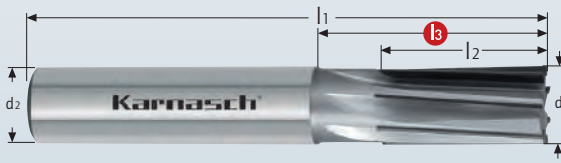


CVD-Vielzahn-Konturfräser – high end superfinish / ziehender Schnitt
 CVD multiple-tooth-contour mill – high-end superfinish, drawing cut

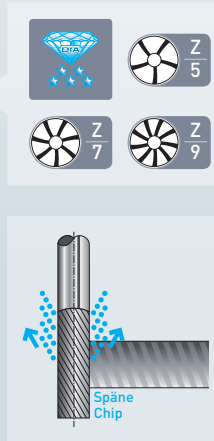


29 6573

| | | |
|--|--|--|
| COMPO-SITES | E.MAX FOR CAD/CAM TECHNOLOGY | KUNSTSTOFF-GRAPHIT plastic-graphite |
| GFK-CFK GFRP-CFRP | GF GF25 | Ampco |
| Aramid fiber AFK-SFK | PVDF GF25 | FR 4 |
| Hybrid-stoffe hybrid materials | TITAN titanium | |
| CFK-ALU Composite CFRP-ALU Composites | TITAN titanium < 1200 N/mm ² | |
| Schicht-stoffe Laminates | Aluminium > 6% Si | |
| PA66 GF30 | MESSING brass | |
| PVDF GF30 | Kupfer copper | |
| ZIRKONIUM ZIRCONIUM | STAHL-GRAPHIT steel-graphite | |



d1* = Ø 8,0 - Ø 10,0 tol -0,000 / -0,022
 d1* = Ø 12,0 - Ø 16,0 tol -0,000 / -0,027



| Art. | d1* | l2 | l3 | d2 h6 | d3 | l1 | Z | € |
|-----------------------|-----|----|----|-------|------|----|---|----------|
| 29 6573 0800 10 18 05 | 8 | 10 | 18 | 8 | 7,4 | 55 | 5 | 451,20 |
| 29 6573 0800 20 28 05 | 8 | 20 | 28 | 8 | 7,4 | 65 | 5 | 675,00 |
| 29 6573 1000 12 20 05 | 10 | 12 | 20 | 10 | 9,2 | 60 | 5 | 498,00 |
| 29 6573 1000 22 30 05 | 10 | 22 | 30 | 10 | 9,2 | 70 | 5 | 726,00 |
| 29 6573 1200 15 23 07 | 12 | 15 | 23 | 12 | 11,2 | 70 | 7 | 811,20 |
| 29 6573 1200 24 33 07 | 12 | 24 | 33 | 12 | 11,2 | 80 | 7 | 1.146,60 |
| 29 6573 1600 24 33 07 | 16 | 24 | 33 | 16 | 15,7 | 80 | 7 | 1.136,40 |
| 29 6573 1600 24 33 09 | 16 | 24 | 33 | 16 | 15,2 | 80 | 9 | 1.407,00 |

⊘ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
 Special price / sale article. While stocks last.

| | |
|----------------------|--------------------|
| CVD | KARNASCH NORM |
| SPEZIAL | DIN 6535 Form HA |
| UGT | 45° x 0,1 |
| HSC | High-Speed-Cutting |
| 99,9% Diamant | Diamond |

Schnittdaten
Cutting data

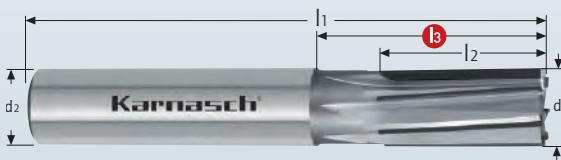


CVD-Vielzahn-Konturfräser – high end superfinish / schiebender Schnitt
 CVD multiple-tooth-contour mill – high-end superfinish, pushing cut

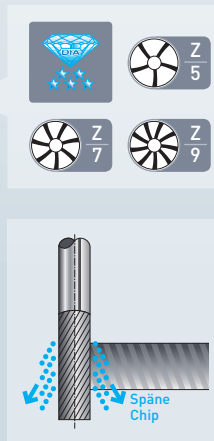


29 6574

| | | |
|--|--|--|
| COMPO-SITES | E.MAX FOR CAD/CAM TECHNOLOGY | KUNSTSTOFF-GRAPHIT plastic-graphite |
| GFK-CFK GFRP-CFRP | GF GF25 | Ampco |
| Aramid fiber AFK-SFK | PVDF GF25 | FR 4 |
| Hybrid-stoffe hybrid materials | TITAN titanium | |
| CFK-ALU Composite CFRP-ALU Composites | TITAN titanium < 1200 N/mm ² | |
| Schicht-stoffe Laminates | Aluminium > 6% Si | |
| PA66 GF30 | MESSING brass | |
| PVDF GF30 | Kupfer copper | |
| ZIRKONIUM ZIRCONIUM | STAHL-GRAPHIT steel-graphite | |



d1* = Ø 8,0 - Ø 10,0 tol -0,000 / -0,022
 d1* = Ø 12,0 - Ø 16,0 tol -0,000 / -0,027



| Art. | d1* | l2 | l3 | d2 h6 | d3 | l1 | Z | € |
|-----------------------|-----|----|----|-------|------|----|---|----------|
| 29 6574 0800 10 18 05 | 8 | 10 | 18 | 8 | 7,4 | 55 | 5 | 451,20 |
| 29 6574 0800 20 28 05 | 8 | 20 | 28 | 8 | 7,4 | 65 | 5 | 675,00 |
| 29 6574 1000 12 20 05 | 10 | 12 | 20 | 10 | 9,2 | 60 | 5 | 498,00 |
| 29 6574 1000 22 30 05 | 10 | 22 | 30 | 10 | 9,2 | 70 | 5 | 726,00 |
| 29 6574 1200 15 23 07 | 12 | 15 | 23 | 12 | 11,2 | 70 | 7 | 811,20 |
| 29 6574 1200 24 33 07 | 12 | 24 | 33 | 12 | 11,2 | 80 | 7 | 1.146,60 |
| 29 6574 1600 24 33 07 | 16 | 24 | 33 | 16 | 15,7 | 80 | 7 | 1.136,40 |
| 29 6574 1600 24 33 09 | 16 | 24 | 33 | 16 | 15,2 | 80 | 9 | 1.407,00 |

⊘ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
 Special price / sale article. While stocks last.

| | |
|----------------------|--------------------|
| CVD | KARNASCH NORM |
| SPEZIAL | DIN 6535 Form HA |
| UGT | 45° x 0,1 |
| HSC | High-Speed-Cutting |
| 99,9% Diamant | Diamond |

Schnittdaten
Cutting data

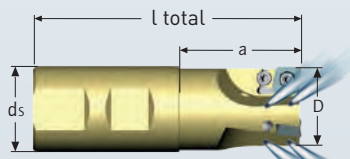


29 6600

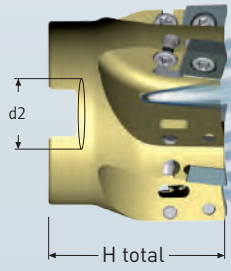
90° Plan - Eckfräser mit μ genauer Planlauf-Feineinstellung und Innenkühlung für Karnasch CVD Schneidplatten
 90° level corner cutter with μ -precise axial run-out setting and inner cooling. For Karnasch CVD cutting plates



- COMPO-SITES PEEK CF30
- GFK GFRP PEEK
- PA66 GF30
- PVDF GF30
- PEEK GF30
- GF GF25
- CFK CFRP
- PTFE CF25



| Art. | D | ds h6 | a | l total | Z | n max U/min. RPM | € |
|--------------|------|-------|----|---------|---|------------------|--------|
| 29 6600 3200 | 32,0 | 32 | 45 | 100 | 3 | 26.000 | 409,80 |



| Art. | D | d2 | H total | Z | n max U/min. RPM | € |
|--------------|------|----|---------|---|------------------|--------|
| 29 6600 4000 | 40,0 | 16 | 40 | 4 | 24.000 | 430,80 |
| 29 6600 5000 | 50,0 | 22 | 40 | 5 | 22.000 | 469,20 |
| 29 6600 6300 | 63,0 | 22 | 40 | 6 | 20.000 | 535,20 |

Anzugsdrehmomente: Einstellschraube mit 0,6 Nm vorspannen
 Schneidplatte mit 1,2 Nm vormontieren
 Mit der Einstellschraube den gewünschten Planlauf einstellen.
 Tightening torque: Schneidplatte mit 3 Nm anziehen
 Adjusting screw with 0,6 Nm pretension
 Assembly the insert with 1,2 Nm
 Adjust the axial run-out with the adjustment screw
 Tighten the insert with 3 Nm

| | |
|----------------|---------------|
| CVD | KARNASCH NORM |
| 90° | |
| 15° | |
| HPC | |
| GELÄPPT LAPPED | |
| | |

Schnittdaten
Cutting data

1269

| Art. | Wendeplatten/ Inserts | l mm | B mm | r _e | R mm | SKL mm | € |
|-----------|--|------|------|----------------|------|--------|-------|
| 29 6610 | CVD Plan/Face CXHW 09T3PDFR5 | 9,67 | 1,8 | 0,4 | 12,5 | 5 | 65,40 |
| 29 6615 | CVD Eck/Shoulder CXHW 09 T3 PD FR 8 | 9,67 | 1,2 | 0,1x45° | 25 | 8 | 80,40 |
| 29 6617 | CVD Breitschlichten/ Finishing CXHW 09 T3 XX FR | 9,73 | 4,0 | 0,4x45° | 100 | 5 | 65,40 |
| 29 6618 | Wendeplattenschraubenset Screwset for inserts Torx T15 Torx Screw T15 | | | | | | 9,60 |
| 29 6619-1 | Drehmoment-Schraubendreher Torque screwdriver Nm 0,3 - 1,2 Torx T15 | | | | | | 64,20 |
| 29 6619-2 | Drehmoment-Schraubendreher Torque screwdriver Nm 3,0 Torx T15 | | | | | | 34,20 |

☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
 Special price / sale article. While stocks last.

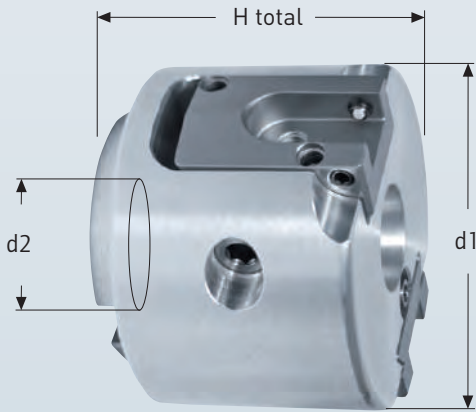
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- 7
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MKD-Diamant/PKD Hochglanz-Finish-Messerkopf
Knife edge for mirror finish



29 6620

| | |
|----------------------------|---------------------------|
| Plexiglas acrylic glass | SAN |
| Acryl Acrylic | CORIAN |
| PMMA GS | Alu- minium |
| PE PP | Bronze bronze |
| PC PET PPE | MESSING brass |
| PMMA XT | Kupfer copper |
| SAN | Gold gold |
| PETG | TITAN titanium |



Vorschneider
Read cutter

A



Fertigschneider
Finishing

B

| | |
|----------------------------|--|
| ALU- MINIUM | KARNASCH NORM |
| SPEZIAL SPECIAL | |
| SPEZIAL SPECIAL | GRATFREI BURRFREE |
| | ACRYLIC ALUMINIUM COPPER BRASS TITANIUM |
| | PKD MKD |
| | |

| Art. | Ø d1 | H total | d2 | Z | € |
|----------------|-------|---------|----|---|-----------------|
| 29 6620 040 16 | • 40 | 45 | 16 | 2 | 490,00 |
| 29 6620 050 16 | • 50 | 45 | 16 | 2 | 588,00 |
| 29 6620 060 22 | • 60 | 45 | 22 | 2 | 756,00 |
| 29 6620 085 27 | • 85 | 55 | 27 | 2 | 1.260,00 |
| 29 6620 100 27 | • 100 | 48 | 27 | 2 | 1.580,00 |

Gerne erstellen wir Ihnen ein Fräsmuster mit Ihrem Material.
Preis: 160 € (Erfolgt eine Bestellung über einen neuen komplett
bestückten Messerkopf, entfallen die Fräskosten)
We can make a milling sample with your material.
Price: 160 € (We do not charge any costs, if you order a new
complete equipped cutter head)

Schneideinsätze für Messerköpfe / hochglanz Spiegelschliff

Cutting insert for knife head/high gloss mirror finish

| | | | | | | | | | | | | |
|----------|--|---|--|--|---|---|---|---|---|---------------------------|---|--|
| A | | PCD Universal Read cutter | PKD Universal Vorschneidezahn | | PMMA GS | PMMA XT | ALUMINIUM WEICH ALUMINIUM SOFT | KUPFER WEICH COPPER SOFT | MESSING WEICH BRASS SOFT | TITAN titanium | 29 6621 € 196,00 | |
| B | | ND natural diamond Finishing Acrylic | ND Natur Diamant Fertigschneider Acryl | | PMMA GS | PMMA XT | PE PP | SAN | PETG | CORIAN | 29 6622 Auf Anfrage /On request | |
| B | | ND natural diamond Finishing Soft aluminum | ND Natur Diamant Fertigschneider Alu weich | | ALUMINIUM WEICH ALUMINIUM SOFT | Gold gold | | | | | 29 6623 Auf Anfrage /On request | |
| B | | ND natural diamond Finishing Soft copper | ND Natur Diamant Fertigschneider Kupfer weich | | KUPFER WEICH COPPER SOFT | MESSING WEICH BRASS SOFT | | | | | 29 6624 Auf Anfrage /On request | |
| B | | ND natural diamond Finishing TITANIUM | ND Natur Diamant Fertigschneider Titan | | TITAN titanium | | | | | | 29 6625 Auf Anfrage /On request | |

Durch Diamantpreisschwankungen empfehlen wir vor Auftragserteilung die aktuellen Preise anzufragen. Diese finden Sie auch in unserem Onlineshop.
Because of diamond price fluctuation, we ask you, to request the current prices, before ordering. You will also find the prices in our online shop.

Einstellen und Wuchten: Wir empfehlen, uns mit Ihrer Bestellung Ihre Werkzeugaufnahme zur Verfügung zu stellen. Diese wird dann mit dem neu eingestellten Messerkopf gewuchtet. Nur so ist ein Spiegelfinish zu erreichen. Alle Diamant-Fertigschneider sind mehrfach nachschleifbar. Zum Nachschleifen mit Karnasch Originalgeometrie bitte um Angabe für welches Material: Acryl Typ GS / Typ XT / Alu weich / Messing weich / Kupfer weich / Titan

Adjusting and balancing: We recommend that you make the tool holder available to us when making your order. Your tool holder will be balanced with the newly adjusted cutter head. This is the only way to achieve a mirror finish. All natural diamond finishing cutter can resharpened. We ask to specify which material should be machined: Acrylic type GS / type XT / Aluminum soft / Brass / Copper / Titanium

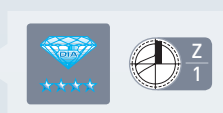


29 6811

MKD Monokristallin-Diamant, Radiusfräser für Hochglanz-Spiegelfinish
MKD/mono-crystal diamond radius milling cutter for high-gloss mirror finish



| | |
|--|------------------------------------|
| Plexiglas acrylic glass | MESSING WEICH BRASS SOFT |
| Acryl Acrylic | ACRYL ACRYLIC TYP GS |
| PMMA GS | ACRYL ACRYLIC TYP XT |
| ALUMINIUM WEICH ALUMINIUM SOFT | Gold gold |
| KUPFER WEICH COPPER SOFT | |



| | |
|---|-------------------------|
| MKD Mono-kristallin MKD MONOCRYSTALLINE | KARNASCH NORM |
| SPEZIAL SPEZIAL | DIN 6535 Form HA |
| SPEZIAL SPEZIAL | Z=1 |
| | HSC HPC |
| | GELÄPPT LAPPED |
| | |

| Art. | d1 | r | l3 | d2 h5 | d3 | l1 | l2 | Z | € |
|-----------------|-------|------|----|-------|-----|----|----|---|---|
| 29 6811 0100 04 | • 1 | 0,5 | 4 | 4 | 0,9 | 50 | 3 | 1 | |
| 29 6811 0150 04 | • 1,5 | 0,75 | 4 | 4 | 1,3 | 50 | 3 | 1 | |
| 29 6811 0200 04 | • 2 | 1 | 4 | 4 | 1,7 | 50 | 3 | 1 | |
| 29 6811 0300 04 | • 3 | 1,5 | 4 | 4 | 2,6 | 60 | 3 | 1 | |
| 29 6811 0400 05 | • 4 | 2 | 5 | 6 | 3,5 | 65 | 3 | 1 | |
| 29 6811 0600 05 | • 6 | 3 | 5 | 6 | 5,0 | 75 | 4 | 1 | |

Durch Diamantpreisschwankungen empfehlen wir vor Auftragserteilung die aktuellen Preise anzufragen.
Die aktuellen Preise finden Sie in unserem Onlineshop.

Because of diamond price fluctuation, we ask you, to request the current prices, before ordering.
You will find the current prices in our online shop.

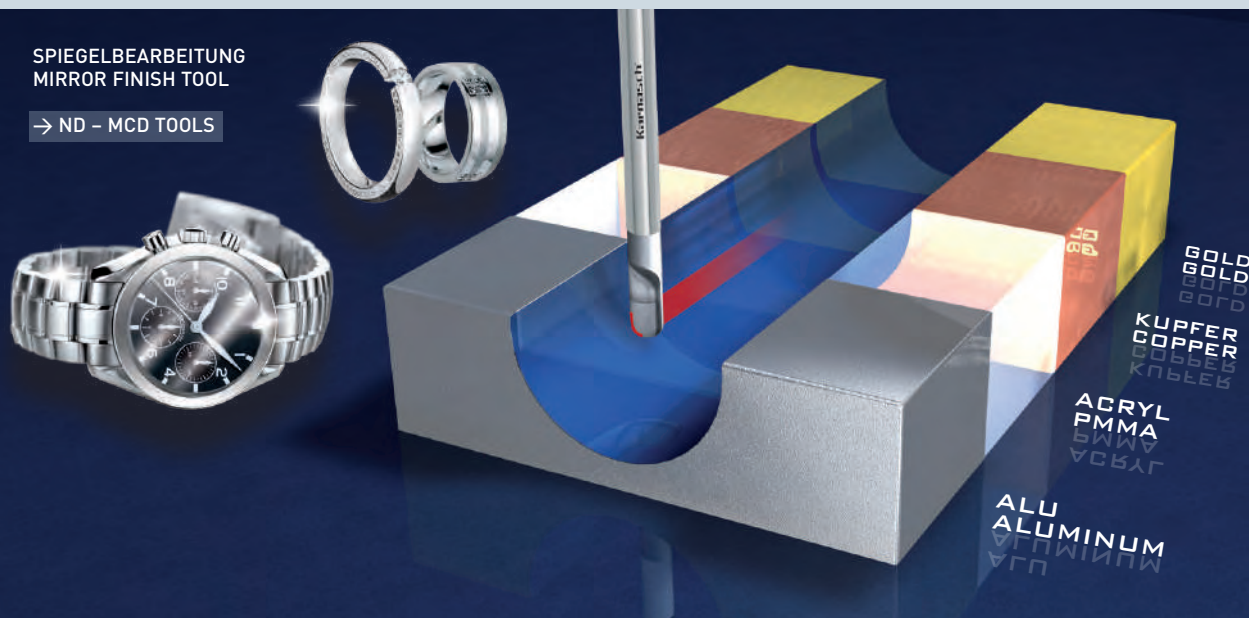
Schnittdaten
Cutting data

Zeichnungen
Drawings



SPIEGELBEARBEITUNG
MIRROR FINISH TOOL

→ ND - MCD TOOLS



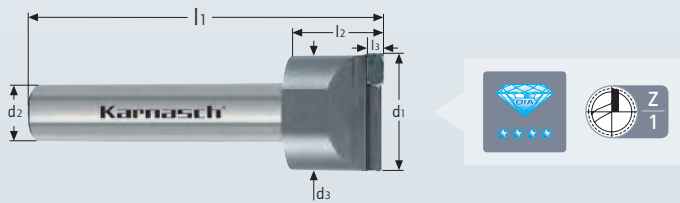
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MKD/Monokristalliner Diamantfräser für Hochglanz Spiegelfinish, stirnschneidend
 MKD/mono-crystal diamond milling cutter for high-gloss mirror finish, end cutting



29 6837

| | |
|-----------------------------------|--|
| Plexiglas acrylic glass | ALUMINIUM WEICH ALUMINIUM SOFT |
| Acryl Acrylic | ACRYL ACRYLIC TYP GS |
| PMMA GS | ACRYL ACRYLIC TYP XT |
| Gold gold | Kupfer copper |



| Art. | d1 | d1 - 2 | d2 h5 | d3 | l1 | l2 | l3 | € |
|--------------|------|--------|-------|------|----|----|----|---|
| 29 6837 1200 | • 12 | 5 | 8 | 11,4 | 60 | 15 | 3 | |
| 29 6837 1600 | • 16 | 5 | 10 | 15,4 | 60 | 15 | 3 | |
| 29 6837 2000 | • 20 | 5 | 10 | 19,4 | 60 | 15 | 3 | |

Durch Diamantpreisschwankungen empfehlen wir vor Auftragserteilung die aktuellen Preise anzufragen. Die aktuellen Preise finden Sie in unserem Onlineshop.

Because of diamond price fluctuation, we ask you, to request the current prices, before ordering. You will find the current prices in our online shop.

| | |
|---|-------------------------|
| MKD Mono-kristallin MCD MONOKRYSTALLINE | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| SPEZIAL SPECIAL | r-spezial |
| | HSC HPC |
| | GELÄPPT LAPPED |
| | |

Schnittdaten
Cutting data



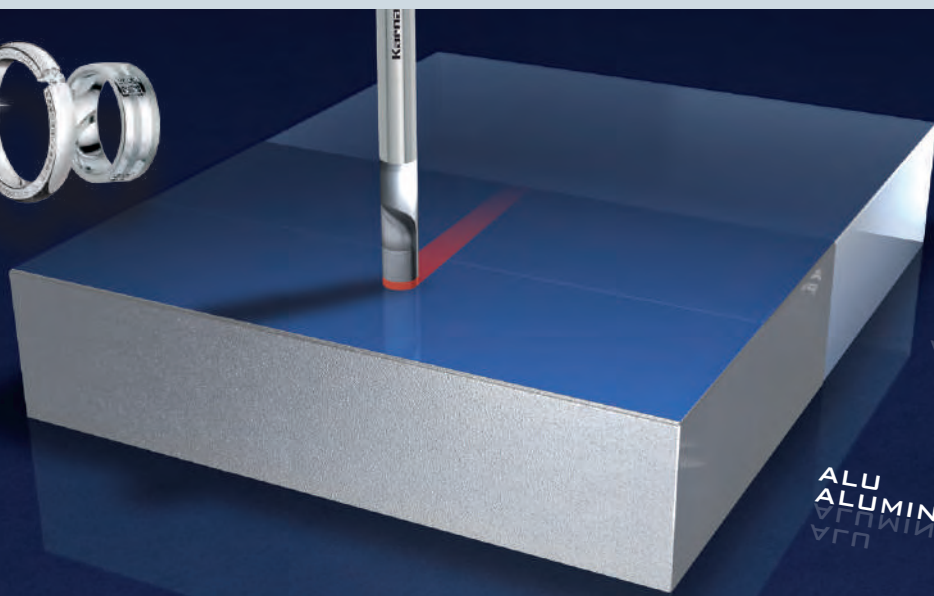
Zeichnungen
Drawings



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SPIEGELBEARBEITUNG
MIRROR FINISH TOOL

→ ND - MCD TOOLS



ACRYL
PMMA
BPMMA
ACRYL

ALU
ALUMINIUM
ALU

29 6838

MKD/Monokristalliner Diamantfräser für Hochglanz Spiegelfinish, stirnschneidend
MKD/mono-crystal diamond milling cutter for high-gloss mirror finish, end cutting



1



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3



4



5



6



7



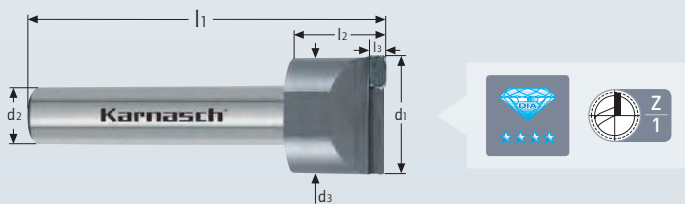
8



9



- KUPFER WEICH
COPPER SOFT
- MESSING WEICH
BRASS SOFT
- Gold
gold
- Silber
silver



| Art. | d1 | d1 - 2 | d2 h5 | d3 | l1 | l2 | l3 | € |
|--------------|------|--------|-------|------|----|----|----|---|
| 29 6838 1200 | • 12 | 5 | 8 | 11,4 | 60 | 15 | 3 | |
| 29 6838 1600 | • 16 | 5 | 10 | 15,4 | 60 | 15 | 3 | |
| 29 6838 2000 | • 20 | 5 | 10 | 19,4 | 60 | 15 | 3 | |

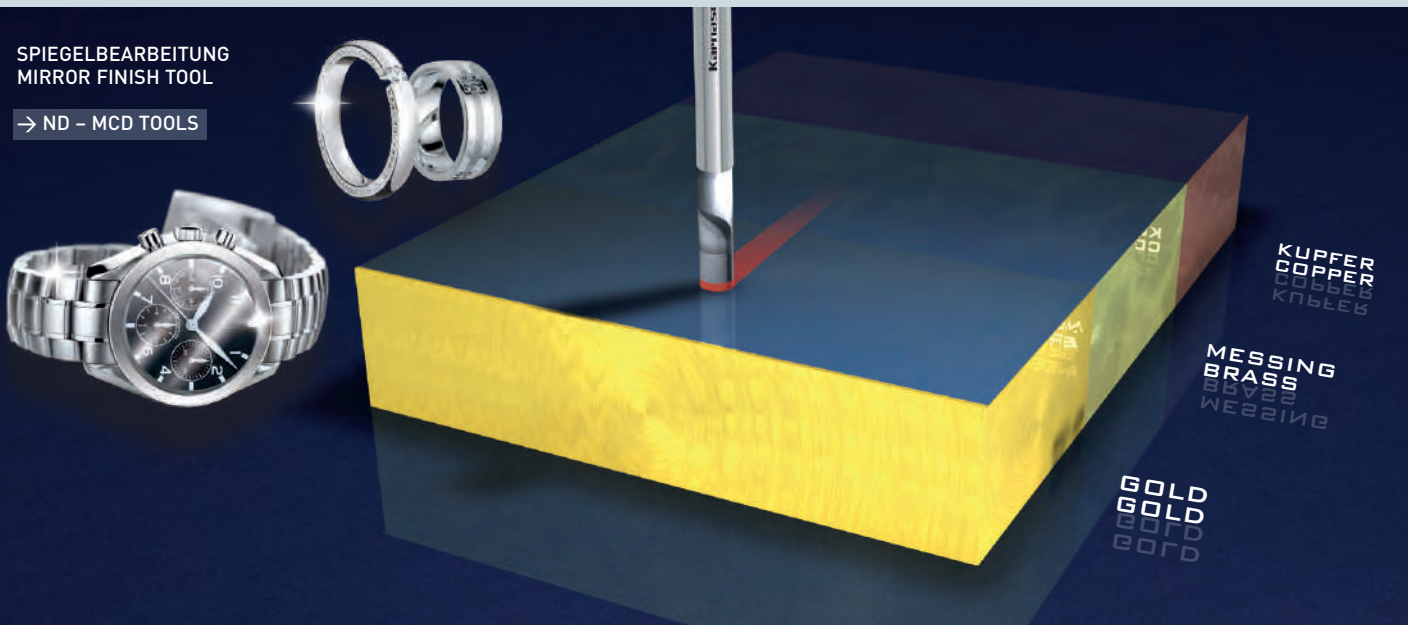
Durch Diamantpreisschwankungen empfehlen wir vor Auftragserteilung die aktuellen Preise anzufragen. Die aktuellen Preise finden Sie in unserem Onlineshop.
Because of diamond price fluctuation, we ask you, to request the current prices, before ordering. You will find the current prices in our online shop.

| | |
|---|-------------------------|
| MKD Mono-kristallin MKD MONOCRYSTALLINE | KARNASCH NORM |
| SPEZIAL SPEZIAL | DIN 6535 Form HA |
| SPEZIAL SPEZIAL | r-spezial |
| | HSC HPC |
| | GELÄPPT LAPPED |
| | |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| | |

SPIEGELBEARBEITUNG
MIRROR FINISH TOOL

→ ND - MCD TOOLS

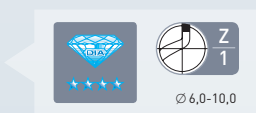


MKD/Monokristalliner Diamantfräser für Hochglanz Spiegelfinish, Umfangfräsen
 MKD/mono-crystal diamond milling cutter for high gloss mirror finish, profile-milling cutter



29 6839

| | |
|-----------------------------------|--|
| Acryl Acrylic | MESSING WEICH BRASS SOFT |
| ACRYL ACRYLIC TYP GS | KUPFER WEICH COPPER SOFT |
| ACRYL ACRYLIC TYP XT | ALUMINIUM WEICH ALUMINIUM SOFT |
| Plexiglas acrylic glass | Gold gold |
| PMMA GS | Silber silver |



Gewuchtet /
Balanced
< 40.000 U/min.

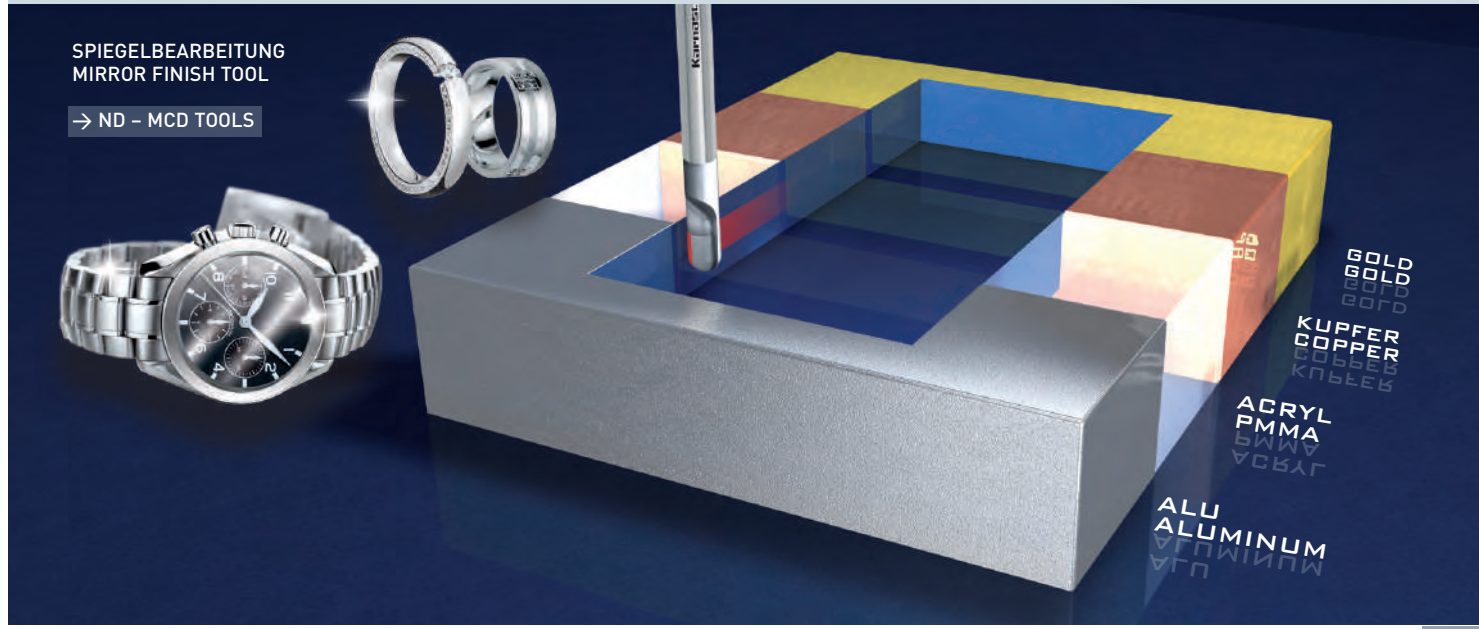
| Art. | Ø d1 ±0,03 | l2 | l3 | d2 h5 | d3 | l1 | Z | € |
|-----------------|------------|----|----|-------|-----|----|---|---|
| 29 6839 0600 03 | • 6,0 | 3 | 20 | 6 | 5,4 | 50 | 1 | |
| 29 6839 0600 04 | • 6,0 | 4 | 20 | 6 | 5,4 | 50 | 1 | |
| 29 6839 0600 05 | • 6,0 | 5 | 20 | 6 | 5,4 | 50 | 1 | |
| 29 6839 0600 06 | • 6,0 | 6 | 20 | 6 | 5,4 | 50 | 1 | |
| 29 6839 0800 04 | • 8,0 | 4 | 25 | 8 | 7,4 | 60 | 1 | |
| 29 6839 0800 05 | • 8,0 | 5 | 25 | 8 | 7,4 | 60 | 1 | |
| 29 6839 0800 06 | • 8,0 | 6 | 25 | 8 | 7,4 | 60 | 1 | |
| 29 6839 0800 08 | • 8,0 | 8 | 25 | 8 | 7,4 | 60 | 1 | |
| 29 6839 0800 10 | • 8,0 | 10 | 25 | 8 | 7,4 | 60 | 1 | |
| 29 6839 0800 11 | • 8,0 | 11 | 25 | 8 | 7,4 | 60 | 1 | |
| 29 6839 0800 12 | • 8,0 | 12 | 25 | 8 | 7,4 | 60 | 1 | |
| 29 6839 1000 04 | • 10,0 | 4 | 25 | 10 | 9,4 | 60 | 1 | |
| 29 6839 1000 05 | • 10,0 | 5 | 25 | 10 | 9,4 | 60 | 1 | |
| 29 6839 1000 06 | • 10,0 | 6 | 25 | 10 | 9,4 | 60 | 1 | |
| 29 6839 1000 08 | • 10,0 | 8 | 25 | 10 | 9,4 | 60 | 1 | |
| 29 6839 1000 10 | • 10,0 | 10 | 25 | 10 | 9,4 | 60 | 1 | |
| 29 6839 1000 11 | • 10,0 | 11 | 25 | 10 | 9,4 | 60 | 1 | |
| 29 6839 1000 12 | • 10,0 | 12 | 25 | 10 | 9,4 | 60 | 1 | |

| | |
|--|-------------------------------|
| MKD Mono-kristallin MCD MONOKRYSTALLIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6355 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | GELÄPPT LAPPED |
| | |

| | | |
|------------------------------|---------------|-------------------------|
| Schnittdaten Cutting data | Film Movie | Zeichnungen Drawings |
| | | |
| 1267 | | DXF/STEP |

Durch Diamantpreisschwankungen empfehlen wir vor Auftragserteilung die aktuellen Preise anzufragen. Die aktuellen Preise finden Sie in unserem Onlineshop.
 Because of diamond price fluctuation, we ask you, to request the current prices, before ordering. You will find the current prices in our online shop.

Bei Ihrer Bestellung bitten wir um Information, welches Material Sie bearbeiten um die Schneidengeometrie anzupassen.
 When ordering, please inform us which material you want to machine to adjust the cutting geometry.



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29 6840

MKD/Monokristalliner Diamantfräser für Hochglanz Spiegelfinish, Umfangfräser und stirnschneidend
MKD/mono-crystal diamond milling cutter for high-gloss mirror finish, circumference-milling cutter and end cutting

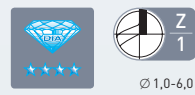


Acryl
Acrylic

ALUMINIUM
WEICH
ALUMINIUM SOFT

Plexiglas
acrylic glass

PMMA
GS



Gewuchtet /
Balanced
< 60.000 U/min.

Ø 1,0-1,5 kein perfektes Spiegelfinish bei stirnseitigem Einsatz.
Ø 1,0-1,5 no perfect mirror finish by milling on the front cutting edge.

| Art. | Ø d1 ±0,03 | l2 | l3 | d2 h5 | d3 | l1 | Z | € |
|-----------------|------------|----|----|-------|-----|----|---|---|
| 29 6840 0100 02 | • 1,0 | 2 | - | 4 | - | 50 | 1 | |
| 29 6840 0100 03 | • 1,0 | 3 | - | 4 | - | 50 | 1 | |
| 29 6840 0100 04 | • 1,0 | 4 | - | 4 | - | 50 | 1 | |
| 29 6840 0150 03 | • 1,5 | 3 | - | 4 | - | 50 | 1 | |
| 29 6840 0150 04 | • 1,5 | 4 | - | 4 | - | 50 | 1 | |
| 29 6840 0150 05 | • 1,5 | 5 | - | 4 | - | 50 | 1 | |
| 29 6840 0200 03 | • 2,0 | 3 | - | 4 | - | 50 | 1 | |
| 29 6840 0200 04 | • 2,0 | 4 | - | 4 | - | 50 | 1 | |
| 29 6840 0200 05 | • 2,0 | 5 | - | 4 | - | 50 | 1 | |
| 29 6840 0200 06 | • 2,0 | 6 | - | 4 | - | 50 | 1 | |
| 29 6840 0300 03 | • 3,0 | 3 | - | 4 | - | 60 | 1 | |
| 29 6840 0300 04 | • 3,0 | 4 | - | 4 | - | 60 | 1 | |
| 29 6840 0300 05 | • 3,0 | 5 | - | 4 | - | 60 | 1 | |
| 29 6840 0300 06 | • 3,0 | 6 | - | 4 | - | 60 | 1 | |
| 29 6840 0400 03 | • 4,0 | 3 | 12 | 4 | 3,4 | 50 | 1 | |
| 29 6840 0400 04 | • 4,0 | 4 | 12 | 4 | 3,4 | 50 | 1 | |
| 29 6840 0400 05 | • 4,0 | 5 | 12 | 4 | 3,4 | 50 | 1 | |
| 29 6840 0400 06 | • 4,0 | 6 | 12 | 4 | 3,4 | 50 | 1 | |
| 29 6840 0600 03 | • 6,0 | 3 | 20 | 6 | 5,4 | 50 | 1 | |
| 29 6840 0600 04 | • 6,0 | 4 | 20 | 6 | 5,4 | 50 | 1 | |
| 29 6840 0600 05 | • 6,0 | 5 | 20 | 6 | 5,4 | 50 | 1 | |
| 29 6840 0600 06 | • 6,0 | 6 | 20 | 6 | 5,4 | 50 | 1 | |

| | |
|--|--------------------------------------|
| MKD Mono- kristallin MKD MONOCRYSTALLINE | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HSC High-Speed- Cutting |
| | GELÄPPT LAPPED |
| | |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1267 | DXF/STEP |

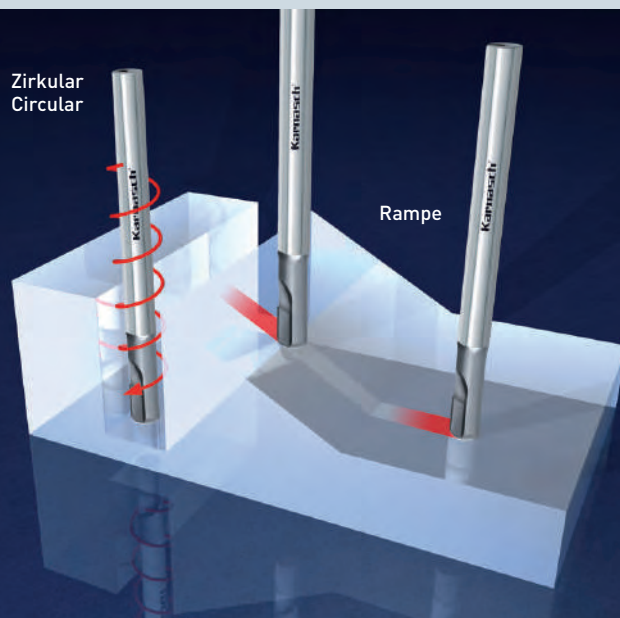
Durch Diamantpreisschwankungen empfehlen wir vor Auftragserteilung die aktuellen Preise anzufragen.
Die aktuellen Preise finden Sie in unserem Onlineshop.
Because of diamond price fluctuation, we ask you, to request the current prices, before ordering.
You will find the current prices in our online shop.

SPIEGELBEARBEITUNG
MIRROR FINISH TOOL

→ ND - MCD TOOLS



Zirkular
Circular



Rampe

ACRYL
PMMA
PMMA
ACRYL

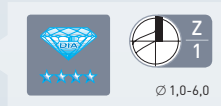
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MKD/Monokristalliner Diamantfräser für Hochglanz Spiegelfinish, Umfangfräser und stirnschneidend
 MKD/mono-crystal diamond milling cutter for high-gloss mirror finish, circumference-milling cutter and end cutting



29 6841

- MESSING
brass
- Kupfer
copper
- Gold
gold
- Silber
silver



Gewuchtet /
Balanced
< 60.000 U/min.

Ø 1,0-1,5 kein perfektes Spiegelfinish bei stirnseitigem Einsatz.
 Ø 1,0-1,5 no perfect mirror finish by milling on the front cutting edge.

| Art. | Ø d1 ±0,03 | l2 | l3 | d2 h5 | d3 | l1 | Z | € |
|-----------------|------------|----|----|-------|-----|----|---|---|
| 29 6841 0100 02 | 1,0 | 2 | - | 4 | - | 50 | 1 | |
| 29 6841 0100 03 | 1,0 | 3 | - | 4 | - | 50 | 1 | |
| 29 6841 0100 04 | 1,0 | 4 | - | 4 | - | 50 | 1 | |
| 29 6841 0150 03 | 1,5 | 3 | - | 4 | - | 50 | 1 | |
| 29 6841 0150 04 | 1,5 | 4 | - | 4 | - | 50 | 1 | |
| 29 6841 0150 05 | 1,5 | 5 | - | 4 | - | 50 | 1 | |
| 29 6841 0200 03 | 2,0 | 3 | - | 4 | - | 50 | 1 | |
| 29 6841 0200 04 | 2,0 | 4 | - | 4 | - | 50 | 1 | |
| 29 6841 0200 05 | 2,0 | 5 | - | 4 | - | 50 | 1 | |
| 29 6841 0200 06 | 2,0 | 6 | - | 4 | - | 50 | 1 | |
| 29 6841 0300 03 | 3,0 | 3 | - | 4 | - | 60 | 1 | |
| 29 6841 0300 04 | 3,0 | 4 | - | 4 | - | 60 | 1 | |
| 29 6841 0300 05 | 3,0 | 5 | - | 4 | - | 60 | 1 | |
| 29 6841 0300 06 | 3,0 | 6 | - | 4 | - | 60 | 1 | |
| 29 6841 0400 03 | 4,0 | 3 | 12 | 4 | 3,4 | 50 | 1 | |
| 29 6841 0400 04 | 4,0 | 4 | 12 | 4 | 3,4 | 50 | 1 | |
| 29 6841 0400 05 | 4,0 | 5 | 12 | 4 | 3,4 | 50 | 1 | |
| 29 6841 0400 06 | 4,0 | 6 | 12 | 4 | 3,4 | 50 | 1 | |
| 29 6841 0600 03 | 6,0 | 3 | 20 | 6 | 5,4 | 50 | 1 | |
| 29 6841 0600 04 | 6,0 | 4 | 20 | 6 | 5,4 | 50 | 1 | |
| 29 6841 0600 05 | 6,0 | 5 | 20 | 6 | 5,4 | 50 | 1 | |
| 29 6841 0600 06 | 6,0 | 6 | 20 | 6 | 5,4 | 50 | 1 | |

Schnittdaten
Cutting data

Zeichnungen
Drawings

1267

DXF/STEP

Durch Diamantpreisschwankungen empfehlen wir vor Auftragserteilung die aktuellen Preise anzufragen.
 Die aktuellen Preise finden Sie in unserem Onlineshop.

Because of diamond price fluctuation, we ask you, to request the current prices, before ordering.
 You will find the current prices in our online shop.

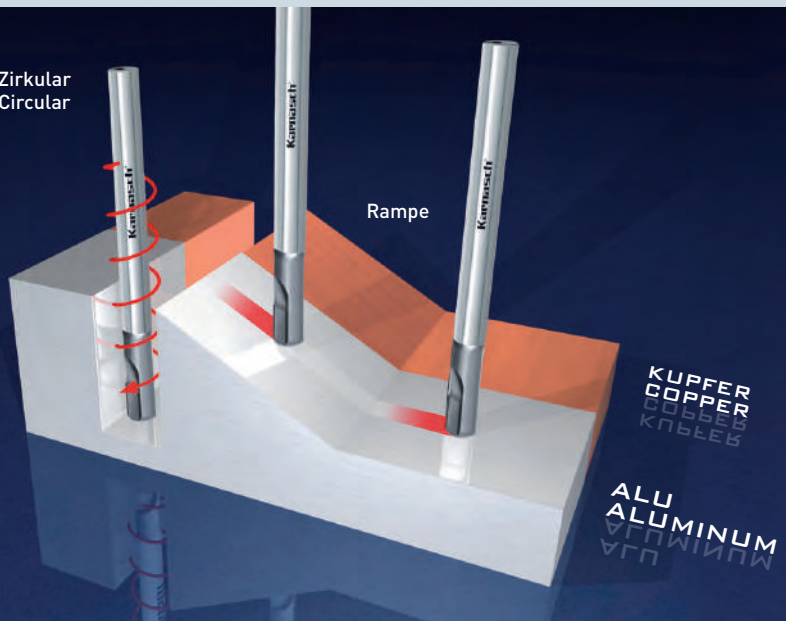
o Keine Lagerware, Lieferzeit und Preis auf Anfrage / No stock tool. Price and delivery on request

SPIEGELBEARBEITUNG
MIRROR FINISH TOOL

→ ND - MCD TOOLS



Zirkular
Circular



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

29 6843

Monokristalliner Diamant/MKD-Fasensenker 45° – Hochglanz Spiegelfinish
 Mono-crystalline Diamond/MKD countersink 45° – high gloss mirror finish. Balanced < 30.000 Rpm



Gewuchtet /
Balanced
< 30.000 U/min.

| Art. | Ø d1 | l2 | l2 - 2 | d2 h5 | d3 | l1 | Z | € |
|-----------------|--------|----|--------|-------|-----|----|---|---|
| 29 6843 0800 05 | • 8,0 | 5 | 3,7 | 8 | 1,0 | 60 | 1 | |
| 29 6843 0950 06 | • 9,5 | 6 | 4,3 | 10 | 1,0 | 60 | 1 | |
| 29 6843 1100 07 | • 11,0 | 7 | 5,1 | 12 | 1,0 | 60 | 1 | |
| 29 6843 1200 08 | • 12,0 | 8 | 5,7 | 12 | 1,0 | 60 | 1 | |
| 29 6843 1350 09 | • 13,5 | 9 | 6,4 | 14 | 1,0 | 60 | 1 | |

Durch Diamantpreisschwankungen empfehlen wir vor Auftragserteilung die aktuellen Preise anzufragen. Die aktuellen Preise finden Sie in unserem Onlineshop.

Because of diamond price fluctuation, we ask you, to request the current prices, before ordering. You will find the current prices in our online shop.

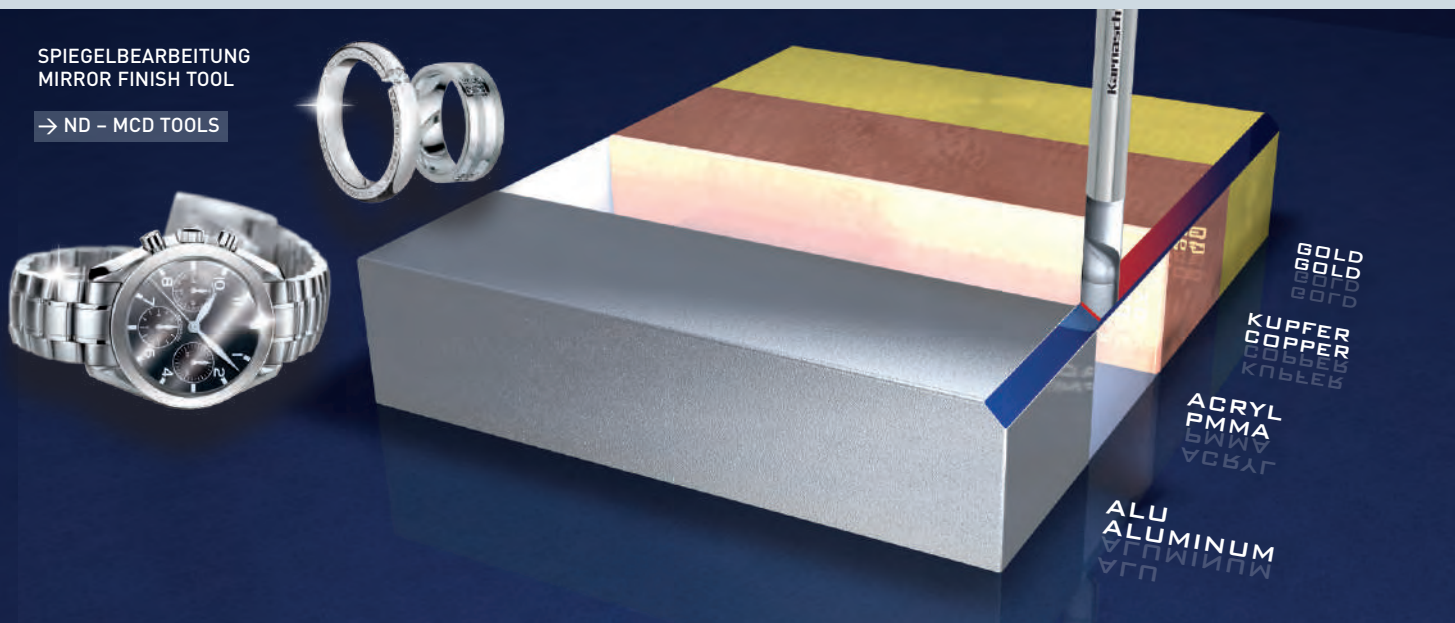
Bei Ihrer Bestellung bitten wir um Information, welches Material Sie bearbeiten um die Schneidengeometrie anzupassen.
 When ordering, please inform us which material you want to machine to adjust the cutting geometry.

| | |
|--|----------------------------|
| MKD Mono-kristallin MKD MONOCRYSTALLINE | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | GELÄPPT LAPPED |
| | |

| | | |
|------------------------------|---------------|-------------------------|
| Schnittdaten Cutting data | Film Movie | Zeichnungen Drawings |
| | | |
| 1267 | | DXF/STEP |

SPIEGELBEARBEITUNG
MIRROR FINISH TOOL

→ ND – MCD TOOLS



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- 3
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- 6
- 7
- 8
- 9

PKD-3D-Radiusfräser mit Kugelstirn, 3xD-5xD-7xD, HSC high-speed-cutting
 PCD-3D-ball milling cutter, 3xD-5xD-7xD, HSC high-speed-cutting

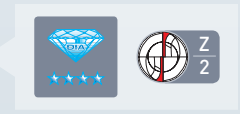


30 6522

- Aluminium < 6% Si
- Aluminium > 6% Si
- MESSING brass
- Kupfer copper
- GFK-CFK GFRP-CFRP
- GRAPHIT graphite
- kurz-spanend short chip
- lang-spanend long chip



BEST SELLER



| | |
|----------------------|---------------------|
| d1* = Ø 3,0 | tol -0,000 / -0,010 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,012 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,015 |
| d1* = Ø 12,0 | tol -0,000 / -0,018 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1* | r ± 0,005 | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|-----------------|------|-----------|-----------|-------|------|-----|------|---|---------------|
| 30 6522 0300 09 | • 3 | 1,5 | 9 | 6 | 2,8 | 75 | 2,5 | 2 | 157,00 |
| 30 6522 0300 15 | • 3 | 1,5 | 15 | 6 | 2,8 | 75 | 2,5 | 2 | 157,00 |
| 30 6522 0300 21 | • 3 | 1,5 | 21 | 6 | 2,8 | 75 | 2,5 | 2 | 157,00 |
| 30 6522 0400 12 | • 4 | 2,0 | 12 | 6 | 3,8 | 75 | 2,5 | 2 | 167,00 |
| 30 6522 0400 20 | • 4 | 2,0 | 20 | 6 | 3,8 | 75 | 2,5 | 2 | 167,00 |
| 30 6522 0400 28 | • 4 | 2,0 | 28 | 6 | 3,8 | 75 | 2,5 | 2 | 167,00 |
| 30 6522 0500 15 | • 5 | 2,5 | 15 | 6 | 4,9 | 75 | 3,0 | 2 | 172,00 |
| 30 6522 0500 25 | • 5 | 2,5 | 25 | 6 | 4,9 | 75 | 3,0 | 2 | 172,00 |
| 30 6522 0500 35 | • 5 | 2,5 | 35 | 6 | 4,9 | 75 | 3,0 | 2 | 172,00 |
| 30 6522 0600 18 | • 6 | 3,0 | 18 | 6 | 5,9 | 100 | 6,0 | 2 | 169,00 |
| 30 6522 0600 30 | • 6 | 3,0 | 30 | 6 | 5,9 | 100 | 6,0 | 2 | 169,00 |
| 30 6522 0600 42 | • 6 | 3,0 | 42 | 6 | 5,9 | 100 | 6,0 | 2 | 169,00 |
| 30 6522 0600 60 | • 6 | 3,0 | 60 | 6 | 5,9 | 100 | 6,0 | 2 | 169,00 |
| 30 6522 0800 24 | • 8 | 4,0 | 24 | 8 | 7,8 | 100 | 8,0 | 2 | 267,00 |
| 30 6522 0800 40 | • 8 | 4,0 | 40 | 8 | 7,8 | 100 | 8,0 | 2 | 267,00 |
| 30 6522 0800 60 | • 8 | 4,0 | 60 | 8 | 7,8 | 100 | 8,0 | 2 | 267,00 |
| 30 6522 1000 30 | • 10 | 5,0 | 30 | 10 | 9,8 | 100 | 10,0 | 2 | 320,00 |
| 30 6522 1000 50 | • 10 | 5,0 | 50 | 10 | 9,8 | 100 | 10,0 | 2 | 320,00 |
| 30 6522 1000 60 | • 10 | 5,0 | 60 | 10 | 9,8 | 105 | 10,0 | 2 | 320,00 |
| 30 6522 1200 36 | • 12 | 6,0 | 36 | 12 | 11,2 | 105 | 9,0 | 2 | 342,00 |
| 30 6522 1200 60 | • 12 | 6,0 | 60 | 12 | 11,2 | 105 | 9,0 | 2 | 342,00 |

| | |
|-------------------------|------------------|
| PKD EXTREME PCD EXTREME | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| 0° | |
| HSC High-Speed-Cutting | |
| POLIERT POLISHED | |

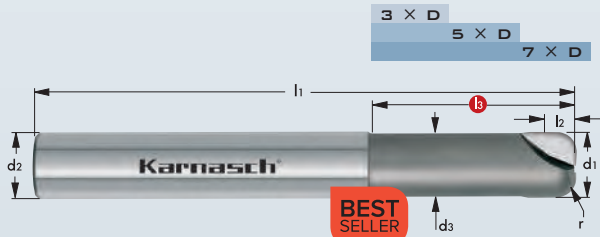
| | |
|---------------------------|----------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1268 | DXF/STEP |

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- 9

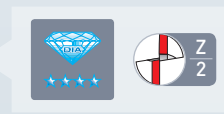
Index

30 6523

PKD-Schaftfräser mit Eckenradius, 3xD-5xD-7xD, HSC high-speed-cutting
PCD-end mill with corner radius, 3xD-5xD-7xD, HSC high-speed-cutting



BEST SELLER



| | |
|----------------------|---------------------|
| d1* = Ø ≤ 3,0 | tol -0,000 / -0,010 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,012 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,015 |
| d1* = Ø 12,0 | tol -0,000 / -0,018 |

Bestseller – preisreduziert - Bestseller – price reduced

| Art. | d1* | r ± 0,005 | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|--------------------|------|-----------|----|-------|------|-----|------|---|--------|
| 30 6523 0300 03 09 | • 3 | 0,3 | 9 | 6 | 2,8 | 75 | 2,5 | 2 | 171,00 |
| 30 6523 0300 03 15 | • 3 | 0,3 | 15 | 6 | 2,8 | 75 | 2,5 | 2 | 171,00 |
| 30 6523 0300 03 21 | • 3 | 0,3 | 21 | 6 | 2,8 | 75 | 2,5 | 2 | 171,00 |
| 30 6523 0300 05 21 | • 3 | 0,5 | 21 | 6 | 2,8 | 75 | 2,5 | 2 | 171,00 |
| 30 6523 0400 03 12 | • 4 | 0,3 | 12 | 6 | 3,8 | 75 | 2,5 | 2 | 175,00 |
| 30 6523 0400 03 20 | • 4 | 0,3 | 20 | 6 | 3,8 | 75 | 2,5 | 2 | 175,00 |
| 30 6523 0400 03 28 | • 4 | 0,3 | 28 | 6 | 3,8 | 75 | 2,5 | 2 | 175,00 |
| 30 6523 0400 05 28 | • 4 | 0,5 | 28 | 6 | 3,8 | 75 | 2,5 | 2 | 175,00 |
| 30 6523 0500 03 15 | • 5 | 0,3 | 15 | 6 | 4,8 | 75 | 3,0 | 2 | 181,00 |
| 30 6523 0500 03 25 | • 5 | 0,3 | 25 | 6 | 4,8 | 75 | 3,0 | 2 | 181,00 |
| 30 6523 0500 03 35 | • 5 | 0,3 | 35 | 6 | 4,8 | 75 | 3,0 | 2 | 181,00 |
| 30 6523 0500 05 35 | • 5 | 0,5 | 35 | 6 | 4,8 | 75 | 3,0 | 2 | 181,00 |
| 30 6523 0600 03 18 | • 6 | 0,3 | 18 | 6 | 5,9 | 100 | 6,0 | 2 | 234,00 |
| 30 6523 0600 03 30 | • 6 | 0,3 | 30 | 6 | 5,9 | 100 | 6,0 | 2 | 234,00 |
| 30 6523 0600 03 42 | • 6 | 0,3 | 42 | 6 | 5,9 | 100 | 6,0 | 2 | 234,00 |
| 30 6523 0600 05 18 | • 6 | 0,5 | 18 | 6 | 5,9 | 100 | 6,0 | 2 | 234,00 |
| 30 6523 0600 05 30 | • 6 | 0,5 | 30 | 6 | 5,9 | 100 | 6,0 | 2 | 234,00 |
| 30 6523 0600 05 42 | • 6 | 0,5 | 42 | 6 | 5,9 | 100 | 6,0 | 2 | 234,00 |
| 30 6523 0600 10 18 | • 6 | 1,0 | 18 | 6 | 5,9 | 100 | 6,0 | 2 | 234,00 |
| 30 6523 0600 10 30 | • 6 | 1,0 | 30 | 6 | 5,9 | 100 | 6,0 | 2 | 234,00 |
| 30 6523 0600 10 42 | • 6 | 1,0 | 42 | 6 | 5,9 | 100 | 6,0 | 2 | 234,00 |
| 30 6523 0800 03 24 | • 8 | 0,3 | 24 | 8 | 7,8 | 100 | 8,0 | 2 | 290,00 |
| 30 6523 0800 03 40 | • 8 | 0,3 | 40 | 8 | 7,8 | 100 | 8,0 | 2 | 290,00 |
| 30 6523 0800 05 24 | • 8 | 0,5 | 24 | 8 | 7,8 | 100 | 8,0 | 2 | 290,00 |
| 30 6523 0800 05 40 | • 8 | 0,5 | 40 | 8 | 7,8 | 100 | 8,0 | 2 | 290,00 |
| 30 6523 0800 05 60 | • 8 | 0,5 | 60 | 8 | 7,8 | 100 | 8,0 | 2 | 290,00 |
| 30 6523 0800 10 24 | • 8 | 1,0 | 24 | 8 | 7,8 | 100 | 8,0 | 2 | 290,00 |
| 30 6523 0800 10 40 | • 8 | 1,0 | 40 | 8 | 7,8 | 100 | 8,0 | 2 | 290,00 |
| 30 6523 0800 10 60 | • 8 | 1,0 | 60 | 8 | 7,8 | 100 | 8,0 | 2 | 290,00 |
| 30 6523 1000 05 30 | • 10 | 0,5 | 30 | 10 | 9,8 | 100 | 10,0 | 2 | 324,00 |
| 30 6523 1000 05 50 | • 10 | 0,5 | 50 | 10 | 9,8 | 100 | 10,0 | 2 | 324,00 |
| 30 6523 1000 05 60 | • 10 | 0,5 | 60 | 10 | 9,8 | 105 | 10,0 | 2 | 324,00 |
| 30 6523 1000 10 30 | • 10 | 1,0 | 30 | 10 | 9,8 | 100 | 10,0 | 2 | 324,00 |
| 30 6523 1000 10 50 | • 10 | 1,0 | 50 | 10 | 9,8 | 100 | 10,0 | 2 | 324,00 |
| 30 6523 1000 10 60 | • 10 | 1,0 | 60 | 10 | 9,8 | 105 | 10,0 | 2 | 324,00 |
| 30 6523 1000 15 30 | • 10 | 1,5 | 30 | 10 | 9,8 | 100 | 10,0 | 2 | 324,00 |
| 30 6523 1000 15 50 | • 10 | 1,5 | 50 | 10 | 9,8 | 100 | 10,0 | 2 | 324,00 |
| 30 6523 1200 05 36 | • 12 | 0,5 | 36 | 12 | 11,6 | 105 | 10,0 | 2 | 349,00 |
| 30 6523 1200 05 60 | • 12 | 0,5 | 60 | 12 | 11,6 | 105 | 10,0 | 2 | 349,00 |
| 30 6523 1200 10 36 | • 12 | 1,0 | 36 | 12 | 11,6 | 105 | 10,0 | 2 | 349,00 |
| 30 6523 1200 10 60 | • 12 | 1,0 | 60 | 12 | 11,6 | 105 | 10,0 | 2 | 349,00 |
| 30 6523 1200 15 36 | • 12 | 1,5 | 36 | 12 | 11,6 | 105 | 10,0 | 2 | 349,00 |
| 30 6523 1200 15 60 | • 12 | 1,5 | 60 | 12 | 11,6 | 105 | 10,0 | 2 | 349,00 |

| | |
|-----------------------------------|-------------------------------|
| PKD EXTREME PCD EXTREME | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | POLIERT POLISHED |
| | |

Schnittdaten Cutting data | Zeichnungen Drawings

1268 | DXF/STEP

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
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PKD-Schaftfräser, 3xD-5xD-7xD, HSC high-speed-cutting
PCD-end mills, 3xD-5xD-7xD, HSC high-speed-cutting



30 6524

- Aluminium < 6% Si
- Aluminium > 6% Si
- MESSING brass
- Kupfer copper
- GFK-CFK GFRP-CFRP
- GRAPHIT graphite
- kurz-spanend short chip
- lang-spanend long chip
- < 12° · 0,1
45°



| | |
|----------------------|---------------------|
| d1* = Ø 3,0 | tol -0,000 / -0,010 |
| d1* = Ø 4,0 - Ø 6,0 | tol -0,000 / -0,012 |
| d1* = Ø 8,0 - Ø 10,0 | tol -0,000 / -0,015 |
| d1* = Ø 12,0 | tol -0,000 / -0,018 |



Bestseller – preisreduziert · Bestseller – price reduced

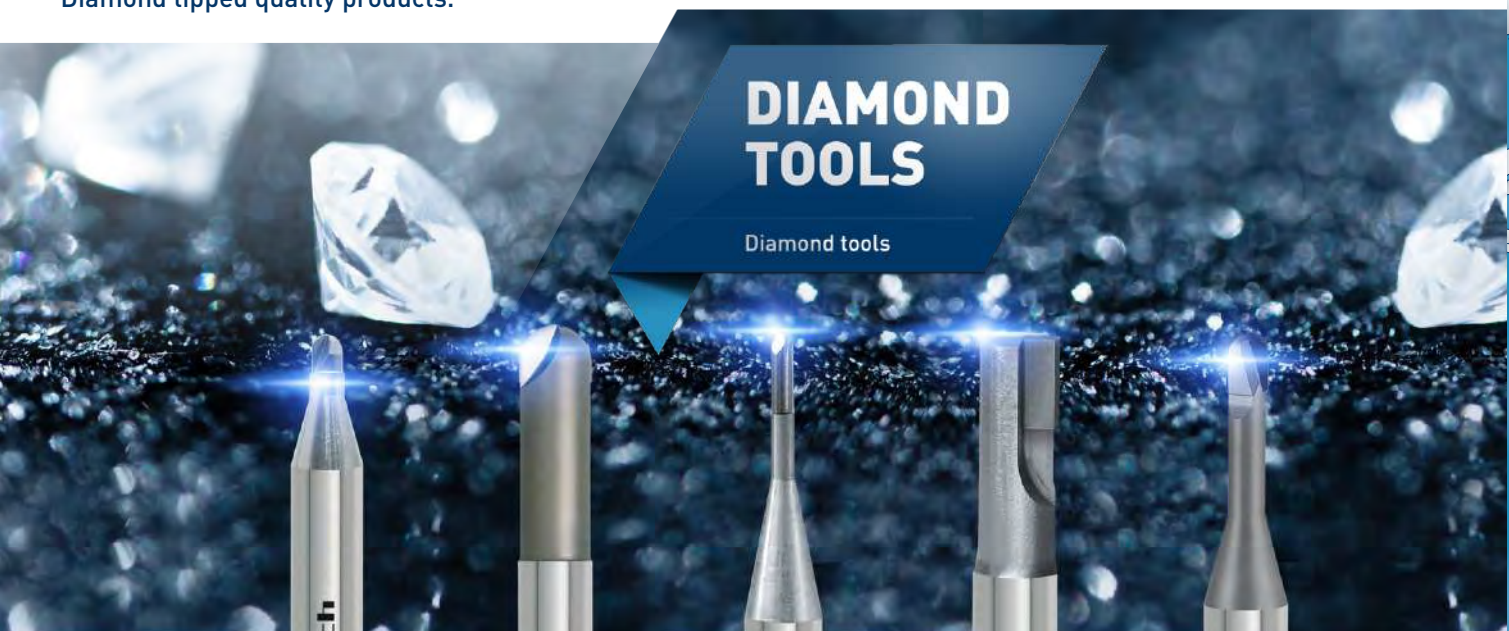
| Art. | d1* | f ±0,02 | l3 | d2 h6 | d3 | l1 | l2 | Z | € |
|-----------------|------|---------|----|-------|------|-----|-----|---|--------|
| 30 6524 0300 09 | • 3 | 0,1 | 9 | 6 | 2,9 | 75 | 2,5 | 2 | 171,00 |
| 30 6524 0300 15 | • 3 | 0,1 | 15 | 6 | 2,9 | 75 | 2,5 | 2 | 171,00 |
| 30 6524 0300 21 | • 3 | 0,1 | 21 | 6 | 2,9 | 75 | 2,5 | 2 | 171,00 |
| 30 6524 0400 12 | • 4 | 0,1 | 12 | 6 | 3,8 | 75 | 2,5 | 2 | 175,00 |
| 30 6524 0400 20 | • 4 | 0,1 | 20 | 6 | 3,8 | 75 | 2,5 | 2 | 175,00 |
| 30 6524 0400 28 | • 4 | 0,1 | 28 | 6 | 3,8 | 75 | 2,5 | 2 | 175,00 |
| 30 6524 0500 15 | • 5 | 0,1 | 15 | 6 | 4,8 | 75 | 3,0 | 2 | 181,00 |
| 30 6524 0500 25 | • 5 | 0,1 | 25 | 6 | 4,8 | 75 | 3,0 | 2 | 181,00 |
| 30 6524 0500 35 | • 5 | 0,1 | 35 | 6 | 4,8 | 75 | 3,0 | 2 | 181,00 |
| 30 6524 0600 18 | • 6 | 0,1 | 18 | 6 | 5,5 | 100 | 6,0 | 2 | 234,00 |
| 30 6524 0600 30 | • 6 | 0,1 | 30 | 6 | 5,5 | 100 | 6,0 | 2 | 234,00 |
| 30 6524 0600 42 | • 6 | 0,1 | 42 | 6 | 5,5 | 100 | 6,0 | 2 | 234,00 |
| 30 6524 0800 24 | • 8 | 0,1 | 24 | 8 | 7,4 | 100 | 7,0 | 2 | 290,00 |
| 30 6524 0800 40 | • 8 | 0,1 | 40 | 8 | 7,4 | 100 | 7,0 | 2 | 290,00 |
| 30 6524 1000 30 | • 10 | 0,1 | 30 | 10 | 9,6 | 100 | 8,0 | 2 | 324,00 |
| 30 6524 1000 50 | • 10 | 0,1 | 50 | 10 | 9,6 | 100 | 8,0 | 2 | 324,00 |
| 30 6524 1200 36 | • 12 | 0,1 | 36 | 12 | 11,6 | 105 | 9,0 | 2 | 349,00 |
| 30 6524 1200 60 | • 12 | 0,1 | 60 | 12 | 11,6 | 105 | 9,0 | 2 | 349,00 |

| | |
|----------------------------|---------------------|
| PKD EXTREME PCD EXTREME | KARNASCH NORM |
| SPEZIAL SPEZIAL | DIN 6535 Form HA |
| 0° | 45° x 0,1 |
| HSC High-Speed-Cutting | POLIERT POLISHED |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1268 | DXF/STEP |

Diamantbestückte Qualitätsprodukte.
Diamond tipped quality products.

Karnasch®
PROFESSIONAL TOOLS



DIAMOND TOOLS

Diamond tools



CBN



PKD
PCD



Naturdiamant
Natural Diamond
ND



Monokristallin Diamant
Monocrystalline
diamond MCD



CVD /
Diamant Beschichtung
Diamond coating

PKD/PCD **EXTREME**

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- 9

Index

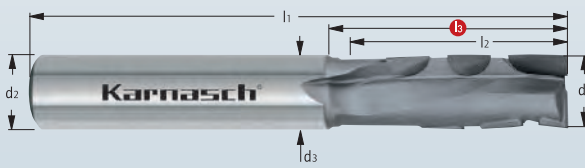
30 6528

PKD/PCD **EXTREME**

Schaftfräser Typ "V" Fräser für gradfreies Fräsen an Ober- und Unterkante von faserverstärkten Kunststoffen



PCD-Extreme type "V" mill for burr-free milling of upper and lower edge of fibre-reinforced plastics



| | | |
|-----|----------|---------------------|
| d1* | = Ø 10,0 | tol -0,000 / -0,022 |
| d1* | = Ø 12,0 | tol -0,000 / -0,027 |

| Art. | d1 h8 | f ±0,02 | l2 | l3 | d2 h6 | d3 | l1 | Z | € |
|--------------|-------|---------|----|----|-------|------|----|---|--------|
| 30 6528 1000 | % 10 | 0,1 | 22 | 30 | 10 | 9,4 | 72 | 2 | 469,80 |
| 30 6528 1200 | % 12 | 0,1 | 26 | 36 | 12 | 11,4 | 83 | 2 | 615,60 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



Die gleichzeitig ziehende und schiebende Anordnung der Schneiden verhindert Delamination.
Concurrent drawing and pushing blade alignment prevents delamination.

| | |
|-------------------------|------------------|
| PKD EXTREME PCD EXTREME | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | 45° x 0,1 |
| | HPC |
| | POLIERT POLISHED |
| | Air |

Schnittdaten
Cutting data

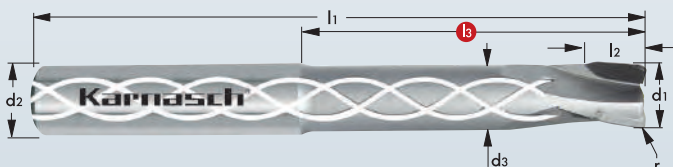
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1268

30 6534

PKD-Eckenradiusfräser mit Innenkühlung, 3×D-5×D-7×D, positiv
PCD-Corner radius end mill, positiv, with interior cooling



- Aluminium < 6% Si
- Aluminium > 6% Si
- MESSING brass
- Kupfer copper
- GFK-CFK GFRP-CFRP
- GRAPHIT graphite
- kurz-spanend short chip
- lang-spanend long chip



| Art. | d1 h7 | r ± 0,005 | l3 | d2 | d3 | l1 | l2 | Z | € |
|--------------------|-------|-----------|----|----|------|-----|----|---|--------|
| 30 6534 0600 10 18 | % 6 | 1,0 | 18 | 6 | 5,4 | 100 | 6 | 3 | 222,60 |
| 30 6534 0600 20 18 | % 6 | 2,0 | 18 | 6 | 5,4 | 100 | 6 | 3 | 222,60 |
| 30 6534 0600 10 30 | % 6 | 1,0 | 30 | 6 | 5,4 | 100 | 6 | 3 | 222,60 |
| 30 6534 0600 10 42 | % 6 | 1,0 | 42 | 6 | 5,4 | 100 | 6 | 3 | 222,60 |
| 30 6534 0800 03 24 | % 8 | 0,3 | 24 | 8 | 7,2 | 100 | 7 | 3 | 236,40 |
| 30 6534 0800 03 40 | % 8 | 0,3 | 40 | 8 | 7,2 | 100 | 7 | 3 | 236,40 |
| 30 6534 1000 10 30 | % 10 | 1,0 | 30 | 10 | 9,0 | 100 | 8 | 3 | 274,80 |
| 30 6534 1000 10 50 | % 10 | 1,0 | 50 | 10 | 9,0 | 100 | 8 | 3 | 274,80 |
| 30 6534 1200 05 36 | % 12 | 0,5 | 36 | 12 | 11,0 | 105 | 9 | 3 | 381,00 |
| 30 6534 1200 20 36 | % 12 | 2,0 | 36 | 12 | 11,0 | 105 | 9 | 3 | 381,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| | |
|---------------------|------------------------|
| PKD PCD MICRO-GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | 15° |
| | HSC High-Speed-Cutting |
| | POLIERT POLISHED |
| | EMU HWS AIR |

Schnittdaten
Cutting data

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1268

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- 8
- 9

Dia-Cut



11 1350

| | |
|--|------------------|
| GFK-CFK GFRP-CFRP | PA66 GF30 |
| THERMO-PLAST THERMO-PLASTICS | PVDF GF30 |
| DURO-PLASTE DURO-PLASTICS | PEEK GF30 |
| Aramid fiber AFK-SFK | PEEK CF30 |
| Hybrid-stoffe hybrid materials | GF GF25 |
| CFK-ALU Composite CFRP-ALU Composites | PVDF GF25 |
| Schicht-stoffe Laminates | GMT |
| Kevlar | SMC |
| Plexiglas acrylic glass | Acryl Acrylic |
| AL/TI | PMMA GS |
| TI-CFK TI-CFRP | Eternit |

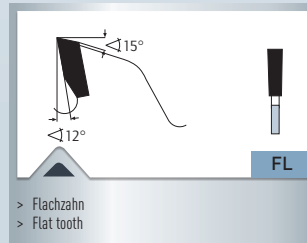


| | |
|---|---------------------------|
| PKD PCD MICRO-GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | |
| $\alpha = 12^\circ$ $\beta = 15^\circ$ | |
| | HSC High-Speed-Cutting |
| | PKD PCD |
| | |

Maschine | Machine

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Tisch- und Formatkreissägen

For hand-held circular saws, mitre saws, cross-cut saws, table and sizing saws



| Art. | | | | | | | € |
|----------------------------|-------|---------|-------|-------|----------|---|--------|
| NEW 11 1350 120 010 | • 120 | 2,2/1,6 | 20 | 6 FL | - | ✓ | 44,15 |
| NEW 11 1350 136 010 | • 136 | 2,2/1,6 | 20 | 6 FL | 2-6-32 | ✓ | 47,00 |
| 11 1350 160 005 | • 160 | 2,2/1,6 | 20/16 | 4 FL | 2-6-32,5 | ✓ | 39,70 |
| 11 1350 160 010 | • 160 | 2,2/1,6 | 20/16 | 8 FL | 2-6-32,5 | ✓ | 78,05 |
| 11 1350 160 020 | • 160 | 2,2/1,6 | 20/16 | 30 FL | 2-6-32,5 | ✓ | 231,50 |
| 11 1350 180 010 | • 180 | 2,2/1,6 | 30/20 | 8 FL | 2-7-42 | ✓ | 78,55 |
| 11 1350 190 005 | • 190 | 2,2/1,6 | 30/20 | 6 FL | 2-7-42 | ✓ | 27,45 |
| 11 1350 190 010 | • 190 | 2,2/1,6 | 30/20 | 8 FL | 2-7-42 | ✓ | 79,10 |
| NEW 11 1350 190 015 | • 190 | 2,2/1,6 | 30/20 | 12 FL | 2-7-42 | ✓ | 86,35 |
| 11 1350 190 020 | • 190 | 2,2/1,6 | 30/20 | 30 FL | 2-7-42 | ✓ | 249,60 |
| NEW 11 1350 210 005 | • 210 | 2,2/1,6 | 30 | 8 FL | UNI | ✓ | 81,15 |
| 11 1350 210 010 | • 210 | 2,2/1,6 | 30 | 12 FL | UNI | ✓ | 111,10 |
| 11 1350 210 020 | • 210 | 2,2/1,6 | 30 | 30 FL | UNI | ✓ | 279,05 |
| 11 1350 216 005 | • 216 | 2,2/1,6 | 30 | 8 FL | UNI | ✓ | 81,25 |
| 11 1350 216 010 | • 216 | 2,2/1,6 | 30 | 12 FL | UNI | ✓ | 113,25 |
| 11 1350 216 020 | • 216 | 2,2/1,6 | 30 | 30 FL | UNI | ✓ | 279,05 |
| 11 1350 230 005 | • 230 | 2,4/1,8 | 30 | 6 FL | UNI | ✓ | 32,20 |
| NEW 11 1350 230 007 | • 230 | 2,4/1,8 | 30 | 8 FL | UNI | ✓ | 84,00 |
| 11 1350 230 010 | • 230 | 2,4/1,8 | 30 | 15 FL | UNI | ✓ | 148,30 |
| 11 1350 230 020 | • 230 | 2,4/1,8 | 30 | 30 FL | UNI | ✓ | 279,05 |
| 11 1350 250 005 | • 250 | 2,4/1,8 | 30 | 6 FL | UNI | ✓ | 32,95 |
| NEW 11 1350 250 007 | • 250 | 2,4/1,8 | 30 | 8 FL | UNI | ✓ | 91,65 |
| 11 1350 250 010 | • 250 | 2,4/1,8 | 30 | 16 FL | UNI | ✓ | 164,85 |
| NEW 11 1350 250 015 | • 250 | 2,4/1,8 | 30 | 28 FL | UNI | ✓ | 172,00 |
| 11 1350 250 020 | • 250 | 2,4/1,8 | 30 | 40 FL | UNI | ✓ | 375,65 |
| NEW 11 1350 250 030 | • 250 | 2,4/1,8 | 30 | 48 FL | UNI | ✓ | 382,65 |
| 11 1350 300 005 | • 300 | 2,6/2,0 | 30 | 8 FL | UNI | ✓ | 88,25 |
| NEW 11 1350 300 015 | • 300 | 2,6/1,8 | 30 | 18 FL | UNI | ✓ | 140,30 |
| 11 1350 300 020 | • 300 | 2,6/2,0 | 30 | 36 FL | UNI | ✓ | 360,15 |
| 11 1350 300 030 | • 300 | 2,6/2,0 | 30 | 48 FL | UNI | ✓ | 468,15 |
| 11 1350 300 040 | • 300 | 2,6/2,0 | 30 | 60 FL | UNI | ✓ | 609,20 |
| NEW 11 1350 350 002 | • 350 | 2,8/2,2 | 30 | 10 FL | UNI | ✓ | 122,15 |
| NEW 11 1350 350 004 | • 350 | 2,8/2,2 | 30 | 24 FL | UNI | ✓ | 222,15 |
| NEW 11 1350 350 006 | • 350 | 2,8/2,2 | 30 | 36 FL | UNI | ✓ | 367,95 |
| NEW 11 1350 350 008 | • 350 | 2,8/2,2 | 30 | 48 FL | UNI | ✓ | 390,00 |
| 11 1350 350 010 | • 350 | 2,8/2,2 | 30 | 60 FL | UNI | ✓ | 649,50 |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.
UNI = 2-7-42 + 2-9-46,40 + 2-10-60



2 BOHREN DRILLING

VOLLHARTMETALL HOCHLEISTUNGSBOHRER
SOLID CARBIDE HIGH PERFORMANCE TWIST DRILL



2.1

☞ 227-296

VOLLHARTMETALL REIBAHLEN
SOLID CARBIDE REAMERS



2.2

☞ 297-302

SPATENBOHRER
SPADE DRILLS



2.3

☞ 303-356

KERNBOHRER
ANNULAR CUTTERS



2.4

☞ 357-562

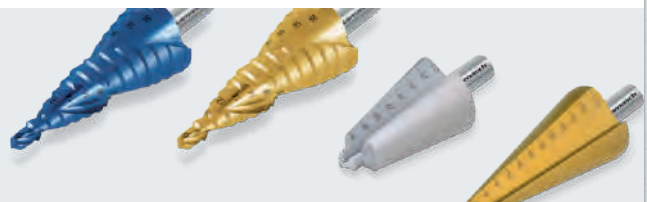
LOCHSÄGEN
HOLE SAWS



2.5

☞ 563-604

STUFENBOHRER · BLECHSCHÄLBOHRER
STEP DRILLS · TUBE AND SHEET DRILLS



2.6

☞ 605-620

HSS SPIRALBOHRER · GEWINDEBOHRER
HSS TWIST DRILLS · TAPS



2.7

☞ 621-626

VHM-GEWINDEBOHRER-AUSBOHRER
SOLID CARBIDE DRILLS TO REMOVE JAMMED TAPS



2.8

☞ 627-630

1



2



3



4



5



6



7



8



9



Index

Ihre Notizen & Zeichnungen Your notices & drafts

1



2



3



4



5



6



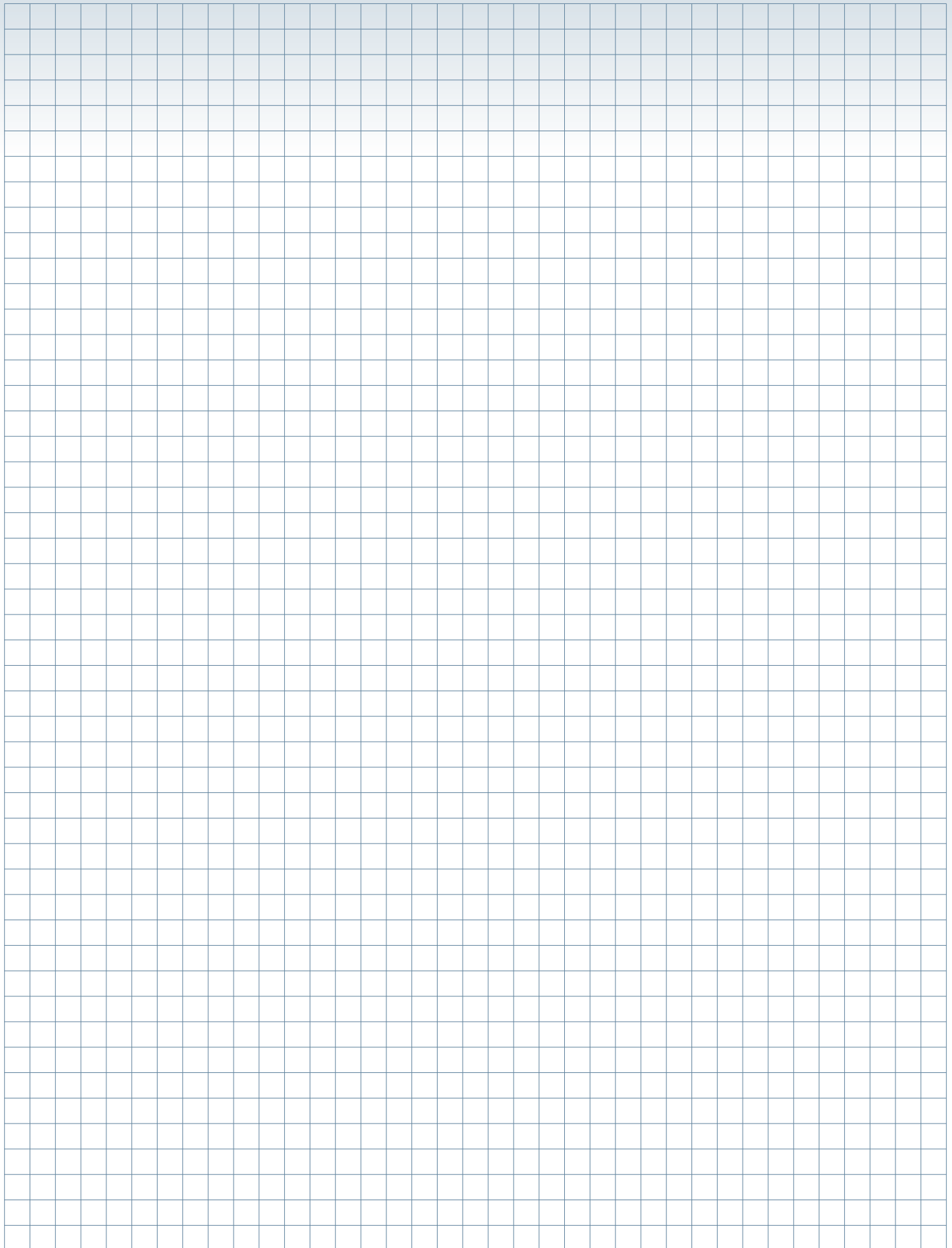
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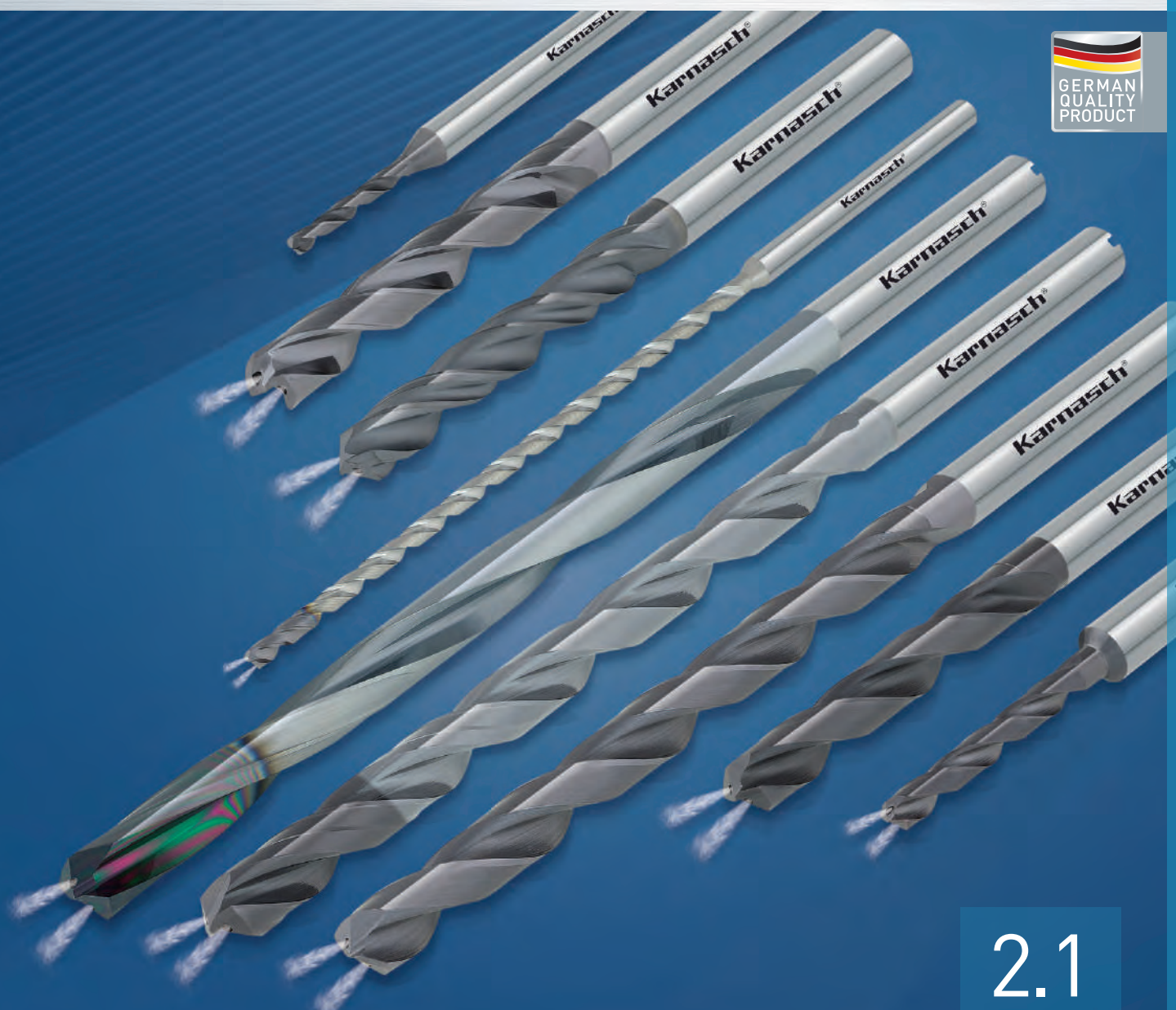


9



VOLLHARTMETALL HOCHLEISTUNGSBOHRER · MICROBOHRER

SOLID CARBIDE HIGH PERFORMANCE TWIST DRILL ·
MICRO TWIST DRILL



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

2.1

KONTAKT | CONTACT

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ONLINE



INHALTSVERZEICHNIS · TABLE OF CONTENTS

| Art. | Vollhartmetallbohrer / Solid carbide drills | Material |  | HSC high-speed cutting | HRC < 50 | HRC < 52 | HRC 50-70 |
|--|--|-------------|---|------------------------------|-------------|-------------|--------------|
| 22 0321 | Ø 0,8 - 2,95  | MICRO GRAIN |  | ✓ | | ✓ | |
| 22 0322 | Ø 0,8 - 2,95 < 30xD  | MICRO GRAIN |  | ✓ | | | |
| 22 0341 | Ø 0,1 - 3,0 < 6xD  | MICRO GRAIN |  | ✓ | | ✓ | |
| 22 0360 | Ø 0,5 - 3,0 < 10xD  | MICRO GRAIN |  | ✓ | | | |
| 22 0390 | Ø 3,0 - 12,0 < 50xD  | MICRO GRAIN |  | ✓ | | | |
| 22 0392 | Ø 2,0 - 12,0 < 40xD  | MICRO GRAIN |  | ✓ | | | |
| 22 0802 | Ø 3,0 - 12,0 < 5xD  | MICRO GRAIN |  | | ✓ | | |
| 22 0402 | Ø 3,0 - 20,0 < 5xD  BEST SELLER | MICRO GRAIN |  | ✓ | | ✓ | |
| 22 0403 | Ø 3,0 - 12,0 H7 < 5xD  | MICRO GRAIN |  | ✓ | | ✓ | |
| 22 0404 | Ø 3,0 - 12,0 < 5xD  | MICRO GRAIN |  | ✓ | | ✓ | |
| 22 0405 | Ø 3,0 - 20,0 < 8xD  BEST SELLER | MICRO GRAIN |  | ✓ | | ✓ | |
| 22 0806 | Ø 3,0 - 12,0 < 5xD  | MICRO GRAIN |  | | ✓ | | |
| 22 0406 | Ø 3,0 - 18,0 < 12xD  BEST SELLER | MICRO GRAIN |  | ✓ | | ✓ | |
| 22 0409 | Ø 3,0 - 16,0 < 8xD  | MICRO GRAIN |  | ✓ | | | |
| 22 0410 | Ø 3,0 - 16,0 < 5xD  | MICRO GRAIN |  | ✓ | | | |
| 22 0412 | Ø 3,0 - 16,0 < 5xD  | MICRO GRAIN |  | ✓ | | | |
| 22 0419 | Ø 3,0 - 12,0 H7 < 5xD  | MICRO GRAIN |  | ✓ | | | |
| 22 0424 | Ø 2,98 - 12,0 H7 < 5xD  | MICRO GRAIN |  | ✓ | | ✓ | |
| 22 0425 | Ø 3,0 - 20,0 H7 < 8xD  | MICRO GRAIN |  | ✓ | | | |
| 22 0468 | Ø 0,3 - 14,0  | MICRO GRAIN |  | | | | ✓ |
| 22 0530 | Ø 3,0 - 12,0 < 5xD  | MICRO GRAIN |  | ✓ | | | |
| Vollhartmetall Pilot-Stufenbohrer / Solid carbide pilot step drill | | | | | | | |
| 22 0389 | Ø 3,0 - 12,0 3xD  | MICRO GRAIN |  | ✓ | | ✓ | |
| Vollhartmetall-, Hochleistungs- und Mehrfasen-Stufenbohrer für HSC-Bearbeitung / Solid carbide high capacity subland twist drill | | | | | | | |
| 22 0471 | M3 - M16  | MICRO GRAIN |  | ✓ | | ✓ | |
| 22 0473 | M4 - M16  | MICRO GRAIN |  | ✓ | | ✓ | |

| STAHL steel | INOX Edelstahl STAINLESS STEEL | INCONEL HASTELLOY TITANIUM | GJL | GJS | GTW GTS | NE METALLE non-ferrous | GRAPHIT graphite | COMPO- SITES | kurz- spanend short chip | lang- spanend long chip | MIT INNEN- KÜHLUNG with interior cooling | OHNE INNEN- KÜHLUNG without interior cooling | DIN 6535 Form HA | DIN 6535 Form HE | DIN 6535 Form HAK | DIN 6535 Form HEK |
|----------------|--------------------------------------|----------------------------------|-----|-----|------------|------------------------------|---------------------|-----------------|--------------------------------|-------------------------------|---|---|---------------------|---------------------|----------------------|----------------------|
| ✓ | ✓ | | ✓ | ✓ | ✓ | | | | ✓ | | | ✓ | ✓ | | | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | ✓ | | | | ✓ | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | | ✓ | ✓ | | | |
| | | | | | | ✓ | | ✓ | | ✓ | | ✓ | ✓ | | | |
| ✓ | ✓ | | ✓ | ✓ | ✓ | | | | ✓ | | ✓ | | | | ✓ | |
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| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | ✓ | | | | | |

1 

2 

3 

4 

5 

6 

7 

8 

9 

INHALTSVERZEICHNIS · TABLE OF CONTENTS

| Art. | Vollhartmetallbohrer / Solid carbide drills | | | Material | | HSC high-speed cutting | HRC < 50 | HRC < 52 | HRC 50-70 |
|--|---|--------|---|--------------------------------|-------------|------------------------------|-------------|-------------|--------------|
| Vollhartmetallbohrer- Hochleistungsbohrer und Aufbohrer / Solid carbide twist drill / cordrill | | | | | | | | | |
| 22 0520 | Ø 3,0 - 12,0 | < 10xD |  | MICRO GRAIN | 273 | ✓ | | ✓ | |
| 22 0525 | Ø 4,0 - 12,0 | < 10xD |  | MICRO GRAIN | 273 | ✓ | | ✓ | |
| Vollhartmetallbohrer Diamantbeschichtet / Solid carbide twist drill with diamant coating | | | | | | | | | |
| 22 0415 | Ø 3,3 - 10,3 | < 5xD |  | DIAMANT DIAMOND DCC 0312 | 284 | ✓ | | | |
| Vollhartmetall Gewindefräser Diamantbeschichtet / Solid carbide thread milling cutter with diamant coating | | | | | | | | | |
| 23 2005 | M4 – M12 | 2,5xD |  | DCC 0318 | 285 | ✓ | | | |
| 23 2006 | M4 – M12 | 2,0xD |  | DCC 0318 | 285 | ✓ | | | |
| Hartgewindebohrer / High-hard machine taps | | | | | | | | | |
| 22 2025 | M3 – M12 | |  | MICRO GRAIN | 282 | | | | ✓ |
| 22 2215 | MF8 – MF12 | |  | MICRO GRAIN | 282 | | | | ✓ |
| 22 2239 | G1/8 – G1/4 | |  | MICRO GRAIN | 283 | | | | ✓ |
| PKD-Hochleistungsbohrer / PCD drill | | | | | | | | | |
| 29 0060 | Ø 0,5 - 2,5 | < 11xD |  | PKD PCD | 284 | ✓ | | | |
| 22 0526 | Ø 8,0 - 12,0 | < 11xD |  | PKD PCD | 280 | ✓ | | | |
| Vollhartmetallbohrer für Composites / Solid carbide drills for composites | | | | | | | | | |
| 29 0080A | Ø 3,0 - 12,0 | < 4xD |  | DIAMANT DIAMOND DCA-06 | 286 | ✓ | | | |
| 29 0080B | Ø 3,0 - 12,0 | < 4xD |  | MICRO GRAIN | 286 | ✓ | | | |
| 29 0120 | Ø 0,5 - 12,0 | |  | DCC 0318 | 288- 289 | ✓ | | | |
| 29 0121 | Ø 2,8 - 5,9 | |  | DCC 0318 | 290 | ✓ | | | |
| 29 0122 | Ø 6,0 - 12,0 | |  | DCC 0318 | 291 | ✓ | | | |

- Lagerware / Stock tool
- Keine Lagerware, Lieferzeit und Preis auf Anfrage
No stock tool. Price and delivery on request
- ☐ Lieferzeit kurzfristig da Rohlinglager vorhanden
Short delivery deadline possible then blanks are on stock available

- ⊘ Sonderpreis. Solange Vorrat reicht. Rückgabe nicht möglich.
Special price. While stocks last. Return not possible.
- 📅 2-3 Arbeitstage Lieferzeit / 2-3 work days delivery time



| STAHL steel | INOX Edelstahl STAINLESS STEEL | INCONEL HASTELLOY TITANIUM | GJL | GJS | GTW GTS | NE METALLE non-ferrous | GRAPHIT graphite | COMPO- SITES | kurz- spanend short chip | lang- spanend long chip | MIT INNEN- KÜHLUNG with in- terior cooling | OHNE INNEN- KÜHLUNG without in- terior cooling | DIN 6535 Form HA | DIN 6535 Form HE | DIN 6535 Form HAK | DIN 6535 Form HEK | |
|----------------|--------------------------------------|----------------------------------|-----|-----|------------|------------------------------|---------------------|-----------------|--------------------------------|-------------------------------|--|--|---------------------|---------------------|----------------------|----------------------|--|
| ✓ | | | ✓ | ✓ | ✓ | | | | ✓ | | | ✓ | ✓ | | | | |
| ✓ | | | ✓ | ✓ | ✓ | | | | ✓ | | ✓ | | | | | ✓ | |
| | | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ | |
| | | | | | | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ | | | | |
| | | | | | | ✓ | ✓ | ✓ | ✓ | | | ✓ | ✓ | | | | |
| | | | ✓ | ✓ | ✓ | | | | ✓ | | | ✓ | | | | | |
| | | | ✓ | ✓ | ✓ | | | | ✓ | | | ✓ | | | | | |
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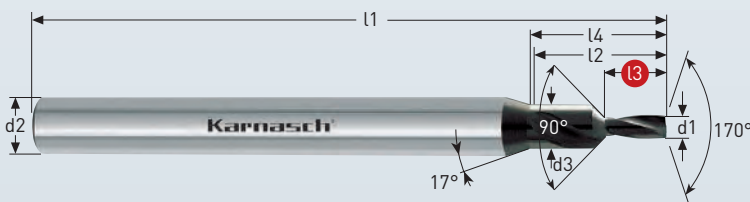
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22 0321

Vollhartmetall-Micro-Pilot-Stufenbohrer 170°/90° abgestimmt auf Micro-Tieflochbohrer 22 0322
Solid-carbide micro pilot step drill 170°/90°. Designed for micro deep hole drill 22 0322



STAHL
steel
< 1200 N/mm²

STAHL
steel
< 1500 N/mm²

INOX
Edelstahl
STAINLESS STEEL

GJL

GJS

GTW
GTS

kurz-spanend
short chip

| m7 | Bohrungstoleranz Hole tolerance |
|-----|------------------------------------|
| ≤ 3 | +0,002 +0,012 |

| Art. | d1 m7 | l3 | l2 | l4 | l1 | d3 | d2 h6 | € |
|--------------|--------|------|------|------|------|-----|-------|-------|
| 22 0321 0080 | • 0,80 | 2,00 | 4,7 | 5,2 | 50,0 | 1,7 | 4,0 | 70,00 |
| 22 0321 0085 | • 0,85 | 2,12 | 4,8 | 5,3 | 50,0 | 1,7 | 4,0 | 70,00 |
| 22 0321 0090 | • 0,90 | 2,25 | 4,9 | 5,4 | 50,0 | 1,7 | 4,0 | 70,00 |
| 22 0321 0095 | • 0,95 | 2,37 | 5,0 | 5,5 | 50,0 | 1,7 | 4,0 | 70,00 |
| 22 0321 0100 | • 1,00 | 2,50 | 5,6 | 6,1 | 55,0 | 2,0 | 4,0 | 70,00 |
| 22 0321 0105 | • 1,05 | 2,62 | 5,7 | 6,2 | 55,0 | 2,0 | 4,0 | 70,00 |
| 22 0321 0110 | • 1,10 | 2,75 | 5,9 | 6,4 | 55,0 | 2,0 | 4,0 | 70,00 |
| 22 0321 0115 | • 1,15 | 2,87 | 6,0 | 6,5 | 55,0 | 2,0 | 4,0 | 70,00 |
| 22 0321 0120 | • 1,20 | 3,00 | 6,1 | 6,6 | 55,0 | 2,0 | 4,0 | 70,00 |
| 22 0321 0125 | • 1,25 | 3,12 | 7,1 | 7,6 | 55,0 | 2,5 | 4,0 | 70,00 |
| 22 0321 0130 | • 1,30 | 3,25 | 7,2 | 7,7 | 55,0 | 2,5 | 4,0 | 70,00 |
| 22 0321 0135 | • 1,35 | 3,37 | 7,3 | 7,8 | 55,0 | 2,5 | 4,0 | 70,00 |
| 22 0321 0140 | • 1,40 | 3,50 | 7,4 | 7,9 | 55,0 | 2,5 | 4,0 | 70,00 |
| 22 0321 0145 | • 1,45 | 3,62 | 7,5 | 8,0 | 55,0 | 2,5 | 4,0 | 70,00 |
| 22 0321 0150 | • 1,50 | 3,75 | 8,6 | 9,1 | 55,0 | 3,0 | 4,0 | 70,00 |
| 22 0321 0155 | • 1,55 | 3,87 | 8,7 | 9,2 | 55,0 | 3,0 | 4,0 | 70,00 |
| 22 0321 0160 | • 1,60 | 4,00 | 8,8 | 9,3 | 55,0 | 3,0 | 4,0 | 70,00 |
| 22 0321 0165 | • 1,65 | 4,12 | 8,9 | 9,4 | 55,0 | 3,0 | 4,0 | 70,00 |
| 22 0321 0170 | • 1,70 | 4,25 | 9,1 | 9,6 | 55,0 | 3,0 | 4,0 | 70,00 |
| 22 0321 0175 | • 1,75 | 4,37 | 9,2 | 9,7 | 55,0 | 3,0 | 4,0 | 70,00 |
| 22 0321 0180 | • 1,80 | 4,50 | 10,1 | 10,6 | 55,0 | 3,5 | 4,0 | 70,00 |
| 22 0321 0185 | • 1,85 | 4,62 | 10,3 | 10,8 | 55,0 | 3,5 | 4,0 | 70,00 |
| 22 0321 0190 | • 1,90 | 4,75 | 10,4 | 10,9 | 55,0 | 3,5 | 4,0 | 70,00 |
| 22 0321 0195 | • 1,95 | 4,87 | 10,5 | 11,0 | 55,0 | 3,5 | 4,0 | 70,00 |
| 22 0321 0200 | • 2,00 | 5,00 | 10,6 | 11,1 | 65,0 | 3,5 | 6,0 | 75,00 |
| 22 0321 0205 | • 2,05 | 5,12 | 10,7 | 11,2 | 65,0 | 3,5 | 6,0 | 75,00 |
| 22 0321 0210 | • 2,10 | 5,25 | 10,8 | 11,3 | 65,0 | 3,5 | 6,0 | 75,00 |
| 22 0321 0215 | • 2,15 | 5,37 | 10,9 | 11,4 | 65,0 | 3,5 | 6,0 | 75,00 |
| 22 0321 0220 | • 2,20 | 5,50 | 12,8 | 13,3 | 65,0 | 4,5 | 6,0 | 75,00 |
| 22 0321 0225 | • 2,25 | 5,62 | 12,9 | 13,4 | 65,0 | 4,5 | 6,0 | 75,00 |
| 22 0321 0230 | • 2,30 | 5,75 | 13,0 | 13,5 | 65,0 | 4,5 | 6,0 | 75,00 |
| 22 0321 0235 | • 2,35 | 5,87 | 13,1 | 13,6 | 65,0 | 4,5 | 6,0 | 75,00 |
| 22 0321 0240 | • 2,40 | 6,00 | 13,2 | 13,7 | 65,0 | 4,5 | 6,0 | 75,00 |
| 22 0321 0245 | • 2,45 | 6,12 | 13,4 | 13,9 | 65,0 | 4,5 | 6,0 | 75,00 |
| 22 0321 0250 | • 2,50 | 6,25 | 13,5 | 14,0 | 65,0 | 4,5 | 6,0 | 75,00 |
| 22 0321 0255 | • 2,55 | 6,37 | 13,6 | 14,1 | 65,0 | 4,5 | 6,0 | 75,00 |
| 22 0321 0260 | • 2,60 | 6,50 | 13,7 | 14,2 | 65,0 | 4,5 | 6,0 | 75,00 |
| 22 0321 0265 | • 2,65 | 6,62 | 14,7 | 15,2 | 65,0 | 5,0 | 6,0 | 75,00 |
| 22 0321 0270 | • 2,70 | 6,75 | 14,8 | 15,3 | 65,0 | 5,0 | 6,0 | 75,00 |
| 22 0321 0275 | • 2,75 | 6,87 | 14,9 | 15,4 | 65,0 | 5,0 | 6,0 | 75,00 |
| 22 0321 0280 | • 2,80 | 7,00 | 15,0 | 15,5 | 65,0 | 5,0 | 6,0 | 75,00 |
| 22 0321 0285 | • 2,85 | 7,12 | 15,1 | 15,6 | 65,0 | 5,0 | 6,0 | 75,00 |
| 22 0321 0290 | • 2,90 | 7,25 | 15,2 | 15,7 | 65,0 | 5,0 | 6,0 | 75,00 |
| 22 0321 0295 | • 2,95 | 7,37 | 15,4 | 15,9 | 65,0 | 5,0 | 6,0 | 75,00 |

MICRO GRAIN KARNASCH NORM

SPEZIAL DIN 6535 Form HA



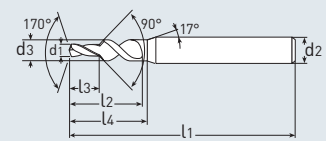
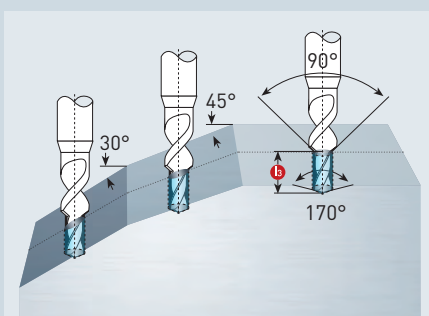
HSC
HPC

DVC-X2



Schnittdaten Cutting data | Film Movie | Zeichnungen Drawings

[i](#) 232 [▶](#) [DXF/STEP](#)



Richtwerte für den Einsatz der KARNASCH VHM-Hochleistungsbohrer ohne Innenkühlung
Recommended cutting data for solid carbide twist drill, without interior cooling supply

| Werkstoffe Work material | Werkstoffgruppe Material group | Bohrer Ø Festigkeit in N/mm ² | Ø 0.80-0.85 | | Ø 0.86-0.99 | | Ø 1.0-2.95 | |
|--|-----------------------------------|--|------------------------|------------------------------|------------------------|------------------------------|------------------------|------------------------------|
| | | | Vc m/min (40-60) | f mm/Umdr. (0.01-0.03) | Vc m/min (40-60) | f mm/Umdr. (0.02-0.05) | Vc m/min (40-60) | f mm/Umdr. (0.04-0.12) |
| Baustahl Mild steel | 1.1 | ≤ 600 | 50 (40-60) | 0.02 (0.01-0.03) | 50 (40-60) | 0.03 (0.02-0.05) | 50 (40-60) | 0.08 (0.04-0.12) |
| Kohlenstoffstahl Legierter Stahl Carbon steel Alloy steel | 1.2-2.1-2.2 2.2-2.3-2.5-2.6 | 600-950 950-1200 | 50 (40-60) | 0.02 (0.01-0.03) | 50 (40-60) | 0.03 (0.02-0.05) | 50 (40-60) | 0.08 (0.04-0.12) |
| Edelstahl Stainless steel | 3.1 | 680 | 30 (20-40) | 0.015 (0.008-0.02) | 30 (20-40) | 0.02 (0.01-0.03) | 30 (20-40) | 0.05 (0.02-0.10) |
| Guss Cast iron | 7.1-7.2 | ≤ 105 HB | 50 (40-60) | 0.02 (0.01-0.03) | 50 (40-60) | 0.04 (0.02-0.06) | 50 (40-60) | 0.08 (0.04-0.12) |
| Kugelgraphitguss Ductile cast iron | 7.4 | ≤ 133 HB | 30 (20-40) | 0.02 (0.01-0.03) | 30 (20-40) | 0.03 (0.02-0.05) | 30 (20-40) | 0.06 (0.02-0.10) |

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1



2



3



4



5



6



7



8



9



Index

22 0322

Mini-Vollhartmetall-Hochleistungsbohrer < 30×D
Mini solid carbide twist drill < 30×D



STAHL
steel
< 1200 N/mm²

STAHL
steel
< 1500 N/mm²

INOX
Edelstahl
STAINLESS STEEL

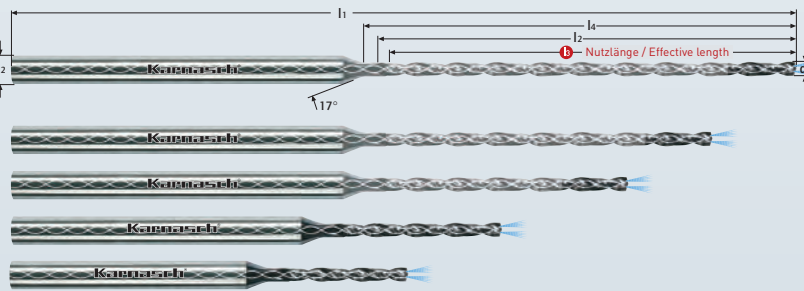
INCONEL
HASTELLOY
TITANIUM

GJL

GJS

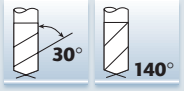
GTW
GTS

kurz-spanend
short chip



MICRO GRAIN KARNASCH NORM

SPEZIAL DIN 6535 Form HAK



HSC
HPC

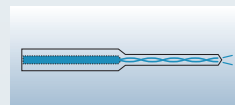
DVC-X2²
Nano-finish



Pilotbohrer Art. 22 0321 auf S. 232.
Pilot drill art. 22 0321 on page 232.

| Bohrertoleranz Drill tolerance |
|-----------------------------------|
| ≤ 3,0 |
| + 0,000 |
| - 0,010 |

Powerkammer
Powerchamber



Vorteile / Advantages

- Erhöhter Kühlmittelaustritt auch bei niedrigem Druck
- Erhöhter Kühlmittelaustritt bei gleichem Druck
- Increased cooling pressure even at a lower pressure
- Increased cooling pressure at identical pressure

Die Aktuelle Produktion wird bis Ø 1,45 mm auf die Ausführung mit Powerkammer-Schaft umgestellt.

The current production until Ø 1,45 mm will be changed in a shank with a powerchamber.

Schnittdaten
Cutting data



Film
Movie



Zeichnungen
Drawings



| Art. | d1 h7 | l3 | l2 | l4 | l1 | d2 h6 | € |
|------------------|--------|------|----|----|----|-------|--------|
| 22 0322 0080 050 | • 0,80 | 5 | 6 | 7 | 50 | 3 | 108,00 |
| 22 0322 0080 105 | • 0,80 | 10,5 | 11 | 12 | 50 | 3 | 117,00 |
| 22 0322 0085 055 | • 0,85 | 5,5 | 7 | 8 | 50 | 3 | 108,00 |
| 22 0322 0085 105 | • 0,85 | 10,5 | 12 | 13 | 50 | 3 | 117,00 |
| 22 0322 0090 055 | • 0,90 | 5,5 | 7 | 8 | 50 | 3 | 108,00 |
| 22 0322 0090 115 | • 0,90 | 11,5 | 13 | 14 | 50 | 3 | 117,00 |
| 22 0322 0095 060 | • 0,95 | 6 | 7 | 8 | 50 | 3 | 108,00 |
| 22 0322 0095 115 | • 0,95 | 11,5 | 13 | 14 | 50 | 3 | 117,00 |
| 22 0322 0100 060 | • 1,00 | 6 | 7 | 8 | 60 | 3 | 96,00 |
| 22 0322 0100 120 | • 1,00 | 12 | 13 | 14 | 65 | 3 | 112,00 |
| 22 0322 0100 180 | • 1,00 | 18 | 20 | 21 | 65 | 3 | 123,00 |
| 22 0322 0105 070 | • 1,05 | 7 | 8 | 10 | 60 | 3 | 96,00 |
| 22 0322 0105 130 | • 1,05 | 13 | 14 | 16 | 65 | 3 | 112,00 |
| 22 0322 0105 190 | • 1,05 | 19 | 21 | 22 | 65 | 3 | 123,00 |
| 22 0322 0110 070 | • 1,10 | 7 | 9 | 10 | 60 | 3 | 96,00 |
| 22 0322 0110 140 | • 1,10 | 14 | 16 | 17 | 65 | 3 | 112,00 |
| 22 0322 0110 200 | • 1,10 | 20 | 22 | 23 | 65 | 3 | 123,00 |
| 22 0322 0115 070 | • 1,15 | 7 | 9 | 10 | 60 | 3 | 96,00 |
| 22 0322 0115 140 | • 1,15 | 14 | 16 | 17 | 65 | 3 | 112,00 |
| 22 0322 0115 210 | • 1,15 | 21 | 23 | 24 | 65 | 3 | 123,00 |
| 22 0322 0120 080 | • 1,20 | 8 | 10 | 11 | 60 | 3 | 96,00 |
| 22 0322 0120 150 | • 1,20 | 15 | 17 | 18 | 65 | 3 | 112,00 |
| 22 0322 0120 220 | • 1,20 | 22 | 24 | 25 | 65 | 3 | 123,00 |
| 22 0322 0125 080 | • 1,25 | 8 | 10 | 11 | 60 | 3 | 96,00 |
| 22 0322 0125 150 | • 1,25 | 15 | 17 | 18 | 65 | 3 | 112,00 |
| 22 0322 0125 230 | • 1,25 | 23 | 25 | 26 | 65 | 3 | 123,00 |
| 22 0322 0130 080 | • 1,30 | 8 | 10 | 11 | 60 | 3 | 96,00 |
| 22 0322 0130 160 | • 1,30 | 16 | 18 | 19 | 65 | 3 | 112,00 |
| 22 0322 0130 240 | • 1,30 | 24 | 26 | 27 | 65 | 3 | 123,00 |
| 22 0322 0135 090 | • 1,35 | 9 | 11 | 12 | 60 | 3 | 96,00 |
| 22 0322 0135 170 | • 1,35 | 17 | 19 | 20 | 65 | 3 | 112,00 |
| 22 0322 0135 250 | • 1,35 | 25 | 27 | 28 | 65 | 3 | 123,00 |
| 22 0322 0140 090 | • 1,40 | 9 | 11 | 12 | 60 | 3 | 96,00 |
| 22 0322 0140 170 | • 1,40 | 17 | 19 | 20 | 65 | 3 | 112,00 |
| 22 0322 0140 260 | • 1,40 | 26 | 28 | 29 | 65 | 3 | 123,00 |
| 22 0322 0145 090 | • 1,45 | 9 | 12 | 13 | 60 | 3 | 96,00 |
| 22 0322 0145 180 | • 1,45 | 18 | 20 | 21 | 65 | 3 | 112,00 |
| 22 0322 0145 270 | • 1,45 | 27 | 30 | 31 | 65 | 3 | 123,00 |
| 22 0322 0150 090 | • 1,50 | 9 | 11 | 12 | 60 | 3 | 96,00 |
| 22 0322 0150 180 | • 1,50 | 18 | 20 | 21 | 65 | 3 | 112,00 |
| 22 0322 0150 270 | • 1,50 | 27 | 30 | 31 | 65 | 3 | 123,00 |
| 22 0322 0155 100 | • 1,55 | 10 | 12 | 13 | 60 | 3 | 96,00 |
| 22 0322 0155 190 | • 1,55 | 19 | 21 | 22 | 65 | 3 | 112,00 |
| 22 0322 0155 280 | • 1,55 | 28 | 31 | 32 | 65 | 3 | 123,00 |

| Art. | d1 h7 | l3 | l2 | l4 | l1 | d2 h6 | € |
|------------------|--------|----|----|----|-----|-------|--------|
| 22 0322 0160 100 | • 1,60 | 10 | 13 | 14 | 60 | 3 | 96,00 |
| 22 0322 0160 200 | • 1,60 | 20 | 22 | 23 | 65 | 3 | 112,00 |
| 22 0322 0160 300 | • 1,60 | 30 | 32 | 33 | 65 | 3 | 123,00 |
| 22 0322 0165 100 | • 1,65 | 10 | 13 | 14 | 60 | 3 | 96,00 |
| 22 0322 0165 200 | • 1,65 | 20 | 22 | 23 | 65 | 3 | 112,00 |
| 22 0322 0165 300 | • 1,65 | 30 | 32 | 33 | 65 | 3 | 123,00 |
| 22 0322 0170 110 | • 1,70 | 11 | 14 | 15 | 60 | 3 | 96,00 |
| 22 0322 0170 210 | • 1,70 | 21 | 23 | 24 | 65 | 3 | 112,00 |
| 22 0322 0170 310 | • 1,70 | 31 | 34 | 35 | 70 | 3 | 123,00 |
| 22 0322 0175 110 | • 1,75 | 11 | 14 | 15 | 60 | 3 | 96,00 |
| 22 0322 0175 210 | • 1,75 | 21 | 23 | 24 | 65 | 3 | 112,00 |
| 22 0322 0175 320 | • 1,75 | 32 | 35 | 36 | 70 | 3 | 123,00 |
| 22 0322 0180 110 | • 1,80 | 11 | 14 | 15 | 60 | 3 | 96,00 |
| 22 0322 0180 220 | • 1,80 | 22 | 25 | 26 | 70 | 3 | 112,00 |
| 22 0322 0180 330 | • 1,80 | 33 | 36 | 37 | 70 | 3 | 123,00 |
| 22 0322 0185 120 | • 1,85 | 12 | 15 | 16 | 60 | 3 | 96,00 |
| 22 0322 0185 230 | • 1,85 | 23 | 26 | 27 | 70 | 3 | 112,00 |
| 22 0322 0185 340 | • 1,85 | 34 | 37 | 38 | 70 | 3 | 123,00 |
| 22 0322 0190 120 | • 1,90 | 12 | 15 | 16 | 60 | 3 | 96,00 |
| 22 0322 0190 230 | • 1,90 | 23 | 26 | 27 | 70 | 3 | 112,00 |
| 22 0322 0190 350 | • 1,90 | 35 | 37 | 38 | 70 | 3 | 123,00 |
| 22 0322 0195 120 | • 1,95 | 12 | 15 | 16 | 60 | 3 | 96,00 |
| 22 0322 0195 240 | • 1,95 | 24 | 27 | 28 | 70 | 3 | 112,00 |
| 22 0322 0195 360 | • 1,95 | 36 | 39 | 40 | 70 | 3 | 123,00 |
| 22 0322 0200 120 | • 2,00 | 12 | 15 | 16 | 60 | 3 | 96,00 |
| 22 0322 0200 240 | • 2,00 | 24 | 26 | 27 | 70 | 3 | 112,00 |
| 22 0322 0200 360 | • 2,00 | 36 | 37 | 38 | 70 | 3 | 123,00 |
| 22 0322 0205 130 | • 2,05 | 13 | 16 | 17 | 60 | 3 | 96,00 |
| 22 0322 0205 250 | • 2,05 | 25 | 28 | 29 | 70 | 3 | 112,00 |
| 22 0322 0205 370 | • 2,05 | 37 | 40 | 41 | 70 | 3 | 123,00 |
| 22 0322 0205 630 | • 2,05 | 63 | 66 | 67 | 118 | 3 | 124,80 |
| 22 0322 0210 130 | • 2,10 | 13 | 16 | 17 | 60 | 3 | 96,00 |
| 22 0322 0210 260 | • 2,10 | 26 | 29 | 30 | 70 | 3 | 112,00 |
| 22 0322 0210 380 | • 2,10 | 38 | 42 | 43 | 70 | 3 | 123,00 |
| 22 0322 0210 650 | • 2,10 | 65 | 68 | 69 | 118 | 3 | 124,80 |
| 22 0322 0215 130 | • 2,15 | 13 | 16 | 17 | 60 | 3 | 96,00 |
| 22 0322 0215 260 | • 2,15 | 26 | 29 | 30 | 70 | 3 | 112,00 |
| 22 0322 0215 390 | • 2,15 | 39 | 43 | 44 | 70 | 3 | 123,00 |
| 22 0322 0215 530 | • 2,15 | 53 | 56 | 57 | 100 | 3 | 112,20 |
| 22 0322 0215 660 | • 2,15 | 66 | 69 | 70 | 118 | 3 | 124,80 |
| 22 0322 0220 140 | • 2,20 | 14 | 18 | 19 | 60 | 3 | 96,00 |
| 22 0322 0220 270 | • 2,20 | 27 | 30 | 31 | 70 | 3 | 112,00 |
| 22 0322 0220 400 | • 2,20 | 40 | 44 | 45 | 75 | 3 | 123,00 |
| 22 0322 0220 550 | • 2,20 | 55 | 58 | 59 | 105 | 3 | 117,00 |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | d1 h7 | l3 | l2 | l4 | l1 | d2 h6 | € |
|------------------|-------|----|----|----|-----|-------|--------|
| 22 0322 0220 680 | 2,20 | 68 | 71 | 72 | 118 | 3 | 124,80 |
| 22 0322 0225 140 | 2,25 | 14 | 18 | 19 | 60 | 3 | 96,00 |
| 22 0322 0225 270 | 2,25 | 27 | 30 | 31 | 70 | 3 | 112,00 |
| 22 0322 0225 410 | 2,25 | 41 | 44 | 45 | 75 | 3 | 123,00 |
| 22 0322 0225 570 | 2,25 | 57 | 60 | 61 | 105 | 3 | 117,00 |
| 22 0322 0225 690 | 2,25 | 69 | 72 | 73 | 118 | 3 | 124,80 |
| 22 0322 0230 140 | 2,30 | 14 | 18 | 19 | 60 | 3 | 96,00 |
| 22 0322 0230 280 | 2,30 | 28 | 31 | 32 | 70 | 3 | 112,00 |
| 22 0322 0230 420 | 2,30 | 42 | 45 | 46 | 82 | 3 | 123,00 |
| 22 0322 0230 570 | 2,30 | 57 | 60 | 61 | 105 | 3 | 117,00 |
| 22 0322 0230 710 | 2,30 | 71 | 74 | 75 | 118 | 3 | 124,80 |
| 22 0322 0235 150 | 2,35 | 15 | 19 | 20 | 60 | 3 | 96,00 |
| 22 0322 0235 290 | 2,35 | 29 | 32 | 33 | 70 | 3 | 112,00 |
| 22 0322 0235 430 | 2,35 | 43 | 46 | 48 | 82 | 3 | 123,00 |
| 22 0322 0235 590 | 2,35 | 59 | 62 | 63 | 105 | 3 | 117,00 |
| 22 0322 0235 730 | 2,35 | 73 | 76 | 77 | 120 | 3 | 124,80 |
| 22 0322 0240 150 | 2,40 | 15 | 19 | 20 | 60 | 3 | 96,00 |
| 22 0322 0240 290 | 2,40 | 29 | 32 | 33 | 70 | 3 | 112,00 |
| 22 0322 0240 440 | 2,40 | 44 | 47 | 48 | 82 | 3 | 123,00 |
| 22 0322 0240 600 | 2,40 | 60 | 63 | 64 | 105 | 3 | 117,00 |
| 22 0322 0240 750 | 2,40 | 75 | 78 | 79 | 120 | 3 | 124,80 |
| 22 0322 0245 150 | 2,45 | 15 | 19 | 20 | 60 | 3 | 96,00 |
| 22 0322 0245 300 | 2,45 | 30 | 33 | 34 | 70 | 3 | 112,00 |
| 22 0322 0245 450 | 2,45 | 45 | 49 | 50 | 82 | 3 | 123,00 |
| 22 0322 0245 620 | 2,45 | 62 | 65 | 66 | 105 | 3 | 117,00 |
| 22 0322 0245 760 | 2,45 | 76 | 79 | 80 | 120 | 3 | 124,80 |
| 22 0322 0250 150 | 2,50 | 15 | 19 | 20 | 60 | 3 | 96,00 |
| 22 0322 0250 300 | 2,50 | 30 | 33 | 34 | 70 | 3 | 112,00 |
| 22 0322 0250 450 | 2,50 | 45 | 49 | 50 | 82 | 3 | 123,00 |
| 22 0322 0250 770 | 2,50 | 77 | 80 | 81 | 120 | 3 | 124,80 |
| 22 0322 0255 160 | 2,55 | 16 | 20 | 21 | 60 | 3 | 96,00 |
| 22 0322 0255 310 | 2,55 | 31 | 35 | 36 | 75 | 3 | 112,00 |
| 22 0322 0255 460 | 2,55 | 46 | 50 | 53 | 82 | 3 | 123,00 |
| 22 0322 0255 670 | 2,55 | 67 | 70 | 71 | 120 | 3 | 121,20 |
| 22 0322 0255 790 | 2,55 | 79 | 82 | 83 | 130 | 3 | 129,60 |
| 22 0322 0260 160 | 2,60 | 16 | 20 | 21 | 60 | 3 | 96,00 |
| 22 0322 0260 320 | 2,60 | 32 | 36 | 37 | 75 | 3 | 112,00 |
| 22 0322 0260 470 | 2,60 | 47 | 52 | 53 | 82 | 3 | 123,00 |
| 22 0322 0260 670 | 2,60 | 67 | 71 | 72 | 120 | 3 | 121,20 |
| 22 0322 0260 800 | 2,60 | 80 | 84 | 85 | 130 | 3 | 129,60 |

| Art. | d1 h7 | l3 | l2 | l4 | l1 | d2 h6 | € |
|------------------|-------|----|----|----|-----|-------|--------|
| 22 0322 0265 160 | 2,65 | 16 | 20 | 21 | 60 | 3 | 96,00 |
| 22 0322 0265 320 | 2,65 | 32 | 36 | 37 | 75 | 3 | 112,00 |
| 22 0322 0265 480 | 2,65 | 48 | 53 | 54 | 82 | 3 | 123,00 |
| 22 0322 0265 680 | 2,65 | 68 | 72 | 73 | 120 | 3 | 121,20 |
| 22 0322 0265 810 | 2,65 | 81 | 85 | 86 | 130 | 3 | 129,60 |
| 22 0322 0270 170 | 2,70 | 17 | 21 | 22 | 60 | 3 | 96,00 |
| 22 0322 0270 330 | 2,70 | 33 | 37 | 38 | 75 | 3 | 112,00 |
| 22 0322 0270 490 | 2,70 | 49 | 54 | 55 | 90 | 3 | 123,00 |
| 22 0322 0270 690 | 2,70 | 69 | 73 | 74 | 120 | 3 | 121,20 |
| 22 0322 0270 830 | 2,70 | 83 | 87 | 88 | 130 | 3 | 129,60 |
| 22 0322 0275 170 | 2,75 | 17 | 21 | 22 | 60 | 3 | 96,00 |
| 22 0322 0275 330 | 2,75 | 33 | 37 | 38 | 75 | 3 | 112,00 |
| 22 0322 0275 500 | 2,75 | 50 | 54 | 56 | 90 | 3 | 123,00 |
| 22 0322 0275 710 | 2,75 | 71 | 75 | 76 | 120 | 3 | 121,20 |
| 22 0322 0275 850 | 2,75 | 85 | 89 | 90 | 130 | 3 | 129,60 |
| 22 0322 0280 170 | 2,80 | 17 | 21 | 22 | 60 | 3 | 96,00 |
| 22 0322 0280 340 | 2,80 | 34 | 38 | 39 | 75 | 3 | 112,00 |
| 22 0322 0280 530 | 2,80 | 53 | 57 | 58 | 90 | 3 | 123,00 |
| 22 0322 0280 720 | 2,80 | 72 | 76 | 77 | 120 | 3 | 121,20 |
| 22 0322 0280 860 | 2,80 | 86 | 90 | 91 | 130 | 3 | 129,60 |
| 22 0322 0285 180 | 2,85 | 18 | 23 | 24 | 60 | 3 | 96,00 |
| 22 0322 0285 350 | 2,85 | 35 | 39 | 40 | 75 | 3 | 112,00 |
| 22 0322 0285 530 | 2,85 | 53 | 57 | 58 | 90 | 3 | 123,00 |
| 22 0322 0285 730 | 2,85 | 73 | 77 | 78 | 120 | 3 | 121,20 |
| 22 0322 0285 880 | 2,85 | 88 | 92 | 93 | 130 | 3 | 129,60 |
| 22 0322 0290 180 | 2,90 | 18 | 23 | 24 | 60 | 3 | 96,00 |
| 22 0322 0290 350 | 2,90 | 35 | 39 | 40 | 75 | 3 | 112,00 |
| 22 0322 0290 530 | 2,90 | 53 | 57 | 58 | 90 | 3 | 123,00 |
| 22 0322 0290 740 | 2,90 | 74 | 78 | 79 | 120 | 3 | 121,20 |
| 22 0322 0290 890 | 2,90 | 89 | 93 | 94 | 130 | 3 | 129,60 |
| 22 0322 0295 180 | 2,95 | 18 | 23 | 24 | 60 | 3 | 96,00 |
| 22 0322 0295 360 | 2,95 | 36 | 40 | 41 | 75 | 3 | 112,00 |
| 22 0322 0295 540 | 2,95 | 54 | 58 | 59 | 90 | 3 | 123,00 |
| 22 0322 0295 740 | 2,95 | 74 | 78 | 79 | 120 | 3 | 121,20 |
| 22 0322 0295 890 | 2,95 | 89 | 93 | 94 | 130 | 3 | 129,60 |

> Ø 2,95 = Art. 22 0390 auf Seite / on page 244-245
 % Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
 Special price / sale article. White stocks last.

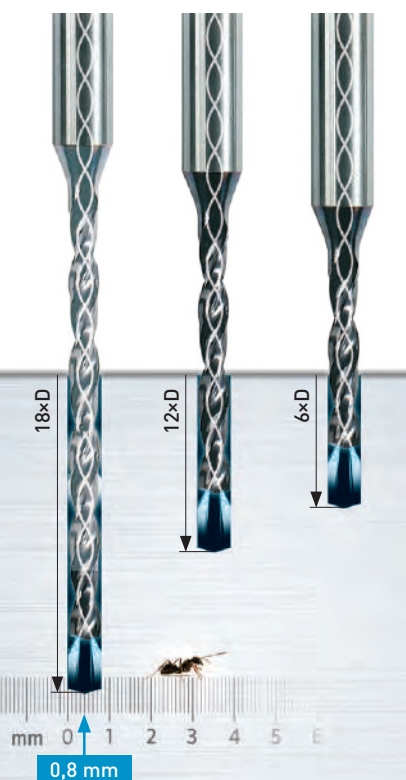
HSC- und HPC-Vollhartmetall-Minibohrer mit Innenkühlung

Ø 0,8 - 0,95 mm 6xD-12xD
 Ø 1,0 - 2,95 mm 6xD-12xD-18xD

HSC- and HPC-solid carbide mini drill with interior cooling supply

Ø 0,8 - 0,95 mm 6xD-12xD
 Ø 1,0 - 2,95 mm 6xD-12xD-18xD

- Neue Perspektive durch Innenkühlung ab 0,8 Ø mm
6xD – 12xD – 18xD
New perspective through interior cooling supply from 0,8 Ø mm
6xD – 12xD – 18xD
- Reduzierte Taktzeiten
Reduced cycle-times
- Überlegene Leistung
Superior performance
- Weltweit einmalige Ausführung
Worldwide unique version
- Prozesssicher
Process reliability



22 0341

Vollhartmetall-Hochleistungs-Minidrill – HSC/HHC < 10xD
Solid carbide-micro-twist drill – HSC/HHC < 10xD



STAHL
steel

INOX
Edelstahl
STAINLESS STEEL

INCONE
HASTELLOY
TITANIUM

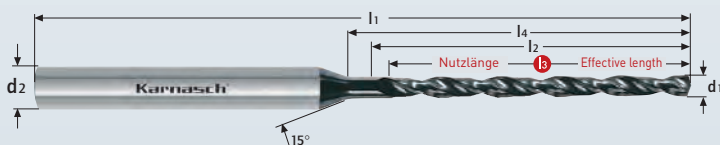
GJL

GJS

GTW
GTS

HRC
< 52

kurz-
spanend
short chip



| k5 | Bohrertoleranz Drill tolerance |
|-------|-----------------------------------|
| ≅ 3,0 | + 0,004 - 0,000 |

| h6 | Bohrertoleranz Drill tolerance |
|-------|-----------------------------------|
| ≅ 3,0 | 0,000 - 0,006 |

| | |
|----------------|--|
| MICRO GRAIN | KARNASCH NORM |
| N/M | DIN 6535 Form HA |
| | |
| | HSC HPC |
| | DVC-X2 ² Nano- finish |
| | MMKS |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1251 | DXF/STEP |

| Art. | d1 k5 | l3 | l2 | l4 | l1 | d2 h6 | € |
|-------------------|-----------|------|------|------|----|-------|-------|
| 22 0341 0010 005 | • 0,10 | 0,5 | 1,5 | 2,0 | 38 | 3,0 | 53,00 |
| 22 0341 0015 006 | • 0,15 | 0,6 | 1,8 | 2,0 | 38 | 3,0 | 30,60 |
| 22 0341 0015 0075 | • 0,15 | 0,75 | 1,8 | 2,0 | 38 | 3,0 | 53,00 |
| 22 0341 0020 008 | • 0,20 | 0,8 | 1,8 | 2,3 | 38 | 3,0 | 54,00 |
| 22 0341 0020 012 | • 0,20 | 1,2 | 2,2 | 2,7 | 38 | 3,0 | 54,00 |
| 22 0341 0025 010 | • 0,25 | 1,0 | 2,0 | 2,5 | 38 | 3,0 | 54,00 |
| 22 0341 0025 015 | • 0,25 | 1,5 | 2,5 | 3,0 | 38 | 3,0 | 54,00 |
| 22 0341 0030 012 | • 0,30 | 1,2 | 2,2 | 2,7 | 38 | 3,0 | 54,00 |
| 22 0341 0030 018 | • 0,30 | 1,8 | 2,8 | 3,3 | 38 | 3,0 | 54,00 |
| 22 0341 0035 014 | • 0,35 | 1,4 | 2,4 | 2,9 | 38 | 3,0 | 54,00 |
| 22 0341 0035 021 | • 0,35 | 2,1 | 3,1 | 3,6 | 38 | 3,0 | 54,00 |
| 22 0341 0040 016 | • 0,40 | 1,6 | 2,6 | 3,1 | 38 | 3,0 | 54,00 |
| 22 0341 0040 024 | • 0,40 | 2,4 | 3,4 | 3,9 | 38 | 3,0 | 54,00 |
| 22 0341 0045 018 | • 0,45 | 1,8 | 2,8 | 3,3 | 38 | 3,0 | 54,00 |
| 22 0341 0045 027 | • 0,45 | 2,7 | 3,7 | 4,2 | 38 | 3,0 | 54,00 |
| 22 0341 0050 020 | • 0,50 | 2,0 | 3,0 | 3,5 | 38 | 3,0 | 54,00 |
| 22 0341 0050 030 | • 0,50 | 3,0 | 4,0 | 4,5 | 38 | 3,0 | 54,00 |
| 22 0341 0050 060 | • 0,50 h6 | 6,0 | 8,0 | 8,5 | 38 | 3,0 | 54,00 |
| 22 0341 0055 022 | • 0,55 | 2,2 | 3,2 | 3,7 | 38 | 3,0 | 54,00 |
| 22 0341 0055 033 | • 0,55 | 3,3 | 4,3 | 4,8 | 38 | 3,0 | 54,00 |
| 22 0341 0060 024 | • 0,60 | 2,4 | 3,4 | 3,9 | 38 | 3,0 | 54,00 |
| 22 0341 0060 036 | • 0,60 | 3,6 | 4,6 | 5,1 | 38 | 3,0 | 54,00 |
| 22 0341 0060 060 | • 0,60 h6 | 6,0 | 8,0 | 8,5 | 38 | 3,0 | 54,00 |
| 22 0341 0065 026 | • 0,65 | 2,6 | 3,6 | 4,1 | 38 | 3,0 | 54,00 |
| 22 0341 0065 039 | • 0,65 | 3,9 | 4,9 | 5,4 | 38 | 3,0 | 54,00 |
| 22 0341 0070 028 | • 0,70 | 2,8 | 3,8 | 4,3 | 38 | 3,0 | 54,00 |
| 22 0341 0070 042 | • 0,70 | 4,2 | 5,2 | 5,7 | 38 | 3,0 | 54,00 |
| 22 0341 0070 080 | • 0,70 h6 | 8,0 | 10,0 | 10,5 | 38 | 3,0 | 54,00 |
| 22 0341 0075 030 | • 0,75 | 3,0 | 4,0 | 4,5 | 38 | 3,0 | 54,00 |
| 22 0341 0075 045 | • 0,75 | 4,5 | 5,5 | 6,0 | 38 | 3,0 | 54,00 |
| 22 0341 0080 032 | • 0,80 | 3,2 | 4,8 | 5,3 | 46 | 3,0 | 53,00 |
| 22 0341 0080 048 | • 0,80 | 4,8 | 5,8 | 6,3 | 54 | 3,0 | 53,00 |
| 22 0341 0080 080 | • 0,80 h6 | 8,0 | 10,0 | 10,5 | 38 | 3,0 | 53,00 |
| 22 0341 0085 034 | • 0,85 | 3,4 | 5,1 | 5,6 | 46 | 3,0 | 53,00 |
| 22 0341 0085 051 | • 0,85 | 5,1 | 6,1 | 6,6 | 54 | 3,0 | 53,00 |
| 22 0341 0090 036 | • 0,90 | 3,6 | 5,4 | 5,9 | 46 | 3,0 | 53,00 |
| 22 0341 0090 054 | • 0,90 | 5,4 | 6,5 | 6,7 | 54 | 3,0 | 53,00 |
| 22 0341 0090 100 | • 0,90 h6 | 10,0 | 12,0 | 12,5 | 38 | 3,0 | 53,00 |
| 22 0341 0095 038 | • 0,95 | 3,8 | 5,7 | 6,2 | 46 | 3,0 | 53,00 |
| 22 0341 0095 057 | • 0,95 | 5,7 | 6,8 | 7,3 | 54 | 3,0 | 53,00 |
| 22 0341 0100 040 | • 1,00 | 4,0 | 6,0 | 6,5 | 46 | 3,0 | 53,00 |
| 22 0341 0100 060 | • 1,00 | 6,0 | 7,2 | 7,7 | 54 | 3,0 | 53,00 |
| 22 0341 0100 100 | • 1,00 h6 | 10,0 | 12,0 | 12,5 | 38 | 3,0 | 53,00 |
| 22 0341 0105 042 | • 1,05 | 4,2 | 6,3 | 6,8 | 46 | 3,0 | 53,00 |
| 22 0341 0105 063 | • 1,05 | 6,3 | 7,6 | 8,1 | 54 | 3,0 | 53,00 |
| 22 0341 0110 044 | • 1,10 | 4,4 | 6,6 | 7,1 | 46 | 3,0 | 53,00 |
| 22 0341 0110 066 | • 1,10 | 6,6 | 7,9 | 8,4 | 54 | 3,0 | 53,00 |
| 22 0341 0110 160 | • 1,10 h6 | 16,0 | 20,0 | 20,5 | 50 | 3,0 | 53,00 |
| 22 0341 0115 046 | • 1,15 | 4,6 | 6,9 | 7,4 | 46 | 3,0 | 53,00 |
| 22 0341 0115 069 | • 1,15 | 6,9 | 8,3 | 8,8 | 54 | 3,0 | 53,00 |
| 22 0341 0120 048 | • 1,20 | 4,8 | 7,2 | 7,7 | 46 | 3,0 | 53,00 |
| 22 0341 0120 072 | • 1,20 | 7,2 | 8,6 | 9,1 | 54 | 3,0 | 53,00 |

Vollhartmetall-Hochleistungs-Minidrill – HSC/HHC < 10xD

Solid carbide-micro-twist drill – HSC/HHC < 10xD

22 0341

| Art. | d1 k5 | l3 | l2 | l4 | l1 | d2 h6 | € |
|------------------|-----------|------|------|------|----|-------|-------|
| 22 0341 0120 160 | • 1,20 h6 | 16,0 | 20,0 | 20,5 | 50 | 3,0 | 53,00 |
| 22 0341 0125 050 | • 1,25 | 5,0 | 7,5 | 8,0 | 46 | 3,0 | 53,00 |
| 22 0341 0125 075 | • 1,25 | 7,5 | 8,9 | 9,5 | 54 | 3,0 | 53,00 |
| 22 0341 0130 052 | • 1,30 | 5,2 | 7,8 | 8,3 | 46 | 3,0 | 53,00 |
| 22 0341 0130 078 | • 1,30 | 7,8 | 9,4 | 9,9 | 54 | 3,0 | 53,00 |
| 22 0341 0130 160 | • 1,30 h6 | 16,0 | 20,0 | 20,5 | 50 | 3,0 | 53,00 |
| 22 0341 0135 054 | • 1,35 | 5,4 | 8,1 | 8,6 | 46 | 3,0 | 53,00 |
| 22 0341 0135 081 | • 1,35 | 8,1 | 9,7 | 10,2 | 54 | 3,0 | 53,00 |
| 22 0341 0140 056 | • 1,40 | 5,6 | 8,4 | 8,9 | 46 | 3,0 | 53,00 |
| 22 0341 0140 084 | • 1,40 | 8,4 | 10,1 | 10,6 | 54 | 3,0 | 53,00 |
| 22 0341 0140 160 | • 1,40 h6 | 16,0 | 20,0 | 20,5 | 50 | 3,0 | 53,00 |
| 22 0341 0145 058 | • 1,45 | 5,8 | 8,7 | 9,2 | 46 | 3,0 | 53,00 |
| 22 0341 0145 087 | • 1,45 | 8,7 | 10,4 | 10,9 | 54 | 3,0 | 53,00 |
| 22 0341 0150 060 | • 1,50 | 6,0 | 9,0 | 9,5 | 46 | 3,0 | 53,00 |
| 22 0341 0150 090 | • 1,50 | 9,0 | 10,8 | 11,3 | 54 | 3,0 | 53,00 |
| 22 0341 0150 160 | • 1,50 h6 | 16,0 | 20,0 | 20,5 | 50 | 3,0 | 53,00 |
| 22 0341 0155 062 | • 1,55 | 6,2 | 7,4 | 7,9 | 46 | 3,0 | 53,00 |
| 22 0341 0155 093 | • 1,55 | 9,3 | 11,2 | 11,7 | 54 | 3,0 | 53,00 |
| 22 0341 0160 064 | • 1,60 | 6,4 | 7,7 | 8,2 | 46 | 3,0 | 53,00 |
| 22 0341 0160 096 | • 1,60 | 9,6 | 11,5 | 12,0 | 54 | 3,0 | 53,00 |
| 22 0341 0160 220 | • 1,60 h6 | 22,0 | 30,0 | 30,5 | 66 | 3,0 | 53,00 |
| 22 0341 0165 066 | • 1,65 | 6,6 | 7,9 | 8,4 | 46 | 3,0 | 53,00 |
| 22 0341 0165 099 | • 1,65 | 9,9 | 11,9 | 12,4 | 54 | 3,0 | 53,00 |
| 22 0341 0170 068 | • 1,70 | 6,8 | 8,2 | 8,7 | 46 | 3,0 | 53,00 |
| 22 0341 0170 102 | • 1,70 | 10,2 | 12,2 | 12,7 | 54 | 3,0 | 53,00 |
| 22 0341 0170 220 | • 1,70 h6 | 22,0 | 30,0 | 30,5 | 66 | 3,0 | 53,00 |
| 22 0341 0175 070 | • 1,75 | 7,0 | 8,4 | 8,9 | 46 | 3,0 | 53,00 |
| 22 0341 0175 105 | • 1,75 | 10,5 | 12,6 | 13,1 | 54 | 3,0 | 53,00 |
| 22 0341 0180 072 | • 1,80 | 7,2 | 8,6 | 9,1 | 46 | 3,0 | 53,00 |
| 22 0341 0180 108 | • 1,80 | 10,8 | 13,0 | 13,5 | 54 | 3,0 | 53,00 |
| 22 0341 0180 220 | • 1,80 h6 | 22,0 | 30,0 | 30,5 | 66 | 3,0 | 53,00 |
| 22 0341 0185 074 | • 1,85 | 7,4 | 8,9 | 9,4 | 46 | 3,0 | 53,00 |
| 22 0341 0185 111 | • 1,85 | 11,1 | 13,3 | 13,8 | 54 | 3,0 | 53,00 |
| 22 0341 0190 076 | • 1,90 | 7,6 | 9,1 | 9,6 | 46 | 3,0 | 53,00 |
| 22 0341 0190 114 | • 1,90 | 11,4 | 13,7 | 14,2 | 54 | 3,0 | 53,00 |
| 22 0341 0190 220 | • 1,90 h6 | 22,0 | 30,0 | 30,5 | 66 | 3,0 | 53,00 |
| 22 0341 0195 078 | • 1,95 | 7,8 | 9,4 | 9,9 | 46 | 3,0 | 53,00 |
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| 22 0341 0200 080 | • 2,00 | 8,0 | 12,0 | 12,5 | 60 | 4,0 | 53,00 |
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| 22 0341 0205 082 | • 2,05 | 8,2 | 12,3 | 12,8 | 60 | 4,0 | 53,00 |
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| 22 0341 0210 084 | • 2,10 | 8,4 | 12,6 | 13,1 | 60 | 4,0 | 53,00 |
| 22 0341 0210 126 | • 2,10 | 12,6 | 15,1 | 15,6 | 65 | 4,0 | 53,00 |
| 22 0341 0210 250 | • 2,10 h6 | 25,0 | 35,0 | 35,5 | 74 | 3,0 | 53,00 |
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| 22 0341 0220 088 | • 2,20 | 8,8 | 13,2 | 13,7 | 60 | 4,0 | 53,00 |
| 22 0341 0220 132 | • 2,20 | 13,2 | 15,8 | 16,3 | 65 | 4,0 | 53,00 |
| 22 0341 0220 250 | • 2,20 h6 | 25,0 | 35,0 | 35,5 | 74 | 3,0 | 53,00 |
| 22 0341 0225 090 | • 2,25 | 9,0 | 13,5 | 14,0 | 60 | 4,0 | 53,00 |
| 22 0341 0225 135 | • 2,25 | 13,5 | 16,2 | 16,7 | 65 | 4,0 | 53,00 |
| 22 0341 0230 092 | • 2,30 | 9,2 | 13,8 | 14,3 | 60 | 4,0 | 53,00 |
| 22 0341 0230 138 | • 2,30 | 13,8 | 16,6 | 17,1 | 65 | 4,0 | 53,00 |
| 22 0341 0230 250 | • 2,30 h6 | 25,0 | 35,0 | 35,5 | 74 | 3,0 | 53,00 |
| 22 0341 0235 094 | • 2,35 | 9,4 | 14,1 | 14,6 | 60 | 4,0 | 53,00 |
| 22 0341 0235 141 | • 2,35 | 14,1 | 16,9 | 17,4 | 65 | 4,0 | 53,00 |
| 22 0341 0240 096 | • 2,40 | 9,6 | 14,4 | 14,9 | 60 | 4,0 | 53,00 |
| 22 0341 0240 144 | • 2,40 | 14,4 | 17,2 | 17,7 | 65 | 4,0 | 53,00 |
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| 22 0341 0245 098 | • 2,45 | 9,8 | 14,7 | 15,2 | 60 | 4,0 | 53,00 |
| 22 0341 0245 147 | • 2,45 | 14,7 | 17,6 | 18,1 | 65 | 4,0 | 53,00 |
| 22 0341 0250 100 | • 2,50 | 10,0 | 15,0 | 15,5 | 60 | 4,0 | 53,00 |
| 22 0341 0250 150 | • 2,50 | 15,0 | 18,0 | 18,5 | 65 | 4,0 | 53,00 |
| 22 0341 0250 250 | • 2,50 h6 | 25,0 | 35,0 | 35,5 | 74 | 3,0 | 53,00 |
| 22 0341 0255 102 | • 2,55 | 10,2 | 15,3 | 15,7 | 60 | 4,0 | 53,00 |
| 22 0341 0255 153 | • 2,55 | 15,3 | 18,5 | 19,0 | 65 | 4,0 | 53,00 |
| 22 0341 0260 104 | • 2,60 | 10,4 | 15,6 | 16,1 | 60 | 4,0 | 53,00 |
| 22 0341 0260 156 | • 2,60 | 15,6 | 18,7 | 19,2 | 65 | 4,0 | 53,00 |
| 22 0341 0260 320 | • 2,60 h6 | 32,0 | 40,0 | 40,5 | 82 | 3,0 | 53,00 |
| 22 0341 0265 106 | • 2,65 | 10,6 | 15,9 | 16,4 | 60 | 4,0 | 53,00 |
| 22 0341 0265 159 | • 2,65 | 15,9 | 19,1 | 19,6 | 65 | 4,0 | 53,00 |
| 22 0341 0270 108 | • 2,70 | 10,8 | 16,2 | 16,7 | 60 | 4,0 | 53,00 |
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| 22 0341 0280 168 | • 2,80 | 16,8 | 20,2 | 20,7 | 65 | 4,0 | 53,00 |
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| 22 0341 0285 114 | • 2,85 | 11,4 | 17,1 | 17,6 | 60 | 4,0 | 53,00 |
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| 22 0341 0290 174 | • 2,90 | 17,4 | 20,9 | 21,4 | 65 | 4,0 | 53,00 |
| 22 0341 0290 320 | • 2,90 h6 | 32,0 | 40,0 | 40,5 | 82 | 3,0 | 53,00 |
| 22 0341 0295 118 | • 2,95 | 11,8 | 17,7 | 18,2 | 60 | 4,0 | 53,00 |
| 22 0341 0295 177 | • 2,95 | 17,7 | 21,2 | 21,7 | 65 | 4,0 | 53,00 |
| 22 0341 0300 120 | • 3,00 | 12,0 | 18,0 | 18,5 | 60 | 4,0 | 53,00 |
| 22 0341 0300 180 | • 3,00 | 18,0 | 21,6 | 22,1 | 65 | 4,0 | 53,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.



SPATENBOHRER
siehe Seite 303-356

SPADE DRILLS
see page 303-356



1



2



3



4



5



6



7



8



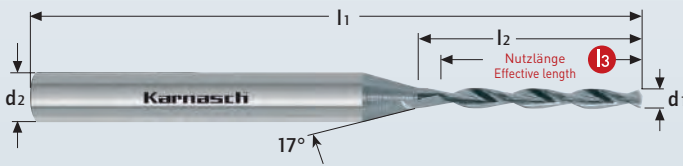
9

Mini-Vollhartmetall-Hochleistungsbohrer
Mini solid carbide twist drill



22 0360

- Alu-
minium**
- Aluminium
< 6% Si
- MESSING**
brass
- Kupfer**
copper
- Gold**
gold
- Kunststoff**
plastic



| | | |
|----|-----------------------------------|---|
| h7 | Bohrertoleranz Drill tolerance | Über 6% Si bis 12% Si empfehlen wir unsere NHC-7000-Beschichtung Over 6% Si until 12% Si we recommend our NHC-7000-coating |
| | ≤ 3,0 | |

| | |
|------------------------|--|
| MICRO GRAIN | KARNASCH NORM |
| W | DIN 6535 Form HA |
| | |
| | HSC High-Speed- Cutting |
| | POLIERT POLISHED |
| | |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|------|----|-------|-------|
| 22 0360 0050 050 | • 0,50 | 5 | 6,5 | 39 | 3 | 19,50 |
| 22 0360 0055 050 | • 0,55 | 5 | 6,5 | 39 | 3 | 19,50 |
| 22 0360 0060 050 | • 0,60 | 5 | 6,5 | 39 | 3 | 19,50 |
| 22 0360 0065 060 | • 0,65 | 6 | 7,5 | 39 | 3 | 19,50 |
| 22 0360 0070 060 | • 0,70 | 6 | 7,5 | 39 | 3 | 19,50 |
| 22 0360 0075 080 | • 0,75 | 8 | 9,5 | 39 | 3 | 19,50 |
| 22 0360 0080 080 | • 0,80 | 8 | 9,5 | 39 | 3 | 19,50 |
| 22 0360 0085 080 | • 0,85 | 8 | 9,5 | 39 | 3 | 19,50 |
| 22 0360 0090 100 | • 0,90 | 10 | 11,5 | 39 | 3 | 19,50 |
| 22 0360 0095 100 | • 0,95 | 10 | 11,5 | 39 | 3 | 19,50 |
| 22 0360 0100 100 | • 1,00 | 10 | 11,5 | 39 | 3 | 19,50 |
| 22 0360 0105 100 | • 1,05 | 10 | 11,5 | 39 | 3 | 19,50 |
| 22 0360 0110 100 | • 1,10 | 10 | 11,5 | 39 | 3 | 19,50 |
| 22 0360 0115 100 | • 1,15 | 10 | 11,5 | 39 | 3 | 19,50 |
| 22 0360 0120 120 | • 1,20 | 12 | 14,5 | 39 | 3 | 19,50 |
| 22 0360 0125 120 | • 1,25 | 12 | 14,5 | 39 | 3 | 19,50 |
| 22 0360 0130 120 | • 1,30 | 12 | 14,5 | 39 | 3 | 19,50 |
| 22 0360 0135 120 | • 1,35 | 12 | 14,5 | 39 | 3 | 19,50 |
| 22 0360 0140 120 | • 1,40 | 12 | 14,5 | 39 | 3 | 19,50 |
| 22 0360 0145 120 | • 1,45 | 12 | 14,5 | 39 | 3 | 19,50 |
| 22 0360 0150 120 | • 1,50 | 12 | 14,5 | 39 | 3 | 19,50 |
| 22 0360 0160 120 | • 1,60 | 12 | 14,5 | 39 | 3 | 19,50 |
| 22 0360 0165 120 | • 1,65 | 12 | 14,5 | 39 | 3 | 19,50 |
| 22 0360 0170 120 | • 1,70 | 12 | 14,5 | 39 | 3 | 19,50 |
| 22 0360 0180 120 | • 1,80 | 12 | 14,5 | 39 | 3 | 19,50 |
| 22 0360 0185 120 | • 1,85 | 12 | 14,5 | 39 | 3 | 19,50 |
| 22 0360 0190 120 | • 1,90 | 12 | 14,5 | 39 | 3 | 19,50 |
| 22 0360 0200 140 | • 2,00 | 14 | 16,5 | 39 | 3 | 19,50 |
| 22 0360 0205 140 | • 2,05 | 14 | 16,5 | 39 | 3 | 19,50 |
| 22 0360 0210 140 | • 2,10 | 14 | 16,5 | 39 | 3 | 19,50 |
| 22 0360 0220 140 | • 2,20 | 14 | 16,5 | 39 | 3 | 19,50 |
| 22 0360 0230 140 | • 2,30 | 14 | 16,5 | 39 | 3 | 19,50 |
| 22 0360 0240 140 | • 2,40 | 14 | 16,5 | 39 | 3 | 19,50 |
| 22 0360 0250 140 | • 2,50 | 14 | 16,5 | 39 | 3 | 19,50 |
| 22 0360 0260 140 | • 2,60 | 14 | 16,5 | 39 | 3 | 19,50 |
| 22 0360 0270 140 | • 2,70 | 14 | 16,5 | 39 | 3 | 19,50 |
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| 22 0360 0290 140 | • 2,90 | 14 | 16,5 | 39 | 3 | 19,50 |
| 22 0360 0300 140 | • 3,00 | 14 | 16,5 | 39 | 3 | 19,50 |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1253 | |

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- 2
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- 8
- 9

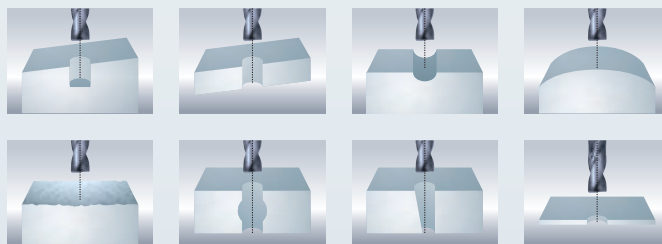
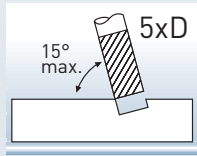
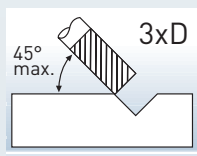
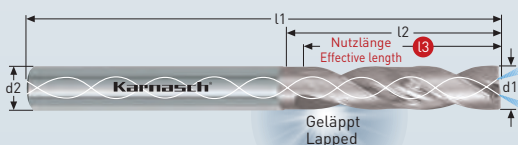
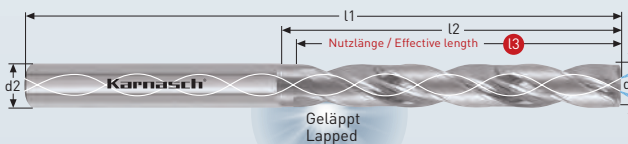
Index

22 0530

Vollhartmetall-Hochleistungsflachkopfbohrer für Aluminium
Solid carbide shallow drill 180° for aluminum



- Alu-
minium**
- Aluminium
< 12% Si
- MESSING**
brass
- Kupfer**
copper
- Kunststoff**
plastic



Auf ebenen Flächen [0°] empfehlen wir eine Pilotbohrung mit unserem VHM-Bohrer 22 0405 / 22 0406.
We recommend a pilot hole with our solid carbide drill 22 0405 / 22 0406 on flat surfaces [0°].

| | |
|--------------------|--------------------------|
| MICRO GRAIN | KARNASCH NORM |
| W | DIN 6535 Form HAK |
| | |
| | HSC HPC |
| | GELÄPPT LAPPED |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1242 | DXF/STEP |

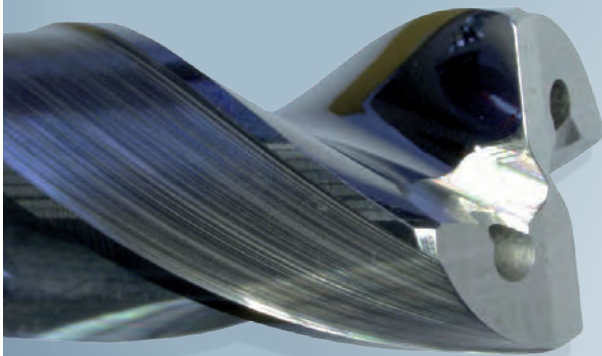
| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|----|-------|--------|
| 22 0530 0300 014 | • 3,00 | 14 | 20 | 62 | 6,0 | 91,00 |
| 22 0530 0300 023 | • 3,00 | 23 | 28 | 66 | 6,0 | 109,00 |
| 22 0530 0320 014 | • 3,20 | 14 | 20 | 62 | 6,0 | 91,00 |
| 22 0530 0320 023 | • 3,20 | 23 | 28 | 66 | 6,0 | 109,00 |
| 22 0530 0330 014 | • 3,30 | 14 | 20 | 62 | 6,0 | 91,00 |
| 22 0530 0330 023 | • 3,30 | 23 | 28 | 66 | 6,0 | 109,00 |
| 22 0530 0340 014 | • 3,40 | 14 | 20 | 62 | 6,0 | 91,00 |
| 22 0530 0340 023 | • 3,40 | 23 | 28 | 66 | 6,0 | 109,00 |
| 22 0530 0350 014 | • 3,50 | 14 | 20 | 62 | 6,0 | 91,00 |
| 22 0530 0350 023 | • 3,50 | 23 | 28 | 66 | 6,0 | 109,00 |
| 22 0530 0370 017 | • 3,70 | 17 | 20 | 62 | 6,0 | 91,00 |
| 22 0530 0370 023 | • 3,70 | 23 | 28 | 66 | 6,0 | 109,00 |
| 22 0530 0380 017 | • 3,80 | 17 | 24 | 66 | 6,0 | 91,00 |
| 22 0530 0380 029 | • 3,80 | 29 | 36 | 74 | 6,0 | 109,00 |
| 22 0530 0390 017 | • 3,90 | 17 | 24 | 66 | 6,0 | 91,00 |
| 22 0530 0390 029 | • 3,90 | 29 | 36 | 74 | 6,0 | 109,00 |
| 22 0530 0400 017 | • 4,00 | 17 | 24 | 66 | 6,0 | 91,00 |
| 22 0530 0400 029 | • 4,00 | 29 | 36 | 74 | 6,0 | 109,00 |
| 22 0530 0420 017 | • 4,20 | 17 | 24 | 66 | 6,0 | 91,00 |
| 22 0530 0420 029 | • 4,20 | 29 | 36 | 74 | 6,0 | 109,00 |
| 22 0530 0430 017 | • 4,30 | 17 | 24 | 66 | 6,0 | 91,00 |
| 22 0530 0430 029 | • 4,30 | 29 | 36 | 74 | 6,0 | 109,00 |
| 22 0530 0450 017 | • 4,50 | 17 | 24 | 66 | 6,0 | 91,00 |
| 22 0530 0450 029 | • 4,50 | 29 | 36 | 74 | 6,0 | 109,00 |
| 22 0530 0465 017 | • 4,65 | 17 | 24 | 66 | 6,0 | 91,00 |
| 22 0530 0465 029 | • 4,65 | 29 | 36 | 74 | 6,0 | 109,00 |
| 22 0530 0480 020 | • 4,80 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0530 0480 035 | • 4,80 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0530 0500 020 | • 5,00 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0530 0500 035 | • 5,00 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0530 0510 020 | • 5,10 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0530 0510 035 | • 5,10 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0530 0520 020 | • 5,20 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0530 0520 035 | • 5,20 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0530 0530 020 | • 5,30 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0530 0530 035 | • 5,30 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0530 0540 020 | • 5,40 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0530 0540 035 | • 5,40 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0530 0550 020 | • 5,50 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0530 0550 035 | • 5,50 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0530 0555 020 | • 5,55 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0530 0555 035 | • 5,55 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0530 0560 020 | • 5,60 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0530 0560 035 | • 5,60 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0530 0570 020 | • 5,70 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0530 0570 035 | • 5,70 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0530 0580 020 | • 5,80 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0530 0580 035 | • 5,80 | 35 | 44 | 82 | 6,0 | 109,00 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|-----|-------|--------|
| 22 0530 0600 020 | • 6,00 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0530 0600 035 | • 6,00 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0530 0610 024 | • 6,10 | 24 | 34 | 79 | 8,0 | 112,00 |
| 22 0530 0610 043 | • 6,10 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0620 024 | • 6,20 | 24 | 34 | 79 | 8,0 | 112,00 |
| 22 0530 0620 043 | • 6,20 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0630 024 | • 6,30 | 24 | 34 | 79 | 8,0 | 112,00 |
| 22 0530 0630 043 | • 6,30 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0640 024 | • 6,40 | 24 | 34 | 79 | 8,0 | 112,00 |
| 22 0530 0640 043 | • 6,40 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0650 024 | • 6,50 | 24 | 34 | 79 | 8,0 | 112,00 |
| 22 0530 0650 043 | • 6,50 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0660 024 | • 6,60 | 24 | 34 | 79 | 8,0 | 112,00 |
| 22 0530 0660 043 | • 6,60 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0670 024 | • 6,70 | 24 | 34 | 79 | 8,0 | 112,00 |
| 22 0530 0670 043 | • 6,70 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0680 024 | • 6,80 | 24 | 34 | 79 | 8,0 | 112,00 |
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| 22 0530 0690 024 | • 6,90 | 24 | 34 | 79 | 8,0 | 112,00 |
| 22 0530 0690 043 | • 6,90 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0700 024 | • 7,00 | 24 | 34 | 79 | 8,0 | 112,00 |
| 22 0530 0700 043 | • 7,00 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0710 029 | • 7,10 | 29 | 41 | 79 | 8,0 | 112,00 |
| 22 0530 0710 043 | • 7,10 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0720 029 | • 7,20 | 29 | 41 | 79 | 8,0 | 112,00 |
| 22 0530 0720 043 | • 7,20 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0730 029 | • 7,30 | 29 | 41 | 79 | 8,0 | 112,00 |
| 22 0530 0730 043 | • 7,30 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0740 029 | • 7,40 | 29 | 41 | 79 | 8,0 | 112,00 |
| 22 0530 0740 043 | • 7,40 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0750 029 | • 7,50 | 29 | 41 | 79 | 8,0 | 112,00 |
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| 22 0530 0780 029 | • 7,80 | 29 | 41 | 79 | 8,0 | 112,00 |
| 22 0530 0780 043 | • 7,80 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0790 029 | • 7,90 | 29 | 41 | 79 | 8,0 | 112,00 |
| 22 0530 0790 043 | • 7,90 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0800 029 | • 8,00 | 29 | 41 | 79 | 8,0 | 112,00 |
| 22 0530 0800 043 | • 8,00 | 43 | 53 | 91 | 8,0 | 121,00 |
| 22 0530 0810 035 | • 8,10 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0810 049 | • 8,10 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 0820 035 | • 8,20 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0820 049 | • 8,20 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 0830 035 | • 8,30 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0830 049 | • 8,30 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 0840 035 | • 8,40 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0840 049 | • 8,40 | 49 | 61 | 103 | 10,0 | 173,00 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|---------|----|----|-----|-------|--------|
| 22 0530 0850 035 | • 8,50 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0850 049 | • 8,50 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 0860 035 | • 8,60 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0860 049 | • 8,60 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 0870 035 | • 8,70 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0870 049 | • 8,70 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 0880 035 | • 8,80 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0880 049 | • 8,80 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 0890 035 | • 8,90 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0890 049 | • 8,90 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 0900 035 | • 9,00 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0900 049 | • 9,00 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 0910 035 | • 9,10 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0910 049 | • 9,10 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 0920 035 | • 9,20 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0920 049 | • 9,20 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 0930 035 | • 9,30 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0930 049 | • 9,30 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 0950 035 | • 9,50 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0950 049 | • 9,50 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 0960 035 | • 9,60 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0960 049 | • 9,60 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 0970 035 | • 9,70 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0970 049 | • 9,70 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 0980 035 | • 9,80 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 0980 049 | • 9,80 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 1000 035 | • 10,00 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0530 1000 049 | • 10,00 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0530 1010 040 | • 10,10 | 40 | 53 | 100 | 12,0 | 192,00 |
| 22 0530 1010 056 | • 10,10 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0530 1020 040 | • 10,20 | 40 | 53 | 100 | 12,0 | 192,00 |
| 22 0530 1020 056 | • 10,20 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0530 1030 040 | • 10,30 | 40 | 53 | 100 | 12,0 | 192,00 |
| 22 0530 1030 056 | • 10,30 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0530 1050 040 | • 10,50 | 40 | 53 | 100 | 12,0 | 192,00 |
| 22 0530 1050 056 | • 10,50 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0530 1060 040 | • 10,60 | 40 | 53 | 100 | 12,0 | 192,00 |
| 22 0530 1060 056 | • 10,60 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0530 1070 040 | • 10,70 | 40 | 53 | 100 | 12,0 | 192,00 |
| 22 0530 1070 056 | • 10,70 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0530 1080 040 | • 10,80 | 40 | 53 | 100 | 12,0 | 192,00 |
| 22 0530 1080 056 | • 10,80 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0530 1090 040 | • 10,90 | 40 | 53 | 100 | 12,0 | 192,00 |
| 22 0530 1090 056 | • 10,90 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0530 1100 040 | • 11,00 | 40 | 53 | 100 | 12,0 | 192,00 |
| 22 0530 1100 056 | • 11,00 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0530 1120 040 | • 11,20 | 40 | 53 | 100 | 12,0 | 192,00 |
| 22 0530 1120 056 | • 11,20 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0530 1150 040 | • 11,50 | 40 | 53 | 100 | 12,0 | 192,00 |
| 22 0530 1150 056 | • 11,50 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0530 1180 040 | • 11,80 | 40 | 53 | 100 | 12,0 | 192,00 |
| 22 0530 1180 056 | • 11,80 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0530 1200 040 | • 12,00 | 40 | 53 | 100 | 12,0 | 192,00 |
| 22 0530 1200 056 | • 12,00 | 56 | 69 | 116 | 12,0 | 243,00 |

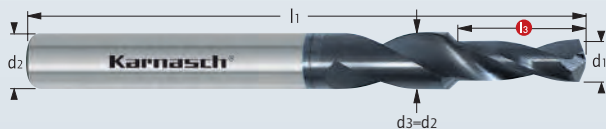
22 0530

180° Spitzenwinkel
180° Point angle



22 0389

Vollhartmetall-Pilot-Stufenbohrer 142°/90° abgestimmt auf Tieflochbohrer 22 0390
Solid carbide pilot step drill 142°/90°. Designed for deep hole drill 22 0390



| $\text{m}7$ | Bohrungstoleranz Hole tolerance | $\text{h}7$ | Bohrungstoleranz Hole tolerance |
|-------------|------------------------------------|-------------|------------------------------------|
| > 3-6 | +0,004 +0,016 | > 3-6 | +0,000 -0,012 |
| > 6-10 | +0,006 +0,021 | > 6-10 | +0,000 -0,015 |
| > 10-18 | +0,007 +0,025 | > 10-18 | +0,000 -0,018 |

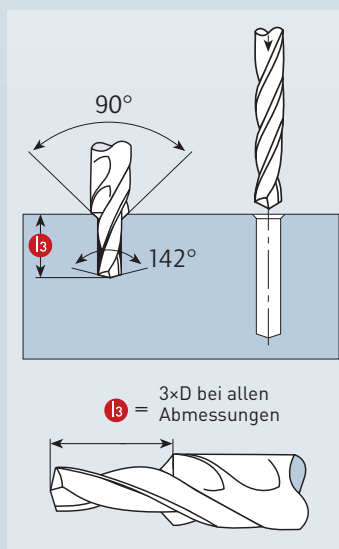
| Art. | d1 h7 | l3 = 3xD | l2 | l1 | d2 h6 | € |
|------------------|-------|-----------------|----|-----|-------|--------|
| 22 0389 0350 105 | 3,5 | 10,5 | 24 | 62 | 6 | 39,00 |
| 22 0389 0450 135 | 4,5 | 13,5 | 28 | 66 | 6 | 39,00 |
| 22 0389 0600 180 | 6,0 | 18,0 | 35 | 79 | 8 | 54,00 |
| 22 0389 0650 195 | 6,5 | 19,5 | 38 | 79 | 8 | 55,20 |
| 22 0389 0700 210 | 7,0 | 21,0 | 46 | 89 | 10 | 67,20 |
| 22 0389 0800 240 | 8,0 | 24,0 | 48 | 89 | 10 | 67,20 |
| 22 0389 0850 255 | 8,5 | 25,5 | 48 | 89 | 10 | 67,80 |
| 22 0389 0900 270 | 9,0 | 27,0 | 55 | 102 | 12 | 84,00 |
| 22 0389 1000 300 | 10,0 | 30,0 | 57 | 102 | 12 | 84,00 |
| 22 0389 1100 330 | 11,0 | 33,0 | 60 | 107 | 14 | 100,80 |
| 22 0389 1200 360 | 12,0 | 36,0 | 62 | 107 | 14 | 100,80 |

⊗ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.

Special price / sale article. While stocks last.

Alternativwerkzeug: 22 0471 + 22 0473 auf Seite / on page 272

Alternative Tool: 22 0402 + 22 0405 auf Seite / on page 254-255 + 259-261



Schnittdaten
Cutting data



Richtwerte für den Einsatz der KARNASCH VHM-Hochleistungsbohrer ohne Innenkühlung Recommended cutting data for solid carbide twist drill, without interior cooling supply

| Werkstoff- gruppe | Werkstoff | Festigkeit N/mm ² | Schnittgeschwindig- keit Vc [m/min] ±10% | Ø 3 - 5,5 | | | Ø 6 - 8,5 | | | Ø 9 - 12 | | |
|----------------------|-------------|---------------------------------|--|-----------|--|--|-----------|--|--|----------|--|--|
| | | | | f = mm/U | | | f = mm/U | | | f = mm/U | | |
| 1.1 | St 42-8 | < 450 | 100 | 0,18 | | | 0,25 | | | 0,30 | | |
| 1.2 | C 50 | < 650 | 90 | 0,18 | | | 0,25 | | | 0,30 | | |
| 2.1 | 51 Cr V4 | < 600 | 70 | 0,15 | | | 0,20 | | | 0,28 | | |
| 2.2 | 26 Cr Mo 4 | < 950 | 70 | 0,15 | | | 0,20 | | | 0,28 | | |
| 2.3 | 100 WV 4 | < 1100 | 60 | 0,15 | | | 0,20 | | | 0,28 | | |
| 2.5 | 34 Cr Al 6 | < 1000 | 60 | 0,15 | | | 0,20 | | | 0,28 | | |
| 2.6 | 31 Cr mo V9 | < 1200 | 70 | 0,15 | | | 0,20 | | | 0,28 | | |
| 3.1 | X 42 Cr 13 | < 700 | 70 | 0,15 | | | 0,20 | | | 0,27 | | |
| 3.2 | S 29 28 | < 1400 | 40 | 0,08 | | | 0,12 | | | 0,15 | | |
| 7.1 | GG 15 | < 180 HB | 100 | 0,24 | | | 0,32 | | | 0,42 | | |
| 7.2 | GG 30 | < 350 HB | 100 | 0,24 | | | 0,32 | | | 0,42 | | |
| 7.4 | GGG 60 | < 200 HB | 90 | 0,20 | | | 0,25 | | | 0,35 | | |
| 7.6 | GTW 3504 | < 230 HB | 90 | 0,20 | | | 0,25 | | | 0,35 | | |
| 8.1 | Toolox 44 | 44 HRC | 30 | 0,08 | | | 0,09 | | | 0,10 | | |
| 12.0 | Hardox 400 | < 1350 | 25 | 0,08 | | | 0,12 | | | 0,15 | | |
| 12.1 | Hardox 500 | < 1800 | 20 | 0,08 | | | 0,12 | | | 0,15 | | |

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Karnasch®
PROFESSIONAL TOOLS



22 0390

Vollhartmetall-4-Fasen-Hochleistungsbohrer < 40xD
Solid carbide 4-chamfer twist drill < 40xD



STAHL
steel
< 1200 N/mm²

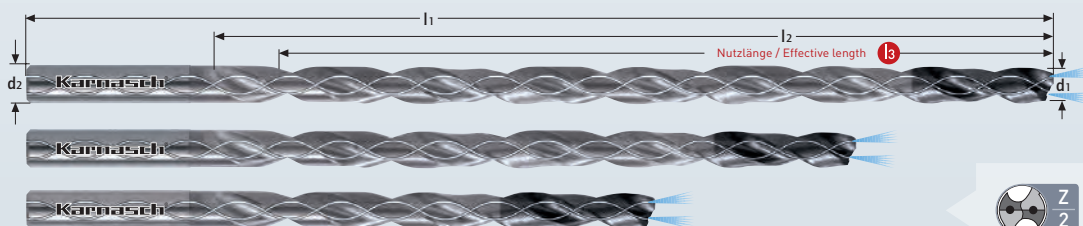
INOX
Edelstahl
STAINLESS STEEL

GJL

GJS

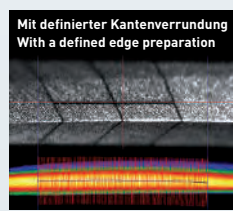
GTW
GTS

kurz-
spanend
short chip



| | |
|---------------------------|--|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HAK |
| | |
| | HSC HPC |
| | DVC-X2 hp ² - finish |
| | 50-80 bar |

| h7 | Bohrertoleranz Drill tolerance |
|---------|-----------------------------------|
| > 3,0 - | +0,000 |
| 6,0 | -0,012 |
| > 6,0 - | +0,000 |
| 10,0 | -0,015 |
| >10,0 - | +0,000 |
| 14,0 | -0,018 |



| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|-----|-----|-----|-------|--------|
| 22 0390 0300 030 | % 3,0 | 30 | 40 | 80 | 6 | 133,20 |
| 22 0390 0300 060 | % 3,0 | 60 | 65 | 105 | 6 | 136,20 |
| 22 0390 0310 045 | % 3,1 | 45 | 50 | 90 | 6 | 140,40 |
| 22 0390 0310 056 | % 3,1 | 56 | 60 | 100 | 6 | 140,40 |
| 22 0390 0340 045 | % 3,4 | 45 | 50 | 90 | 6 | 140,40 |
| 22 0390 0340 056 | % 3,4 | 56 | 60 | 100 | 6 | 140,40 |
| 22 0390 0350 050 | % 3,5 | 50 | 60 | 100 | 6 | 137,40 |
| 22 0390 0350 060 | % 3,5 | 60 | 65 | 105 | 6 | 137,40 |
| 22 0390 0350 070 | % 3,5 | 70 | 75 | 115 | 6 | 141,60 |
| 22 0390 0350 144 | % 3,5 | 144 | 150 | 190 | 6 | 226,20 |
| 22 0390 0360 050 | % 3,6 | 50 | 55 | 100 | 6 | 140,40 |
| 22 0390 0360 053 | % 3,6 | 53 | 68 | 110 | 6 | 150,00 |
| 22 0390 0370 050 | % 3,7 | 50 | 55 | 100 | 6 | 140,40 |
| 22 0390 0370 053 | % 3,7 | 53 | 68 | 110 | 6 | 150,00 |
| 22 0390 0380 050 | % 3,8 | 50 | 55 | 100 | 6 | 140,40 |
| 22 0390 0380 053 | % 3,8 | 53 | 68 | 110 | 6 | 150,00 |
| 22 0390 0390 053 | % 3,9 | 53 | 68 | 110 | 6 | 150,00 |
| 22 0390 0400 055 | % 4,0 | 55 | 65 | 105 | 6 | 146,40 |
| 22 0390 0400 085 | % 4,0 | 85 | 90 | 130 | 6 | 162,00 |
| 22 0390 0400 095 | % 4,0 | 95 | 100 | 140 | 6 | 163,20 |
| 22 0390 0400 105 | % 4,0 | 105 | 110 | 150 | 6 | 183,00 |
| 22 0390 0400 120 | % 4,0 | 120 | 125 | 165 | 6 | 196,20 |
| 22 0390 0400 160 | % 4,0 | 160 | 165 | 210 | 6 | 253,80 |
| 22 0390 0410 060 | % 4,1 | 60 | 65 | 105 | 6 | 146,40 |
| 22 0390 0410 073 | % 4,1 | 73 | 78 | 118 | 6 | 148,80 |
| 22 0390 0420 060 | % 4,2 | 60 | 65 | 105 | 6 | 146,40 |
| 22 0390 0420 154 | % 4,2 | 154 | 160 | 205 | 6 | 253,80 |
| 22 0390 0420 174 | % 4,2 | 174 | 180 | 225 | 6 | 256,80 |
| 22 0390 0430 060 | % 4,3 | 60 | 65 | 105 | 6 | 146,40 |
| 22 0390 0430 073 | % 4,3 | 73 | 78 | 118 | 6 | 148,80 |
| 22 0390 0440 060 | % 4,4 | 60 | 65 | 105 | 6 | 146,40 |
| 22 0390 0440 073 | % 4,4 | 73 | 78 | 118 | 6 | 148,80 |
| 22 0390 0450 060 | % 4,5 | 60 | 65 | 105 | 6 | 146,40 |
| 22 0390 0450 080 | % 4,5 | 80 | 88 | 130 | 6 | 149,40 |
| 22 0390 0450 110 | % 4,5 | 110 | 118 | 160 | 6 | 171,00 |
| 22 0390 0450 184 | % 4,5 | 184 | 190 | 230 | 6 | 256,80 |
| 22 0390 0460 065 | % 4,6 | 65 | 71 | 110 | 6 | 146,40 |
| 22 0390 0460 079 | % 4,6 | 79 | 85 | 125 | 6 | 162,00 |
| 22 0390 0470 065 | % 4,7 | 65 | 71 | 110 | 6 | 146,40 |
| 22 0390 0470 079 | % 4,7 | 79 | 85 | 125 | 6 | 162,00 |
| 22 0390 0480 065 | % 4,8 | 65 | 71 | 110 | 6 | 146,40 |
| 22 0390 0480 079 | % 4,8 | 79 | 85 | 125 | 6 | 162,00 |
| 22 0390 0490 065 | % 4,9 | 65 | 71 | 110 | 6 | 146,40 |
| 22 0390 0490 079 | % 4,9 | 79 | 85 | 125 | 6 | 162,00 |
| 22 0390 0500 070 | % 5,0 | 70 | 80 | 120 | 6 | 142,80 |
| 22 0390 0500 090 | % 5,0 | 90 | 98 | 140 | 6 | 150,60 |
| 22 0390 0500 109 | % 5,0 | 109 | 115 | 155 | 6 | 171,00 |
| 22 0390 0500 120 | % 5,0 | 120 | 128 | 170 | 6 | 172,80 |
| 22 0390 0500 200 | % 5,0 | 200 | 210 | 250 | 6 | 270,00 |
| 22 0390 0510 074 | % 5,1 | 74 | 80 | 120 | 6 | 142,80 |
| 22 0390 0510 088 | % 5,1 | 88 | 95 | 135 | 6 | 150,60 |
| 22 0390 0520 074 | % 5,2 | 74 | 80 | 120 | 6 | 142,80 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Schnittdaten
Cutting data

Film
Movie

1245

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|-----|-----|-----|-------|--------|
| 22 0390 0520 088 | 5,2 | 88 | 95 | 135 | 6 | 150,60 |
| 22 0390 0530 074 | 5,3 | 74 | 80 | 120 | 6 | 142,80 |
| 22 0390 0530 088 | 5,3 | 88 | 95 | 135 | 6 | 150,60 |
| 22 0390 0540 074 | 5,4 | 74 | 80 | 120 | 6 | 142,80 |
| 22 0390 0540 088 | 5,4 | 88 | 95 | 135 | 6 | 150,60 |
| 22 0390 0550 100 | 5,5 | 100 | 108 | 150 | 6 | 151,80 |
| 22 0390 0550 130 | 5,5 | 130 | 138 | 180 | 6 | 172,80 |
| 22 0390 0550 160 | 5,5 | 160 | 168 | 210 | 6 | 192,60 |
| 22 0390 0560 079 | 5,6 | 79 | 85 | 125 | 6 | 149,40 |
| 22 0390 0560 097 | 5,6 | 97 | 105 | 145 | 6 | 183,00 |
| 22 0390 0570 079 | 5,7 | 79 | 85 | 125 | 6 | 149,40 |
| 22 0390 0570 097 | 5,7 | 97 | 105 | 145 | 6 | 183,00 |
| 22 0390 0580 079 | 5,8 | 79 | 85 | 125 | 6 | 149,40 |
| 22 0390 0580 097 | 5,8 | 97 | 105 | 145 | 6 | 183,00 |
| 22 0390 0590 079 | 5,9 | 79 | 85 | 125 | 6 | 149,40 |
| 22 0390 0590 097 | 5,9 | 97 | 105 | 145 | 6 | 183,00 |
| 22 0390 0600 070 | 6,0 | 70 | 85 | 125 | 6 | 149,40 |
| 22 0390 0600 090 | 6,0 | 90 | 105 | 145 | 6 | 166,80 |
| 22 0390 0600 248 | 6,0 | 248 | 255 | 295 | 6 | 234,00 |
| 22 0390 0610 082 | 6,1 | 82 | 90 | 130 | 8 | 193,80 |
| 22 0390 0620 082 | 6,2 | 82 | 90 | 130 | 8 | 193,80 |
| 22 0390 0620 102 | 6,2 | 102 | 110 | 150 | 8 | 210,00 |
| 22 0390 0630 082 | 6,3 | 82 | 90 | 130 | 8 | 193,80 |
| 22 0390 0630 102 | 6,3 | 102 | 110 | 150 | 8 | 210,00 |
| 22 0390 0640 082 | 6,4 | 82 | 90 | 130 | 8 | 193,80 |
| 22 0390 0640 102 | 6,4 | 102 | 110 | 150 | 8 | 210,00 |
| 22 0390 0650 095 | 6,5 | 95 | 110 | 150 | 8 | 210,00 |
| 22 0390 0650 115 | 6,5 | 115 | 130 | 170 | 8 | 218,40 |
| 22 0390 0650 155 | 6,5 | 155 | 170 | 210 | 8 | 255,60 |
| 22 0390 0650 195 | 6,5 | 195 | 210 | 250 | 8 | 295,20 |
| 22 0390 0650 262 | 6,5 | 262 | 270 | 310 | 8 | 384,00 |
| 22 0390 0660 092 | 6,6 | 92 | 100 | 140 | 8 | 196,80 |
| 22 0390 0660 112 | 6,6 | 112 | 120 | 160 | 8 | 205,20 |
| 22 0390 0670 092 | 6,7 | 92 | 100 | 140 | 8 | 196,80 |
| 22 0390 0670 112 | 6,7 | 112 | 120 | 160 | 8 | 205,20 |
| 22 0390 0680 092 | 6,8 | 92 | 100 | 140 | 8 | 196,80 |
| 22 0390 0680 112 | 6,8 | 112 | 120 | 160 | 8 | 205,20 |
| 22 0390 0690 092 | 6,9 | 92 | 100 | 140 | 8 | 196,80 |
| 22 0390 0690 112 | 6,9 | 112 | 120 | 160 | 8 | 205,20 |
| 22 0390 0700 095 | 7,0 | 95 | 110 | 150 | 8 | 211,80 |
| 22 0390 0700 125 | 7,0 | 125 | 140 | 180 | 8 | 220,80 |
| 22 0390 0700 165 | 7,0 | 165 | 180 | 220 | 8 | 255,60 |
| 22 0390 0700 210 | 7,0 | 210 | 225 | 265 | 8 | 298,80 |
| 22 0390 0710 095 | 7,1 | 95 | 105 | 150 | 8 | 211,80 |
| 22 0390 0710 120 | 7,1 | 120 | 130 | 170 | 8 | 218,40 |
| 22 0390 0720 100 | 7,2 | 100 | 110 | 150 | 8 | 211,80 |
| 22 0390 0730 100 | 7,3 | 100 | 110 | 150 | 8 | 211,80 |
| 22 0390 0740 100 | 7,4 | 100 | 110 | 150 | 8 | 211,80 |
| 22 0390 0750 100 | 7,5 | 100 | 110 | 150 | 8 | 211,80 |
| 22 0390 0750 120 | 7,5 | 120 | 130 | 170 | 8 | 218,40 |
| 22 0390 0760 105 | 7,6 | 105 | 115 | 155 | 8 | 214,80 |
| 22 0390 0760 125 | 7,6 | 125 | 135 | 175 | 8 | 220,80 |
| 22 0390 0770 105 | 7,7 | 105 | 115 | 155 | 8 | 214,80 |
| 22 0390 0770 125 | 7,7 | 125 | 135 | 175 | 8 | 220,80 |
| 22 0390 0780 105 | 7,8 | 105 | 115 | 155 | 8 | 214,80 |
| 22 0390 0780 125 | 7,8 | 125 | 135 | 175 | 8 | 220,80 |
| 22 0390 0790 105 | 7,9 | 105 | 115 | 155 | 8 | 214,80 |
| 22 0390 0800 095 | 8,0 | 95 | 115 | 155 | 8 | 211,80 |
| 22 0390 0800 145 | 8,0 | 145 | 160 | 200 | 8 | 219,00 |
| 22 0390 0800 190 | 8,0 | 190 | 205 | 245 | 8 | 254,40 |
| 22 0390 0800 240 | 8,0 | 240 | 260 | 300 | 8 | 312,00 |
| 22 0390 0810 108 | 8,1 | 108 | 118 | 160 | 10 | 261,60 |
| 22 0390 0810 135 | 8,1 | 135 | 145 | 190 | 10 | 310,20 |
| 22 0390 0820 108 | 8,2 | 108 | 118 | 160 | 10 | 261,60 |
| 22 0390 0820 135 | 8,2 | 135 | 145 | 190 | 10 | 310,20 |
| 22 0390 0830 108 | 8,3 | 108 | 118 | 160 | 10 | 261,60 |
| 22 0390 0840 108 | 8,4 | 108 | 118 | 160 | 10 | 261,60 |
| 22 0390 0840 135 | 8,4 | 135 | 145 | 190 | 10 | 310,20 |
| 22 0390 0850 150 | 8,5 | 150 | 160 | 205 | 10 | 295,80 |
| 22 0390 0850 200 | 8,5 | 200 | 210 | 255 | 10 | 355,80 |
| 22 0390 0860 118 | 8,6 | 118 | 130 | 175 | 10 | 277,20 |
| 22 0390 0860 144 | 8,6 | 144 | 155 | 200 | 10 | 295,80 |
| 22 0390 0870 118 | 8,7 | 118 | 130 | 175 | 10 | 291,00 |
| 22 0390 0870 144 | 8,7 | 144 | 155 | 200 | 10 | 295,80 |
| 22 0390 0880 118 | 8,8 | 118 | 130 | 175 | 10 | 277,20 |
| 22 0390 0880 144 | 8,8 | 144 | 155 | 200 | 10 | 295,80 |
| 22 0390 0890 118 | 8,9 | 118 | 130 | 175 | 10 | 277,20 |
| 22 0390 0900 110 | 9,0 | 110 | 130 | 175 | 10 | 277,20 |
| 22 0390 0900 118 | 9,0 | 118 | 130 | 175 | 10 | 277,20 |
| 22 0390 0900 150 | 9,0 | 150 | 160 | 205 | 10 | 285,60 |
| 22 0390 0900 200 | 9,0 | 200 | 210 | 255 | 10 | 344,40 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|-----|-----|-----|-------|--------|
| 22 0390 0900 250 | 9,0 | 250 | 260 | 305 | 10 | 410,40 |
| 22 0390 0910 123 | 9,1 | 123 | 135 | 180 | 10 | 281,40 |
| 22 0390 0910 155 | 9,1 | 155 | 170 | 210 | 10 | 320,40 |
| 22 0390 0920 123 | 9,2 | 123 | 135 | 180 | 10 | 281,40 |
| 22 0390 0920 155 | 9,2 | 155 | 170 | 210 | 10 | 320,40 |
| 22 0390 0930 123 | 9,3 | 123 | 135 | 180 | 10 | 281,40 |
| 22 0390 0940 123 | 9,4 | 123 | 135 | 180 | 10 | 281,40 |
| 22 0390 0950 123 | 9,5 | 123 | 135 | 180 | 10 | 281,40 |
| 22 0390 0950 155 | 9,5 | 155 | 170 | 210 | 10 | 320,40 |
| 22 0390 0960 130 | 9,6 | 130 | 145 | 190 | 10 | 286,80 |
| 22 0390 0960 163 | 9,6 | 163 | 175 | 220 | 10 | 323,40 |
| 22 0390 0970 130 | 9,7 | 130 | 145 | 190 | 10 | 286,80 |
| 22 0390 0970 163 | 9,7 | 163 | 175 | 220 | 10 | 323,40 |
| 22 0390 0980 130 | 9,8 | 130 | 145 | 190 | 10 | 286,80 |
| 22 0390 0980 163 | 9,8 | 163 | 175 | 220 | 10 | 323,40 |
| 22 0390 0990 130 | 9,9 | 130 | 145 | 190 | 10 | 286,80 |
| 22 0390 0990 163 | 9,9 | 163 | 175 | 220 | 10 | 323,40 |
| 22 0390 1000 110 | 10,0 | 110 | 130 | 175 | 10 | 270,00 |
| 22 0390 1000 150 | 10,0 | 150 | 160 | 205 | 10 | 271,80 |
| 22 0390 1000 180 | 10,0 | 180 | 190 | 235 | 10 | 297,00 |
| 22 0390 1000 220 | 10,0 | 220 | 230 | 275 | 10 | 339,00 |
| 22 0390 1010 142 | 10,1 | 142 | 155 | 205 | 12 | 378,60 |
| 22 0390 1010 167 | 10,1 | 167 | 180 | 230 | 12 | 441,00 |
| 22 0390 1020 142 | 10,2 | 142 | 155 | 205 | 12 | 378,60 |
| 22 0390 1020 167 | 10,2 | 167 | 180 | 230 | 12 | 441,00 |
| 22 0390 1030 142 | 10,3 | 142 | 155 | 205 | 12 | 378,60 |
| 22 0390 1040 142 | 10,4 | 142 | 155 | 205 | 12 | 378,60 |
| 22 0390 1050 142 | 10,5 | 142 | 155 | 205 | 12 | 378,60 |
| 22 0390 1050 167 | 10,5 | 167 | 180 | 230 | 12 | 441,00 |
| 22 0390 1070 147 | 10,7 | 147 | 160 | 210 | 12 | 378,60 |
| 22 0390 1080 147 | 10,8 | 147 | 160 | 210 | 12 | 378,60 |
| 22 0390 1100 180 | 11,0 | 180 | 194 | 245 | 12 | 382,80 |
| 22 0390 1100 220 | 11,0 | 220 | 234 | 285 | 12 | 433,80 |
| 22 0390 1150 186 | 11,5 | 186 | 200 | 250 | 12 | 454,80 |
| 22 0390 1180 186 | 11,8 | 186 | 200 | 250 | 12 | 454,80 |
| 22 0390 1200 180 | 12,0 | 180 | 194 | 245 | 12 | 357,60 |
| 22 0390 1200 220 | 12,0 | 220 | 234 | 285 | 12 | 404,40 |

Einsatzempfehlung: Wir empfehlen über 12xD Bohrtiefe eine Pilotbohrung mit 22 0402 oder 22 0405 in der jeweils kürzesten Ausführung. Bei schrägen Flächen empfehlen wir unseren VHM-Bohrer 22 0404.

☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.

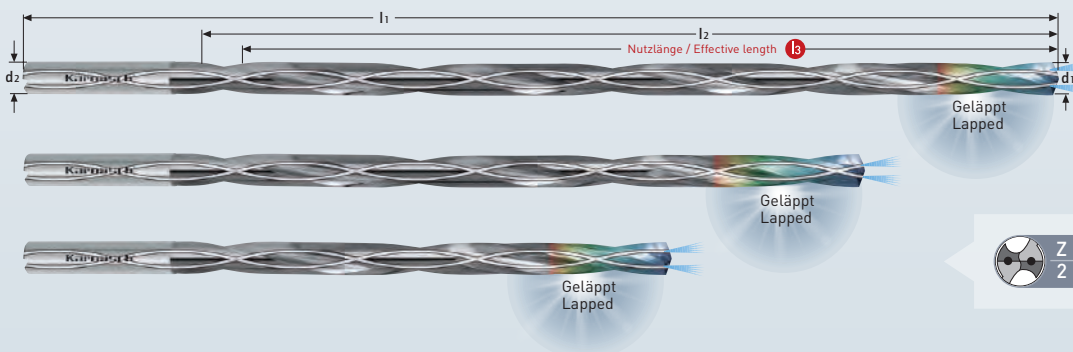
Application recommendation: We recommend over 12xD drilling depth a pilot drilling with 22 0402 or 22 0405 in each case the short version. We recommend our solid carbide drill 22 0404 on bevel surfaces.

☞ Special price / sale article. While stocks last.



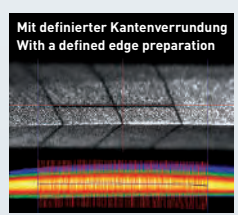
22 0392

Vollhartmetall-Hochleistungsbohrer < 40xD
Solid carbide twist drill < 40xD



| | |
|--------------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| W/M | DIN 6535 Form HA |
| | |
| | HSC HPC |
| | NHC 7000 |
| | 50-80 bar |

| h7 | Bohrungstoleranz Hole tolerance |
|---------|------------------------------------|
| > 3-6 | +0,000 -0,012 |
| > 6-10 | +0,000 -0,015 |
| > 10-18 | +0,000 -0,018 |



| | | |
|------------------------------|---------------|-------------------------|
| Schnittdaten Cutting data | Film Movie | Zeichnungen Drawings |
| | | |
| 1242 | | DXF/STEP |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|-----|-----|-----|-------|--------|
| 22 0392 0100 006 | • 1,0 | 6 | 8 | 55 | 4 | 83,00 |
| 22 0392 0110 010 | • 1,1 | 10 | 12 | 55 | 4 | 83,00 |
| 22 0392 0120 010 | • 1,2 | 10 | 12 | 55 | 4 | 83,00 |
| 22 0392 0130 010 | • 1,3 | 10 | 12 | 55 | 4 | 83,00 |
| 22 0392 0140 010 | • 1,4 | 10 | 12 | 55 | 4 | 83,00 |
| 22 0392 0150 010 | • 1,5 | 10 | 12 | 55 | 4 | 83,00 |
| 22 0392 0160 013 | • 1,6 | 13 | 16 | 55 | 4 | 83,00 |
| 22 0392 0170 013 | • 1,7 | 13 | 16 | 55 | 4 | 83,00 |
| 22 0392 0180 013 | • 1,8 | 13 | 16 | 55 | 4 | 83,00 |
| 22 0392 0190 013 | • 1,9 | 13 | 16 | 55 | 4 | 83,00 |
| 22 0392 0200 017 | • 2,0 | 17 | 21 | 57 | 4 | 83,00 |
| 22 0392 0200 047 | • 2,0 | 47 | 50 | 92 | 4 | 130,00 |
| 22 0392 0200 067 | • 2,0 | 67 | 70 | 115 | 4 | 146,00 |
| 22 0392 0210 017 | • 2,1 | 17 | 21 | 57 | 4 | 83,00 |
| 22 0392 0220 017 | • 2,2 | 17 | 21 | 57 | 4 | 83,00 |
| 22 0392 0220 044 | • 2,2 | 44 | 48 | 80 | 4 | 75,00 |
| 22 0392 0220 047 | • 2,2 | 47 | 50 | 92 | 4 | 130,00 |
| 22 0392 0220 066 | • 2,2 | 66 | 70 | 110 | 4 | 146,00 |
| 22 0392 0230 017 | • 2,3 | 17 | 21 | 57 | 4 | 83,00 |
| 22 0392 0230 046 | • 2,3 | 46 | 50 | 80 | 4 | 75,00 |
| 22 0392 0230 047 | • 2,3 | 47 | 50 | 92 | 4 | 130,00 |
| 22 0392 0230 067 | • 2,3 | 67 | 70 | 115 | 4 | 146,00 |
| 22 0392 0230 069 | • 2,3 | 69 | 73 | 110 | 4 | 84,60 |
| 22 0392 0240 017 | • 2,4 | 17 | 21 | 57 | 4 | 83,00 |
| 22 0392 0240 048 | • 2,4 | 48 | 52 | 85 | 4 | 88,20 |
| 22 0392 0240 066 | • 2,4 | 66 | 70 | 112 | 4 | 153,00 |
| 22 0392 0240 072 | • 2,4 | 72 | 76 | 110 | 4 | 98,40 |
| 22 0392 0240 086 | • 2,4 | 86 | 90 | 138 | 4 | 170,00 |
| 22 0392 0250 017 | • 2,5 | 17 | 21 | 57 | 4 | 83,00 |
| 22 0392 0250 066 | • 2,5 | 66 | 70 | 112 | 4 | 144,00 |
| 22 0392 0250 075 | • 2,5 | 75 | 80 | 110 | 4 | 98,40 |
| 22 0392 0250 086 | • 2,5 | 86 | 90 | 138 | 4 | 170,00 |
| 22 0392 0260 017 | • 2,6 | 17 | 21 | 57 | 4 | 83,00 |
| 22 0392 0270 017 | • 2,7 | 17 | 21 | 57 | 4 | 83,00 |
| 22 0392 0270 054 | • 2,7 | 54 | 59 | 90 | 4 | 83,40 |
| 22 0392 0270 066 | • 2,7 | 66 | 70 | 112 | 4 | 144,00 |
| 22 0392 0270 081 | • 2,7 | 81 | 86 | 120 | 4 | 98,40 |
| 22 0392 0270 086 | • 2,7 | 86 | 90 | 138 | 4 | 170,00 |
| 22 0392 0280 017 | • 2,8 | 17 | 21 | 57 | 4 | 83,00 |
| 22 0392 0280 056 | • 2,8 | 56 | 61 | 95 | 4 | 83,40 |
| 22 0392 0280 066 | • 2,8 | 66 | 70 | 112 | 4 | 144,00 |
| 22 0392 0280 084 | • 2,8 | 84 | 89 | 120 | 4 | 98,40 |
| 22 0392 0280 086 | • 2,8 | 86 | 90 | 138 | 4 | 170,00 |
| 22 0392 0290 017 | • 2,9 | 17 | 21 | 57 | 4 | 83,00 |
| 22 0392 0300 022 | • 3,0 | 22 | 28 | 66 | 6 | 83,00 |
| 22 0392 0300 029 | • 3,0 | 29 | 34 | 72 | 6 | 136,00 |
| 22 0392 0300 045 | • 3,0 | 45 | 51 | 95 | 6 | 163,00 |
| 22 0392 0300 055 | • 3,0 | 55 | 60 | 100 | 6 | 173,00 |
| 22 0392 0300 075 | • 3,0 | 75 | 80 | 120 | 6 | 191,00 |
| 22 0392 0300 090 | • 3,0 | 90 | 96 | 140 | 6 | 221,00 |
| 22 0392 0300 100 | • 3,0 | 100 | 105 | 150 | 6 | 281,00 |
| 22 0392 0310 022 | • 3,1 | 22 | 28 | 66 | 6 | 83,00 |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

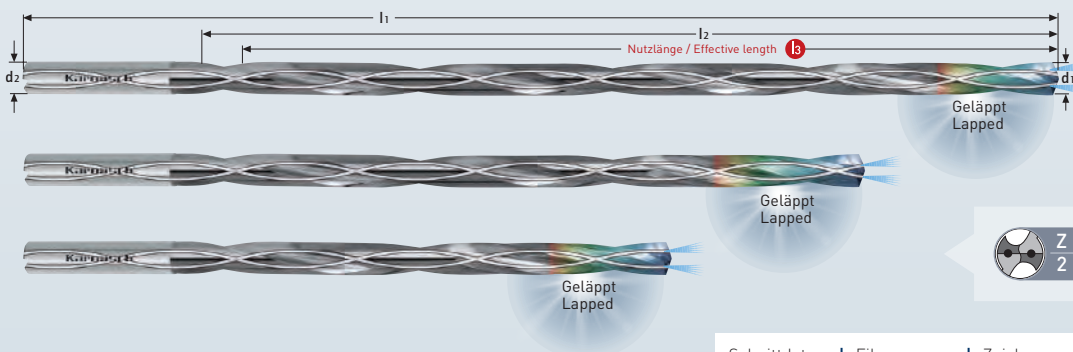
- 1
- 2
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- 8
- 9

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|-----|-----|-----|-------|--------|
| 22 0392 0310 029 | • 3,1 | 29 | 34 | 72 | 6 | 136,00 |
| 22 0392 0310 048 | • 3,1 | 48 | 54 | 92 | 6 | 163,00 |
| 22 0392 0320 023 | • 3,2 | 23 | 28 | 66 | 6 | 83,00 |
| 22 0392 0320 029 | • 3,2 | 29 | 34 | 72 | 6 | 136,00 |
| 22 0392 0320 048 | • 3,2 | 48 | 54 | 95 | 6 | 163,00 |
| 22 0392 0320 055 | • 3,2 | 55 | 60 | 100 | 6 | 173,00 |
| 22 0392 0320 064 | • 3,2 | 64 | 70 | 110 | 6 | 106,20 |
| 22 0392 0320 075 | • 3,2 | 75 | 80 | 120 | 6 | 191,00 |
| 22 0392 0320 080 | • 3,2 | 80 | 86 | 125 | 6 | 111,00 |
| 22 0392 0320 093 | • 3,2 | 93 | 98 | 135 | 6 | 221,00 |
| 22 0392 0320 096 | • 3,2 | 96 | 102 | 140 | 6 | 128,40 |
| 22 0392 0320 100 | • 3,2 | 100 | 105 | 150 | 6 | 281,00 |
| 22 0392 0330 023 | • 3,3 | 23 | 28 | 66 | 6 | 83,00 |
| 22 0392 0330 029 | • 3,3 | 29 | 34 | 72 | 6 | 136,00 |
| 22 0392 0330 048 | • 3,3 | 48 | 54 | 92 | 6 | 163,00 |
| 22 0392 0330 050 | • 3,3 | 50 | 56 | 95 | 6 | 173,00 |
| 22 0392 0330 066 | • 3,3 | 66 | 72 | 110 | 6 | 111,00 |
| 22 0392 0330 075 | • 3,3 | 75 | 80 | 120 | 6 | 191,00 |
| 22 0392 0330 083 | • 3,3 | 83 | 89 | 130 | 6 | 115,20 |
| 22 0392 0330 099 | • 3,3 | 99 | 105 | 150 | 6 | 128,40 |
| 22 0392 0330 105 | • 3,3 | 105 | 110 | 150 | 6 | 221,00 |
| 22 0392 0330 129 | • 3,3 | 129 | 135 | 185 | 6 | 281,00 |
| 22 0392 0340 023 | • 3,4 | 23 | 28 | 66 | 6 | 83,00 |
| 22 0392 0340 029 | • 3,4 | 29 | 34 | 72 | 6 | 136,00 |
| 22 0392 0340 048 | • 3,4 | 48 | 54 | 92 | 6 | 163,00 |
| 22 0392 0350 023 | • 3,5 | 23 | 28 | 66 | 6 | 83,00 |
| 22 0392 0350 029 | • 3,5 | 29 | 34 | 72 | 6 | 136,00 |
| 22 0392 0350 048 | • 3,5 | 48 | 54 | 92 | 6 | 163,00 |
| 22 0392 0350 053 | • 3,5 | 53 | 59 | 100 | 6 | 173,00 |
| 22 0392 0350 070 | • 3,5 | 70 | 77 | 120 | 6 | 191,00 |
| 22 0392 0350 088 | • 3,5 | 88 | 94 | 140 | 6 | 128,40 |
| 22 0392 0350 105 | • 3,5 | 105 | 112 | 150 | 6 | 221,00 |
| 22 0392 0350 129 | • 3,5 | 129 | 135 | 185 | 6 | 281,00 |
| 22 0392 0360 023 | • 3,6 | 23 | 28 | 66 | 6 | 83,00 |
| 22 0392 0360 029 | • 3,6 | 29 | 34 | 72 | 6 | 136,00 |
| 22 0392 0360 048 | • 3,6 | 48 | 54 | 92 | 6 | 163,00 |
| 22 0392 0370 023 | • 3,7 | 23 | 28 | 66 | 6 | 83,00 |
| 22 0392 0370 029 | • 3,7 | 29 | 34 | 72 | 6 | 136,00 |
| 22 0392 0370 048 | • 3,7 | 48 | 54 | 92 | 6 | 163,00 |
| 22 0392 0380 029 | • 3,8 | 29 | 36 | 74 | 6 | 82,00 |
| 22 0392 0380 036 | • 3,8 | 36 | 43 | 80 | 6 | 136,00 |
| 22 0392 0380 057 | • 3,8 | 57 | 64 | 102 | 6 | 163,00 |
| 22 0392 0380 069 | • 3,8 | 69 | 75 | 115 | 6 | 179,00 |
| 22 0392 0380 076 | • 3,8 | 76 | 83 | 130 | 6 | 115,20 |
| 22 0392 0380 084 | • 3,8 | 84 | 90 | 130 | 6 | 198,00 |
| 22 0392 0380 095 | • 3,8 | 95 | 102 | 150 | 6 | 145,80 |
| 22 0392 0380 114 | • 3,8 | 114 | 120 | 160 | 6 | 251,00 |
| 22 0392 0380 129 | • 3,8 | 129 | 135 | 185 | 6 | 281,00 |
| 22 0392 0390 029 | • 3,9 | 29 | 36 | 74 | 6 | 82,00 |
| 22 0392 0390 036 | • 3,9 | 36 | 43 | 80 | 6 | 136,00 |
| 22 0392 0390 057 | • 3,9 | 57 | 64 | 102 | 6 | 163,00 |
| 22 0392 0400 029 | • 4,0 | 29 | 36 | 74 | 6 | 82,00 |
| 22 0392 0400 036 | • 4,0 | 36 | 43 | 80 | 6 | 136,00 |
| 22 0392 0400 057 | • 4,0 | 57 | 64 | 102 | 6 | 163,00 |
| 22 0392 0400 060 | • 4,0 | 60 | 68 | 110 | 6 | 99,60 |
| 22 0392 0400 069 | • 4,0 | 69 | 75 | 115 | 6 | 179,00 |
| 22 0392 0400 080 | • 4,0 | 80 | 88 | 130 | 6 | 198,00 |
| 22 0392 0400 114 | • 4,0 | 114 | 120 | 160 | 6 | 251,00 |
| 22 0392 0400 129 | • 4,0 | 129 | 135 | 185 | 6 | 281,00 |
| 22 0392 0400 160 | • 4,0 | 160 | 168 | 210 | 6 | 180,00 |
| 22 0392 0410 029 | • 4,1 | 29 | 36 | 74 | 6 | 82,00 |
| 22 0392 0410 036 | • 4,1 | 36 | 43 | 80 | 6 | 136,00 |
| 22 0392 0410 057 | • 4,1 | 57 | 64 | 102 | 6 | 163,00 |
| 22 0392 0420 029 | • 4,2 | 29 | 36 | 74 | 6 | 82,00 |
| 22 0392 0420 036 | • 4,2 | 36 | 43 | 80 | 6 | 136,00 |
| 22 0392 0420 057 | • 4,2 | 57 | 64 | 102 | 6 | 163,00 |
| 22 0392 0420 063 | • 4,2 | 63 | 71 | 120 | 6 | 111,60 |
| 22 0392 0420 069 | • 4,2 | 69 | 75 | 115 | 6 | 192,00 |
| 22 0392 0420 084 | • 4,2 | 84 | 92 | 140 | 6 | 118,20 |
| 22 0392 0420 103 | • 4,2 | 103 | 110 | 160 | 6 | 213,00 |
| 22 0392 0420 114 | • 4,2 | 114 | 120 | 160 | 6 | 251,00 |
| 22 0392 0420 126 | • 4,2 | 126 | 134 | 185 | 6 | 281,00 |
| 22 0392 0430 029 | • 4,3 | 29 | 36 | 74 | 6 | 82,00 |
| 22 0392 0430 036 | • 4,3 | 36 | 43 | 80 | 6 | 136,00 |
| 22 0392 0430 057 | • 4,3 | 57 | 64 | 102 | 6 | 163,00 |
| 22 0392 0440 029 | • 4,4 | 29 | 36 | 74 | 6 | 82,00 |
| 22 0392 0440 036 | • 4,4 | 36 | 43 | 80 | 6 | 136,00 |
| 22 0392 0440 057 | • 4,4 | 57 | 64 | 102 | 6 | 163,00 |
| 22 0392 0450 029 | • 4,5 | 29 | 36 | 74 | 6 | 82,00 |
| 22 0392 0450 036 | • 4,5 | 36 | 43 | 80 | 6 | 136,00 |
| 22 0392 0450 057 | • 4,5 | 57 | 64 | 102 | 6 | 163,00 |
| 22 0392 0450 068 | • 4,5 | 68 | 76 | 120 | 6 | 106,20 |
| 22 0392 0450 082 | • 4,5 | 82 | 90 | 130 | 6 | 192,00 |
| 22 0392 0450 090 | • 4,5 | 90 | 99 | 140 | 6 | 118,20 |
| 22 0392 0450 103 | • 4,5 | 103 | 110 | 160 | 6 | 213,00 |
| 22 0392 0450 112 | • 4,5 | 112 | 121 | 165 | 6 | 143,40 |
| 22 0392 0450 127 | • 4,5 | 127 | 135 | 180 | 6 | 261,00 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|-----|-----|-----|-------|--------|
| 22 0392 0450 135 | • 4,5 | 135 | 144 | 185 | 6 | 168,00 |
| 22 0392 0450 157 | • 4,5 | 157 | 165 | 215 | 6 | 299,00 |
| 22 0392 0460 029 | • 4,6 | 29 | 36 | 74 | 6 | 82,00 |
| 22 0392 0460 036 | • 4,6 | 36 | 43 | 80 | 6 | 136,00 |
| 22 0392 0460 057 | • 4,6 | 57 | 64 | 102 | 6 | 163,00 |
| 22 0392 0470 029 | • 4,7 | 29 | 36 | 74 | 6 | 82,00 |
| 22 0392 0470 036 | • 4,7 | 36 | 43 | 80 | 6 | 136,00 |
| 22 0392 0470 057 | • 4,7 | 57 | 64 | 102 | 6 | 163,00 |
| 22 0392 0480 035 | • 4,8 | 35 | 44 | 82 | 6 | 82,00 |
| 22 0392 0480 048 | • 4,8 | 48 | 57 | 95 | 6 | 136,00 |
| 22 0392 0480 069 | • 4,8 | 69 | 78 | 116 | 6 | 163,00 |
| 22 0392 0480 072 | • 4,8 | 72 | 81 | 125 | 6 | 112,20 |
| 22 0392 0480 082 | • 4,8 | 82 | 90 | 130 | 6 | 203,00 |
| 22 0392 0480 096 | • 4,8 | 96 | 105 | 150 | 6 | 124,80 |
| 22 0392 0480 112 | • 4,8 | 112 | 120 | 160 | 6 | 225,00 |
| 22 0392 0480 120 | • 4,8 | 120 | 129 | 175 | 6 | 146,40 |
| 22 0392 0480 127 | • 4,8 | 127 | 135 | 180 | 6 | 261,00 |
| 22 0392 0480 144 | • 4,8 | 144 | 153 | 200 | 6 | 168,00 |
| 22 0392 0480 157 | • 4,8 | 157 | 165 | 215 | 6 | 299,00 |
| 22 0392 0490 035 | • 4,9 | 35 | 44 | 82 | 6 | 82,00 |
| 22 0392 0490 048 | • 4,9 | 48 | 57 | 95 | 6 | 136,00 |
| 22 0392 0490 069 | • 4,9 | 69 | 78 | 116 | 6 | 163,00 |
| 22 0392 0500 035 | • 5,0 | 35 | 44 | 82 | 6 | 82,00 |
| 22 0392 0500 048 | • 5,0 | 48 | 57 | 95 | 6 | 136,00 |
| 22 0392 0500 069 | • 5,0 | 69 | 78 | 116 | 6 | 163,00 |
| 22 0392 0500 082 | • 5,0 | 82 | 90 | 130 | 6 | 203,00 |
| 22 0392 0500 100 | • 5,0 | 100 | 110 | 150 | 6 | 124,80 |
| 22 0392 0500 112 | • 5,0 | 112 | 120 | 160 | 6 | 225,00 |
| 22 0392 0500 125 | • 5,0 | 125 | 135 | 175 | 6 | 261,00 |
| 22 0392 0500 150 | • 5,0 | 150 | 160 | 200 | 6 | 168,00 |
| 22 0392 0500 157 | • 5,0 | 157 | 165 | 215 | 6 | 299,00 |
| 22 0392 0500 200 | • 5,0 | 200 | 210 | 250 | 6 | 233,40 |
| 22 0392 0510 035 | • 5,1 | 35 | 44 | 82 | 6 | 82,00 |
| 22 0392 0510 048 | • 5,1 | 48 | 57 | 95 | 6 | 136,00 |
| 22 0392 0510 069 | • 5,1 | 69 | 78 | 116 | 6 | 163,00 |
| 22 0392 0520 035 | • 5,2 | 35 | 44 | 82 | 6 | 82,00 |
| 22 0392 0520 048 | • 5,2 | 48 | 57 | 95 | 6 | 136,00 |
| 22 0392 0520 069 | • 5,2 | 69 | 78 | 116 | 6 | 163,00 |
| 22 0392 0530 035 | • 5,3 | 35 | 44 | 82 | 6 | 82,00 |
| 22 0392 0530 048 | • 5,3 | 48 | 57 | 95 | 6 | 136,00 |
| 22 0392 0530 069 | • 5,3 | 69 | 78 | 116 | 6 | 163,00 |
| 22 0392 0540 035 | • 5,4 | 35 | 44 | 82 | 6 | 82,00 |
| 22 0392 0540 048 | • 5,4 | 48 | 57 | 95 | 6 | 136,00 |
| 22 0392 0540 069 | • 5,4 | 69 | 78 | 116 | 6 | 163,00 |
| 22 0392 0550 035 | • 5,5 | 35 | 44 | 82 | 6 | 82,00 |
| 22 0392 0550 048 | • 5,5 | 48 | 57 | 95 | 6 | 136,00 |
| 22 0392 0550 069 | • 5,5 | 69 | 78 | 116 | 6 | 163,00 |
| 22 0392 0550 083 | • 5,5 | 83 | 93 | 135 | 6 | 118,20 |
| 22 0392 0550 099 | • 5,5 | 99 | 108 | 150 | 6 | 212,00 |
| 22 0392 0550 110 | • 5,5 | 110 | 121 | 160 | 6 | 130,80 |
| 22 0392 0550 131 | • 5,5 | 131 | 140 | 185 | 6 | 235,00 |
| 22 0392 0550 138 | • 5,5 | 138 | 148 | 190 | 6 | 156,00 |
| 22 0392 0550 159 | • 5,5 | 159 | 168 | 205 | 6 | 281,00 |
| 22 0392 0550 165 | • 5,5 | 165 | 176 | 215 | 6 | 174,60 |
| 22 0392 0550 171 | • 5,5 | 171 | 180 | 230 | 6 | 312,00 |
| 22 0392 0560 035 | • 5,6 | 35 | 44 | 82 | 6 | 82,00 |
| 22 0392 0560 048 | • 5,6 | 48 | 57 | 95 | 6 | 136,00 |
| 22 0392 0560 069 | • 5,6 | 69 | 78 | 116 | 6 | 163,00 |
| 22 0392 0570 035 | • 5,7 | 35 | 44 | 82 | 6 | 82,00 |
| 22 0392 0570 048 | • 5,7 | 48 | 57 | 95 | 6 | 136,00 |
| 22 0392 0570 069 | • 5,7 | 69 | 78 | 116 | 6 | 163,00 |
| 22 0392 0580 035 | • 5,8 | 35 | 44 | 82 | 6 | 82,00 |
| 22 0392 0580 048 | • 5,8 | 48 | 57 | 95 | 6 | 136,00 |
| 22 0392 0580 069 | • 5,8 | 69 | 78 | 116 | 6 | 163,00 |
| 22 0392 0580 087 | • 5,8 | 87 | 98 | 140 | 6 | 118,20 |
| 22 0392 0580 099 | • 5,8 | 99 | 108 | 150 | 6 | 212,00 |
| 22 0392 0580 116 | • 5,8 | 116 | 127 | 170 | 6 | 130,80 |
| 22 0392 0580 131 | • 5,8 | 131 | 140 | 185 | 6 | 235,00 |
| 22 0392 0580 145 | • 5,8 | 145 | 156 | 200 | 6 | 156,00 |
| 22 0392 0580 159 | • 5,8 | 159 | 168 | 205 | 6 | 281,00 |
| 22 0392 0580 171 | • 5,8 | 171 | 180 | 230 | 6 | 312,00 |
| 22 0392 0590 035 | • 5,9 | 35 | 44 | 82 | 6 | 82,00 |
| 22 0392 0590 048 | • 5,9 | 48 | 57 | 95 | 6 | 136,00 |
| 22 0392 0590 069 | • 5,9 | 69 | 78 | 116 | 6 | 1 |

22 0392

Vollhartmetall-Hochleistungsbohrer < 40xD
Solid carbide twist drill < 40xD



MICRO GRAIN KARNASCH NORM

W/M DIN 6535 Form HA

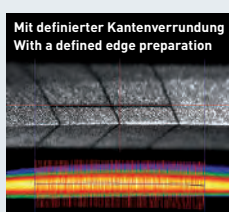
15° 137°

HSC HPC

NHC 7000

50-80 bar

| h7 | Bohrungstoleranz Hole tolerance |
|---------|------------------------------------|
| > 3-6 | +0,000 -0,012 |
| > 6-10 | +0,000 -0,015 |
| > 10-18 | +0,000 -0,018 |



Schnittdaten Cutting data **i** 1242

Film Movie **▶**

Zeichnungen Drawings **📄** DXF/STEP

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|-----|-----|-----|-------|--------|
| 22 0392 0610 096 | • 6,1 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0620 043 | • 6,2 | 43 | 53 | 90 | 8 | 90,00 |
| 22 0392 0620 066 | • 6,2 | 66 | 76 | 114 | 8 | 170,00 |
| 22 0392 0620 096 | • 6,2 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0630 043 | • 6,3 | 43 | 53 | 90 | 8 | 90,00 |
| 22 0392 0630 066 | • 6,3 | 66 | 76 | 114 | 8 | 170,00 |
| 22 0392 0630 096 | • 6,3 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0640 043 | • 6,4 | 43 | 53 | 90 | 8 | 90,00 |
| 22 0392 0640 066 | • 6,4 | 66 | 76 | 114 | 8 | 170,00 |
| 22 0392 0640 096 | • 6,4 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0650 043 | • 6,5 | 43 | 53 | 90 | 8 | 90,00 |
| 22 0392 0650 066 | • 6,5 | 66 | 76 | 114 | 8 | 170,00 |
| 22 0392 0650 096 | • 6,5 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0650 114 | • 6,5 | 114 | 125 | 165 | 8 | 226,00 |
| 22 0392 0650 130 | % 6,5 | 130 | 143 | 185 | 8 | 137,40 |
| 22 0392 0650 149 | • 6,5 | 149 | 160 | 210 | 8 | 252,00 |
| 22 0392 0650 163 | % 6,5 | 163 | 175 | 215 | 8 | 174,60 |
| 22 0392 0650 189 | • 6,5 | 189 | 200 | 240 | 8 | 326,00 |
| 22 0392 0650 195 | % 6,5 | 195 | 208 | 250 | 8 | 193,20 |
| 22 0392 0650 205 | • 6,5 | 205 | 215 | 280 | 8 | 343,00 |
| 22 0392 0660 043 | • 6,6 | 43 | 53 | 90 | 8 | 90,00 |
| 22 0392 0660 066 | • 6,6 | 66 | 76 | 114 | 8 | 170,00 |
| 22 0392 0660 096 | • 6,6 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0670 043 | • 6,7 | 43 | 53 | 90 | 8 | 90,00 |
| 22 0392 0670 066 | • 6,7 | 66 | 76 | 114 | 8 | 170,00 |
| 22 0392 0670 096 | • 6,7 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0680 043 | • 6,8 | 43 | 53 | 90 | 8 | 90,00 |
| 22 0392 0680 066 | • 6,8 | 66 | 76 | 114 | 8 | 170,00 |
| 22 0392 0680 096 | • 6,8 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0680 102 | % 6,8 | 102 | 115 | 160 | 8 | 131,40 |
| 22 0392 0680 114 | • 6,8 | 114 | 125 | 165 | 8 | 226,00 |
| 22 0392 0680 136 | % 6,8 | 136 | 149 | 195 | 8 | 149,40 |
| 22 0392 0680 149 | • 6,8 | 149 | 160 | 210 | 8 | 270,00 |
| 22 0392 0680 170 | % 6,8 | 170 | 183 | 230 | 8 | 174,60 |
| 22 0392 0680 189 | • 6,8 | 189 | 200 | 240 | 8 | 313,00 |
| 22 0392 0680 204 | % 6,8 | 204 | 217 | 265 | 8 | 199,20 |
| 22 0392 0680 219 | • 6,8 | 219 | 230 | 280 | 8 | 357,00 |
| 22 0392 0690 043 | • 6,9 | 43 | 53 | 90 | 8 | 90,00 |
| 22 0392 0690 066 | • 6,9 | 66 | 76 | 114 | 8 | 170,00 |
| 22 0392 0690 096 | • 6,9 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0700 041 | • 7,0 | 41 | 53 | 90 | 8 | 90,00 |
| 22 0392 0700 064 | • 7,0 | 64 | 76 | 114 | 8 | 170,00 |
| 22 0392 0700 096 | • 7,0 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0700 105 | % 7,0 | 105 | 119 | 160 | 8 | 131,40 |
| 22 0392 0700 114 | • 7,0 | 114 | 125 | 165 | 8 | 226,00 |
| 22 0392 0700 140 | % 7,0 | 140 | 154 | 195 | 8 | 156,00 |
| 22 0392 0700 149 | • 7,0 | 149 | 160 | 210 | 8 | 270,00 |
| 22 0392 0700 175 | % 7,0 | 175 | 189 | 230 | 8 | 174,60 |
| 22 0392 0700 189 | • 7,0 | 189 | 200 | 240 | 8 | 313,00 |
| 22 0392 0700 219 | • 7,0 | 219 | 230 | 280 | 8 | 357,00 |
| 22 0392 0710 041 | • 7,1 | 41 | 53 | 90 | 8 | 90,00 |
| 22 0392 0710 064 | • 7,1 | 64 | 76 | 114 | 8 | 170,00 |
| 22 0392 0710 096 | • 7,1 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0720 041 | • 7,2 | 41 | 53 | 90 | 8 | 90,00 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|-----|-----|-----|-------|--------|
| 22 0392 0720 064 | • 7,2 | 64 | 76 | 114 | 8 | 170,00 |
| 22 0392 0720 096 | • 7,2 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0730 041 | • 7,3 | 41 | 53 | 90 | 8 | 90,00 |
| 22 0392 0730 064 | • 7,3 | 64 | 76 | 114 | 8 | 170,00 |
| 22 0392 0730 096 | • 7,3 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0740 041 | • 7,4 | 41 | 53 | 90 | 8 | 90,00 |
| 22 0392 0740 064 | • 7,4 | 64 | 76 | 114 | 8 | 170,00 |
| 22 0392 0740 096 | • 7,4 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0750 041 | • 7,5 | 41 | 53 | 90 | 8 | 90,00 |
| 22 0392 0750 064 | • 7,5 | 64 | 76 | 114 | 8 | 170,00 |
| 22 0392 0750 096 | • 7,5 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0750 113 | % 7,5 | 113 | 128 | 165 | 8 | 128,40 |
| 22 0392 0750 128 | • 7,5 | 128 | 140 | 180 | 8 | 270,00 |
| 22 0392 0750 150 | % 7,5 | 150 | 165 | 210 | 8 | 168,00 |
| 22 0392 0750 168 | • 7,5 | 168 | 180 | 230 | 8 | 301,00 |
| 22 0392 0750 188 | % 7,5 | 188 | 203 | 255 | 8 | 199,20 |
| 22 0392 0750 208 | • 7,5 | 208 | 220 | 260 | 8 | 349,00 |
| 22 0392 0750 219 | • 7,5 | 219 | 230 | 280 | 8 | 357,00 |
| 22 0392 0750 225 | % 7,5 | 225 | 240 | 280 | 8 | 220,80 |
| 22 0392 0760 041 | • 7,6 | 41 | 53 | 90 | 8 | 90,00 |
| 22 0392 0760 064 | • 7,6 | 64 | 76 | 114 | 8 | 170,00 |
| 22 0392 0760 096 | • 7,6 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0770 041 | • 7,7 | 41 | 53 | 90 | 8 | 90,00 |
| 22 0392 0770 064 | • 7,7 | 64 | 76 | 114 | 8 | 170,00 |
| 22 0392 0770 096 | • 7,7 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0780 041 | • 7,8 | 41 | 53 | 90 | 8 | 90,00 |
| 22 0392 0780 064 | • 7,8 | 64 | 76 | 114 | 8 | 170,00 |
| 22 0392 0780 096 | • 7,8 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0780 117 | % 7,8 | 117 | 133 | 170 | 8 | 149,40 |
| 22 0392 0780 128 | • 7,8 | 128 | 140 | 180 | 8 | 270,00 |
| 22 0392 0780 156 | % 7,8 | 156 | 172 | 215 | 8 | 171,60 |
| 22 0392 0780 168 | • 7,8 | 168 | 180 | 230 | 8 | 301,00 |
| 22 0392 0780 195 | % 7,8 | 195 | 211 | 255 | 8 | 196,20 |
| 22 0392 0780 208 | • 7,8 | 208 | 220 | 260 | 8 | 349,00 |
| 22 0392 0780 234 | % 7,8 | 234 | 250 | 315 | 8 | 224,40 |
| 22 0392 0780 253 | • 7,8 | 253 | 265 | 315 | 8 | 398,00 |
| 22 0392 0790 041 | • 7,9 | 41 | 53 | 90 | 8 | 90,00 |
| 22 0392 0790 064 | • 7,9 | 64 | 76 | 114 | 8 | 170,00 |
| 22 0392 0790 096 | • 7,9 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0800 041 | • 8,0 | 41 | 53 | 90 | 8 | 90,00 |
| 22 0392 0800 064 | • 8,0 | 64 | 76 | 114 | 8 | 170,00 |
| 22 0392 0800 096 | • 8,0 | 96 | 108 | 146 | 8 | 223,00 |
| 22 0392 0800 120 | % 8,0 | 120 | 136 | 180 | 8 | 177,20 |
| 22 0392 0800 128 | • 8,0 | 128 | 140 | 180 | 8 | 250,00 |
| 22 0392 0800 160 | % 8,0 | 160 | 176 | 215 | 8 | 174,00 |
| 22 0392 0800 168 | • 8,0 | 168 | 180 | 230 | 8 | 301,00 |
| 22 0392 0800 200 | % 8,0 | 200 | 216 | 255 | 8 | 199,20 |
| 22 0392 0800 208 | • 8,0 | 208 | 220 | 260 | 8 | 349,00 |
| 22 0392 0800 240 | % 8,0 | 240 | 256 | 315 | 8 | 224,40 |
| 22 0392 0800 253 | • 8,0 | 253 | 265 | 315 | 8 | 398,00 |
| 22 0392 0810 046 | • 8,1 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0810 080 | • 8,1 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0810 106 | • 8,1 | 106 | 120 | 162 | 10 | 282,00 |
| 22 0392 0820 046 | • 8,2 | 46 | 61 | 103 | 10 | 106,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|-----|-----|-----|-------|--------|
| 22 0392 0820 080 | • 8,2 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0820 106 | • 8,2 | 106 | 120 | 162 | 10 | 282,00 |
| 22 0392 0830 046 | • 8,3 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0830 080 | • 8,3 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0830 106 | • 8,3 | 106 | 120 | 162 | 10 | 282,00 |
| 22 0392 0840 046 | • 8,4 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0840 080 | • 8,4 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0840 106 | • 8,4 | 106 | 120 | 162 | 10 | 282,00 |
| 22 0392 0850 046 | • 8,5 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0850 080 | • 8,5 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0850 106 | • 8,5 | 106 | 120 | 162 | 10 | 282,00 |
| 22 0392 0850 128 | % 8,5 | 128 | 145 | 190 | 10 | 168,00 |
| 22 0392 0850 146 | • 8,5 | 146 | 160 | 205 | 10 | 300,00 |
| 22 0392 0850 170 | % 8,5 | 170 | 187 | 230 | 10 | 190,20 |
| 22 0392 0850 182 | • 8,5 | 182 | 195 | 260 | 10 | 334,00 |
| 22 0392 0850 212 | % 8,5 | 212 | 230 | 285 | 10 | 224,40 |
| 22 0392 0850 227 | • 8,5 | 227 | 240 | 285 | 10 | 392,00 |
| 22 0392 0850 255 | % 8,5 | 255 | 272 | 315 | 10 | 258,60 |
| 22 0392 0850 282 | • 8,5 | 282 | 295 | 350 | 10 | 460,00 |
| 22 0392 0860 046 | • 8,6 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0860 080 | • 8,6 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0860 106 | • 8,6 | 106 | 120 | 162 | 10 | 282,00 |
| 22 0392 0870 046 | • 8,7 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0870 080 | • 8,7 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0870 106 | • 8,7 | 106 | 120 | 162 | 10 | 282,00 |
| 22 0392 0880 046 | • 8,8 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0880 080 | • 8,8 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0880 106 | • 8,8 | 106 | 120 | 162 | 10 | 282,00 |
| 22 0392 0880 132 | % 8,8 | 132 | 150 | 200 | 10 | 190,20 |
| 22 0392 0880 146 | • 8,8 | 146 | 160 | 205 | 10 | 334,00 |
| 22 0392 0880 176 | % 8,8 | 176 | 193 | 240 | 10 | 208,80 |
| 22 0392 0880 215 | • 8,8 | 215 | 230 | 290 | 10 | 370,00 |
| 22 0392 0880 220 | % 8,8 | 220 | 238 | 310 | 10 | 243,00 |
| 22 0392 0880 253 | • 8,8 | 253 | 268 | 310 | 10 | 427,00 |
| 22 0392 0880 264 | % 8,8 | 264 | 281 | 325 | 10 | 274,20 |
| 22 0392 0880 315 | • 8,8 | 315 | 330 | 380 | 10 | 485,00 |
| 22 0392 0890 046 | • 8,9 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0890 080 | • 8,9 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0890 106 | • 8,9 | 106 | 120 | 162 | 10 | 282,00 |
| 22 0392 0900 046 | • 9,0 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0900 080 | • 9,0 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0900 106 | • 9,0 | 106 | 120 | 162 | 10 | 282,00 |
| 22 0392 0900 135 | % 9,0 | 135 | 153 | 200 | 10 | 190,20 |
| 22 0392 0900 146 | • 9,0 | 146 | 160 | 205 | 10 | 334,00 |
| 22 0392 0900 180 | % 9,0 | 180 | 198 | 250 | 10 | 208,80 |
| 22 0392 0900 215 | • 9,0 | 215 | 230 | 290 | 10 | 370,00 |
| 22 0392 0900 225 | % 9,0 | 225 | 243 | 310 | 10 | 246,60 |
| 22 0392 0900 253 | • 9,0 | 253 | 268 | 310 | 10 | 427,00 |
| 22 0392 0900 270 | % 9,0 | 270 | 288 | 335 | 10 | 274,20 |
| 22 0392 0900 315 | • 9,0 | 315 | 330 | 380 | 10 | 485,00 |
| 22 0392 0910 046 | • 9,1 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0910 080 | • 9,1 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0910 138 | • 9,1 | 138 | 156 | 204 | 10 | 381,00 |
| 22 0392 0920 046 | • 9,2 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0920 080 | • 9,2 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0920 138 | • 9,2 | 138 | 156 | 204 | 10 | 381,00 |
| 22 0392 0930 046 | • 9,3 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0930 080 | • 9,3 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0930 138 | • 9,3 | 138 | 156 | 204 | 10 | 381,00 |
| 22 0392 0940 046 | • 9,4 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0940 080 | • 9,4 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0940 138 | • 9,4 | 138 | 156 | 204 | 10 | 381,00 |
| 22 0392 0950 046 | • 9,5 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0950 080 | • 9,5 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0950 138 | • 9,5 | 138 | 156 | 204 | 10 | 381,00 |
| 22 0392 0960 046 | • 9,6 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0960 080 | • 9,6 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0960 138 | • 9,6 | 138 | 156 | 204 | 10 | 381,00 |
| 22 0392 0970 046 | • 9,7 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0970 080 | • 9,7 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0970 138 | • 9,7 | 138 | 156 | 204 | 10 | 381,00 |
| 22 0392 0980 046 | • 9,8 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0980 080 | • 9,8 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0980 138 | • 9,8 | 138 | 156 | 204 | 10 | 381,00 |
| 22 0392 0980 147 | % 9,8 | 147 | 166 | 215 | 10 | 187,20 |
| 22 0392 0980 165 | • 9,8 | 165 | 180 | 225 | 10 | 334,00 |
| 22 0392 0980 196 | % 9,8 | 196 | 215 | 265 | 10 | 208,80 |
| 22 0392 0980 215 | • 9,8 | 215 | 230 | 290 | 10 | 370,00 |
| 22 0392 0980 245 | % 9,8 | 245 | 264 | 310 | 10 | 246,60 |
| 22 0392 0980 253 | • 9,8 | 253 | 268 | 310 | 10 | 427,00 |
| 22 0392 0980 294 | % 9,8 | 294 | 313 | 360 | 10 | 279,00 |
| 22 0392 0980 315 | • 9,8 | 315 | 330 | 380 | 10 | 485,00 |
| 22 0392 0990 046 | • 9,9 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 0990 080 | • 9,9 | 80 | 95 | 142 | 10 | 215,00 |
| 22 0392 0990 138 | • 9,9 | 138 | 156 | 204 | 10 | 381,00 |
| 22 0392 1000 046 | • 10,0 | 46 | 61 | 103 | 10 | 106,00 |
| 22 0392 1000 080 | • 10,0 | 80 | 95 | 142 | 10 | 215,00 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|----------|-----|-----|-----|-------|--------|
| 22 0392 1000 138 | • 10,0 | 138 | 156 | 204 | 10 | 381,00 |
| 22 0392 1000 150 | % 10,0 | 150 | 170 | 215 | 10 | 193,20 |
| 22 0392 1000 165 | • 10,0 | 165 | 180 | 225 | 10 | 334,00 |
| 22 0392 1000 200 | • 10,0 | 200 | 220 | 265 | 10 | 208,80 |
| 22 0392 1000 215 | • 10,0 | 215 | 230 | 290 | 10 | 370,00 |
| 22 0392 1000 250 | % 10,0 | 250 | 270 | 315 | 10 | 246,60 |
| 22 0392 1000 253 | • 10,0 | 253 | 268 | 310 | 10 | 427,00 |
| 22 0392 1000 300 | % 10,0 | 300 | 320 | 365 | 10 | 277,20 |
| 22 0392 1000 315 | • 10,0 | 315 | 330 | 380 | 10 | 485,00 |
| 22 0392 1010 053 | • 10,1 | 53 | 71 | 118 | 12 | 145,00 |
| 22 0392 1020 053 | • 10,2 | 53 | 71 | 118 | 12 | 145,00 |
| 22 0392 1020 096 | • 10,2 | 96 | 114 | 162 | 12 | 273,00 |
| 22 0392 1020 138 | • 10,2 | 138 | 156 | 204 | 12 | 382,00 |
| 22 0392 1020 153 | % 10,2 | 153 | 173 | 230 | 12 | 211,80 |
| 22 0392 1020 174 | • 10,2 | 174 | 190 | 240 | 12 | 373,00 |
| 22 0392 1020 204 | % 10,2 | 204 | 224 | 275 | 12 | 230,40 |
| 22 0392 1020 250 | • 10,2 | 250 | 268 | 315 | 12 | 410,00 |
| 22 0392 1020 255 | % 10,2 | 255 | 275 | 325 | 12 | 237,00 |
| 22 0392 1020 306 | • 10,2 | 306 | 326 | 375 | 12 | 515,00 |
| 22 0392 1020 362 | • 10,2 | 362 | 380 | 430 | 12 | 620,00 |
| 22 0392 1030 053 | • 10,3 | 53 | 71 | 118 | 12 | 145,00 |
| 22 0392 1040 053 | • 10,4 | 53 | 71 | 118 | 12 | 145,00 |
| 22 0392 1050 053 | • 10,5 | 53 | 71 | 118 | 12 | 145,00 |
| 22 0392 1050 096 | • 10,5 | 96 | 114 | 162 | 12 | 273,00 |
| 22 0392 1050 138 | • 10,5 | 138 | 156 | 204 | 12 | 382,00 |
| 22 0392 1080 053 | • 10,8 | 53 | 71 | 118 | 12 | 145,00 |
| 22 0392 1080 096 | • 10,8 | 96 | 114 | 162 | 12 | 273,00 |
| 22 0392 1080 138 | • 10,8 | 138 | 156 | 204 | 12 | 382,00 |
| 22 0392 1080 162 | % 10,8 | 162 | 183 | 230 | 12 | 211,80 |
| 22 0392 1080 174 | • 10,8 | 174 | 190 | 240 | 12 | 373,00 |
| 22 0392 1080 216 | % 10,8 | 216 | 237 | 290 | 12 | 230,40 |
| 22 0392 1080 250 | • 10,8 | 250 | 268 | 315 | 12 | 410,00 |
| 22 0392 1080 270 | % 10,8 | 270 | 291 | 340 | 12 | 292,80 |
| 22 0392 1080 307 | • 10,8 | 307 | 325 | 375 | 12 | 515,00 |
| 22 0392 1080 324 | % 10,8 | 324 | 345 | 395 | 12 | 355,20 |
| 22 0392 1080 362 | • 10,8 | 362 | 380 | 430 | 12 | 620,00 |
| 22 0392 1100 053 | • 11,0 | 53 | 71 | 118 | 12 | 145,00 |
| 22 0392 1100 096 | • 11,0 | 96 | 114 | 162 | 12 | 273,00 |
| 22 0392 1100 138 | • 11,0 | 138 | 156 | 204 | 12 | 382,00 |
| 22 0392 1100 362 | • 11,0 | 362 | 380 | 430 | 12 | 620,00 |
| 22 0392 1110 053 | • 11,1 | 53 | 71 | 118 | 12 | 145,00 |
| 22 0392 1120 053 | • 11,2 | 53 | 71 | 118 | 12 | 145,00 |
| 22 0392 1120 096 | • 11,2 | 96 | 114 | 162 | 12 | 273,00 |
| 22 0392 1120 138 | • 11,2 | 138 | 156 | 204 | 12 | 382,00 |
| 22 0392 1130 053 | • 11,3 | 53 | 71 | 118 | 12 | 145,00 |
| 22 0392 1150 053 | • 11,5 | 53 | 71 | 118 | 12 | 145,00 |
| 22 0392 1150 096 | • 11,5 | 96 | 114 | 162 | 12 | 273,00 |
| 22 0392 1150 138 | • 11,5 | 138 | 156 | 204 | 12 | 382,00 |
| 22 0392 1180 053 | • 11,8 | 53 | 71 | 118 | 12 | 145,00 |
| 22 0392 1180 096 | • 11,8 | 96 | 114 | 162 | 12 | 273,00 |
| 22 0392 1180 138 | • 11,8 | 138 | 156 | 204 | 12 | 382,00 |
| 22 0392 1180 177 | % 11,8 | 177 | 200 | 255 | 12 | 211,80 |
| 22 0392 1180 197 | • 11,8 | 197 | 215 | 265 | 12 | 373,00 |
| 22 0392 1180 236 | % 11,8 | 236 | 259 | 315 | 12 | 233,40 |
| 22 0392 1180 250 | • 11,8 | 250 | 268 | 315 | 12 | 410,00 |
| 22 0392 1180 295 | % 11,8 | 295 | 318 | 375 | 12 | 297,00 |
| 22 0392 1180 307 | • 11,8 | 307 | 325 | 375 | 12 | 515,00 |
| 22 0392 1180 354 | % 11,8 | 354 | 377 | 425 | 12 | 355,20 |
| 22 0392 1180 362 | • 11,8 | 362 | 380 | 430 | 12 | 620,00 |
| 22 0392 1200 053 | • 12,0 | 53 | 71 | 118 | 12 | 145,00 |
| 22 0392 1200 096 | • 12,0 | 96 | 114 | 162 | 12 | 273,00 |
| 22 0392 1200 138 | • 12,0 | 138 | 156 | 204 | 12 | 382,00 |
| 22 0392 1200 180 | % 12,0 | 180 | 204 | 255 | 12 | 216,60 |
| 22 0392 1200 197 | • 12,0 | 197 | 215 | 265 | 12 | 373,00 |
| 22 0392 1200 240 | % 12,0 | 240 | 264 | 315 | 12 | 237,00 |
| 22 0392 1200 250 | • 12,0 | 250 | 268 | 315 | 12 | 410,00 |
| 22 0392 1200 300 | % 12,0 | 300 | 324 | 375 | 12 | 297,00 |
| 22 0392 1200 307 | • 12,0 | 307 | 325 | 375 | 12 | 515,00 |
| 22 0392 1200 360 | • 12,0</ | | | | | |

22 0802

VALUETOOL

Vollhartmetallbohrer
Solid carbide twist drill



STAHL

steel

INOX

Edelstahl

STAINLESS STEEL

GJL

GJS

GTW

GTS

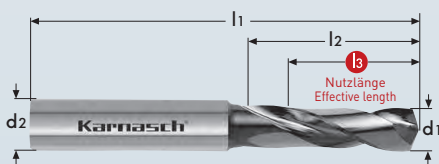
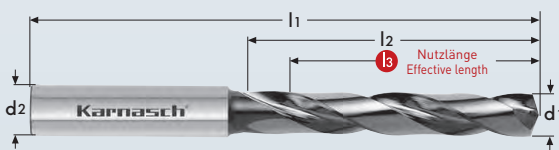
HRC

< 50

kurz-

spanend

short chip



| h7 | Bohrungstoleranz Hole tolerance |
|--------|------------------------------------|
| > 3-6 | +0,000 |
| | -0,012 |
| > 6-10 | +0,000 |
| | -0,015 |
| >10-18 | +0,000 |
| | -0,018 |

MICRO
GRAIN

DIN
6537

N

DIN 6535
Form HA



VTC



TM-8



Schnittdaten
Cutting data

Zeichnungen
Drawings



1252

DXF/STEP

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|----|----|----|-------|-------|
| 22 0802 0300 014 | • 3,0 | 14 | 20 | 62 | 6,0 | 17,00 |
| 22 0802 0300 023 | • 3,0 | 23 | 28 | 66 | 6,0 | 20,00 |
| 22 0802 0310 014 | • 3,1 | 14 | 20 | 62 | 6,0 | 17,00 |
| 22 0802 0310 023 | • 3,1 | 23 | 28 | 66 | 6,0 | 20,00 |
| 22 0802 0320 014 | • 3,2 | 14 | 20 | 62 | 6,0 | 17,00 |
| 22 0802 0320 023 | • 3,2 | 23 | 28 | 66 | 6,0 | 20,00 |
| 22 0802 0330 014 | • 3,3 | 14 | 20 | 62 | 6,0 | 17,00 |
| 22 0802 0330 023 | • 3,3 | 23 | 28 | 66 | 6,0 | 20,00 |
| 22 0802 0340 014 | • 3,4 | 14 | 20 | 62 | 6,0 | 17,00 |
| 22 0802 0340 023 | • 3,4 | 23 | 28 | 66 | 6,0 | 20,00 |
| 22 0802 0350 014 | • 3,5 | 14 | 20 | 62 | 6,0 | 17,00 |
| 22 0802 0350 023 | • 3,5 | 23 | 28 | 66 | 6,0 | 20,00 |
| 22 0802 0360 014 | • 3,6 | 14 | 20 | 62 | 6,0 | 17,00 |
| 22 0802 0360 023 | • 3,6 | 23 | 28 | 66 | 6,0 | 20,00 |
| 22 0802 0370 014 | • 3,7 | 14 | 20 | 62 | 6,0 | 17,00 |
| 22 0802 0370 023 | • 3,7 | 23 | 28 | 66 | 6,0 | 20,00 |
| 22 0802 0380 017 | • 3,8 | 17 | 24 | 66 | 6,0 | 18,00 |
| 22 0802 0380 029 | • 3,8 | 29 | 36 | 74 | 6,0 | 20,00 |
| 22 0802 0390 017 | • 3,9 | 17 | 24 | 66 | 6,0 | 18,00 |
| 22 0802 0390 029 | • 3,9 | 29 | 36 | 74 | 6,0 | 20,00 |
| 22 0802 0400 017 | • 4,0 | 17 | 24 | 66 | 6,0 | 19,00 |
| 22 0802 0400 029 | • 4,0 | 29 | 36 | 74 | 6,0 | 21,00 |
| 22 0802 0410 017 | • 4,1 | 17 | 24 | 66 | 6,0 | 19,00 |
| 22 0802 0410 029 | • 4,1 | 29 | 36 | 74 | 6,0 | 21,00 |
| 22 0802 0420 017 | • 4,2 | 17 | 24 | 66 | 6,0 | 19,00 |
| 22 0802 0420 029 | • 4,2 | 29 | 36 | 74 | 6,0 | 21,00 |
| 22 0802 0430 017 | • 4,3 | 17 | 24 | 66 | 6,0 | 19,00 |
| 22 0802 0430 029 | • 4,3 | 29 | 36 | 74 | 6,0 | 21,00 |
| 22 0802 0440 017 | • 4,4 | 17 | 24 | 66 | 6,0 | 19,00 |
| 22 0802 0440 029 | • 4,4 | 29 | 36 | 74 | 6,0 | 21,00 |
| 22 0802 0450 017 | • 4,5 | 17 | 24 | 66 | 6,0 | 19,00 |
| 22 0802 0450 029 | • 4,5 | 29 | 36 | 74 | 6,0 | 21,00 |
| 22 0802 0460 017 | • 4,6 | 17 | 24 | 66 | 6,0 | 19,00 |
| 22 0802 0460 029 | • 4,6 | 29 | 36 | 74 | 6,0 | 21,00 |
| 22 0802 0470 017 | • 4,7 | 17 | 24 | 66 | 6,0 | 19,00 |
| 22 0802 0470 029 | • 4,7 | 29 | 36 | 74 | 6,0 | 21,00 |
| 22 0802 0480 020 | • 4,8 | 20 | 28 | 66 | 6,0 | 19,00 |
| 22 0802 0480 035 | • 4,8 | 35 | 44 | 82 | 6,0 | 24,00 |
| 22 0802 0490 020 | • 4,9 | 20 | 28 | 66 | 6,0 | 18,00 |
| 22 0802 0490 035 | • 4,9 | 35 | 44 | 82 | 6,0 | 24,00 |
| 22 0802 0500 020 | • 5,0 | 20 | 28 | 66 | 6,0 | 18,00 |
| 22 0802 0500 035 | • 5,0 | 35 | 44 | 82 | 6,0 | 24,00 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
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| 22 0802 0510 020 | • 5,1 | 20 | 28 | 66 | 6,0 | 18,00 |
| 22 0802 0510 035 | • 5,1 | 35 | 44 | 82 | 6,0 | 24,00 |
| 22 0802 0520 020 | • 5,2 | 20 | 28 | 66 | 6,0 | 18,00 |
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| 22 0802 0530 020 | • 5,3 | 20 | 28 | 66 | 6,0 | 18,00 |
| 22 0802 0530 035 | • 5,3 | 35 | 44 | 82 | 6,0 | 24,00 |
| 22 0802 0540 020 | • 5,4 | 20 | 28 | 66 | 6,0 | 18,00 |
| 22 0802 0540 035 | • 5,4 | 35 | 44 | 82 | 6,0 | 24,00 |
| 22 0802 0550 020 | • 5,5 | 20 | 28 | 66 | 6,0 | 18,00 |
| 22 0802 0550 035 | • 5,5 | 35 | 44 | 82 | 6,0 | 26,00 |
| 22 0802 0560 020 | • 5,6 | 20 | 28 | 66 | 6,0 | 19,00 |
| 22 0802 0560 035 | • 5,6 | 35 | 44 | 82 | 6,0 | 26,00 |
| 22 0802 0570 020 | • 5,7 | 20 | 28 | 66 | 6,0 | 19,00 |
| 22 0802 0570 035 | • 5,7 | 35 | 44 | 82 | 6,0 | 26,00 |
| 22 0802 0580 020 | • 5,8 | 20 | 28 | 66 | 6,0 | 19,00 |
| 22 0802 0580 035 | • 5,8 | 35 | 44 | 82 | 6,0 | 26,00 |
| 22 0802 0590 020 | • 5,9 | 20 | 28 | 66 | 6,0 | 19,00 |
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| 22 0802 0600 020 | • 6,0 | 20 | 28 | 66 | 6,0 | 19,00 |
| 22 0802 0600 035 | • 6,0 | 35 | 44 | 82 | 6,0 | 26,00 |
| 22 0802 0610 024 | • 6,1 | 24 | 34 | 79 | 8,0 | 25,00 |
| 22 0802 0610 043 | • 6,1 | 43 | 53 | 91 | 8,0 | 36,00 |
| 22 0802 0620 024 | • 6,2 | 24 | 34 | 79 | 8,0 | 25,00 |
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| 22 0802 0630 024 | • 6,3 | 24 | 34 | 79 | 8,0 | 25,00 |
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| 22 0802 0640 024 | • 6,4 | 24 | 34 | 79 | 8,0 | 25,00 |
| 22 0802 0640 043 | • 6,4 | 43 | 53 | 91 | 8,0 | 36,00 |
| 22 0802 0650 024 | • 6,5 | 24 | 34 | 79 | 8,0 | 25,00 |
| 22 0802 0650 043 | • 6,5 | 43 | 53 | 91 | 8,0 | 36,00 |
| 22 0802 0660 024 | • 6,6 | 24 | 34 | 79 | 8,0 | 25,00 |
| 22 0802 0660 043 | • 6,6 | 43 | 53 | 91 | 8,0 | 36,00 |
| 22 0802 0670 024 | • 6,7 | 24 | 34 | 79 | 8,0 | 25,00 |
| 22 0802 0670 043 | • 6,7 | 43 | 53 | 91 | 8,0 | 36,00 |
| 22 0802 0680 024 | • 6,8 | 24 | 34 | 79 | 8,0 | 25,00 |
| 22 0802 0680 043 | • 6,8 | 43 | 53 | 91 | 8,0 | 36,00 |
| 22 0802 0690 024 | • 6,9 | 24 | 34 | 79 | 8,0 | 24,00 |
| 22 0802 0690 043 | • 6,9 | 43 | 53 | 91 | 8,0 | 37,00 |
| 22 0802 0700 024 | • 7,0 | 24 | 34 | 79 | 8,0 | 25,00 |
| 22 0802 0700 043 | • 7,0 | 43 | 53 | 91 | 8,0 | 37,00 |
| 22 0802 0710 029 | • 7,1 | 29 | 41 | 79 | 8,0 | 25,00 |
| 22 0802 0710 043 | • 7,1 | 43 | 53 | 91 | 8,0 | 37,00 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
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| 22 0802 0720 029 | • 7,2 | 29 | 41 | 79 | 8,0 | 25,00 |
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| 22 0802 0730 029 | • 7,3 | 29 | 41 | 79 | 8,0 | 25,00 |
| 22 0802 0730 043 | • 7,3 | 43 | 53 | 91 | 8,0 | 37,00 |
| 22 0802 0740 029 | • 7,4 | 29 | 41 | 79 | 8,0 | 25,00 |
| 22 0802 0740 043 | • 7,4 | 43 | 53 | 91 | 8,0 | 37,00 |
| 22 0802 0750 029 | • 7,5 | 29 | 41 | 79 | 8,0 | 25,00 |
| 22 0802 0750 043 | • 7,5 | 43 | 53 | 91 | 8,0 | 37,00 |
| 22 0802 0760 029 | • 7,6 | 29 | 41 | 79 | 8,0 | 25,00 |
| 22 0802 0760 043 | • 7,6 | 43 | 53 | 91 | 8,0 | 37,00 |
| 22 0802 0770 029 | • 7,7 | 29 | 41 | 79 | 8,0 | 25,00 |
| 22 0802 0770 043 | • 7,7 | 43 | 53 | 91 | 8,0 | 37,00 |
| 22 0802 0780 029 | • 7,8 | 29 | 41 | 79 | 8,0 | 25,00 |
| 22 0802 0780 043 | • 7,8 | 43 | 53 | 91 | 8,0 | 37,00 |
| 22 0802 0790 029 | • 7,9 | 29 | 41 | 79 | 8,0 | 25,00 |
| 22 0802 0790 043 | • 7,9 | 43 | 53 | 91 | 8,0 | 37,00 |
| 22 0802 0800 029 | • 8,0 | 29 | 41 | 79 | 8,0 | 26,00 |
| 22 0802 0800 043 | • 8,0 | 43 | 53 | 91 | 8,0 | 37,00 |
| 22 0802 0810 035 | • 8,1 | 35 | 47 | 89 | 10,0 | 37,00 |
| 22 0802 0810 049 | • 8,1 | 49 | 61 | 103 | 10,0 | 49,00 |
| 22 0802 0820 035 | • 8,2 | 35 | 47 | 89 | 10,0 | 37,00 |
| 22 0802 0820 049 | • 8,2 | 49 | 61 | 103 | 10,0 | 49,00 |
| 22 0802 0830 035 | • 8,3 | 35 | 47 | 89 | 10,0 | 37,00 |
| 22 0802 0830 049 | • 8,3 | 49 | 61 | 103 | 10,0 | 49,00 |
| 22 0802 0840 035 | • 8,4 | 35 | 47 | 89 | 10,0 | 37,00 |
| 22 0802 0840 049 | • 8,4 | 49 | 61 | 103 | 10,0 | 49,00 |
| 22 0802 0850 035 | • 8,5 | 35 | 47 | 89 | 10,0 | 37,00 |
| 22 0802 0850 049 | • 8,5 | 49 | 61 | 103 | 10,0 | 49,00 |
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| 22 0802 0870 035 | • 8,7 | 35 | 47 | 89 | 10,0 | 37,00 |
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| 22 0802 0890 035 | • 8,9 | 35 | 47 | 89 | 10,0 | 37,00 |
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| 22 0802 0900 035 | • 9,0 | 35 | 47 | 89 | 10,0 | 37,00 |
| 22 0802 0900 049 | • 9,0 | 49 | 61 | 103 | 10,0 | 50,00 |
| 22 0802 0910 035 | • 9,1 | 35 | 47 | 89 | 10,0 | 37,00 |
| 22 0802 0910 049 | • 9,1 | 49 | 61 | 103 | 10,0 | 50,00 |
| 22 0802 0920 035 | • 9,2 | 35 | 47 | 89 | 10,0 | 37,00 |
| 22 0802 0920 049 | • 9,2 | 49 | 61 | 103 | 10,0 | 50,00 |
| 22 0802 0930 035 | • 9,3 | 35 | 47 | 89 | 10,0 | 37,00 |
| 22 0802 0930 049 | • 9,3 | 49 | 61 | 103 | 10,0 | 50,00 |
| 22 0802 0940 035 | • 9,4 | 35 | 47 | 89 | 10,0 | 37,00 |
| 22 0802 0940 049 | • 9,4 | 49 | 61 | 103 | 10,0 | 50,00 |
| 22 0802 0950 035 | • 9,5 | 35 | 47 | 89 | 10,0 | 37,00 |
| 22 0802 0950 049 | • 9,5 | 49 | 61 | 103 | 10,0 | 50,00 |
| 22 0802 0960 035 | • 9,6 | 35 | 47 | 89 | 10,0 | 37,00 |
| 22 0802 0960 049 | • 9,6 | 49 | 61 | 103 | 10,0 | 50,00 |
| 22 0802 0970 035 | • 9,7 | 35 | 47 | 89 | 10,0 | 37,00 |
| 22 0802 0970 049 | • 9,7 | 49 | 61 | 103 | 10,0 | 50,00 |
| 22 0802 0980 035 | • 9,8 | 35 | 47 | 89 | 10,0 | 37,00 |
| 22 0802 0980 049 | • 9,8 | 49 | 61 | 103 | 10,0 | 50,00 |
| 22 0802 0990 035 | • 9,9 | 35 | 47 | 89 | 10,0 | 37,00 |
| 22 0802 0990 049 | • 9,9 | 49 | 61 | 103 | 10,0 | 50,00 |
| 22 0802 1000 035 | • 10,0 | 35 | 47 | 89 | 10,0 | 38,00 |
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| 22 0802 1010 040 | • 10,1 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1010 056 | • 10,1 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1020 040 | • 10,2 | 40 | 55 | 102 | 12,0 | 48,00 |
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| 22 0802 1030 040 | • 10,3 | 40 | 55 | 102 | 12,0 | 48,00 |
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| 22 0802 1040 056 | • 10,4 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1050 040 | • 10,5 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1050 056 | • 10,5 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1060 040 | • 10,6 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1060 056 | • 10,6 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1070 040 | • 10,7 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1070 056 | • 10,7 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1080 040 | • 10,8 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1080 056 | • 10,8 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1090 040 | • 10,9 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1090 056 | • 10,9 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1100 040 | • 11,0 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1100 056 | • 11,0 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1110 040 | • 11,1 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1110 056 | • 11,1 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1120 040 | • 11,2 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1120 056 | • 11,2 | 56 | 71 | 118 | 12,0 | 73,00 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|-----|-------|-------|
| 22 0802 1130 040 | • 11,3 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1130 056 | • 11,3 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1140 040 | • 11,4 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1140 056 | • 11,4 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1150 040 | • 11,5 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1150 056 | • 11,5 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1160 040 | • 11,6 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1160 056 | • 11,6 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1170 040 | • 11,7 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1170 056 | • 11,7 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1180 040 | • 11,8 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1180 056 | • 11,8 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1190 040 | • 11,9 | 40 | 55 | 102 | 12,0 | 48,00 |
| 22 0802 1190 056 | • 11,9 | 56 | 71 | 118 | 12,0 | 73,00 |
| 22 0802 1200 040 | • 12,0 | 40 | 55 | 102 | 12,0 | 49,00 |
| 22 0802 1200 056 | • 12,0 | 56 | 71 | 118 | 12,0 | 73,00 |

Alternative 22 0402 auf Seite 254-255
Alternative 22 0402 on page 254-255

1



2



3



4



5



6



7



8



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Index

22 0806

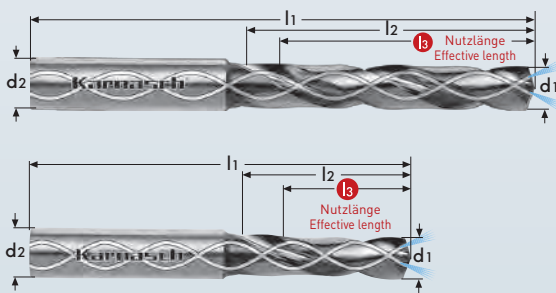
VALUETOOL

Vollhartmetallbohrer mit Innenkühlung
Solid carbide twist drill with interior cooling supply



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

- STAHL**
steel
- HRC < 50**
- INOX**
Edelstahl
STAINLESS STEEL
- kurzspanend
short chip
- GJL**
- GJS**
- GTW**
GTS



| h7 | Bohrungstoleranz Hole tolerance |
|---------|------------------------------------|
| > 3-6 | +0,000 -0,012 |
| > 6-10 | +0,000 -0,015 |
| > 10-18 | +0,000 -0,018 |

- MICRO GRAIN**
- DIN 6537**
- N**
- DIN 6535**
Form HA
- 30°
- 140°
- VTC**
- TM-8**

Schnittdaten
Cutting data

Zeichnungen
Drawings

i 1252

DXF/STEP

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
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| 22 0806 0300 014 | • 3,0 | 14 | 20 | 62 | 6,0 | 21,00 |
| 22 0806 0300 023 | • 3,0 | 23 | 28 | 66 | 6,0 | 25,00 |
| 22 0806 0310 014 | • 3,1 | 14 | 20 | 62 | 6,0 | 21,00 |
| 22 0806 0310 023 | • 3,1 | 23 | 28 | 66 | 6,0 | 25,00 |
| 22 0806 0320 014 | • 3,2 | 14 | 20 | 62 | 6,0 | 21,00 |
| 22 0806 0320 023 | • 3,2 | 23 | 28 | 66 | 6,0 | 25,00 |
| 22 0806 0330 014 | • 3,3 | 14 | 20 | 62 | 6,0 | 21,00 |
| 22 0806 0330 023 | • 3,3 | 23 | 28 | 66 | 6,0 | 25,00 |
| 22 0806 0340 014 | • 3,4 | 14 | 20 | 62 | 6,0 | 21,00 |
| 22 0806 0340 023 | • 3,4 | 23 | 28 | 66 | 6,0 | 25,00 |
| 22 0806 0350 014 | • 3,5 | 14 | 20 | 62 | 6,0 | 21,00 |
| 22 0806 0350 023 | • 3,5 | 23 | 28 | 66 | 6,0 | 25,00 |
| 22 0806 0360 014 | • 3,6 | 14 | 20 | 62 | 6,0 | 21,00 |
| 22 0806 0360 023 | • 3,6 | 23 | 28 | 66 | 6,0 | 25,00 |
| 22 0806 0370 014 | • 3,7 | 14 | 20 | 62 | 6,0 | 21,00 |
| 22 0806 0370 023 | • 3,7 | 23 | 28 | 66 | 6,0 | 25,00 |
| 22 0806 0380 017 | • 3,8 | 17 | 24 | 66 | 6,0 | 23,00 |
| 22 0806 0380 029 | • 3,8 | 29 | 36 | 74 | 6,0 | 25,00 |
| 22 0806 0390 017 | • 3,9 | 17 | 24 | 66 | 6,0 | 23,00 |
| 22 0806 0390 029 | • 3,9 | 29 | 36 | 74 | 6,0 | 25,00 |
| 22 0806 0400 017 | • 4,0 | 17 | 24 | 66 | 6,0 | 23,00 |
| 22 0806 0400 029 | • 4,0 | 29 | 36 | 74 | 6,0 | 26,00 |
| 22 0806 0410 017 | • 4,1 | 17 | 24 | 66 | 6,0 | 23,00 |
| 22 0806 0410 029 | • 4,1 | 29 | 36 | 74 | 6,0 | 26,00 |
| 22 0806 0420 017 | • 4,2 | 17 | 24 | 66 | 6,0 | 23,00 |
| 22 0806 0420 029 | • 4,2 | 29 | 36 | 74 | 6,0 | 26,00 |
| 22 0806 0430 017 | • 4,3 | 17 | 24 | 66 | 6,0 | 23,00 |
| 22 0806 0430 029 | • 4,3 | 29 | 36 | 74 | 6,0 | 26,00 |
| 22 0806 0440 017 | • 4,4 | 17 | 24 | 66 | 6,0 | 23,00 |
| 22 0806 0440 029 | • 4,4 | 29 | 36 | 74 | 6,0 | 26,00 |
| 22 0806 0450 017 | • 4,5 | 17 | 24 | 66 | 6,0 | 23,00 |
| 22 0806 0450 029 | • 4,5 | 29 | 36 | 74 | 6,0 | 26,00 |
| 22 0806 0460 017 | • 4,6 | 17 | 24 | 66 | 6,0 | 23,00 |
| 22 0806 0460 029 | • 4,6 | 29 | 36 | 74 | 6,0 | 26,00 |
| 22 0806 0470 017 | • 4,7 | 17 | 24 | 66 | 6,0 | 23,00 |
| 22 0806 0470 029 | • 4,7 | 29 | 36 | 74 | 6,0 | 26,00 |
| 22 0806 0480 020 | • 4,8 | 20 | 28 | 66 | 6,0 | 23,00 |
| 22 0806 0480 035 | • 4,8 | 35 | 44 | 82 | 6,0 | 30,00 |
| 22 0806 0490 020 | • 4,9 | 20 | 28 | 66 | 6,0 | 23,00 |
| 22 0806 0490 035 | • 4,9 | 35 | 44 | 82 | 6,0 | 30,00 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|----|----|----|-------|-------|
| 22 0806 0500 020 | • 5,0 | 20 | 28 | 66 | 6,0 | 23,00 |
| 22 0806 0500 035 | • 5,0 | 35 | 44 | 82 | 6,0 | 30,00 |
| 22 0806 0510 020 | • 5,1 | 20 | 28 | 66 | 6,0 | 23,00 |
| 22 0806 0510 035 | • 5,1 | 35 | 44 | 82 | 6,0 | 30,00 |
| 22 0806 0520 020 | • 5,2 | 20 | 28 | 66 | 6,0 | 23,00 |
| 22 0806 0520 035 | • 5,2 | 35 | 44 | 82 | 6,0 | 30,00 |
| 22 0806 0530 020 | • 5,3 | 20 | 28 | 66 | 6,0 | 23,00 |
| 22 0806 0530 035 | • 5,3 | 35 | 44 | 82 | 6,0 | 30,00 |
| 22 0806 0540 020 | • 5,4 | 20 | 28 | 66 | 6,0 | 23,00 |
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| 22 0806 0550 020 | • 5,5 | 20 | 28 | 66 | 6,0 | 23,00 |
| 22 0806 0550 035 | • 5,5 | 35 | 44 | 82 | 6,0 | 31,00 |
| 22 0806 0560 020 | • 5,6 | 20 | 28 | 66 | 6,0 | 24,00 |
| 22 0806 0560 035 | • 5,6 | 35 | 44 | 82 | 6,0 | 31,00 |
| 22 0806 0570 020 | • 5,7 | 20 | 28 | 66 | 6,0 | 24,00 |
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| 22 0806 0580 020 | • 5,8 | 20 | 28 | 66 | 6,0 | 24,00 |
| 22 0806 0580 035 | • 5,8 | 35 | 44 | 82 | 6,0 | 31,00 |
| 22 0806 0590 020 | • 5,9 | 20 | 28 | 66 | 6,0 | 24,00 |
| 22 0806 0590 035 | • 5,9 | 35 | 44 | 82 | 6,0 | 31,00 |
| 22 0806 0600 020 | • 6,0 | 20 | 28 | 66 | 6,0 | 24,00 |
| 22 0806 0600 035 | • 6,0 | 35 | 44 | 82 | 6,0 | 31,00 |
| 22 0806 0610 024 | • 6,1 | 24 | 34 | 79 | 8,0 | 34,00 |
| 22 0806 0610 043 | • 6,1 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0620 024 | • 6,2 | 24 | 34 | 79 | 8,0 | 34,00 |
| 22 0806 0620 043 | • 6,2 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0630 024 | • 6,3 | 24 | 34 | 79 | 8,0 | 34,00 |
| 22 0806 0630 043 | • 6,3 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0640 024 | • 6,4 | 24 | 34 | 79 | 8,0 | 34,00 |
| 22 0806 0640 043 | • 6,4 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0650 024 | • 6,5 | 24 | 34 | 79 | 8,0 | 34,00 |
| 22 0806 0650 043 | • 6,5 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0660 024 | • 6,6 | 24 | 34 | 79 | 8,0 | 34,00 |
| 22 0806 0660 043 | • 6,6 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0670 024 | • 6,7 | 24 | 34 | 79 | 8,0 | 34,00 |
| 22 0806 0670 043 | • 6,7 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0680 024 | • 6,8 | 24 | 34 | 79 | 8,0 | 34,00 |
| 22 0806 0680 043 | • 6,8 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0690 024 | • 6,9 | 24 | 34 | 79 | 8,0 | 34,00 |
| 22 0806 0690 043 | • 6,9 | 43 | 53 | 91 | 8,0 | 38,00 |



| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
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| 22 0806 0700 024 | • 7,0 | 24 | 34 | 79 | 8,0 | 34,00 |
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| 22 0806 0710 029 | • 7,1 | 29 | 41 | 79 | 8,0 | 34,00 |
| 22 0806 0710 043 | • 7,1 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0720 029 | • 7,2 | 29 | 41 | 79 | 8,0 | 34,00 |
| 22 0806 0720 043 | • 7,2 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0730 029 | • 7,3 | 29 | 41 | 79 | 8,0 | 34,00 |
| 22 0806 0730 043 | • 7,3 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0740 029 | • 7,4 | 29 | 41 | 79 | 8,0 | 34,00 |
| 22 0806 0740 043 | • 7,4 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0750 029 | • 7,5 | 29 | 41 | 79 | 8,0 | 34,00 |
| 22 0806 0750 043 | • 7,5 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0760 029 | • 7,6 | 29 | 41 | 79 | 8,0 | 34,00 |
| 22 0806 0760 043 | • 7,6 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0770 029 | • 7,7 | 29 | 41 | 79 | 8,0 | 34,00 |
| 22 0806 0770 043 | • 7,7 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0780 029 | • 7,8 | 29 | 41 | 79 | 8,0 | 34,00 |
| 22 0806 0780 043 | • 7,8 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0790 029 | • 7,9 | 29 | 41 | 79 | 8,0 | 34,00 |
| 22 0806 0790 043 | • 7,9 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0800 029 | • 8,0 | 29 | 41 | 79 | 8,0 | 34,00 |
| 22 0806 0800 043 | • 8,0 | 43 | 53 | 91 | 8,0 | 38,00 |
| 22 0806 0810 035 | • 8,1 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0810 049 | • 8,1 | 49 | 61 | 103 | 10,0 | 47,00 |
| 22 0806 0820 035 | • 8,2 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0820 049 | • 8,2 | 49 | 61 | 103 | 10,0 | 47,00 |
| 22 0806 0830 035 | • 8,3 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0830 049 | • 8,3 | 49 | 61 | 103 | 10,0 | 47,00 |
| 22 0806 0840 035 | • 8,4 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0840 049 | • 8,4 | 49 | 61 | 103 | 10,0 | 47,00 |
| 22 0806 0850 035 | • 8,5 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0850 049 | • 8,5 | 49 | 61 | 103 | 10,0 | 47,00 |
| 22 0806 0860 035 | • 8,6 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0860 049 | • 8,6 | 49 | 61 | 103 | 10,0 | 47,00 |
| 22 0806 0870 035 | • 8,7 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0870 049 | • 8,7 | 49 | 61 | 103 | 10,0 | 47,00 |
| 22 0806 0880 035 | • 8,8 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0880 049 | • 8,8 | 49 | 61 | 103 | 10,0 | 47,00 |
| 22 0806 0890 035 | • 8,9 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0890 049 | • 8,9 | 49 | 61 | 103 | 10,0 | 47,00 |
| 22 0806 0900 035 | • 9,0 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0900 049 | • 9,0 | 49 | 61 | 103 | 10,0 | 47,00 |
| 22 0806 0910 035 | • 9,1 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0910 049 | • 9,1 | 49 | 61 | 103 | 10,0 | 47,00 |
| 22 0806 0920 035 | • 9,2 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0920 049 | • 9,2 | 49 | 61 | 103 | 10,0 | 48,00 |
| 22 0806 0930 035 | • 9,3 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0930 049 | • 9,3 | 49 | 61 | 103 | 10,0 | 48,00 |
| 22 0806 0940 035 | • 9,4 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0940 049 | • 9,4 | 49 | 61 | 103 | 10,0 | 48,00 |
| 22 0806 0950 035 | • 9,5 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0950 049 | • 9,5 | 49 | 61 | 103 | 10,0 | 48,00 |
| 22 0806 0960 035 | • 9,6 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0960 049 | • 9,6 | 49 | 61 | 103 | 10,0 | 48,00 |
| 22 0806 0970 035 | • 9,7 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0970 049 | • 9,7 | 49 | 61 | 103 | 10,0 | 48,00 |
| 22 0806 0980 035 | • 9,8 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0980 049 | • 9,8 | 49 | 61 | 103 | 10,0 | 48,00 |
| 22 0806 0990 035 | • 9,9 | 35 | 47 | 89 | 10,0 | 44,00 |
| 22 0806 0990 049 | • 9,9 | 49 | 61 | 103 | 10,0 | 48,00 |
| 22 0806 1000 035 | • 10,0 | 35 | 47 | 89 | 10,0 | 46,00 |
| 22 0806 1000 049 | • 10,0 | 49 | 61 | 103 | 10,0 | 48,00 |
| 22 0806 1010 040 | • 10,1 | 40 | 55 | 102 | 12,0 | 61,00 |
| 22 0806 1010 056 | • 10,1 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1020 040 | • 10,2 | 40 | 55 | 102 | 12,0 | 61,00 |
| 22 0806 1020 056 | • 10,2 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1030 040 | • 10,3 | 40 | 55 | 102 | 12,0 | 61,00 |
| 22 0806 1030 056 | • 10,3 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1040 040 | • 10,4 | 40 | 55 | 102 | 12,0 | 61,00 |
| 22 0806 1040 056 | • 10,4 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1050 040 | • 10,5 | 40 | 55 | 102 | 12,0 | 61,00 |
| 22 0806 1050 056 | • 10,5 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1060 040 | • 10,6 | 40 | 55 | 102 | 12,0 | 61,00 |
| 22 0806 1060 056 | • 10,6 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1070 040 | • 10,7 | 40 | 55 | 102 | 12,0 | 61,00 |
| 22 0806 1070 056 | • 10,7 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1080 040 | • 10,8 | 40 | 55 | 102 | 12,0 | 61,00 |
| 22 0806 1080 056 | • 10,8 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1090 040 | • 10,9 | 40 | 55 | 102 | 12,0 | 61,00 |
| 22 0806 1090 056 | • 10,9 | 56 | 71 | 118 | 12,0 | 79,00 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|-----|-------|-------|
| 22 0806 1100 040 | • 11,0 | 40 | 55 | 102 | 12,0 | 62,00 |
| 22 0806 1100 056 | • 11,0 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1110 040 | • 11,1 | 40 | 55 | 102 | 12,0 | 62,00 |
| 22 0806 1110 056 | • 11,1 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1120 040 | • 11,2 | 40 | 55 | 102 | 12,0 | 62,00 |
| 22 0806 1120 056 | • 11,2 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1130 040 | • 11,3 | 40 | 55 | 102 | 12,0 | 62,00 |
| 22 0806 1130 056 | • 11,3 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1140 040 | • 11,4 | 40 | 55 | 102 | 12,0 | 62,00 |
| 22 0806 1140 056 | • 11,4 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1150 040 | • 11,5 | 40 | 55 | 102 | 12,0 | 62,00 |
| 22 0806 1150 056 | • 11,5 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1160 040 | • 11,6 | 40 | 55 | 102 | 12,0 | 62,00 |
| 22 0806 1160 056 | • 11,6 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1170 040 | • 11,7 | 40 | 55 | 102 | 12,0 | 62,00 |
| 22 0806 1170 056 | • 11,7 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1180 040 | • 11,8 | 40 | 55 | 102 | 12,0 | 62,00 |
| 22 0806 1180 056 | • 11,8 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1190 040 | • 11,9 | 40 | 55 | 102 | 12,0 | 62,00 |
| 22 0806 1190 056 | • 11,9 | 56 | 71 | 118 | 12,0 | 79,00 |
| 22 0806 1200 040 | • 12,0 | 40 | 55 | 102 | 12,0 | 62,00 |
| 22 0806 1200 056 | • 12,0 | 56 | 71 | 118 | 12,0 | 80,00 |

Alternative 22 0406 auf Seite 262-263
Alternative 22 0406 on page 262-263



22 0402

Vollhartmetall-Hochleistungsbohrer
Solid carbide high performance twist drill



STAHL
steel

INOX
Edelstahl
STAINLESS STEEL

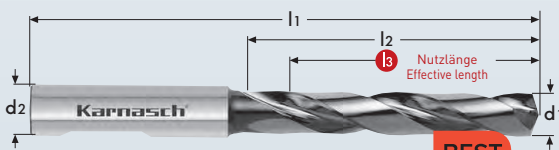
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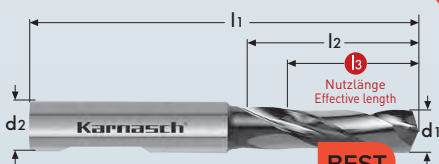
GTW
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HRC
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kurz-
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short chip



BEST SELLER



BEST SELLER



| | |
|--------------------|-------------------------|
| MICRO GRAIN | DIN 6537 |
| N | DIN 6535 Form HE |
| | |
| | HSC HPC |
| | DVC-X2 |
| | |

Schnittdaten
Cutting data

Zeichnungen
Drawings



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|----|----|----|-------|-------|
| 22 0402 0300 014 | • 3,0 | 14 | 20 | 62 | 6,0 | 33,00 |
| 22 0402 0300 023 | • 3,0 | 23 | 28 | 66 | 6,0 | 41,00 |
| 22 0402 0310 014 | • 3,1 | 14 | 20 | 62 | 6,0 | 33,00 |
| 22 0402 0310 023 | • 3,1 | 23 | 28 | 66 | 6,0 | 41,00 |
| 22 0402 0320 014 | • 3,2 | 14 | 20 | 62 | 6,0 | 33,00 |
| 22 0402 0320 023 | • 3,2 | 23 | 28 | 66 | 6,0 | 41,00 |
| 22 0402 0330 014 | • 3,3 | 14 | 20 | 62 | 6,0 | 33,00 |
| 22 0402 0330 023 | • 3,3 | 23 | 28 | 66 | 6,0 | 41,00 |
| 22 0402 0340 014 | • 3,4 | 14 | 20 | 62 | 6,0 | 33,00 |
| 22 0402 0340 023 | • 3,4 | 23 | 28 | 66 | 6,0 | 41,00 |
| 22 0402 0350 014 | • 3,5 | 14 | 20 | 62 | 6,0 | 33,00 |
| 22 0402 0350 023 | • 3,5 | 23 | 28 | 66 | 6,0 | 41,00 |
| 22 0402 0360 014 | • 3,6 | 14 | 20 | 62 | 6,0 | 33,00 |
| 22 0402 0360 023 | • 3,6 | 23 | 28 | 66 | 6,0 | 41,00 |
| 22 0402 0370 014 | • 3,7 | 14 | 20 | 62 | 6,0 | 33,00 |
| 22 0402 0370 023 | • 3,7 | 23 | 28 | 66 | 6,0 | 41,00 |
| 22 0402 0380 017 | • 3,8 | 17 | 24 | 66 | 6,0 | 33,00 |
| 22 0402 0380 029 | • 3,8 | 29 | 36 | 74 | 6,0 | 41,00 |
| 22 0402 0390 017 | • 3,9 | 17 | 24 | 66 | 6,0 | 33,00 |
| 22 0402 0390 029 | • 3,9 | 29 | 36 | 74 | 6,0 | 41,00 |
| 22 0402 0400 017 | • 4,0 | 17 | 24 | 66 | 6,0 | 33,00 |
| 22 0402 0400 029 | • 4,0 | 29 | 36 | 74 | 6,0 | 41,00 |
| 22 0402 0410 017 | • 4,1 | 17 | 24 | 66 | 6,0 | 33,00 |
| 22 0402 0410 029 | • 4,1 | 29 | 36 | 74 | 6,0 | 41,00 |
| 22 0402 0420 017 | • 4,2 | 17 | 24 | 66 | 6,0 | 33,00 |
| 22 0402 0420 029 | • 4,2 | 29 | 36 | 74 | 6,0 | 41,00 |
| 22 0402 0430 017 | • 4,3 | 17 | 24 | 66 | 6,0 | 33,00 |
| 22 0402 0430 029 | • 4,3 | 29 | 36 | 74 | 6,0 | 41,00 |
| 22 0402 0440 017 | • 4,4 | 17 | 24 | 66 | 6,0 | 33,00 |
| 22 0402 0440 029 | • 4,4 | 29 | 36 | 74 | 6,0 | 41,00 |
| 22 0402 0450 017 | • 4,5 | 17 | 24 | 66 | 6,0 | 33,00 |
| 22 0402 0450 029 | • 4,5 | 29 | 36 | 74 | 6,0 | 41,00 |
| 22 0402 0460 017 | • 4,6 | 17 | 24 | 66 | 6,0 | 33,00 |
| 22 0402 0460 029 | • 4,6 | 29 | 36 | 74 | 6,0 | 41,00 |
| 22 0402 0470 017 | • 4,7 | 17 | 24 | 66 | 6,0 | 33,00 |
| 22 0402 0470 029 | • 4,7 | 29 | 36 | 74 | 6,0 | 41,00 |
| 22 0402 0480 020 | • 4,8 | 20 | 28 | 66 | 6,0 | 33,00 |
| 22 0402 0480 035 | • 4,8 | 35 | 44 | 82 | 6,0 | 41,00 |
| 22 0402 0490 020 | • 4,9 | 20 | 28 | 66 | 6,0 | 33,00 |
| 22 0402 0490 035 | • 4,9 | 35 | 44 | 82 | 6,0 | 41,00 |
| 22 0402 0500 020 | • 5,0 | 20 | 28 | 66 | 6,0 | 33,00 |
| 22 0402 0500 035 | • 5,0 | 35 | 44 | 82 | 6,0 | 41,00 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|----|----|----|-------|-------|
| 22 0402 0510 020 | • 5,1 | 20 | 28 | 66 | 6,0 | 33,00 |
| 22 0402 0510 035 | • 5,1 | 35 | 44 | 82 | 6,0 | 41,00 |
| 22 0402 0520 020 | • 5,2 | 20 | 28 | 66 | 6,0 | 33,00 |
| 22 0402 0520 035 | • 5,2 | 35 | 44 | 82 | 6,0 | 41,00 |
| 22 0402 0530 020 | • 5,3 | 20 | 28 | 66 | 6,0 | 33,00 |
| 22 0402 0530 035 | • 5,3 | 35 | 44 | 82 | 6,0 | 41,00 |
| 22 0402 0540 020 | • 5,4 | 20 | 28 | 66 | 6,0 | 33,00 |
| 22 0402 0540 035 | • 5,4 | 35 | 44 | 82 | 6,0 | 41,00 |
| 22 0402 0550 020 | • 5,5 | 20 | 28 | 66 | 6,0 | 33,00 |
| 22 0402 0550 035 | • 5,5 | 35 | 44 | 82 | 6,0 | 41,00 |
| 22 0402 0560 020 | • 5,6 | 20 | 28 | 66 | 6,0 | 33,00 |
| 22 0402 0560 035 | • 5,6 | 35 | 44 | 82 | 6,0 | 41,00 |
| 22 0402 0570 020 | • 5,7 | 20 | 28 | 66 | 6,0 | 33,00 |
| 22 0402 0570 035 | • 5,7 | 35 | 44 | 82 | 6,0 | 41,00 |
| 22 0402 0580 020 | • 5,8 | 20 | 28 | 66 | 6,0 | 33,00 |
| 22 0402 0580 035 | • 5,8 | 35 | 44 | 82 | 6,0 | 41,00 |
| 22 0402 0590 020 | • 5,9 | 20 | 28 | 66 | 6,0 | 33,00 |
| 22 0402 0590 035 | • 5,9 | 35 | 44 | 82 | 6,0 | 41,00 |
| 22 0402 0600 020 | • 6,0 | 20 | 28 | 66 | 6,0 | 33,00 |
| 22 0402 0600 035 | • 6,0 | 35 | 44 | 82 | 6,0 | 41,00 |
| 22 0402 0610 024 | • 6,1 | 24 | 34 | 79 | 8,0 | 40,00 |
| 22 0402 0610 043 | • 6,1 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0620 024 | • 6,2 | 24 | 34 | 79 | 8,0 | 40,00 |
| 22 0402 0620 043 | • 6,2 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0630 024 | • 6,3 | 24 | 34 | 79 | 8,0 | 40,00 |
| 22 0402 0630 043 | • 6,3 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0640 024 | • 6,4 | 24 | 34 | 79 | 8,0 | 40,00 |
| 22 0402 0640 043 | • 6,4 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0650 024 | • 6,5 | 24 | 34 | 79 | 8,0 | 40,00 |
| 22 0402 0650 043 | • 6,5 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0660 024 | • 6,6 | 24 | 34 | 79 | 8,0 | 40,00 |
| 22 0402 0660 043 | • 6,6 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0670 024 | • 6,7 | 24 | 34 | 79 | 8,0 | 40,00 |
| 22 0402 0670 043 | • 6,7 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0680 024 | • 6,8 | 24 | 34 | 79 | 8,0 | 40,00 |
| 22 0402 0680 043 | • 6,8 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0690 024 | • 6,9 | 24 | 34 | 79 | 8,0 | 40,00 |
| 22 0402 0690 043 | • 6,9 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0700 024 | • 7,0 | 24 | 34 | 79 | 8,0 | 40,00 |
| 22 0402 0700 043 | • 7,0 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0710 029 | • 7,1 | 29 | 41 | 79 | 8,0 | 40,00 |
| 22 0402 0710 043 | • 7,1 | 43 | 53 | 91 | 8,0 | 45,00 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|-----|-------|-------|
| 22 0402 0720 029 | • 7,2 | 29 | 41 | 79 | 8,0 | 40,00 |
| 22 0402 0720 043 | • 7,2 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0730 029 | • 7,3 | 29 | 41 | 79 | 8,0 | 40,00 |
| 22 0402 0730 043 | • 7,3 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0740 029 | • 7,4 | 29 | 41 | 79 | 8,0 | 40,00 |
| 22 0402 0740 043 | • 7,4 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0750 029 | • 7,5 | 29 | 41 | 79 | 8,0 | 40,00 |
| 22 0402 0750 043 | • 7,5 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0760 029 | • 7,6 | 29 | 41 | 79 | 8,0 | 40,00 |
| 22 0402 0760 043 | • 7,6 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0770 029 | • 7,7 | 29 | 41 | 79 | 8,0 | 40,00 |
| 22 0402 0770 043 | • 7,7 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0780 029 | • 7,8 | 29 | 41 | 79 | 8,0 | 40,00 |
| 22 0402 0780 043 | • 7,8 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0790 029 | • 7,9 | 29 | 41 | 79 | 8,0 | 40,00 |
| 22 0402 0790 043 | • 7,9 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0800 029 | • 8,0 | 29 | 41 | 79 | 8,0 | 40,00 |
| 22 0402 0800 043 | • 8,0 | 43 | 53 | 91 | 8,0 | 45,00 |
| 22 0402 0810 035 | • 8,1 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0810 049 | • 8,1 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0820 035 | • 8,2 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0820 049 | • 8,2 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0830 035 | • 8,3 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0830 049 | • 8,3 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0840 035 | • 8,4 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0840 049 | • 8,4 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0850 035 | • 8,5 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0850 049 | • 8,5 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0860 035 | • 8,6 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0860 049 | • 8,6 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0870 035 | • 8,7 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0870 049 | • 8,7 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0880 035 | • 8,8 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0880 049 | • 8,8 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0890 035 | • 8,9 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0890 049 | • 8,9 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0900 035 | • 9,0 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0900 049 | • 9,0 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0910 035 | • 9,1 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0910 049 | • 9,1 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0920 035 | • 9,2 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0920 049 | • 9,2 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0930 035 | • 9,3 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0930 049 | • 9,3 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0940 035 | • 9,4 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0940 049 | • 9,4 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0950 035 | • 9,5 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0950 049 | • 9,5 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0960 035 | • 9,6 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0960 049 | • 9,6 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0970 035 | • 9,7 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0970 049 | • 9,7 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0980 035 | • 9,8 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0980 049 | • 9,8 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 0990 035 | • 9,9 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 0990 049 | • 9,9 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 1000 035 | • 10,0 | 35 | 47 | 89 | 10,0 | 45,00 |
| 22 0402 1000 049 | • 10,0 | 49 | 61 | 103 | 10,0 | 51,00 |
| 22 0402 1010 040 | • 10,1 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1010 056 | • 10,1 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1020 040 | • 10,2 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1020 056 | • 10,2 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1030 040 | • 10,3 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1030 056 | • 10,3 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1040 040 | • 10,4 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1040 056 | • 10,4 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1050 040 | • 10,5 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1050 056 | • 10,5 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1060 040 | • 10,6 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1060 056 | • 10,6 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1070 040 | • 10,7 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1070 056 | • 10,7 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1080 040 | • 10,8 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1080 056 | • 10,8 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1090 040 | • 10,9 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1090 056 | • 10,9 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1100 040 | • 11,0 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1100 056 | • 11,0 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1110 040 | • 11,1 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1110 056 | • 11,1 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1120 040 | • 11,2 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1120 056 | • 11,2 | 56 | 71 | 118 | 12,0 | 75,00 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|-----|-------|--------|
| 22 0402 1130 040 | • 11,3 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1130 056 | • 11,3 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1140 040 | • 11,4 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1140 056 | • 11,4 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1150 040 | • 11,5 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1150 056 | • 11,5 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1160 040 | • 11,6 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1160 056 | • 11,6 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1170 040 | • 11,7 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1170 056 | • 11,7 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1180 040 | • 11,8 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1180 056 | • 11,8 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1190 040 | • 11,9 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1190 056 | • 11,9 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1200 040 | • 12,0 | 40 | 55 | 102 | 12,0 | 67,00 |
| 22 0402 1200 056 | • 12,0 | 56 | 71 | 118 | 12,0 | 75,00 |
| 22 0402 1250 043 | • 12,5 | 43 | 60 | 107 | 14,0 | 88,00 |
| 22 0402 1250 060 | • 12,5 | 60 | 77 | 124 | 14,0 | 98,00 |
| 22 0402 1280 043 | • 12,8 | 43 | 60 | 107 | 14,0 | 88,00 |
| 22 0402 1280 060 | • 12,8 | 60 | 77 | 124 | 14,0 | 98,00 |
| 22 0402 1300 043 | • 13,0 | 43 | 60 | 107 | 14,0 | 88,00 |
| 22 0402 1300 060 | • 13,0 | 60 | 60 | 124 | 14,0 | 98,00 |
| 22 0402 1350 043 | • 13,5 | 43 | 60 | 107 | 14,0 | 88,00 |
| 22 0402 1350 060 | • 13,5 | 60 | 77 | 124 | 14,0 | 98,00 |
| 22 0402 1380 043 | • 13,8 | 43 | 60 | 107 | 14,0 | 88,00 |
| 22 0402 1380 060 | • 13,8 | 60 | 77 | 124 | 14,0 | 98,00 |
| 22 0402 1400 043 | • 14,0 | 43 | 60 | 107 | 14,0 | 88,00 |
| 22 0402 1400 060 | • 14,0 | 60 | 77 | 124 | 14,0 | 98,00 |
| 22 0402 1450 045 | • 14,5 | 45 | 65 | 115 | 16,0 | 112,00 |
| 22 0402 1450 063 | • 14,5 | 63 | 83 | 133 | 16,0 | 130,00 |
| 22 0402 1480 045 | • 14,8 | 45 | 65 | 115 | 16,0 | 112,00 |
| 22 0402 1480 063 | • 14,8 | 63 | 83 | 133 | 16,0 | 130,00 |
| 22 0402 1500 045 | • 15,0 | 45 | 65 | 115 | 16,0 | 112,00 |
| 22 0402 1500 063 | • 15,0 | 63 | 83 | 133 | 16,0 | 130,00 |
| 22 0402 1550 045 | • 15,5 | 45 | 65 | 115 | 16,0 | 112,00 |
| 22 0402 1550 063 | • 15,5 | 63 | 83 | 133 | 16,0 | 130,00 |
| 22 0402 1580 045 | • 15,8 | 45 | 65 | 115 | 16,0 | 112,00 |
| 22 0402 1580 063 | • 15,8 | 63 | 83 | 133 | 16,0 | 130,00 |
| 22 0402 1600 045 | • 16,0 | 45 | 65 | 115 | 16,0 | 112,00 |
| 22 0402 1600 063 | • 16,0 | 63 | 83 | 133 | 16,0 | 130,00 |
| 22 0402 1880 055 | • 18,8 | 55 | 79 | 131 | 20,0 | 120,00 |

Nachfolgewerkzeug 22 0405 auf Seite 259-261

Replacement article 22 0405 on page 259-261

☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



22 0403

Vollhartmetall-Hochleistungsbohrer / für Bohrung H7 / 2 Fasen
Solid carbide twist drill / for drill hole tolerances H7 / 2 chamfer



1



STAHL
steel

INOX
Edelstahl
STAINLESS STEEL

GJL

GJS

GTW
GTS

HRC
< 52

kurz-
spanend
short chip

2



3



4



5



6



7

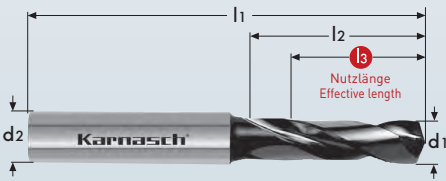


8



9

Index



| H7 | Bohrungstoleranz Hole tolerance | | |
|------|------------------------------------|-------|-----------|
| 3-6 | -0/+0,012 | 10-18 | -0/+0,018 |
| 6-10 | -0/+0,015 | 18-30 | -0/+0,021 |

| Art. | d1 H7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|-----|-------|-------|
| 22 0403 0300 014 | • 3,0 | 14 | 20 | 62 | 6,0 | 41,00 |
| 22 0403 0400 017 | • 4,0 | 17 | 24 | 66 | 6,0 | 41,00 |
| 22 0403 0500 020 | • 5,0 | 20 | 28 | 66 | 6,0 | 41,00 |
| 22 0403 0600 020 | • 6,0 | 20 | 28 | 66 | 6,0 | 41,00 |
| 22 0403 0700 024 | • 7,0 | 24 | 34 | 79 | 8,0 | 49,00 |
| 22 0403 0800 029 | • 8,0 | 29 | 41 | 79 | 8,0 | 49,00 |
| 22 0403 0900 035 | • 9,0 | 35 | 47 | 89 | 10,0 | 54,00 |
| 22 0403 1000 035 | • 10,0 | 35 | 47 | 89 | 10,0 | 54,00 |
| 22 0403 1200 040 | • 12,0 | 40 | 55 | 102 | 12,0 | 83,00 |

| | |
|--------------------|-------------------------|
| MICRO GRAIN | DIN 6537 |
| N | DIN 6535 Form HA |
| | |
| | HSC HPC |
| | XFN-2 NANO |
| | |

Schnittdaten
Cutting data



1252

Zeichnungen
Drawings



DXF/STEP

22 0403

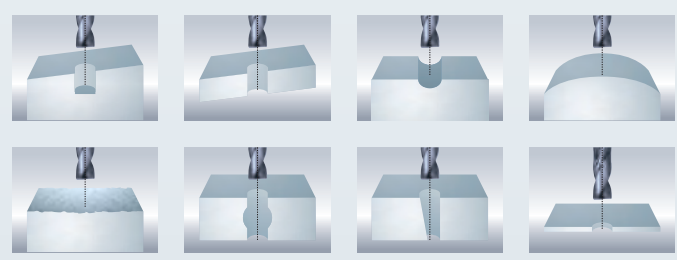
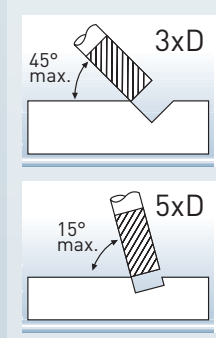
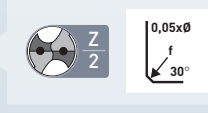
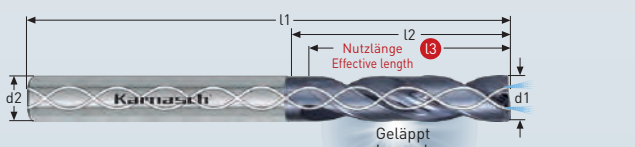
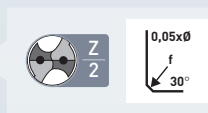
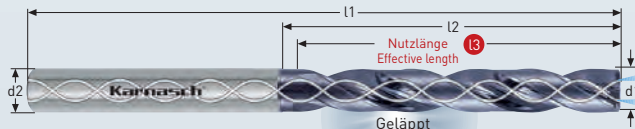


Vollhartmetall-Hochleistungsflachkopfbohrer für Stahl, 180°
Solid carbide shallow drill 180° for steel



22 0404

- STAHL**
steel
- INOX**
Edelstahl
STAINLESS STEEL
- GJL**
- GJS**
- GTW**
GTS
- HRC**
< 52
- kurzspanend
short chip



Auf ebenen Flächen [0°] empfehlen wir eine Pilotbohrung mit unserem VHM-Bohrer 22 0405 / 22 0406.
We recommend a pilot hole with our solid carbide drill 22 0405 / 22 0406 on flat surfaces [0°].

Schnittdaten
Cutting data

Zeichnungen
Drawings

i 1242

DXF/STEP

MICRO GRAIN **KARNASCH NORM**

N **DIN 6535 Form HAK**

30° 180°

HSC HPC

DMC-X2



| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|----|-------|--------|
| 22 0404 0300 014 | • 3,00 | 14 | 20 | 62 | 6,0 | 91,00 |
| 22 0404 0300 023 | • 3,00 | 23 | 28 | 66 | 6,0 | 109,00 |
| 22 0404 0320 014 | • 3,20 | 14 | 20 | 62 | 6,0 | 91,00 |
| 22 0404 0320 023 | • 3,20 | 23 | 28 | 66 | 6,0 | 109,00 |
| 22 0404 0330 014 | • 3,30 | 14 | 20 | 62 | 6,0 | 91,00 |
| 22 0404 0330 023 | • 3,30 | 23 | 28 | 66 | 6,0 | 109,00 |
| 22 0404 0340 014 | • 3,40 | 14 | 20 | 62 | 6,0 | 91,00 |
| 22 0404 0340 023 | • 3,40 | 23 | 28 | 66 | 6,0 | 109,00 |
| 22 0404 0350 014 | • 3,50 | 14 | 20 | 62 | 6,0 | 91,00 |
| 22 0404 0350 023 | • 3,50 | 23 | 28 | 66 | 6,0 | 109,00 |
| 22 0404 0370 017 | • 3,70 | 17 | 20 | 62 | 6,0 | 91,00 |
| 22 0404 0370 023 | • 3,70 | 23 | 28 | 66 | 6,0 | 109,00 |
| 22 0404 0380 017 | • 3,80 | 17 | 24 | 66 | 6,0 | 91,00 |
| 22 0404 0380 029 | • 3,80 | 29 | 36 | 74 | 6,0 | 109,00 |
| 22 0404 0390 017 | • 3,90 | 17 | 24 | 66 | 6,0 | 91,00 |
| 22 0404 0390 029 | • 3,90 | 29 | 36 | 74 | 6,0 | 109,00 |
| 22 0404 0400 017 | • 4,00 | 17 | 24 | 66 | 6,0 | 91,00 |
| 22 0404 0400 029 | • 4,00 | 29 | 36 | 74 | 6,0 | 109,00 |
| 22 0404 0420 017 | • 4,20 | 17 | 24 | 66 | 6,0 | 91,00 |
| 22 0404 0420 029 | • 4,20 | 29 | 36 | 74 | 6,0 | 109,00 |
| 22 0404 0430 017 | • 4,30 | 17 | 24 | 66 | 6,0 | 91,00 |
| 22 0404 0430 029 | • 4,30 | 29 | 36 | 74 | 6,0 | 109,00 |
| 22 0404 0450 017 | • 4,50 | 17 | 24 | 66 | 6,0 | 91,00 |
| 22 0404 0450 029 | • 4,50 | 29 | 36 | 74 | 6,0 | 109,00 |
| 22 0404 0465 017 | • 4,65 | 17 | 24 | 66 | 6,0 | 91,00 |
| 22 0404 0465 029 | • 4,65 | 29 | 36 | 74 | 6,0 | 109,00 |
| 22 0404 0480 020 | • 4,80 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0404 0480 035 | • 4,80 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0404 0500 020 | • 5,00 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0404 0500 035 | • 5,00 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0404 0510 020 | • 5,10 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0404 0510 035 | • 5,10 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0404 0520 020 | • 5,20 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0404 0520 035 | • 5,20 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0404 0530 020 | • 5,30 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0404 0530 035 | • 5,30 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0404 0540 020 | • 5,40 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0404 0540 035 | • 5,40 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0404 0550 020 | • 5,50 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0404 0550 035 | • 5,50 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0404 0555 020 | • 5,55 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0404 0555 035 | • 5,55 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0404 0560 020 | • 5,60 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0404 0560 035 | • 5,60 | 35 | 44 | 82 | 6,0 | 109,00 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|----|-------|--------|
| 22 0404 0570 020 | • 5,70 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0404 0570 035 | • 5,70 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0404 0580 020 | • 5,80 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0404 0580 035 | • 5,80 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0404 0600 020 | • 6,00 | 20 | 28 | 66 | 6,0 | 91,00 |
| 22 0404 0600 035 | • 6,00 | 35 | 44 | 82 | 6,0 | 109,00 |
| 22 0404 0610 024 | • 6,10 | 24 | 34 | 79 | 8,0 | 111,00 |
| 22 0404 0610 043 | • 6,10 | 43 | 53 | 91 | 8,0 | 120,00 |
| 22 0404 0620 024 | • 6,20 | 24 | 34 | 79 | 8,0 | 111,00 |
| 22 0404 0620 043 | • 6,20 | 43 | 53 | 91 | 8,0 | 120,00 |
| 22 0404 0630 024 | • 6,30 | 24 | 34 | 79 | 8,0 | 111,00 |
| 22 0404 0630 043 | • 6,30 | 43 | 53 | 91 | 8,0 | 120,00 |
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| 22 0404 0640 043 | • 6,40 | 43 | 53 | 91 | 8,0 | 120,00 |
| 22 0404 0650 024 | • 6,50 | 24 | 34 | 79 | 8,0 | 111,00 |
| 22 0404 0650 043 | • 6,50 | 43 | 53 | 91 | 8,0 | 120,00 |
| 22 0404 0660 024 | • 6,60 | 24 | 34 | 79 | 8,0 | 111,00 |
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| 22 0404 0670 043 | • 6,70 | 43 | 53 | 91 | 8,0 | 120,00 |
| 22 0404 0680 024 | • 6,80 | 24 | 34 | 79 | 8,0 | 111,00 |
| 22 0404 0680 043 | • 6,80 | 43 | 53 | 91 | 8,0 | 120,00 |
| 22 0404 0690 024 | • 6,90 | 24 | 34 | 79 | 8,0 | 111,00 |
| 22 0404 0690 043 | • 6,90 | 43 | 53 | 91 | 8,0 | 120,00 |
| 22 0404 0700 024 | • 7,00 | 24 | 34 | 79 | 8,0 | 111,00 |
| 22 0404 0700 043 | • 7,00 | 43 | 53 | 91 | 8,0 | 120,00 |
| 22 0404 0710 029 | • 7,10 | 29 | 41 | 79 | 8,0 | 111,00 |
| 22 0404 0710 043 | • 7,10 | 43 | 53 | 91 | 8,0 | 120,00 |
| 22 0404 0720 029 | • 7,20 | 29 | 41 | 79 | 8,0 | 111,00 |
| 22 0404 0720 043 | • 7,20 | 43 | 53 | 91 | 8,0 | 120,00 |
| 22 0404 0730 029 | • 7,30 | 29 | 41 | 79 | 8,0 | 111,00 |
| 22 0404 0730 043 | • 7,30 | 43 | 53 | 91 | 8,0 | 120,00 |
| 22 0404 0740 029 | • 7,40 | 29 | 41 | 79 | 8,0 | 111,00 |
| 22 0404 0740 043 | • 7,40 | 43 | 53 | 91 | 8,0 | 120,00 |
| 22 0404 0750 029 | • 7,50 | 29 | 41 | 79 | 8,0 | 111,00 |
| 22 0404 0750 043 | • 7,50 | 43 | 53 | 91 | 8,0 | 120,00 |
| 22 0404 0760 029 | • 7,60 | 29 | 41 | 79 | 8,0 | 111,00 |
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| 22 0404 0780 029 | • 7,80 | 29 | 41 | 79 | 8,0 | 111,00 |
| 22 0404 0780 043 | • 7,80 | 43 | 53 | 91 | 8,0 | 120,00 |
| 22 0404 0790 029 | • 7,90 | 29 | 41 | 79 | 8,0 | 111,00 |
| 22 0404 0790 043 | • 7,90 | 43 | 53 | 91 | 8,0 | 120,00 |
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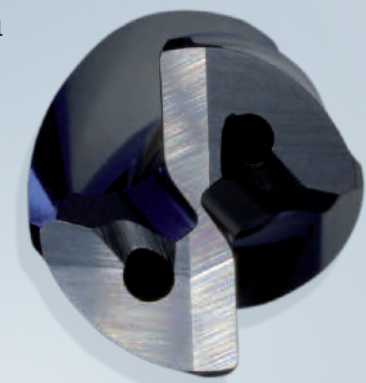
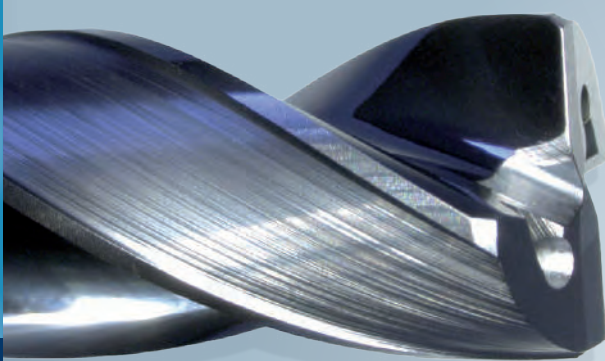
22 0404

- 1 
- 2 
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- 7 
- 8 
- 9 

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|---------|----|----|-----|-------|--------|
| 22 0404 0810 035 | • 8,10 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0404 0810 049 | • 8,10 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 0820 035 | • 8,20 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0404 0820 049 | • 8,20 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 0830 035 | • 8,30 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0404 0830 049 | • 8,30 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 0840 035 | • 8,40 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0404 0840 049 | • 8,40 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 0850 035 | • 8,50 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0404 0850 049 | • 8,50 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 0860 035 | • 8,60 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0404 0860 049 | • 8,60 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 0870 035 | • 8,70 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0404 0870 049 | • 8,70 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 0880 035 | • 8,80 | 35 | 47 | 89 | 10,0 | 151,00 |
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| 22 0404 0890 049 | • 8,90 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 0900 035 | • 9,00 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0404 0900 049 | • 9,00 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 0910 035 | • 9,10 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0404 0910 049 | • 9,10 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 0920 035 | • 9,20 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0404 0920 049 | • 9,20 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 0930 035 | • 9,30 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0404 0930 049 | • 9,30 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 0950 035 | • 9,50 | 35 | 47 | 89 | 10,0 | 151,00 |
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| 22 0404 0960 035 | • 9,60 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0404 0960 049 | • 9,60 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 0970 035 | • 9,70 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0404 0970 049 | • 9,70 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 0980 035 | • 9,80 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0404 0980 049 | • 9,80 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 1000 035 | • 10,00 | 35 | 47 | 89 | 10,0 | 151,00 |
| 22 0404 1000 049 | • 10,00 | 49 | 61 | 103 | 10,0 | 173,00 |
| 22 0404 1010 040 | • 10,10 | 40 | 53 | 100 | 12,0 | 193,00 |
| 22 0404 1010 056 | • 10,10 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0404 1020 040 | • 10,20 | 40 | 53 | 100 | 12,0 | 193,00 |
| 22 0404 1020 056 | • 10,20 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0404 1030 040 | • 10,30 | 40 | 53 | 100 | 12,0 | 193,00 |
| 22 0404 1030 056 | • 10,30 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0404 1050 040 | • 10,50 | 40 | 53 | 100 | 12,0 | 193,00 |
| 22 0404 1050 056 | • 10,50 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0404 1060 040 | • 10,60 | 40 | 53 | 100 | 12,0 | 193,00 |
| 22 0404 1060 056 | • 10,60 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0404 1070 040 | • 10,70 | 40 | 53 | 100 | 12,0 | 193,00 |
| 22 0404 1070 056 | • 10,70 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0404 1080 040 | • 10,80 | 40 | 53 | 100 | 12,0 | 193,00 |
| 22 0404 1080 056 | • 10,80 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0404 1090 040 | • 10,90 | 40 | 53 | 100 | 12,0 | 193,00 |
| 22 0404 1090 056 | • 10,90 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0404 1100 040 | • 11,00 | 40 | 53 | 100 | 12,0 | 193,00 |
| 22 0404 1100 056 | • 11,00 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0404 1120 040 | • 11,20 | 40 | 53 | 100 | 12,0 | 193,00 |
| 22 0404 1120 056 | • 11,20 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0404 1150 040 | • 11,50 | 40 | 53 | 100 | 12,0 | 193,00 |
| 22 0404 1150 056 | • 11,50 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0404 1180 040 | • 11,80 | 40 | 53 | 100 | 12,0 | 193,00 |
| 22 0404 1180 056 | • 11,80 | 56 | 69 | 116 | 12,0 | 243,00 |
| 22 0404 1200 040 | • 12,00 | 40 | 53 | 100 | 12,0 | 193,00 |
| 22 0404 1200 056 | • 12,00 | 56 | 69 | 116 | 12,0 | 243,00 |

180° Spitzenwinkel
180° Point angle

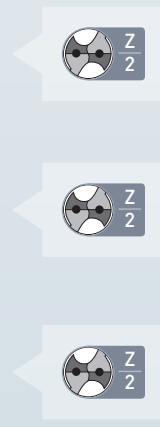
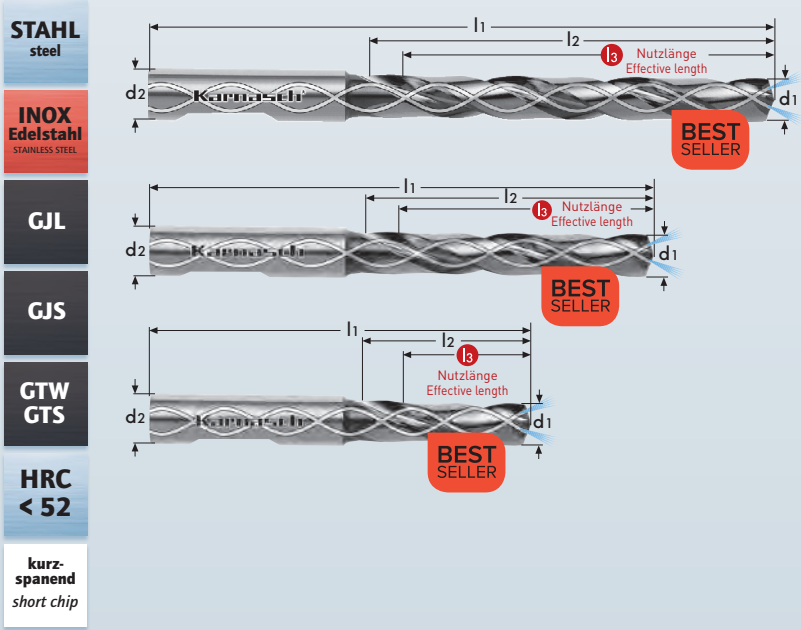
22 0404



Vollhartmetall-Hochleistungsbohrer, DIN 6535 HEK
Solid carbide high performance twist drill, DIN 6535 HEK



22 0405



| | |
|--------------------|--------------------------|
| MICRO GRAIN | DIN 6537 |
| N | DIN 6535 Form HEK |
| | |
| | HSC HPC |
| | DVC-X2 |
| | |

| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1252 | DXF/STEP |

Bestseller – preisreduziert - Bestseller – price reduced

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|----|----|----|-------|-------|
| 22 0405 0300 014 | • 3,0 | 14 | 20 | 62 | 6,0 | 61,00 |
| 22 0405 0300 023 | • 3,0 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0405 0300 029 | • 3,0 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0405 0310 014 | • 3,1 | 14 | 20 | 62 | 6,0 | 61,00 |
| 22 0405 0310 023 | • 3,1 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0405 0310 029 | • 3,1 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0405 0320 014 | • 3,2 | 14 | 20 | 62 | 6,0 | 61,00 |
| 22 0405 0320 023 | • 3,2 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0405 0320 029 | • 3,2 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0405 0330 014 | • 3,3 | 14 | 20 | 62 | 6,0 | 61,00 |
| 22 0405 0330 023 | • 3,3 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0405 0330 029 | • 3,3 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0405 0340 014 | • 3,4 | 14 | 20 | 62 | 6,0 | 61,00 |
| 22 0405 0340 023 | • 3,4 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0405 0340 029 | • 3,4 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0405 0350 014 | • 3,5 | 14 | 20 | 62 | 6,0 | 61,00 |
| 22 0405 0350 023 | • 3,5 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0405 0350 029 | • 3,5 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0405 0360 014 | • 3,6 | 14 | 20 | 62 | 6,0 | 61,00 |
| 22 0405 0360 023 | • 3,6 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0405 0360 029 | • 3,6 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0405 0370 014 | • 3,7 | 14 | 20 | 62 | 6,0 | 61,00 |
| 22 0405 0370 023 | • 3,7 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0405 0370 029 | • 3,7 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0405 0380 017 | • 3,8 | 17 | 24 | 66 | 6,0 | 61,00 |
| 22 0405 0380 029 | • 3,8 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0405 0380 036 | • 3,8 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0405 0390 017 | • 3,9 | 17 | 24 | 66 | 6,0 | 61,00 |
| 22 0405 0390 029 | • 3,9 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0405 0390 036 | • 3,9 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0405 0400 017 | • 4,0 | 17 | 24 | 66 | 6,0 | 61,00 |
| 22 0405 0400 029 | • 4,0 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0405 0400 036 | • 4,0 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0405 0410 017 | • 4,1 | 17 | 24 | 66 | 6,0 | 61,00 |
| 22 0405 0410 029 | • 4,1 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0405 0410 036 | • 4,1 | 36 | 43 | 81 | 6,0 | 90,00 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|----|----|----|-------|-------|
| 22 0405 0420 017 | • 4,2 | 17 | 24 | 66 | 6,0 | 61,00 |
| 22 0405 0420 029 | • 4,2 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0405 0420 036 | • 4,2 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0405 0430 017 | • 4,3 | 17 | 24 | 66 | 6,0 | 61,00 |
| 22 0405 0430 029 | • 4,3 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0405 0430 036 | • 4,3 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0405 0440 017 | • 4,4 | 17 | 24 | 66 | 6,0 | 61,00 |
| 22 0405 0440 029 | • 4,4 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0405 0440 036 | • 4,4 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0405 0450 017 | • 4,5 | 17 | 24 | 66 | 6,0 | 61,00 |
| 22 0405 0450 029 | • 4,5 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0405 0450 036 | • 4,5 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0405 0460 017 | • 4,6 | 17 | 24 | 66 | 6,0 | 61,00 |
| 22 0405 0460 029 | • 4,6 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0405 0460 036 | • 4,6 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0405 0470 017 | • 4,7 | 17 | 24 | 66 | 6,0 | 61,00 |
| 22 0405 0470 029 | • 4,7 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0405 0470 036 | • 4,7 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0405 0480 020 | • 4,8 | 20 | 28 | 66 | 6,0 | 61,00 |
| 22 0405 0480 035 | • 4,8 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0405 0480 048 | • 4,8 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0405 0490 020 | • 4,9 | 20 | 28 | 66 | 6,0 | 61,00 |
| 22 0405 0490 035 | • 4,9 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0405 0490 048 | • 4,9 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0405 0500 020 | • 5,0 | 20 | 28 | 66 | 6,0 | 61,00 |
| 22 0405 0500 035 | • 5,0 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0405 0500 048 | • 5,0 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0405 0510 020 | • 5,1 | 20 | 28 | 66 | 6,0 | 61,00 |
| 22 0405 0510 035 | • 5,1 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0405 0510 048 | • 5,1 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0405 0520 020 | • 5,2 | 20 | 28 | 66 | 6,0 | 61,00 |
| 22 0405 0520 035 | • 5,2 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0405 0520 048 | • 5,2 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0405 0530 020 | • 5,3 | 20 | 28 | 66 | 6,0 | 61,00 |
| 22 0405 0530 035 | • 5,3 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0405 0530 048 | • 5,3 | 48 | 57 | 95 | 6,0 | 97,00 |

Alternative 22 0406 auf Seite 262-263
Alternative 22 0406 on page 262-263



22 0405

STAHL
steel

HRC
< 52

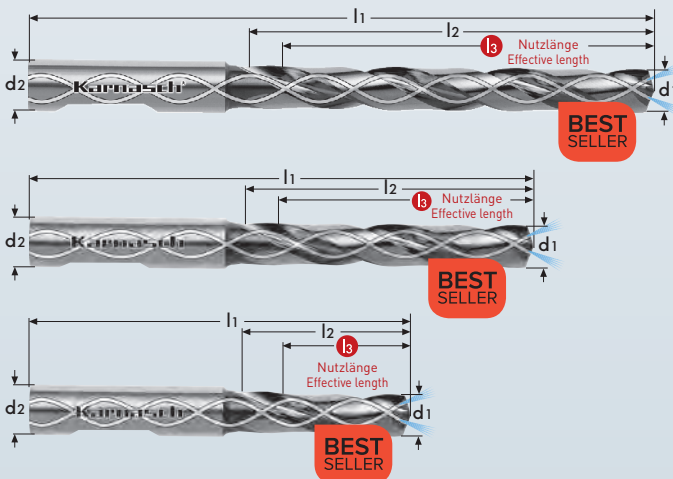
INOX
Edelstahl
STAINLESS STEEL

kurzspanend
short chip

GJL

GJS

GTW
GTS

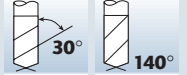


MICRO
GRAIN

DIN
6537

N

DIN 6535
Form HEK



HSC
HPC

DVC-X2



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|----|----|-----|-------|--------|
| 22 0405 0540 020 | • 5,4 | 20 | 28 | 66 | 6,0 | 61,00 |
| 22 0405 0540 035 | • 5,4 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0405 0540 048 | • 5,4 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0405 0550 020 | • 5,5 | 20 | 28 | 66 | 6,0 | 61,00 |
| 22 0405 0550 035 | • 5,5 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0405 0550 048 | • 5,5 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0405 0560 020 | • 5,6 | 20 | 28 | 66 | 6,0 | 61,00 |
| 22 0405 0560 035 | • 5,6 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0405 0560 048 | • 5,6 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0405 0570 020 | • 5,7 | 20 | 28 | 66 | 6,0 | 61,00 |
| 22 0405 0570 035 | • 5,7 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0405 0570 048 | • 5,7 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0405 0580 020 | • 5,8 | 20 | 28 | 66 | 6,0 | 61,00 |
| 22 0405 0580 035 | • 5,8 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0405 0580 048 | • 5,8 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0405 0590 020 | • 5,9 | 20 | 28 | 66 | 6,0 | 61,00 |
| 22 0405 0590 035 | • 5,9 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0405 0590 048 | • 5,9 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0405 0600 020 | • 6,0 | 20 | 28 | 66 | 6,0 | 61,00 |
| 22 0405 0600 035 | • 6,0 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0405 0600 048 | • 6,0 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0405 0610 024 | • 6,1 | 24 | 34 | 79 | 8,0 | 69,00 |
| 22 0405 0610 043 | • 6,1 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0610 064 | • 6,1 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0620 024 | • 6,2 | 24 | 34 | 79 | 8,0 | 69,00 |
| 22 0405 0620 043 | • 6,2 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0620 064 | • 6,2 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0630 024 | • 6,3 | 24 | 34 | 79 | 8,0 | 69,00 |
| 22 0405 0630 043 | • 6,3 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0630 064 | • 6,3 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0640 024 | • 6,4 | 24 | 34 | 79 | 8,0 | 69,00 |
| 22 0405 0640 043 | • 6,4 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0640 064 | • 6,4 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0650 024 | • 6,5 | 24 | 34 | 79 | 8,0 | 69,00 |
| 22 0405 0650 043 | • 6,5 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0650 064 | • 6,5 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0660 024 | • 6,6 | 24 | 34 | 79 | 8,0 | 69,00 |
| 22 0405 0660 043 | • 6,6 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0660 064 | • 6,6 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0670 024 | • 6,7 | 24 | 34 | 79 | 8,0 | 69,00 |
| 22 0405 0670 043 | • 6,7 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0670 064 | • 6,7 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0680 024 | • 6,8 | 24 | 34 | 79 | 8,0 | 69,00 |
| 22 0405 0680 043 | • 6,8 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0680 064 | • 6,8 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0690 024 | • 6,9 | 24 | 34 | 79 | 8,0 | 69,00 |
| 22 0405 0690 043 | • 6,9 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0690 064 | • 6,9 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0700 024 | • 7,0 | 24 | 34 | 79 | 8,0 | 69,00 |
| 22 0405 0700 043 | • 7,0 | 43 | 53 | 91 | 8,0 | 72,00 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|----|----|-----|-------|--------|
| 22 0405 0700 066 | • 7,0 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0710 029 | • 7,1 | 29 | 41 | 79 | 8,0 | 69,00 |
| 22 0405 0710 043 | • 7,1 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0710 066 | • 7,1 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0720 029 | • 7,2 | 29 | 41 | 79 | 8,0 | 69,00 |
| 22 0405 0720 043 | • 7,2 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0720 066 | • 7,2 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0730 029 | • 7,3 | 29 | 41 | 79 | 8,0 | 69,00 |
| 22 0405 0730 043 | • 7,3 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0730 066 | • 7,3 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0740 029 | • 7,4 | 29 | 41 | 79 | 8,0 | 69,00 |
| 22 0405 0740 043 | • 7,4 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0740 066 | • 7,4 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0750 029 | • 7,5 | 29 | 41 | 79 | 8,0 | 69,00 |
| 22 0405 0750 043 | • 7,5 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0750 066 | • 7,5 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0760 029 | • 7,6 | 29 | 41 | 79 | 8,0 | 69,00 |
| 22 0405 0760 043 | • 7,6 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0760 066 | • 7,6 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0770 029 | • 7,7 | 29 | 41 | 79 | 8,0 | 69,00 |
| 22 0405 0770 043 | • 7,7 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0770 066 | • 7,7 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0780 029 | • 7,8 | 29 | 41 | 79 | 8,0 | 69,00 |
| 22 0405 0780 043 | • 7,8 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0780 066 | • 7,8 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0790 029 | • 7,9 | 29 | 41 | 79 | 8,0 | 69,00 |
| 22 0405 0790 043 | • 7,9 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0790 066 | • 7,9 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0800 029 | • 8,0 | 29 | 41 | 79 | 8,0 | 69,00 |
| 22 0405 0800 043 | • 8,0 | 43 | 53 | 91 | 8,0 | 72,00 |
| 22 0405 0800 066 | • 8,0 | 64 | 76 | 114 | 8,0 | 128,00 |
| 22 0405 0810 035 | • 8,1 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0810 049 | • 8,1 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0810 080 | • 8,1 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0820 035 | • 8,2 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0820 049 | • 8,2 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0820 080 | • 8,2 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0830 035 | • 8,3 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0830 049 | • 8,3 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0830 080 | • 8,3 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0840 035 | • 8,4 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0840 049 | • 8,4 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0840 080 | • 8,4 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0850 035 | • 8,5 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0850 049 | • 8,5 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0850 080 | • 8,5 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0860 035 | • 8,6 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0860 049 | • 8,6 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0860 080 | • 8,6 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0870 035 | • 8,7 | 35 | 47 | 89 | 10,0 | 81,00 |

Alternative 22 0406 auf Seite 262-263
Alternative 22 0406 on page 262-263

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|-----|-----|-----|-------|--------|
| 22 0405 0870 049 | • 8,7 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0870 080 | • 8,7 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0880 035 | • 8,8 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0880 049 | • 8,8 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0880 080 | • 8,8 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0890 035 | • 8,9 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0890 049 | • 8,9 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0890 080 | • 8,9 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0900 035 | • 9,0 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0900 049 | • 9,0 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0900 080 | • 9,0 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0910 035 | • 9,1 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0910 049 | • 9,1 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0910 080 | • 9,1 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0920 035 | • 9,2 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0920 049 | • 9,2 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0920 080 | • 9,2 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0930 035 | • 9,3 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0930 049 | • 9,3 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0930 080 | • 9,3 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0940 035 | • 9,4 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0940 049 | • 9,4 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0940 080 | • 9,4 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0950 035 | • 9,5 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0950 049 | • 9,5 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0950 080 | • 9,5 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0960 035 | • 9,6 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0960 049 | • 9,6 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0960 080 | • 9,6 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0970 035 | • 9,7 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0970 049 | • 9,7 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0970 080 | • 9,7 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0980 035 | • 9,8 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0980 049 | • 9,8 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0980 080 | • 9,8 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 0990 035 | • 9,9 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 0990 049 | • 9,9 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 0990 080 | • 9,9 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 1000 035 | • 10,0 | 35 | 47 | 89 | 10,0 | 81,00 |
| 22 0405 1000 049 | • 10,0 | 49 | 61 | 103 | 10,0 | 84,00 |
| 22 0405 1000 080 | • 10,0 | 80 | 95 | 142 | 10,0 | 170,00 |
| 22 0405 1010 040 | • 10,1 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1010 056 | • 10,1 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1010 096 | • 10,1 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1020 040 | • 10,2 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1020 056 | • 10,2 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1020 096 | • 10,2 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1030 040 | • 10,3 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1030 056 | • 10,3 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1030 096 | • 10,3 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1040 040 | • 10,4 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1040 056 | • 10,4 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1040 096 | • 10,4 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1050 040 | • 10,5 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1050 056 | • 10,5 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1050 096 | • 10,5 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1060 040 | • 10,6 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1060 056 | • 10,6 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1060 096 | • 10,6 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1060 142 | • 10,6 | 142 | 156 | 204 | 12,0 | 178,20 |
| 22 0405 1070 040 | • 10,7 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1070 056 | • 10,7 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1070 096 | • 10,7 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1070 142 | • 10,7 | 142 | 156 | 204 | 12,0 | 178,20 |
| 22 0405 1080 040 | • 10,8 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1080 056 | • 10,8 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1080 096 | • 10,8 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1090 040 | • 10,9 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1090 056 | • 10,9 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1090 096 | • 10,9 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1090 142 | • 10,9 | 142 | 156 | 204 | 12,0 | 178,20 |
| 22 0405 1100 040 | • 11,0 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1100 056 | • 11,0 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1100 096 | • 11,0 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1110 040 | • 11,1 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1110 056 | • 11,1 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1110 096 | • 11,1 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1120 040 | • 11,2 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1120 056 | • 11,2 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1120 096 | • 11,2 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1130 040 | • 11,3 | 40 | 55 | 102 | 12,0 | 114,00 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|-----|-----|-----|-------|--------|
| 22 0405 1130 056 | • 11,3 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1130 096 | • 11,3 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1130 142 | • 11,3 | 142 | 156 | 204 | 12,0 | 178,20 |
| 22 0405 1140 040 | • 11,4 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1140 056 | • 11,4 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1140 096 | • 11,4 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1140 142 | • 11,4 | 142 | 156 | 204 | 12,0 | 178,20 |
| 22 0405 1150 040 | • 11,5 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1150 056 | • 11,5 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1150 096 | • 11,5 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1160 040 | • 11,6 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1160 056 | • 11,6 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1160 096 | • 11,6 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1170 040 | • 11,7 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1170 056 | • 11,7 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1170 096 | • 11,7 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1170 142 | • 11,7 | 142 | 156 | 204 | 12,0 | 198,00 |
| 22 0405 1180 040 | • 11,8 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1180 056 | • 11,8 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1180 096 | • 11,8 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1190 040 | • 11,9 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1190 056 | • 11,9 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1190 096 | • 11,9 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1190 142 | • 11,9 | 142 | 156 | 204 | 12,0 | 178,20 |
| 22 0405 1200 040 | • 12,0 | 40 | 55 | 102 | 12,0 | 114,00 |
| 22 0405 1200 056 | • 12,0 | 56 | 71 | 118 | 12,0 | 119,00 |
| 22 0405 1200 096 | • 12,0 | 96 | 114 | 162 | 12,0 | 236,00 |
| 22 0405 1230 060 | • 12,3 | 60 | 77 | 124 | 14,0 | 158,00 |
| 22 0405 1240 060 | • 12,4 | 60 | 77 | 124 | 14,0 | 158,00 |
| 22 0405 1250 043 | • 12,5 | 43 | 60 | 107 | 14,0 | 151,00 |
| 22 0405 1250 060 | • 12,5 | 60 | 77 | 124 | 14,0 | 158,00 |
| 22 0405 1250 112 | • 12,5 | 112 | 133 | 178 | 14,0 | 335,00 |
| 22 0405 1270 060 | • 12,7 | 60 | 77 | 124 | 14,0 | 158,00 |
| 22 0405 1280 060 | • 12,8 | 60 | 77 | 124 | 14,0 | 158,00 |
| 22 0405 1280 112 | • 12,8 | 112 | 133 | 178 | 14,0 | 335,00 |
| 22 0405 1300 043 | • 13,0 | 43 | 60 | 107 | 14,0 | 151,00 |
| 22 0405 1300 060 | • 13,0 | 60 | 77 | 124 | 14,0 | 158,00 |
| 22 0405 1300 112 | • 13,0 | 112 | 133 | 178 | 14,0 | 335,00 |
| 22 0405 1350 043 | • 13,5 | 43 | 60 | 107 | 14,0 | 151,00 |
| 22 0405 1350 060 | • 13,5 | 60 | 77 | 124 | 14,0 | 158,00 |
| 22 0405 1350 112 | • 13,5 | 112 | 133 | 178 | 14,0 | 335,00 |
| 22 0405 1380 043 | • 13,8 | 43 | 60 | 107 | 14,0 | 151,00 |
| 22 0405 1380 060 | • 13,8 | 60 | 77 | 124 | 14,0 | 158,00 |
| 22 0405 1380 112 | • 13,8 | 112 | 133 | 178 | 14,0 | 335,00 |
| 22 0405 1400 043 | • 14,0 | 43 | 60 | 107 | 14,0 | 151,00 |
| 22 0405 1400 060 | • 14,0 | 60 | 77 | 124 | 14,0 | 158,00 |
| 22 0405 1400 112 | • 14,0 | 112 | 133 | 178 | 14,0 | 335,00 |
| 22 0405 1450 045 | • 14,5 | 45 | 65 | 115 | 16,0 | 214,00 |
| 22 0405 1450 063 | • 14,5 | 63 | 83 | 133 | 16,0 | 211,00 |
| 22 0405 1500 045 | • 15,0 | 45 | 65 | 115 | 16,0 | 214,00 |
| 22 0405 1500 063 | • 15,0 | 63 | 83 | 133 | 16,0 | 211,00 |
| 22 0405 1500 128 | • 15,0 | 128 | 152 | 203 | 16,0 | 439,00 |
| 22 0405 1550 045 | • 15,5 | 45 | 65 | 115 | 16,0 | 214,00 |
| 22 0405 1550 063 | • 15,5 | 63 | 83 | 133 | 16,0 | 211,00 |
| 22 0405 1550 128 | • 15,5 | 128 | 152 | 203 | 16,0 | 439,00 |
| 22 0405 1580 128 | • 15,8 | 128 | 152 | 203 | 16,0 | 439,00 |
| 22 0405 1600 045 | • 16,0 | 45 | 65 | 115 | 16,0 | 214,00 |
| 22 0405 1600 063 | • 16,0 | 63 | 83 | 133 | 16,0 | 211,00 |
| 22 0405 1650 051 | • 16,5 | 51 | 73 | 123 | 18,0 | 298,00 |
| 22 0405 1650 071 | • 16,5 | 71 | 93 | 143 | 18,0 | 324,00 |
| 22 0405 1680 051 | • 16,8 | 51 | 73 | 123 | 18,0 | 298,00 |
| 22 0405 1680 071 | • 16,8 | 71 | 93 | 143 | 18,0 | 324,00 |
| 22 0405 1700 051 | • 17,0 | 51 | 73 | 123 | 18,0 | 298,00 |
| 22 0405 1700 071 | • 17,0 | 71 | 93 | 143 | 18,0 | 324,00 |
| 22 0405 1750 051 | • 17,5 | 51 | 73 | 123 | 18,0 | 298,00 |
| 22 0405 1750 071 | • 17,5 | 71 | 93 | 143 | 18,0 | 324,00 |
| 22 0405 1780 071 | • 17,8 | 71 | 93 | 143 | 18,0 | 324,00 |
| 22 0405 1800 051 | • 18,0 | 51 | 73 | 123 | 18,0 | 298,00 |
| 22 0405 1800 071 | • 18,0 | 71 | 93 | 143 | 18,0 | 324,00 |
| 22 0405 1850 055 | • 18,5 | 55 | 79 | 131 | 20,0 | 368,00 |
| 22 0405 1850 077 | • 18,5 | 77 | 101 | 153 | 20,0 | 409,00 |
| 22 0405 1850 160 | • 18,5 | | | | | |

22 0406

Vollhartmetall-Hochleistungsbohrer, DIN 6535 HAK
Solid carbide high performance twist drill, DIN 6535 HAK



STAHL

steel

INOX
Edelstahl
STAINLESS STEEL

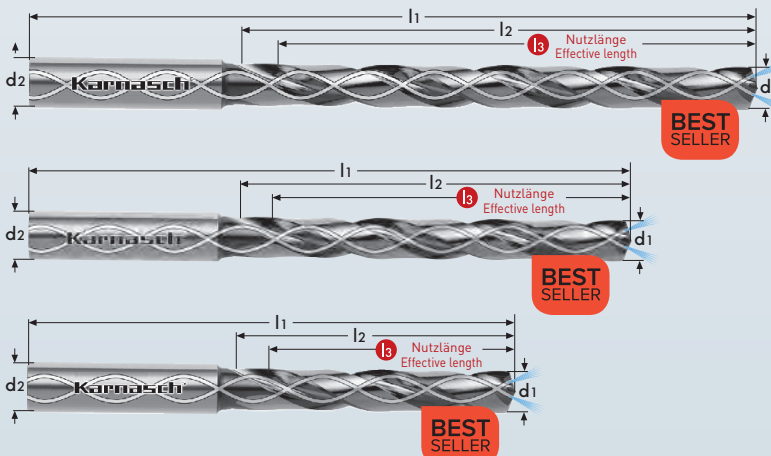
GJL

GJS

GTW
GTS

HRC
< 52

kurz-
spanend
short chip



MICRO
GRAIN

DIN
6537

N

DIN 6535
Form HAK



HSC
HPC



DVC-X2



Schnittdaten
Cutting data

Zeichnungen
Drawings



1252

DXF/STEP

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|-----|-------|--------|
| 22 0406 0300 023 | • 3,0 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0406 0300 029 | • 3,0 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0406 0300 048 | • 3,0 | 48 | 54 | 92 | 6,0 | 105,00 |
| 22 0406 0310 023 | • 3,1 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0406 0310 029 | • 3,1 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0406 0310 048 | • 3,1 | 48 | 54 | 92 | 6,0 | 106,00 |
| 22 0406 0320 023 | • 3,2 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0406 0320 029 | • 3,2 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0406 0320 048 | • 3,2 | 48 | 54 | 92 | 6,0 | 106,00 |
| 22 0406 0330 023 | • 3,3 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0406 0330 029 | • 3,3 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0406 0330 048 | • 3,3 | 48 | 54 | 92 | 6,0 | 106,00 |
| 22 0406 0340 023 | • 3,4 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0406 0340 029 | • 3,4 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0406 0340 048 | • 3,4 | 48 | 54 | 92 | 6,0 | 106,00 |
| 22 0406 0350 023 | • 3,5 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0406 0350 029 | • 3,5 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0406 0350 048 | • 3,5 | 48 | 54 | 92 | 6,0 | 106,00 |
| 22 0406 0360 023 | • 3,6 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0406 0360 029 | • 3,6 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0406 0360 048 | • 3,6 | 48 | 54 | 92 | 6,0 | 106,00 |
| 22 0406 0365 023 | • 3,65 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0406 0370 023 | • 3,7 | 23 | 28 | 66 | 6,0 | 64,00 |
| 22 0406 0370 029 | • 3,7 | 29 | 34 | 72 | 6,0 | 85,00 |
| 22 0406 0370 048 | • 3,7 | 48 | 54 | 92 | 6,0 | 106,00 |
| 22 0406 0380 029 | • 3,8 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0406 0380 036 | • 3,8 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0406 0380 058 | • 3,8 | 58 | 64 | 102 | 6,0 | 106,00 |
| 22 0406 0390 029 | • 3,9 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0406 0390 036 | • 3,9 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0406 0390 058 | • 3,9 | 58 | 64 | 102 | 6,0 | 106,00 |
| 22 0406 0400 029 | • 4,0 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0406 0400 036 | • 4,0 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0406 0400 058 | • 4,0 | 58 | 64 | 102 | 6,0 | 106,00 |
| 22 0406 0410 029 | • 4,1 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0406 0410 036 | • 4,1 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0406 0410 058 | • 4,1 | 58 | 64 | 102 | 6,0 | 106,00 |
| 22 0406 0420 029 | • 4,2 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0406 0420 036 | • 4,2 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0406 0420 058 | • 4,2 | 58 | 64 | 102 | 6,0 | 106,00 |
| 22 0406 0430 029 | • 4,3 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0406 0430 036 | • 4,3 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0406 0430 058 | • 4,3 | 58 | 64 | 102 | 6,0 | 106,00 |
| 22 0406 0440 029 | • 4,4 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0406 0440 036 | • 4,4 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0406 0440 058 | • 4,4 | 58 | 64 | 102 | 6,0 | 106,00 |
| 22 0406 0450 029 | • 4,5 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0406 0450 036 | • 4,5 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0406 0450 058 | • 4,5 | 58 | 64 | 102 | 6,0 | 106,00 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|-----|-------|--------|
| 22 0406 0460 029 | • 4,6 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0406 0460 036 | • 4,6 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0406 0460 058 | • 4,6 | 58 | 64 | 102 | 6,0 | 106,00 |
| 22 0406 0465 029 | • 4,65 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0406 0470 029 | • 4,7 | 29 | 36 | 74 | 6,0 | 64,00 |
| 22 0406 0470 036 | • 4,7 | 36 | 43 | 81 | 6,0 | 90,00 |
| 22 0406 0470 058 | • 4,7 | 58 | 64 | 102 | 6,0 | 106,00 |
| 22 0406 0480 035 | • 4,8 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0406 0480 048 | • 4,8 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0406 0480 070 | • 4,8 | 70 | 78 | 116 | 6,0 | 106,00 |
| 22 0406 0490 035 | • 4,9 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0406 0490 048 | • 4,9 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0406 0490 070 | • 4,9 | 70 | 78 | 116 | 6,0 | 106,00 |
| 22 0406 0500 035 | • 5,0 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0406 0500 048 | • 5,0 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0406 0500 070 | • 5,0 | 70 | 78 | 116 | 6,0 | 106,00 |
| 22 0406 0510 035 | • 5,1 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0406 0510 048 | • 5,1 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0406 0510 070 | • 5,1 | 70 | 78 | 116 | 6,0 | 106,00 |
| 22 0406 0520 035 | • 5,2 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0406 0520 048 | • 5,2 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0406 0520 070 | • 5,2 | 70 | 78 | 116 | 6,0 | 106,00 |
| 22 0406 0530 035 | • 5,3 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0406 0530 048 | • 5,3 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0406 0530 070 | • 5,3 | 70 | 78 | 116 | 6,0 | 106,00 |
| 22 0406 0540 035 | • 5,4 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0406 0540 048 | • 5,4 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0406 0540 070 | • 5,4 | 70 | 78 | 116 | 6,0 | 106,00 |
| 22 0406 0550 035 | • 5,5 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0406 0550 048 | • 5,5 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0406 0550 070 | • 5,5 | 70 | 78 | 116 | 6,0 | 106,00 |
| 22 0406 0560 035 | • 5,6 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0406 0560 048 | • 5,6 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0406 0560 070 | • 5,6 | 70 | 78 | 116 | 6,0 | 106,00 |
| 22 0406 0570 035 | • 5,7 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0406 0570 048 | • 5,7 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0406 0570 070 | • 5,7 | 70 | 78 | 116 | 6,0 | 106,00 |
| 22 0406 0580 035 | • 5,8 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0406 0580 048 | • 5,8 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0406 0580 070 | • 5,8 | 70 | 78 | 116 | 6,0 | 106,00 |
| 22 0406 0590 035 | • 5,9 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0406 0590 048 | • 5,9 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0406 0590 070 | • 5,9 | 70 | 78 | 116 | 6,0 | 106,00 |
| 22 0406 0600 035 | • 6,0 | 35 | 44 | 82 | 6,0 | 64,00 |
| 22 0406 0600 048 | • 6,0 | 48 | 57 | 95 | 6,0 | 97,00 |
| 22 0406 0600 070 | • 6,0 | 70 | 78 | 116 | 6,0 | 106,00 |

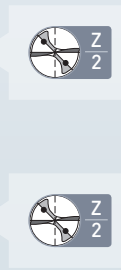
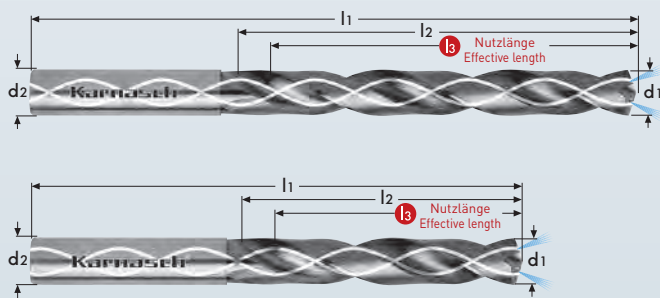
22 0409

Vollhartmetall-Hochleistungsbohrer
Solid carbide high performance twist drill



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

| | |
|--|--|
| INOX stainless steel < 900 N/mm ² ferritic | HASTELLOY |
| INOX stainless steel > 900 N/mm ² martensitic | MONEL |
| INOX stainless steel < 900 N/mm ² austenitic | NIMONIC |
| NI-ALLOYS < 900 N/mm ² | Ampco |
| NI-CO ALLOYS > 900 N/mm ² | NICKEL < 500 N/mm ² |
| HARDOX | lang-spanend long chip |



| | |
|---------------------------|-----------------------------|
| MICRO GRAIN | DIN 6537 |
| SPEZIAL SPECIAL | DIN 6535 Form HAK |
| | |
| | HSC HPC |
| | DVC-X1² |
| | |

Schnittdaten
Cutting data



| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|----|----|----|-------|-------|
| 22 0409 0300 023 | 3,0 | 23 | 28 | 66 | 6,0 | 28,80 |
| 22 0409 0300 029 | 3,0 | 29 | 34 | 72 | 6,0 | 39,00 |
| 22 0409 0310 023 | 3,1 | 23 | 28 | 66 | 6,0 | 29,40 |
| 22 0409 0330 023 | 3,3 | 23 | 28 | 66 | 6,0 | 29,40 |
| 22 0409 0340 029 | 3,4 | 29 | 34 | 72 | 6,0 | 39,60 |
| 22 0409 0350 023 | 3,5 | 23 | 28 | 66 | 6,0 | 29,40 |
| 22 0409 0350 029 | 3,5 | 29 | 34 | 72 | 6,0 | 39,60 |
| 22 0409 0360 023 | 3,6 | 23 | 28 | 66 | 6,0 | 29,40 |
| 22 0409 0360 029 | 3,6 | 29 | 34 | 72 | 6,0 | 39,60 |
| 22 0409 0370 023 | 3,7 | 23 | 28 | 66 | 6,0 | 29,40 |
| 22 0409 0370 029 | 3,7 | 29 | 34 | 72 | 6,0 | 39,60 |
| 22 0409 0380 036 | 3,8 | 36 | 43 | 81 | 6,0 | 41,40 |
| 22 0409 0390 029 | 3,9 | 29 | 36 | 74 | 6,0 | 29,40 |
| 22 0409 0390 036 | 3,9 | 36 | 43 | 81 | 6,0 | 41,40 |
| 22 0409 0400 029 | 4,0 | 29 | 36 | 74 | 6,0 | 29,40 |
| 22 0409 0410 029 | 4,1 | 29 | 36 | 74 | 6,0 | 29,40 |
| 22 0409 0410 036 | 4,1 | 36 | 43 | 81 | 6,0 | 41,40 |
| 22 0409 0420 029 | 4,2 | 29 | 36 | 74 | 6,0 | 29,40 |
| 22 0409 0420 036 | 4,2 | 36 | 43 | 81 | 6,0 | 41,40 |
| 22 0409 0430 029 | 4,3 | 29 | 36 | 74 | 6,0 | 29,40 |
| 22 0409 0430 036 | 4,3 | 36 | 43 | 81 | 6,0 | 41,40 |
| 22 0409 0440 036 | 4,4 | 36 | 43 | 81 | 6,0 | 41,40 |
| 22 0409 0450 029 | 4,5 | 29 | 36 | 74 | 6,0 | 29,40 |
| 22 0409 0450 036 | 4,5 | 36 | 43 | 81 | 6,0 | 41,40 |
| 22 0409 0460 029 | 4,6 | 29 | 36 | 74 | 6,0 | 29,40 |
| 22 0409 0460 036 | 4,6 | 36 | 43 | 81 | 6,0 | 41,40 |
| 22 0409 0470 029 | 4,7 | 29 | 36 | 74 | 6,0 | 29,40 |
| 22 0409 0470 036 | 4,7 | 36 | 43 | 81 | 6,0 | 41,40 |
| 22 0409 0480 035 | 4,8 | 35 | 44 | 82 | 6,0 | 29,40 |
| 22 0409 0480 048 | 4,8 | 48 | 57 | 95 | 6,0 | 45,00 |
| 22 0409 0490 048 | 4,9 | 48 | 57 | 95 | 6,0 | 45,00 |
| 22 0409 0500 035 | 5,0 | 35 | 44 | 82 | 6,0 | 29,40 |
| 22 0409 0500 048 | 5,0 | 48 | 57 | 95 | 6,0 | 45,00 |
| 22 0409 0510 035 | 5,1 | 35 | 44 | 82 | 6,0 | 29,40 |
| 22 0409 0510 048 | 5,1 | 48 | 57 | 95 | 6,0 | 45,00 |
| 22 0409 0520 035 | 5,2 | 35 | 44 | 82 | 6,0 | 29,40 |
| 22 0409 0520 048 | 5,2 | 48 | 57 | 95 | 6,0 | 45,00 |
| 22 0409 0530 035 | 5,3 | 35 | 44 | 82 | 6,0 | 29,40 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|----|----|-----|-------|-------|
| 22 0409 0530 048 | 5,3 | 48 | 57 | 95 | 6,0 | 45,00 |
| 22 0409 0540 035 | 5,4 | 35 | 44 | 82 | 6,0 | 29,40 |
| 22 0409 0540 048 | 5,4 | 48 | 57 | 95 | 6,0 | 45,00 |
| 22 0409 0550 035 | 5,5 | 35 | 44 | 82 | 6,0 | 29,40 |
| 22 0409 0550 048 | 5,5 | 48 | 57 | 95 | 6,0 | 45,00 |
| 22 0409 0560 035 | 5,6 | 35 | 44 | 82 | 6,0 | 29,40 |
| 22 0409 0560 048 | 5,6 | 48 | 57 | 95 | 6,0 | 45,00 |
| 22 0409 0570 035 | 5,7 | 35 | 44 | 82 | 6,0 | 29,40 |
| 22 0409 0570 048 | 5,7 | 48 | 57 | 95 | 6,0 | 45,00 |
| 22 0409 0580 035 | 5,8 | 35 | 44 | 82 | 6,0 | 29,40 |
| 22 0409 0580 048 | 5,8 | 48 | 57 | 95 | 6,0 | 45,00 |
| 22 0409 0590 035 | 5,9 | 35 | 44 | 82 | 6,0 | 29,40 |
| 22 0409 0590 048 | 5,9 | 48 | 57 | 95 | 6,0 | 45,00 |
| 22 0409 0600 035 | 6,0 | 35 | 44 | 82 | 6,0 | 29,40 |
| 22 0409 0600 048 | 6,0 | 48 | 57 | 95 | 6,0 | 45,00 |
| 22 0409 0610 043 | 6,1 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0610 064 | 6,1 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0620 043 | 6,2 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0620 064 | 6,2 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0630 043 | 6,3 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0630 064 | 6,3 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0640 043 | 6,4 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0640 064 | 6,4 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0650 043 | 6,5 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0650 064 | 6,5 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0660 064 | 6,6 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0670 043 | 6,7 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0670 064 | 6,7 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0680 043 | 6,8 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0680 064 | 6,8 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0690 043 | 6,9 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0690 064 | 6,9 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0700 043 | 7,0 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0700 064 | 7,0 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0710 043 | 7,1 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0710 064 | 7,1 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0720 043 | 7,2 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0720 064 | 7,2 | 64 | 76 | 114 | 8,0 | 58,80 |

Mindestbestellmenge für Zwischenabmessungen 5 Stück / Minimum order volume for intermediate dimensions 5 pieces ♦ auf Anfrage / on request
 % Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
 Special price / sale article. While stocks last.

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|-----|-----|-------|--------|
| 22 0409 0730 043 | % 7,3 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0730 064 | % 7,3 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0740 043 | % 7,4 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0740 064 | % 7,4 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0750 043 | % 7,5 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0750 064 | % 7,5 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0760 043 | % 7,6 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0760 064 | % 7,6 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0770 043 | % 7,7 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0770 064 | % 7,7 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0780 043 | % 7,8 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0780 064 | % 7,8 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0790 043 | % 7,9 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0790 064 | % 7,9 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0800 043 | % 8,0 | 43 | 53 | 91 | 8,0 | 33,60 |
| 22 0409 0800 064 | % 8,0 | 64 | 76 | 114 | 8,0 | 58,80 |
| 22 0409 0810 049 | % 8,1 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0810 080 | % 8,1 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 0820 049 | % 8,2 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0820 080 | % 8,2 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 0830 049 | % 8,3 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0830 080 | % 8,3 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 0840 049 | % 8,4 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0840 080 | % 8,4 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 0850 080 | % 8,5 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 0870 049 | % 8,7 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0870 080 | % 8,7 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 0880 049 | % 8,8 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0880 080 | % 8,8 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 0890 049 | % 8,9 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0890 080 | % 8,9 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 0900 049 | % 9,0 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0900 080 | % 9,0 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 0910 049 | % 9,1 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0910 080 | % 9,1 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 0920 049 | % 9,2 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0930 049 | % 9,3 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0930 080 | % 9,3 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 0940 049 | % 9,4 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0940 080 | % 9,4 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 0950 049 | % 9,5 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0960 049 | % 9,6 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0960 080 | % 9,6 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 0970 049 | % 9,7 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0970 080 | % 9,7 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 0980 049 | % 9,8 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0980 080 | % 9,8 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 0990 049 | % 9,9 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 0990 080 | % 9,9 | 80 | 95 | 142 | 10,0 | 78,60 |
| 22 0409 1000 049 | % 10,0 | 49 | 61 | 103 | 10,0 | 38,40 |
| 22 0409 1000 080 | % 10,0 | 80 | 95 | 142 | 10,0 | 79,09 |
| 22 0409 1010 056 | % 10,1 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1010 096 | % 10,1 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1020 056 | % 10,2 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1020 096 | % 10,2 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1030 056 | % 10,3 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1030 096 | % 10,3 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1040 056 | % 10,4 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1040 096 | % 10,4 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1050 056 | % 10,5 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1050 096 | % 10,5 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1060 056 | % 10,6 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1060 096 | % 10,6 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1070 056 | % 10,7 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1070 096 | % 10,7 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1080 056 | % 10,8 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1080 096 | % 10,8 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1090 056 | % 10,9 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1090 096 | % 10,9 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1100 056 | % 11,0 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1100 096 | % 11,0 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1110 056 | % 11,1 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1110 096 | % 11,1 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1120 056 | % 11,2 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1120 096 | % 11,2 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1130 056 | % 11,3 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1130 096 | % 11,3 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1140 056 | % 11,4 | 56 | 71 | 118 | 12,0 | 54,60 |

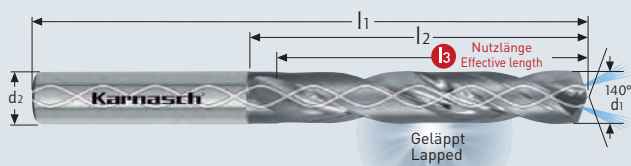
| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|-----|-----|-----|-------|--------|
| 22 0409 1140 096 | % 11,4 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1150 056 | % 11,5 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1150 096 | % 11,5 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1160 056 | % 11,6 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1160 096 | % 11,6 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1170 056 | % 11,7 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1170 096 | % 11,7 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1180 056 | % 11,8 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1180 096 | % 11,8 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1190 056 | % 11,9 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1190 096 | % 11,9 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1200 056 | % 12,0 | 56 | 71 | 118 | 12,0 | 54,60 |
| 22 0409 1200 096 | % 12,0 | 96 | 114 | 162 | 12,0 | 106,80 |
| 22 0409 1250 060 | % 12,5 | 60 | 77 | 124 | 14,0 | 73,20 |
| 22 0409 1250 112 | % 12,5 | 112 | 133 | 178 | 14,0 | 152,40 |
| 22 0409 1280 060 | % 12,8 | 60 | 77 | 124 | 14,0 | 73,20 |
| 22 0409 1280 112 | % 12,8 | 112 | 133 | 178 | 14,0 | 152,40 |
| 22 0409 1300 060 | % 13,0 | 60 | 77 | 124 | 14,0 | 73,20 |
| 22 0409 1300 112 | % 13,0 | 112 | 133 | 178 | 14,0 | 152,40 |
| 22 0409 1350 060 | % 13,5 | 60 | 77 | 124 | 14,0 | 73,20 |
| 22 0409 1350 112 | % 13,5 | 112 | 133 | 178 | 14,0 | 152,40 |
| 22 0409 1380 060 | % 13,8 | 60 | 77 | 124 | 14,0 | 73,20 |
| 22 0409 1380 112 | % 13,8 | 112 | 133 | 178 | 14,0 | 152,40 |
| 22 0409 1400 060 | % 14,0 | 60 | 77 | 124 | 14,0 | 73,20 |
| 22 0409 1400 112 | % 14,0 | 112 | 133 | 178 | 14,0 | 152,40 |
| 22 0409 1450 063 | % 14,5 | 63 | 83 | 133 | 16,0 | 97,80 |
| 22 0409 1450 128 | % 14,5 | 128 | 152 | 203 | 16,0 | 200,40 |
| 22 0409 1480 063 | % 14,8 | 63 | 83 | 133 | 16,0 | 97,80 |
| 22 0409 1480 128 | % 14,8 | 128 | 152 | 203 | 16,0 | 200,40 |
| 22 0409 1500 063 | % 15,0 | 63 | 83 | 133 | 16,0 | 97,80 |
| 22 0409 1500 128 | % 15,0 | 128 | 152 | 203 | 16,0 | 200,40 |
| 22 0409 1550 128 | % 15,5 | 128 | 152 | 203 | 16,0 | 200,40 |
| 22 0409 1600 063 | % 16,0 | 63 | 83 | 133 | 16,0 | 97,80 |
| 22 0409 1600 128 | % 16,0 | 128 | 152 | 203 | 16,0 | 200,40 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



22 0410

VHM-Hochleistungsbohrer mit Innenkühlung für INCONEL
Solid carbide high performance twist drill with interior cooling for INCONEL



| | |
|------------------------|--------------------------|
| MICRO GRAIN | DIN 6537 5xD |
| SPEZIAL SPECIAL | DIN 6535 Form HAK |
| | |
| | HSC HPC |
| | GELÄPPT LAPPED |
| | |

Empfohlene Schnittdaten / Recommended cutting data

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit Closeness | Schnittgeschwindigkeit Cutting speed Vc m/min | Vorschub pro Umdrehung Feed per revolution mm | | |
|-----------------------------------|---|--|---|---|-------------|-------------|
| | | | | Ø3 - Ø5 | Ø5 - Ø8 | Ø8 - Ø12 |
| 5.1 5.2 5.3 | Nickel 100% Nickel-Legierung / Nickel alloy Nickel-Legierung / Nickel alloy | <900 N/mm ² >900 N/mm ² | 25-35 | 0,04 - 0,09 | 0,06 - 0,16 | 0,13 - 0,22 |

Schnittdaten
Cutting data

Zeichnungen
Drawings

| | |
|-----|----------|
| | |
| 266 | DXF/STEP |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|----|-------|--------|
| 22 0410 0300 023 | • 3,0 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0410 0320 023 | • 3,2 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0410 0330 023 | • 3,3 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0410 0340 023 | • 3,4 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0410 0350 023 | • 3,5 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0410 0370 023 | • 3,7 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0410 0380 029 | • 3,8 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0410 0390 029 | • 3,9 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0410 0400 029 | • 4,0 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0410 0420 029 | • 4,2 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0410 0430 029 | • 4,3 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0410 0450 029 | • 4,5 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0410 0465 029 | • 4,65 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0410 0480 035 | • 4,8 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0500 035 | • 5,0 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0510 035 | • 5,1 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0520 035 | • 5,2 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0530 035 | • 5,3 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0540 035 | • 5,4 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0550 035 | • 5,5 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0555 035 | • 5,55 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0560 035 | • 5,6 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0570 035 | • 5,7 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0580 035 | • 5,8 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0600 035 | • 6,0 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0410 0610 043 | • 6,1 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0620 043 | • 6,2 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0630 043 | • 6,3 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0640 043 | • 6,4 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0650 043 | • 6,5 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0660 043 | • 6,6 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0670 043 | • 6,7 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0680 043 | • 6,8 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0690 043 | • 6,9 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0700 043 | • 7,0 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0710 043 | • 7,1 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0720 043 | • 7,2 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0730 043 | • 7,3 | 43 | 53 | 91 | 8 | 134,00 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|-----|-------|--------|
| 22 0410 0740 043 | • 7,4 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0750 043 | • 7,5 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0760 043 | • 7,6 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0780 043 | • 7,8 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0790 043 | • 7,9 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0800 043 | • 8,0 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0410 0810 049 | • 8,1 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0820 049 | • 8,2 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0830 049 | • 8,3 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0840 049 | • 8,4 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0850 049 | • 8,5 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0860 049 | • 8,6 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0870 049 | • 8,7 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0880 049 | • 8,8 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0890 049 | • 8,9 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0900 049 | • 9,0 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0910 049 | • 9,1 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0920 049 | • 9,2 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0930 049 | • 9,3 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0950 049 | • 9,5 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0960 049 | • 9,6 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0970 049 | • 9,7 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 0980 049 | • 9,8 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 1000 049 | • 10,0 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0410 1010 056 | • 10,1 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1020 056 | • 10,2 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1030 056 | • 10,3 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1050 056 | • 10,5 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1060 056 | • 10,6 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1070 056 | • 10,7 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1080 056 | • 10,8 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1090 056 | • 10,9 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1100 056 | • 11,0 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1120 056 | • 11,2 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1150 056 | • 11,5 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1180 056 | • 11,8 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0410 1200 056 | • 12,0 | 56 | 69 | 116 | 12 | 276,00 |

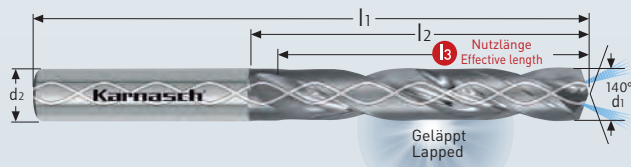
VHM-Hochleistungsbohrer mit Innenkühlung für **TITAN**

Solid carbide high performance twist drill with interior cooling for **TITANIUM**



22 0412

- TITAN
titanium
- TITAN
titanium
< 1200 N/mm²
- TITAN
GRADE 1
TITANIUM GRADE 1
- TITAN
GRADE 2
TITANIUM GRADE 2
- TITAN
GRADE 3
TITANIUM GRADE 3
- TITAN
GRADE 4
TITANIUM GRADE 4
- TITAN
GRADE 5
TITANIUM GRADE 5
- TITAN
GRADE 12
TITANIUM GRADE 12



| | |
|------------------------|--------------------------|
| MICRO GRAIN | DIN 6537 5xD |
| SPEZIAL SPECIAL | DIN 6535 Form HAK |
| | |
| | HSC HPC |
| | GELÄPPT LAPPED |
| | |

Empfohlene Schnittdaten / Recommended cutting data

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit Closeness | Schnitt- geschwindigkeit Cutting speed Vc m/min | Vorschub pro Umdrehung Feed per revolution mm | | |
|-----------------------------------|---|--|--|---|-------------|-------------|
| | | | | Ø3 - Ø5 | Ø5 - Ø8 | Ø8 - Ø12 |
| 4.1 4.2 4.3 | Reintitan / Pure Titanium 3.7105-3.7115-3.7124 3.7154-3.7164-3.7124 | <900 N/mm ² >900 N/mm ² | 30-45 | 0,10 - 0,17 | 0,14 - 0,26 | 0,20 - 0,40 |

Schnittdaten
Cutting data

Zeichnungen
Drawings

267

DXF/STEP

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|----|-------|--------|
| 22 0412 0300 023 | • 3,0 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0412 0320 023 | • 3,2 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0412 0330 023 | • 3,3 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0412 0340 023 | • 3,4 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0412 0350 023 | • 3,5 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0412 0370 023 | • 3,7 | 23 | 28 | 66 | 6 | 123,00 |
| 22 0412 0380 029 | • 3,8 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0412 0390 029 | • 3,9 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0412 0400 029 | • 4,0 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0412 0420 029 | • 4,2 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0412 0430 029 | • 4,3 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0412 0450 029 | • 4,5 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0412 0465 029 | • 4,65 | 29 | 36 | 74 | 6 | 123,00 |
| 22 0412 0480 035 | • 4,8 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0500 035 | • 5,0 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0510 035 | • 5,1 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0520 035 | • 5,2 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0530 035 | • 5,3 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0540 035 | • 5,4 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0550 035 | • 5,5 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0555 035 | • 5,55 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0560 035 | • 5,6 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0570 035 | • 5,7 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0580 035 | • 5,8 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0600 035 | • 6,0 | 35 | 44 | 82 | 6 | 123,00 |
| 22 0412 0610 043 | • 6,1 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0620 043 | • 6,2 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0630 043 | • 6,3 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0640 043 | • 6,4 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0650 043 | • 6,5 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0660 043 | • 6,6 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0670 043 | • 6,7 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0680 043 | • 6,8 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0690 043 | • 6,9 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0700 043 | • 7,0 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0710 043 | • 7,1 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0720 043 | • 7,2 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0730 043 | • 7,3 | 43 | 53 | 91 | 8 | 134,00 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|-----|-------|--------|
| 22 0412 0740 043 | • 7,4 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0750 043 | • 7,5 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0760 043 | • 7,6 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0780 043 | • 7,8 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0790 043 | • 7,9 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0800 043 | • 8,0 | 43 | 53 | 91 | 8 | 134,00 |
| 22 0412 0810 049 | • 8,1 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0820 049 | • 8,2 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0830 049 | • 8,3 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0840 049 | • 8,4 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0850 049 | • 8,5 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0860 049 | • 8,6 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0870 049 | • 8,7 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0880 049 | • 8,8 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0890 049 | • 8,9 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0900 049 | • 9,0 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0910 049 | • 9,1 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0920 049 | • 9,2 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0930 049 | • 9,3 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0950 049 | • 9,5 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0960 049 | • 9,6 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0970 049 | • 9,7 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 0980 049 | • 9,8 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 1000 049 | • 10,0 | 49 | 61 | 103 | 10 | 203,00 |
| 22 0412 1010 056 | • 10,1 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1020 056 | • 10,2 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1030 056 | • 10,3 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1050 056 | • 10,5 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1060 056 | • 10,6 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1070 056 | • 10,7 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1080 056 | • 10,8 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1090 056 | • 10,9 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1100 056 | • 11,0 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1120 056 | • 11,2 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1150 056 | • 11,5 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1180 056 | • 11,8 | 56 | 69 | 116 | 12 | 276,00 |
| 22 0412 1200 056 | • 12,0 | 56 | 69 | 116 | 12 | 276,00 |

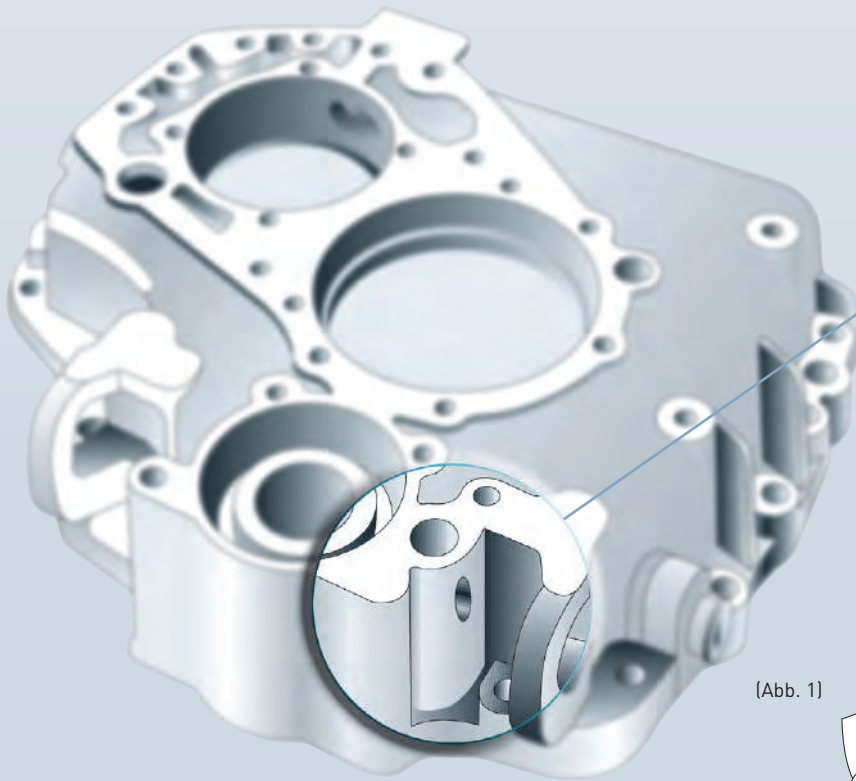
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22 0419

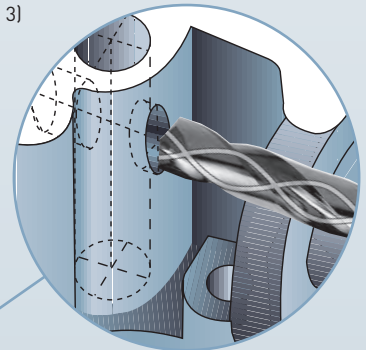
IQ-DRILL 4-Fasen Bohrer für H7- Bohrung 5xD und 8xD mit/ohne Innenkühlung. Wir optimieren Ihre Fertigung. IQ-DRILL 4-chamfer 5xD and 8xD with/without interior cooling supply. We optimize your production.

22 0424

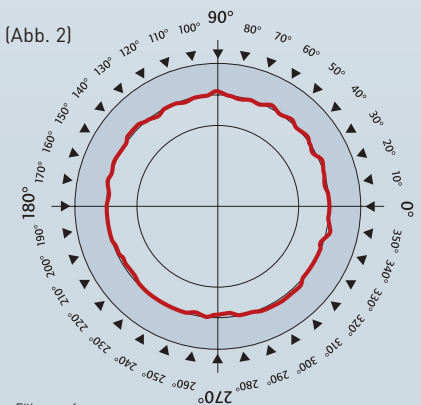
22 0425



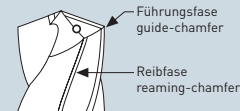
(Abb. 3)



(Abb. 2)



(Abb. 1)



1 Diese Neuentwicklung aus unserem Hause erfüllt höchste Anforderungen an die Bohrungsqualität. Auf Reiboperationen kann in vielen Fällen verzichtet werden.

This new development from Karnasch meets highest demands on drill quality. Reaming after drilling is often not necessary any more.

2 4 Fasen optimal am Bohrumfang positioniert (Abb. 1) erschließen neue Anwendungen. Diese zusätzlichen Führungsfasen stabilisieren bereits in der Anbohrfase entscheidend das weitere Bohrverhalten.

4 chamfer are optimal ajustet on the drill-diameter (see picture 1) develops new application. This additional guide-chamfer stabilizes already on the very beginning of drilling and is responsible for the further drilling process.

3 Mit IQ-Drill garantieren wir eine maximale Fluchtungsgenauigkeit (Abb. 2) und Koaxialität bei extremen Bohrtiefen besonders über 5xD Bohrtiefe.

IQ-Drill guarantees maximal alignment accuracy (see picture 2) and coaxiality in particular for drilling depths exceeding 5xD.

4 Durch das einzigartige Eigenzentrierverhalten, auch bei unterbrochenem Schnitt, (Abb. 3) bleibt die Rundheit und Fluchtungsgenauigkeit mit IQ-Drill nahezu konstant.

Because of the extraordinary self-centering-ability, also by interrupting drill holes (see picture 3), the alignment and concentricity stays almost constant.

5 Vorteile beim Einsatz mit IQ-Drill · Advantages IQ-Drill:

- kein Anzentrieren / no center drilling
- kein Vorbohren / no predrilling
- kein Aufbohren / no counterboring
- keine Bohrbuchse / no drill bushing
- hohe Oberflächenqualität / Reibqualität
- high surface quality / reamer quality
- hohe Fluchtungsgenauigkeit / high alignment accuracy
- Toleranz H7 / tolerance H7

| H7 | Bohrungstoleranz / Hole tolerance | | |
|------|-----------------------------------|-------|-----------|
| 3-6 | -0/+0,012 | 10-18 | -0/+0,018 |
| 6-10 | -0/+0,015 | 18-30 | -0/+0,021 |

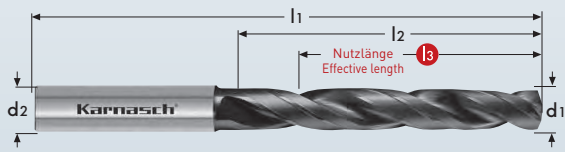
| m7 | Bohrertoleranz / Drill tolerance | | |
|------|----------------------------------|-------|--------|
| 3-6 | +0,004 | 10-18 | +0,007 |
| | +0,016 | | +0,025 |
| 6-10 | +0,006 | 18-30 | +0,008 |
| | +0,021 | | +0,029 |

IQ-DRILL Vollhartmetall-Hochleistungsbohrer für Bohrung H7, 4 Fasenbohrer
Solid carbide twist IQ-drill for drill hole tolerances H7, 4 chamfer drill



22 0419

- UNI
- STAHL
steel
- INOX
Edelstahl
STAINLESS STEEL
- GJL
- GJS
- GTW
GTS
- kurz-
spanend
short chip



| H7 | Bohrungstoleranz Hole tolerance | | | |
|------|------------------------------------|-------|-----------|--|
| 3-6 | -0/+0,012 | 10-18 | -0/+0,018 | |
| 6-10 | -0/+0,015 | 18-30 | -0/+0,021 | |

| Art. | d1 H7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|--------|----|----|-----|-------|--------|
| 22 0419 0300 023 | • 3,0 | 23 | 28 | 66 | 6,0 | 63,00 |
| 22 0419 0400 029 | • 4,0 | 29 | 36 | 74 | 6,0 | 63,00 |
| 22 0419 0500 035 | • 5,0 | 35 | 44 | 82 | 6,0 | 63,00 |
| 22 0419 0600 035 | • 6,0 | 35 | 44 | 82 | 6,0 | 63,00 |
| 22 0419 0800 043 | • 8,0 | 43 | 53 | 91 | 8,0 | 75,00 |
| 22 0419 1000 049 | • 10,0 | 49 | 61 | 103 | 10,0 | 81,00 |
| 22 0419 1200 056 | • 12,0 | 56 | 71 | 118 | 12,0 | 118,00 |

Zwischenabmessungen sind kurzfristig lieferbar
Intermediate sizes are available at short notice

| | |
|--------------------|-------------------------|
| MICRO GRAIN | DIN 6537 |
| N | DIN 6535 Form HA |
| | |
| | HSC HPC |
| | XFN-2 NANO |
| | |

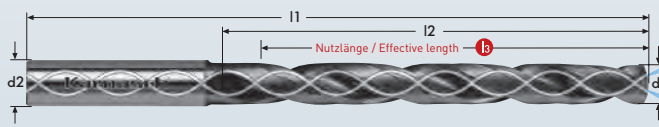
| | |
|------------------------------|-------------------------|
| Schnittdaten Cutting data | Zeichnungen Drawings |
| | |
| 1252 | DXF/STEP |

IQ-DRILL Vollhartmetall-Hochleistungsbohrer für Bohrung H7, 4 Fasen
Solid carbide twist IQ-drill for drill hole tolerances H7, 4 chamfer drill



22 0425

- UNI
- STAHL
steel
- INOX
Edelstahl
STAINLESS STEEL
- GJL
- GJS
- GTW
GTS
- kurz-
spanend
short chip



| H7 | Bohrungstoleranz Hole tolerance | | | |
|------|------------------------------------|-------|-----------|--|
| 3-6 | -0/+0,012 | 10-18 | -0/+0,018 | |
| 6-10 | -0/+0,015 | 18-30 | -0/+0,021 | |

| Art. | d1 H7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------|----|----|-----|-------|-------|
| 22 0425 0800 064 | • 8,0 | 64 | 76 | 114 | 8,0 | 60,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| | |
|--------------------|--------------------------|
| MICRO GRAIN | DIN 6537 |
| N | DIN 6535 Form HAK |
| | |
| | HSC HPC |
| | XFN-2 NANO |
| | |

| |
|------------------------------|
| Schnittdaten Cutting data |
| |
| 1252 |

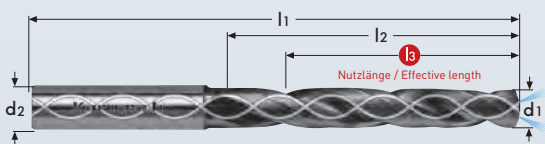
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- 5
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Index

22 0424

IQ-DRILL

Vollhartmetall-Hochleistungsbohrer für Bohrungen H7, Übermaß und Untermaß, 4 Fasen
Solid carbide twist IQ-drill for drill hole tolerances H7, 4 chamfer drill



| | |
|--------------------|--------------------------|
| MICRO GRAIN | DIN 6537 |
| N | DIN 6535 Form HAK |
| | |
| | HSC HPC |
| | XFN-2 NANO |
| | |

UNI

STAHL
steel
< 1000 N/mm²

HRC < 52

INOX
stainless steel
< 900 N/mm² ferritic

GJL

GJS

GTW GTS

kurz-spanend
short chip

| Art. | d1 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-----------------------|----|----|-----|-------|--------|
| 22 0424 0298 023 | • 2,98 -0,002/+0,004 | 23 | 28 | 66 | 6 | 137,00 |
| 22 0424 0299 023 | • 2,99 -0,002/+0,004 | 23 | 28 | 66 | 6 | 137,00 |
| 22 0424 0300 023 | • 3,00 H7 | 23 | 28 | 66 | 6 | 137,00 |
| 22 0424 0301 023 | • 3,01 -0,002/+0,004 | 23 | 28 | 66 | 6 | 137,00 |
| 22 0424 0302 023 | • 3,02 -0,002/+0,004 | 23 | 28 | 66 | 6 | 137,00 |
| 22 0424 0398 029 | • 3,98 -0,002/+0,004 | 29 | 36 | 74 | 6 | 137,00 |
| 22 0424 0399 029 | • 3,99 -0,002/+0,004 | 29 | 36 | 74 | 6 | 137,00 |
| 22 0424 0400 029 | • 4,00 H7 | 29 | 36 | 74 | 6 | 137,00 |
| 22 0424 0401 029 | • 4,01 -0,002/+0,004 | 29 | 36 | 74 | 6 | 137,00 |
| 22 0424 0402 029 | • 4,02 -0,002/+0,004 | 29 | 36 | 74 | 6 | 137,00 |
| 22 0424 0498 035 | • 4,98 -0,002/+0,004 | 35 | 44 | 82 | 6 | 137,00 |
| 22 0424 0499 035 | • 4,99 -0,002/+0,004 | 35 | 44 | 82 | 6 | 137,00 |
| 22 0424 0500 035 | • 5,00 H7 | 35 | 44 | 82 | 6 | 137,00 |
| 22 0424 0501 035 | • 5,01 -0,002/+0,004 | 35 | 44 | 82 | 6 | 137,00 |
| 22 0424 0502 035 | • 5,02 -0,002/+0,004 | 35 | 44 | 82 | 6 | 137,00 |
| 22 0424 0598 035 | • 5,98 -0,002/+0,004 | 35 | 44 | 82 | 6 | 137,00 |
| 22 0424 0599 035 | • 5,99 -0,002/+0,004 | 35 | 44 | 82 | 6 | 137,00 |
| 22 0424 0600 035 | • 6,00 H7 | 35 | 44 | 82 | 6 | 137,00 |
| 22 0424 0601 035 | • 6,01 -0,002/+0,004 | 35 | 44 | 82 | 6 | 135,00 |
| 22 0424 0602 035 | • 6,02 -0,002/+0,004 | 35 | 44 | 82 | 6 | 135,00 |
| 22 0424 0700 043 | • 7,00 H7 | 43 | 53 | 91 | 8 | 175,00 |
| 22 0424 0798 043 | • 7,98 -0,002/+0,004 | 43 | 53 | 91 | 8 | 175,00 |
| 22 0424 0799 043 | • 7,99 -0,002/+0,004 | 43 | 53 | 91 | 8 | 175,00 |
| 22 0424 0800 043 | • 8,00 H7 | 43 | 53 | 91 | 8 | 175,00 |
| 22 0424 0801 043 | • 8,01 -0,002/+0,004 | 43 | 53 | 91 | 8 | 175,00 |
| 22 0424 0802 043 | • 8,02 -0,002/+0,004 | 43 | 53 | 91 | 8 | 175,00 |
| 22 0424 0900 049 | • 9,00 H7 | 49 | 61 | 103 | 10 | 198,00 |
| 22 0424 0998 049 | • 9,98 -0,002/+0,004 | 49 | 61 | 103 | 10 | 198,00 |
| 22 0424 0999 049 | • 9,99 -0,002/+0,004 | 49 | 61 | 103 | 10 | 198,00 |
| 22 0424 1000 049 | • 10,00 H7 | 49 | 61 | 103 | 10 | 198,00 |
| 22 0424 1001 049 | • 10,01 -0,002/+0,004 | 49 | 61 | 103 | 10 | 198,00 |
| 22 0424 1002 049 | • 10,02 -0,002/+0,004 | 49 | 61 | 103 | 10 | 198,00 |
| 22 0424 1100 056 | • 11,00 H7 | 56 | 71 | 118 | 12 | 255,00 |
| 22 0424 1200 056 | • 12,00 H7 | 56 | 71 | 118 | 12 | 255,00 |

Schnittdaten
Cutting data

Zeichnungen
Drawings

270

DXF/STEP

| H7 | Bohrungstoleranz Hole tolerance |
|---------|------------------------------------|
| > 3-6 | -0,000 +0,012 |
| > 6-10 | -0,000 +0,015 |
| > 10-18 | -0,000 +0,018 |
| > 18-30 | -0,000 +0,021 |

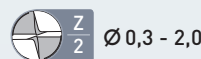
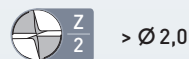
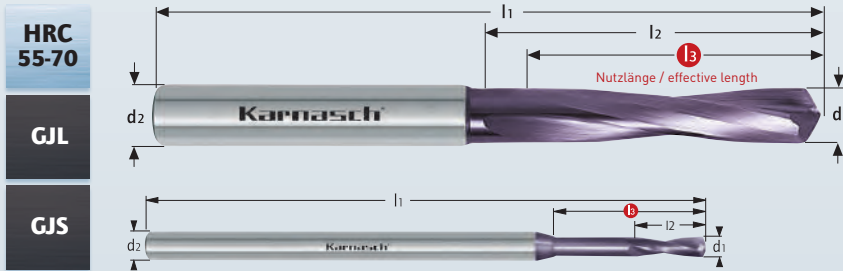
Richtwerte für den Einsatz der KARNASCH VHM-Hochleistungsbohrer mit Innenkühlung
Recommended cutting data for solid carbide twist drill, with interior cooling supply

| Werkstoffgruppe Material group | Werkstoff | Festigkeit N/mm ² | Schnittgeschwindigkeit Vc m/min ±10% | Ø 2,98 - Ø 5,02 | | Ø 5,98 - Ø 9,00 | | | Ø 9,98 - Ø 12,0 | | | |
|-----------------------------------|-----------|---------------------------------|--|-----------------|-----------------------|-----------------|----------|-----------------------|-----------------|----------|-----------------------|------------|
| | | | | f = mm/U | n = min ⁻¹ | f = mm/min | f = mm/U | n = min ⁻¹ | f = mm/min | f = mm/U | n = min ⁻¹ | f = mm/min |
| 1.1 | 36Mn 6 | < 450 | 110 | 0,18 | 7.000 | 1.260 | 0,24 | 4.200 | 1.000 | 0,30 | 3.100 | 930 |
| 1.2 | CM45 | <650 | 90 | 0,18 | 6.500 | 1.170 | 0,24 | 3.800 | 920 | 0,30 | 2.700 | 810 |
| 1.3 | 24CrMo5 | <850 | 110 | 0,18 | 7.000 | 1.260 | 0,24 | 4.200 | 1.000 | 0,30 | 3.100 | 930 |
| 1.4 | 43CrMo4 | <950 | 90 | 0,18 | 6.500 | 1.170 | 0,24 | 3.800 | 920 | 0,30 | 2.700 | 810 |
| 2.1 | 21MnCr5 | <600 | 80 | 0,15 | 5.400 | 800 | 0,22 | 3.200 | 700 | 0,28 | 2.300 | 650 |
| 2.2 | 26CrMo4 | <950 | 80 | 0,16 | 5.400 | 870 | 0,22 | 3.200 | 700 | 0,28 | 2.300 | 650 |
| 2.3 | 41CrALMo7 | <1.100 | 60 | 0,15 | 4.200 | 630 | 0,20 | 2.600 | 520 | 0,26 | 1.800 | 470 |
| 2.5 | 34CrALS5 | <1.000 | 80 | 0,15 | 5.400 | 800 | 0,20 | 3.200 | 640 | 0,26 | 2.300 | 600 |
| 2.6 | 31CrMoV9 | >1.000 | 80 | 0,15 | 5.400 | 800 | 0,20 | 3.200 | 640 | 0,26 | 2.300 | 600 |
| 3.1 | X36CrMo17 | <700-1.000 | 45 | 0,08 | 2.800 | 220 | 0,12 | 1.700 | 200 | 0,18 | 1.000 | 180 |
| 3.2 | X12CrS13 | <700 | 45 | 0,08 | 2.800 | 220 | 0,12 | 1.700 | 200 | 0,18 | 1.000 | 180 |
| 7.1 | GG15 | <260 HB | 110 | 0,24 | 8.000 | 1.900 | 0,30 | 5.200 | 1.550 | 0,40 | 3.400 | 1.350 |
| 7.2 | GG40 | <200 HB | 90 | 0,24 | 6.700 | 1.600 | 0,30 | 4.200 | 1.250 | 0,40 | 2.800 | 1.120 |
| 7.3 | GG650 | <250 HB | 80 | 0,20 | 6.400 | 1.300 | 0,25 | 4.000 | 1.000 | 0,35 | 2.600 | 910 |
| 7.4 | GG670 | <250 HB | 70 | 0,10 | 4.800 | 480 | 0,12 | 3.000 | 360 | 0,15 | 2.000 | 300 |

Vollhartmetall-Hochleistungsbohrer 55-70 HRC
Solid carbide twist drill 55-70 HRC

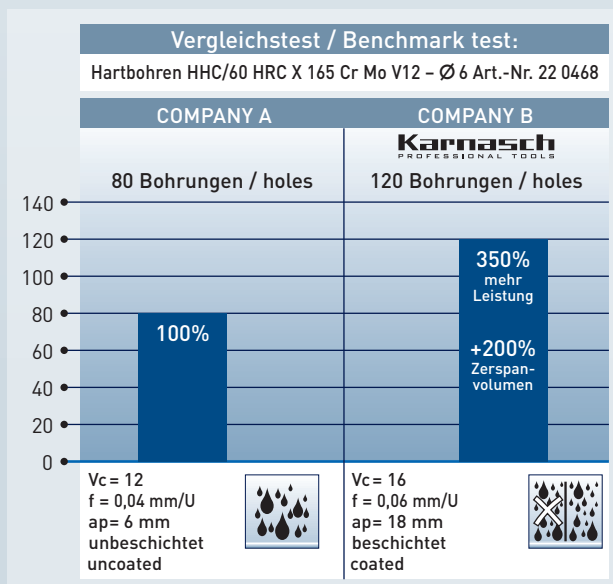


22 0468



- HRC 55-70**
- GJL**
- GJS**
- GTW GTS**

kurzspanend
short chip



| | |
|--------------------|-------------------------|
| MICRO GRAIN | KARNASCH NORM |
| H | DIN 6535 Form HA |
| | |
| | HHC |
| | DVC-X1 |
| | |

Schnittdaten Cutting data **1254**

Zeichnungen Drawings **DXF/STEP**

| Art. | d1 m7 | l3 | d2 h6 | l1 | l2 | € |
|--------------|----------------|-----|-------|----|-----|-------|
| 22 0468 0030 | • 0,3 | 2,5 | 3 | 38 | 0,9 | 74,00 |
| 22 0468 0040 | • 0,4 | 3 | 3 | 38 | 1,2 | 74,00 |
| 22 0468 0050 | • 0,5 | 4 | 3 | 38 | 1,5 | 74,00 |
| 22 0468 0060 | • 0,6 | 4,5 | 3 | 38 | 1,8 | 74,00 |
| 22 0468 0070 | • 0,7 | 5,5 | 3 | 38 | 2,1 | 74,00 |
| 22 0468 0080 | • 0,8 | 6,5 | 3 | 38 | 2,4 | 74,00 |
| 22 0468 0090 | • 0,9 | 7,5 | 3 | 38 | 2,7 | 74,00 |
| 22 0468 0100 | • 1,0 | 8 | 3 | 38 | 3,0 | 74,00 |
| 22 0468 0110 | • 1,1 | 8 | 3 | 50 | 3,3 | 78,00 |
| 22 0468 0120 | • 1,2 | 10 | 3 | 50 | 3,6 | 78,00 |
| 22 0468 0130 | • 1,3 | 12 | 3 | 50 | 3,9 | 78,00 |
| 22 0468 0140 | • 1,4 | 12 | 3 | 50 | 4,2 | 78,00 |
| 22 0468 0150 | • 1,5 | 12 | 3 | 50 | 4,5 | 78,00 |
| 22 0468 0160 | • 1,6 | 15 | 3 | 50 | 4,8 | 78,00 |
| 22 0468 0170 | • 1,7 | 15 | 3 | 50 | 5,1 | 78,00 |
| 22 0468 0180 | • 1,8 | 15 | 3 | 50 | 5,4 | 78,00 |
| 22 0468 0190 | • 1,9 | 15 | 3 | 50 | 5,8 | 78,00 |
| 22 0468 0200 | • 2,0 | 16 | 3 | 50 | 6,0 | 78,00 |
| 22 0468 0260 | • 2,6/M3 x 0,5 | 6 | 3 | 46 | 16 | 64,00 |
| 22 0468 0300 | • 3,0 | 6 | 3 | 46 | 16 | 64,00 |
| 22 0468 0320 | • 3,2 | 6 | 4 | 48 | 16 | 64,00 |
| 22 0468 0330 | • 3,3 | 6 | 4 | 48 | 16 | 64,00 |
| 22 0468 0340 | • 3,4 | 10 | 4 | 50 | 20 | 64,00 |
| 22 0468 0350 | • 3,5/M4 x 0,7 | 10 | 4 | 50 | 20 | 64,00 |
| 22 0468 0380 | • 3,8 | 12 | 4 | 52 | 22 | 64,00 |
| 22 0468 0390 | • 3,9 | 12 | 4 | 52 | 22 | 64,00 |
| 22 0468 0400 | • 4,0 | 12 | 4 | 52 | 22 | 64,00 |
| 22 0468 0410 | • 4,1 | 15 | 6 | 65 | 25 | 73,50 |
| 22 0468 0420 | • 4,2 | 15 | 6 | 65 | 25 | 73,50 |
| 22 0468 0430 | • 4,3 | 15 | 6 | 68 | 28 | 73,50 |
| 22 0468 0440 | • 4,4/M5 x 0,8 | 15 | 6 | 68 | 28 | 73,50 |
| 22 0468 0450 | • 4,5 | 15 | 6 | 68 | 28 | 73,50 |
| 22 0468 0470 | • 4,7 | 15 | 6 | 68 | 28 | 73,50 |
| 22 0468 0480 | • 4,8 | 18 | 6 | 72 | 32 | 76,50 |
| 22 0468 0490 | • 4,9 | 18 | 6 | 72 | 32 | 76,50 |
| 22 0468 0500 | • 5,0 | 18 | 6 | 72 | 32 | 76,50 |
| 22 0468 0510 | • 5,1 | 18 | 6 | 72 | 32 | 76,50 |
| 22 0468 0520 | • 5,2 | 18 | 6 | 72 | 32 | 76,50 |
| 22 0468 0530 | • 5,3/M6 x 1 | 18 | 6 | 72 | 32 | 76,50 |
| 22 0468 0550 | • 5,5 | 18 | 6 | 75 | 35 | 76,50 |

| Art. | d1 m7 | l3 | d2 h6 | l1 | l2 | € |
|--------------|-------------------|----|-------|-----|----|--------|
| 22 0468 0560 | • 5,6 | 18 | 6 | 75 | 35 | 76,50 |
| 22 0468 0570 | • 5,7 | 18 | 6 | 75 | 35 | 76,50 |
| 22 0468 0580 | • 5,8 | 18 | 6 | 75 | 35 | 76,50 |
| 22 0468 0590 | • 5,9 | 18 | 6 | 75 | 35 | 76,50 |
| 22 0468 0600 | • 6,0 | 18 | 6 | 75 | 35 | 76,50 |
| 22 0468 0610 | • 6,1 | 25 | 8 | 80 | 40 | 95,50 |
| 22 0468 0640 | • 6,4 | 25 | 8 | 80 | 40 | 95,50 |
| 22 0468 0650 | • 6,5 | 25 | 8 | 80 | 40 | 95,50 |
| 22 0468 0660 | • 6,6 | 25 | 8 | 80 | 40 | 95,50 |
| 22 0468 0670 | • 6,7 | 25 | 8 | 80 | 40 | 95,50 |
| 22 0468 0680 | • 6,8 | 30 | 8 | 85 | 45 | 99,00 |
| 22 0468 0690 | • 6,9 | 30 | 8 | 85 | 45 | 99,00 |
| 22 0468 0700 | • 7,0 | 30 | 8 | 85 | 45 | 99,00 |
| 22 0468 0710 | • 7,1/M8 x 1,25 | 30 | 8 | 85 | 45 | 99,00 |
| 22 0468 0720 | • 7,2 | 30 | 8 | 85 | 45 | 99,00 |
| 22 0468 0730 | • 7,3/M8 x 1 | 30 | 8 | 85 | 45 | 99,00 |
| 22 0468 0750 | • 7,5 | 30 | 8 | 85 | 45 | 99,00 |
| 22 0468 0760 | • 7,6 | 35 | 8 | 98 | 50 | 125,50 |
| 22 0468 0780 | • 7,8 | 35 | 8 | 98 | 50 | 125,50 |
| 22 0468 0800 | • 8,0 | 35 | 8 | 98 | 50 | 125,50 |
| 22 0468 0850 | • 8,5 | 35 | 10 | 98 | 50 | 125,50 |
| 22 0468 0860 | • 8,6 | 42 | 10 | 105 | 57 | 125,50 |
| 22 0468 0880 | • 8,8/M10 x 1,5 | 42 | 10 | 105 | 57 | 125,50 |
| 22 0468 0930 | • 9,3/M10 x 1,0 | 42 | 10 | 105 | 57 | 125,50 |
| 22 0468 0950 | • 9,5 | 42 | 10 | 105 | 57 | 75,31 |
| 22 0468 0970 | • 9,7 | 45 | 10 | 111 | 63 | 125,50 |
| 22 0468 0980 | • 9,8 | 45 | 10 | 111 | 63 | 125,50 |
| 22 0468 1000 | • 10,0 | 45 | 10 | 111 | 63 | 125,50 |
| 22 0468 1020 | • 10,2 | 45 | 10 | 111 | 63 | 152,00 |
| 22 0468 1030 | • 10,3 | 45 | 10 | 111 | 63 | 152,00 |
| 22 0468 1050 | • 10,5/M12 x 1,75 | 45 | 12 | 111 | 63 | 152,00 |
| 22 0468 1080 | • 10,8/M12 x 1,5 | 50 | 12 | 111 | 63 | 154,00 |
| 22 0468 1100 | • 11,0 | 50 | 12 | 119 | 71 | 154,00 |
| 22 0468 1150 | • 11,5 | 50 | 12 | 119 | 71 | 94,80 |
| 22 0468 1190 | • 11,9 | 50 | 12 | 119 | 71 | 158,00 |
| 22 0468 1200 | • 12,0 | 50 | 12 | 119 | 71 | 158,00 |
| 22 0468 1300 | • 13,0 | 55 | 14 | 125 | 77 | 187,00 |
| 22 0468 1400 | • 14,0 | 55 | 14 | 125 | 77 | 187,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

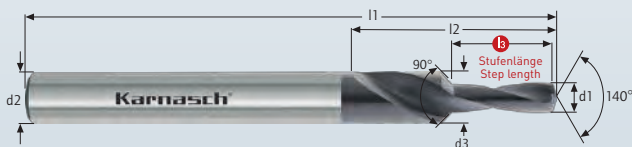
22 0471

Hochleistungs-Vollhartmetall-Stufenbohrer High capacity solid carbide twist drill



Index

- UNI
- STAHL
steel
- INOX
Edelstahl
STAINLESS STEEL
- GJL
- GJS
- GTW
GTS
- HRC
< 52
- kurz-
spanend
short chip



| Art. | Gewinde Ø | d1 m7 | d2 h6 | d3 h8 | l3 | l2 | l1 | € |
|------------|-----------|-------|-------|-------|------|----|-----|--------|
| 22 0471 04 | % M 4 | 3,3 | 6,0 | 6 | 11,4 | 24 | 62 | 24,00 |
| 22 0471 05 | % M 5 | 4,2 | 6,0 | 6 | 13,6 | 28 | 66 | 27,60 |
| 22 0471 06 | % M 6 | 5,0 | 8,0 | 8 | 16,5 | 34 | 79 | 34,20 |
| 22 0471 08 | % M 8 | 6,8 | 10,0 | 10 | 21,0 | 47 | 89 | 55,20 |
| 22 0471 10 | % M 10 | 8,5 | 12,0 | 12 | 25,5 | 55 | 102 | 67,80 |
| 22 0471 12 | % M 12 | 10,2 | 14,0 | 14 | 30,0 | 60 | 107 | 95,40 |
| 22 0471 14 | % M 14 | 12,0 | 16,0 | 16 | 34,5 | 65 | 115 | 111,60 |
| 22 0471 16 | % M 16 | 14,0 | 18,0 | 18 | 38,5 | 73 | 123 | 119,40 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.
Weitere Stufenbohrer in Qualität HSS-XE siehe Seite 274-279
More subland drills in quality HSS-XE see page 274-279

| | |
|----------------|---------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HA |
| | |
| | HSC HPC |
| | DVC-X2 |
| | |

Schnittdaten
Cutting data

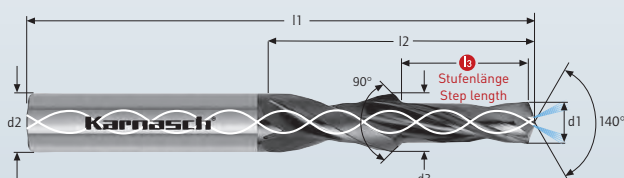
1252

22 0473

Hochleistungs-Vollhartmetall-Mehrfasen-Stufenbohrer, mit Innenkühlung High capacity Solid carbide subland twist drill, with interior cooling



- UNI
- STAHL
steel
- INOX
Edelstahl
STAINLESS STEEL
- GJL
- GJS
- GTW
GTS
- HRC
< 45
- kurz-
spanend
short chip



| Art. | Gewinde Ø | d1 m7 | d2 h6 | d3 h8 | l3 | l2 | l1 | € |
|------------|-----------|-------|-------|-------|------|----|-----|--------|
| 22 0473 04 | • M 4 | 3,3 | 6,0 | 6 | 11,4 | 24 | 62 | 70,00 |
| 22 0473 05 | • M 5 | 4,2 | 6,0 | 6 | 13,6 | 28 | 66 | 78,00 |
| 22 0473 06 | • M 6 | 5,0 | 8,0 | 8 | 16,5 | 34 | 79 | 98,00 |
| 22 0473 08 | • M 8 | 6,8 | 10,0 | 10 | 21,0 | 47 | 89 | 155,00 |
| 22 0473 10 | • M 10 | 8,5 | 12,0 | 12 | 25,5 | 55 | 102 | 189,00 |
| 22 0473 12 | • M 12 | 10,2 | 14,0 | 14 | 30,0 | 60 | 107 | 256,00 |
| 22 0473 14 | % M 14 | 12,0 | 16,0 | 16 | 34,5 | 65 | 115 | 178,20 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.
Weitere Stufenbohrer in Qualität HSS-XE siehe Seite 274-279
More subland drills in quality HSS-XE see page 274-279

| | |
|----------------|----------------------|
| MICRO GRAIN | KARNASCH NORM |
| N | DIN 6535 Form HAK |
| | |
| | HSC HPC |
| | DVC-X2 |
| | |

Schnittdaten
Cutting data

Zeichnungen
Drawings

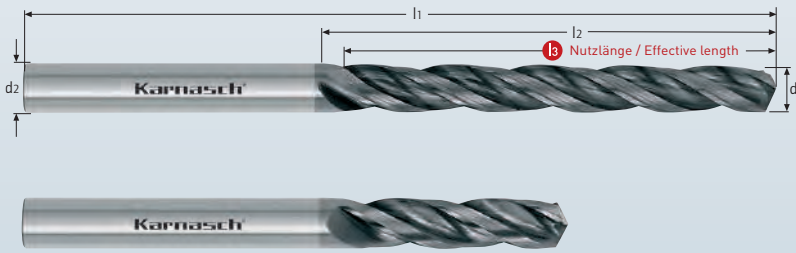
1252

Vollhartmetall-Hochleistungsbohrer und Aufbohrer, 3 Schneiden
Solid carbide twist drill/cordrill, 3 cutting edges



22 0520

- GJL
- GJS
- GTW
GTS
- GRAPHIT
graphite
- HRC
< 52
- kurz-
spanend
short chip



| Art. | d1 h7 | l3 | l2 | l1 | d2 ^{-0,002} / _{-0,005} | € |
|------------------|-------|----|-----|-----|--|-------|
| 22 0520 0300 012 | 3,0 | 12 | 16 | 46 | 3 | 13,51 |
| 22 0520 0400 017 | 4,0 | 17 | 22 | 55 | 4 | 13,51 |
| 22 0520 0400 038 | 4,0 | 38 | 43 | 75 | 4 | 14,71 |
| 22 0520 0600 021 | 6,0 | 21 | 28 | 66 | 6 | 17,40 |
| 22 0520 0600 050 | 6,0 | 50 | 57 | 93 | 6 | 23,71 |
| 22 0520 0700 026 | 7,0 | 26 | 34 | 74 | 7 | 20,40 |
| 22 0520 0800 065 | 8,0 | 65 | 75 | 117 | 8 | 37,80 |
| 22 0520 0900 029 | 9,0 | 29 | 40 | 84 | 9 | 30,00 |
| 22 0520 1000 031 | 10,0 | 31 | 44 | 90 | 10 | 37,80 |
| 22 0520 1000 075 | 10,0 | 75 | 87 | 135 | 10 | 69,60 |
| 22 0520 1200 037 | 12,0 | 37 | 50 | 102 | 12 | 65,71 |
| 22 0520 1200 088 | 12,0 | 88 | 100 | 150 | 12 | 99,31 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

MICRO GRAIN KARNASCH NORM

SPEZIAL SPECIAL DIN 6535 Form HA

30° 140°

HSC HPC

DVC-X2

Schnittdaten
Cutting data

i

1250

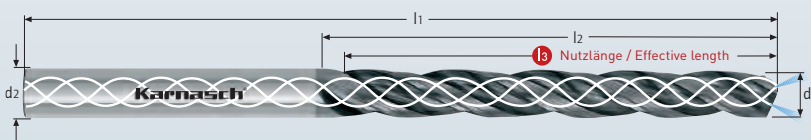


Vollhartmetall-Hochleistungsbohrer und Aufbohrer, 3 Schneiden
Solid carbide twist drill/cordrill, 3 cutting edges



22 0525

- GJL
- GJS
- GTW
GTS
- GRAPHIT
graphite
- HRC
< 52
- kurz-
spanend
short chip



| Art. | d1 h7 | l3 | l2 | l1 | d2 ^{-0,002} / _{-0,005} | € |
|------------------|-------|----|-----|-----|--|--------|
| 22 0525 0400 040 | 4,0 | 40 | 43 | 82 | 6 | 48,60 |
| 22 0525 0500 045 | 5,0 | 45 | 52 | 92 | 6 | 48,60 |
| 22 0525 0600 050 | 6,0 | 50 | 57 | 95 | 6 | 48,60 |
| 22 0525 0800 065 | 8,0 | 65 | 75 | 115 | 8 | 72,00 |
| 22 0525 1200 088 | 12,0 | 88 | 100 | 150 | 12 | 141,91 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

MICRO GRAIN KARNASCH NORM

SPEZIAL SPECIAL DIN 6535 Form HAK

30° 140°

HSC HPC

DVC-X2

Schnittdaten
Cutting data

i

1250



ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | GFK/CFK |
| < 900 N | < 900 N | | > 10% Si | | Plastics GRP/CRP |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

Zum Senken in folgende Materialien:

- Edelstähle (V2A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

Bohr- und Senkstufe sind jeweils mit eigenen Span-Nuten und Führungsfasen gefertigt. Dadurch mehrmaliges Nachschleifen möglich.

HSS-XE steel

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

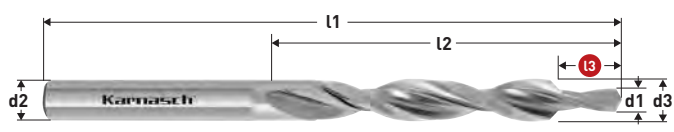
For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A)
- Steel
- Cast iron
- Non ferrous metals

Drill and counterbore each with its own chip flutes and guide chamfers. This means it can be reground many times.

40 1010

HSS-XE Mehrfasen-Stufenbohrer, DIN 8374, 90°, Gütegrad fein für Durchgangsloch
HSS-XE subland drill, DIN 8374, 90°, fine grade for through holes



| Art. | Für Gewinde For thread Ø | d1 h9 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|--------------------------|----------|----------|----------|-------|-------|-------|-------|
| 40 1010 030 | M 3 | • 3,2 | 6,0 | 6,0 | 9,0 | 57,0 | 93,0 | 23,45 |
| 40 1010 040 | M 4 | • 4,3 | 8,0 | 8,0 | 11,0 | 75,0 | 117,0 | 26,70 |
| 40 1010 050 | M 5 | • 5,3 | 10,0 | 10,0 | 13,0 | 87,0 | 133,0 | 33,80 |
| 40 1010 060 | M 6 | • 6,4 | 11,5 | 11,5 | 15,0 | 94,0 | 142,0 | 37,80 |
| 40 1010 080 | M 8 | • 8,4 | 15,0 | 15,0 | 19,0 | 114,0 | 169,0 | 62,85 |
| 40 1010 100 | M 10 | • 10,5 | 19,0 | 19,0 | 23,0 | 135,0 | 198,0 | 96,45 |

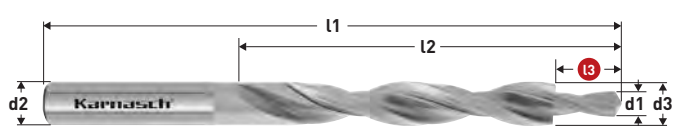


Verwendung: Für Schrauben- und Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74 Blatt 1, Form A, Gütegrad fein. Für Senkschrauben nach ISO 2009, 2010, 7046 / DIN 963, 964, 965, 966.

Use: For through holes for screws DIN-ISO 273 and countersinks to DIN 74 sheet 1, form A, fine grade. For countersunk screws to ISO 2009, 2010, 7046 / DIN 963, 964, 965, 966.

40 1020

HSS-XE Mehrfasen-Stufenbohrer, DIN 8376, 180°, Gütegrad mittel für Durchgangsloch
HSS-XE subland drill, DIN 8376, 180°, medium grade for through holes



| Art. | Für Gewinde For thread Ø | d1 h9 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|--------------------------|----------|----------|----------|-------|-------|-------|-------|
| 40 1020 030 | M 3 | • 3,4 | 6,5 | 6,5 | 9,0 | 63,0 | 101,0 | 24,85 |
| 40 1020 040 | M 4 | • 4,5 | 8,0 | 8,0 | 11,0 | 75,0 | 117,0 | 26,50 |
| 40 1020 050 | M 5 | • 5,5 | 10,0 | 10,0 | 13,0 | 87,0 | 133,0 | 31,85 |
| 40 1020 060 | M 6 | • 6,6 | 11,0 | 11,0 | 15,0 | 94,0 | 142,0 | 36,75 |
| 40 1020 080 | M 8 | • 9,0 | 15,0 | 15,0 | 19,0 | 114,0 | 169,0 | 46,70 |
| 40 1020 100 | M 10 | • 11,0 | 18,0 | 18,0 | 23,0 | 130,0 | 191,0 | 96,05 |

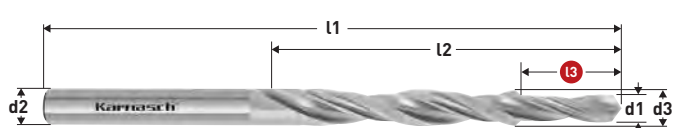


Verwendung: Für Schrauben- und Durchgangslöcher nach DIN-ISO 273 und Schraubenkopfsenkungen Form H, J, K. Gütegrad mittel nach DIN 74 Blatt 2.

Use: For screw through holes to DIN-ISO 273 and screw head counterbores shape H, J, K. Medium grade to DIN 74 sheet 2.

40 1030

HSS-XE Mehrfasen-Stufenbohrer, DIN 8378, für Kernloch, 90° Ansenkung
HSS-XE subland drill, DIN 8378, for tapping holes, 90° countersink



| Art. | Für Gewinde For thread Ø | d1 h9 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|--------------------------|----------|----------|----------|-------|-------|-------|-------|
| 40 1030 030 | M 3 | • 2,5 | 3,4 | 3,4 | 8,8 | 39,0 | 70,0 | 19,45 |
| 40 1030 040 | M 4 | • 3,3 | 4,5 | 4,5 | 11,4 | 47,0 | 80,0 | 21,10 |
| 40 1030 050 | M 5 | • 4,2 | 5,5 | 5,5 | 13,6 | 57,0 | 93,0 | 21,65 |
| 40 1030 060 | M 6 | • 5,0 | 6,6 | 6,6 | 16,5 | 63,0 | 101,0 | 24,60 |
| 40 1030 080 | M 8 | • 6,8 | 9,0 | 9,0 | 21,0 | 81,0 | 125,0 | 28,15 |
| 40 1030 100 | M 10 | • 8,5 | 11,0 | 11,0 | 25,5 | 94,0 | 142,0 | 36,10 |
| 40 1030 120 | M 12 | • 10,2 | 13,5 | 13,5 | 30,0 | 108,0 | 160,0 | 46,15 |



Verwendung: Gewindekernloch und Ansenkung werden genau fluchtend zueinander in einem Arbeitsgang gefertigt. Für Gewinde-Kernloch-Bohrungen nach DIN 336 Blatt 1 mit Ansenkungen 90° (ähnlich DIN 69, Gütegrad mittel).

Use: Tapping hole and countersink are produced in one operation. For drilling tapping holes to DIN 336 sheet 1 with 90° countersinking (similar DIN 69, medium grade).

Schnittdaten
Cutting data

Film
Movie



1319

ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 1100 N | < 900 N | | > 10% Si | | |

Bohr- und Senkstufe sind jeweils mit eigenen Span-Nuten und Führungsfasen gefertigt. Dadurch mehrmaliges Nachschleifen möglich.
 Drill and counterbore each with its own chip flutes and guide chamfers. This means it can be reground many times.

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + TITAN-TEC beschichtet
 Gefertigt aus hochlegiertem Spezialstahl „XE“ für wesentlich höhere Standzeiten gegenüber HSS-Stähle.
 TITAN-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

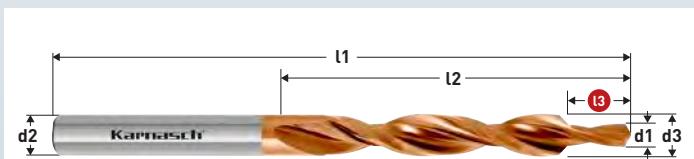
- Zum Senken in folgende Materialien:**
- Edelstähle (V2A / V4A)
 - Stahl
 - Guss
 - Bunt- und Leichtmetalle

HSS-XE steel + TITAN-TEC coated
 Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.
 TITAN-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

- For countersinking in materials:**
- High-alloyed chromium steel such as stainless (V2A / V4A)
 - Acid resistant steel
 - Steel
 - Cast iron
 - Non ferrous metals

HSS-XE + TITAN-TEC Mehrfasen-Stufenbohrer, DIN 8374, 90°, Gütegrad fein für Durchgangsloch
HSS-XE + TITAN-TEC subland drill, DIN 8374, 90°, fine grade for through holes

40 2010



| Art. | Für Gewinde Ø For thread | d1 h9 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-----------------------------|-------------|-------------|-------------|----------|----------|----------|--------|
| 40 2010 030 | M 3 | • 3,2 | 6,0 | 6,0 | 9,0 | 57,0 | 93,0 | 29,30 |
| 40 2010 040 | M 4 | • 4,3 | 8,0 | 8,0 | 11,0 | 75,0 | 117,0 | 33,35 |
| 40 2010 050 | M 5 | • 5,3 | 10,0 | 10,0 | 13,0 | 87,0 | 133,0 | 42,25 |
| 40 2010 060 | M 6 | • 6,4 | 11,5 | 11,5 | 15,0 | 94,0 | 142,0 | 47,20 |
| 40 2010 080 | M 8 | • 8,4 | 15,0 | 15,0 | 19,0 | 114,0 | 169,0 | 78,55 |
| 40 2010 100 | M 10 | • 10,5 | 19,0 | 19,0 | 23,0 | 135,0 | 198,0 | 120,55 |

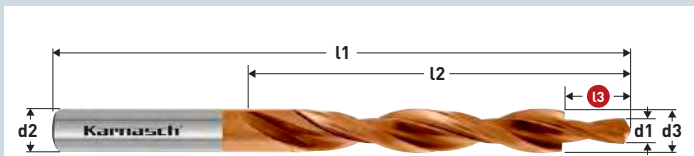
HSS-XE **90°** **TITAN-TEC** beschichtet / coated **DIN 8374** **118°** **20-30°** **Z 2**

Verwendung: Für Schrauben- und Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74 Blatt 1, Form A, Gütegrad fein. Für Senkschrauben nach ISO 2009, 2010, 7046 / DIN 963, 964, 965, 966.

Use: For through holes for screws DIN-ISO 273 and countersinks to DIN 74 sheet 1, form A, fine grade. For countersunk screws to ISO 2009, 2010, 7046 / DIN 963, 964, 965, 966.

HSS-XE + TITAN-TEC Mehrfasen-Stufenbohrer, DIN 8376, 180°, Gütegrad mittel für Durchgangsloch
HSS-XE + TITAN-TEC subland drill, DIN 8376, 180°, medium grade for through holes

40 2020



| Art. | Für Gewinde Ø For thread | d1 h9 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-----------------------------|-------------|-------------|-------------|----------|----------|----------|--------|
| 40 2020 030 | M 3 | • 3,4 | 6,5 | 6,5 | 9,0 | 63,0 | 101,0 | 31,05 |
| 40 2020 040 | M 4 | • 4,5 | 8,0 | 8,0 | 11,0 | 75,0 | 117,0 | 33,10 |
| 40 2020 050 | M 5 | • 5,5 | 10,0 | 10,0 | 13,0 | 87,0 | 133,0 | 39,80 |
| 40 2020 060 | M 6 | • 6,6 | 11,0 | 11,0 | 15,0 | 94,0 | 142,0 | 45,95 |
| 40 2020 080 | M 8 | • 9,0 | 15,0 | 15,0 | 19,0 | 114,0 | 169,0 | 58,40 |
| 40 2020 100 | M 10 | • 11,0 | 18,0 | 18,0 | 23,0 | 130,0 | 191,0 | 120,05 |

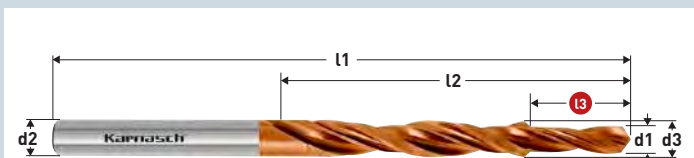
HSS-XE **180°** **TITAN-TEC** beschichtet / coated **DIN 8376** **118°** **20-30°** **Z 2**

Verwendung: Für Schrauben- und Durchgangslöcher nach DIN-ISO 273 und Schraubenkopfsenkungen Form H, J, K. Gütegrad mittel nach DIN 74 Blatt 2.

Use: For screw through holes to DIN-ISO 273 and screw head counterbores shape H, J, K. Medium grade to DIN 74 sheet 2.

HSS-XE + TITAN-TEC Mehrfasen-Stufenbohrer, DIN 8378, für Kernloch, 90° Ansenkung
HSS-XE + TITAN-TEC subland drill, DIN 8378, for tapping holes, 90° countersink

40 2030



| Art. | Für Gewinde Ø For thread | d1 h9 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-----------------------------|-------------|-------------|-------------|----------|----------|----------|-------|
| 40 2030 030 | M 3 | • 2,5 | 3,4 | 3,4 | 8,8 | 39,0 | 70,0 | 24,35 |
| 40 2030 040 | M 4 | • 3,3 | 4,5 | 4,5 | 11,4 | 47,0 | 80,0 | 26,35 |
| 40 2030 050 | M 5 | • 4,2 | 5,5 | 5,5 | 13,6 | 57,0 | 93,0 | 27,05 |
| 40 2030 060 | M 6 | • 5,0 | 6,6 | 6,6 | 16,5 | 63,0 | 101,0 | 30,70 |
| 40 2030 080 | M 8 | • 6,8 | 9,0 | 9,0 | 21,0 | 81,0 | 125,0 | 35,15 |
| 40 2030 100 | M 10 | • 8,5 | 11,0 | 11,0 | 25,5 | 94,0 | 142,0 | 45,15 |
| 40 2030 120 | M 12 | • 10,2 | 13,5 | 13,5 | 30,0 | 108,0 | 160,0 | 57,70 |

HSS-XE **90°** **TITAN-TEC** beschichtet / coated **DIN 8378** **118°** **20-30°** **Z 2**

Verwendung: Gewindekernloch und Ansenkung werden genau fluchtend zueinander in einem Arbeitsgang gefertigt. Für Gewinde-Kernloch-Bohrungen nach DIN 336 Blatt 1 mit Ansenkungen 90° (ähnlich DIN 69, Gütegrad mittel).

Use: Tapping hole and countersink are produced in one operation. For drilling tapping holes to DIN 336 sheet 1 with 90° countersinking (similar DIN 69, medium grade).

Schnittdaten
Cutting data

Film
Movie









1319

275



Index

ANWENDUNG · APPLICATION

| | | | | | |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| Stahl Steel | Edelstahl Stainless | Grauguss Grey cast iron | Alu Alu | Kupfer, Messing, Zinn Copper, brass, tin | Kunststoffe GFK/CFK Plastics GRP/CRP |
| < 900 N | < 900 N | | > 10% Si | | |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

Zum Senken in folgende Materialien:

- Edelstähle (V2A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

HSS-XE steel

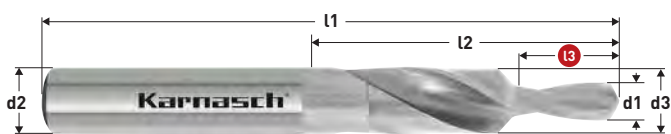
Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A)
- Steel
- Cast iron
- Non ferrous metals

40 1040

HSS-XE Kurzstufenbohrer für Durchgangsloch 90° (Senkschrauben)
HSS-XE stub subland drill for through holes 90° (countersunk screws)



| Art. | Für Gewinde Ø For thread Ø | d1 h8 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-------------------------------|-------------|-------------|-------------|----------|----------|----------|-------|
| 40 1040 030 | M 3 | • 3,2 | 6,0 | 6,0 | 9,0 | 28,0 | 66,0 | 15,45 |
| 40 1040 040 | M 4 | • 4,3 | 8,0 | 8,0 | 11,0 | 37,0 | 79,0 | 17,70 |
| 40 1040 050 | M 5 | • 5,3 | 10,0 | 10,0 | 13,0 | 43,0 | 89,0 | 22,05 |
| 40 1040 060 | M 6 | • 6,4 | 11,5 | 11,5 | 15,0 | 47,0 | 95,0 | 25,90 |
| 40 1040 080 | M 8 | • 8,4 | 15,0 | 15,0 | 19,0 | 56,0 | 111,0 | 30,25 |
| 40 1040 100 | M 10 | • 10,5 | 19,0 | 19,0 | 23,0 | 64,0 | 127,0 | 45,25 |

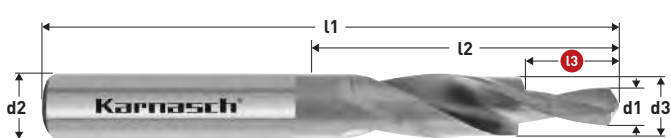


Verwendung: Besonders geeignet für NC-Maschinen, da hohe Positionsgenauigkeit, beste Zentriereigenschaft und sehr stabil. Das vorherige Zentrieren kann deshalb oft entfallen. Sehr stabile und enge Rundlauf-toleranzen zwischen Bohr- und Senkdurchmesser garantieren exakte Fluchtung. Für Schrauben-Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74, Blatt 1, Form A, Gütegrad fein. Für Schrauben nach ISO 2009, 2010, 7046, 7047 (DIN 963, 964, 965, 966).

Use: Particular suitable for NC machines due to high positional accuracy, excellent centering properties and great sturdiness. The preceding centering operation can thus often be omitted. Very sturdy and tight concentricity tolerances between drill Ø and counterbore Ø guarantee exact alignment. For through holes for screws to DIN-ISO 273 and counter-sinks to DIN 74, sheet 1 form A fine grade. For screws to ISO 2009, 2010, 7046, 7047 (DIN 963, 964, 965, 966).

40 1050

HSS-XE Kurzstufenbohrer für Durchgangsloch 180° (Zylinderkopf-Schrauben)
HSS-XE stub subland drill for through holes 180° (socket-head screws)



| Art. | Für Gewinde Ø For thread Ø | d1 h8 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-------------------------------|-------------|-------------|-------------|----------|----------|----------|-------|
| 40 1050 030 | M 3 | • 3,4 | 6,0 | 6,0 | 9,0 | 28,0 | 66,0 | 15,15 |
| 40 1050 040 | M 4 | • 4,5 | 8,0 | 8,0 | 11,0 | 37,0 | 79,0 | 17,20 |
| 40 1050 050 | M 5 | • 5,5 | 10,0 | 10,0 | 13,0 | 43,0 | 89,0 | 21,10 |
| 40 1050 060 | M 6 | • 6,6 | 11,0 | 11,0 | 15,0 | 47,0 | 95,0 | 24,55 |
| 40 1050 080 | M 8 | • 9,0 | 15,0 | 15,0 | 19,0 | 56,0 | 111,0 | 30,85 |
| 40 1050 100 | M 10 | • 11,0 | 18,0 | 18,0 | 23,0 | 62,0 | 123,0 | 47,05 |



Verwendung: Sehr stabile und enge Rundlauf-toleranzen zwischen Bohr- und Senkdurchmesser garantieren exakte Fluchtung. Für Schrauben-Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74, Blatt 2, Form H, J, K, Gütegrad mittel. Für Schrauben nach DIN 912, 6912, 7984, ISO 1207 (DIN 84).

Use: Very sturdy and tight concentricity tolerances between drill Ø and counterbore Ø guarantee exact alignment. For through holes for screws to DIN-ISO 273 and countersinking to DIN 74, sheet 2 form H, J, K, medium grade. For screws to DIN 912, 6912, 7984, ISO 1207 (DIN 84).

Schnittdaten
Cutting data

Film
Movie



1319



ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 1100 N | < 900 N | | > 10% Si | | |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + TITAN-TEC beschichtet
 Gefertigt aus hochlegiertem Spezialstahl „XE“ für wesentlich höhere Standzeiten gegenüber HSS-Stähle.
 TITAN-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

- Zum Senken in folgende Materialien:**
- Edelstahl (V2A / V4A)
 - Stahl
 - Guss
 - Bunt- und Leichtmetalle

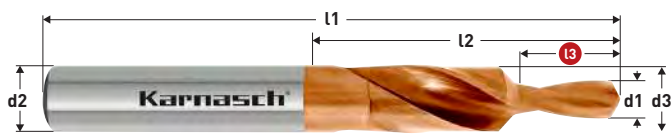
HSS-XE steel + TITAN-TEC coated
 Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel. TITAN-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

- For countersinking in materials:**
- High-alloyed chromium steel such as stainless (V2A / V4A)
 - Acid resistant steel
 - Steel
 - Cast iron
 - Non ferrous metals

HSS-XE + TITAN-TEC Kurzstufenbohrer für Durchgangsloch 90° (Senkschrauben)
HSS-XE + TITAN-TEC stub subland drill for through holes 90° (countersunk screws)



40 2040



| Art. | Für Gewinde Ø For thread Ø | d1 h8 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-------------------------------|-------------|-------------|-------------|----------|----------|----------|-------|
| 40 2040 030 | M 3 | • 3,2 | 6,0 | 6,0 | 9,0 | 28,0 | 66,0 | 19,30 |
| 40 2040 040 | M 4 | • 4,3 | 8,0 | 8,0 | 11,0 | 37,0 | 79,0 | 22,15 |
| 40 2040 050 | M 5 | • 5,3 | 10,0 | 10,0 | 13,0 | 43,0 | 89,0 | 27,55 |
| 40 2040 060 | M 6 | • 6,4 | 11,5 | 11,5 | 15,0 | 47,0 | 95,0 | 32,35 |
| 40 2040 080 | M 8 | • 8,4 | 15,0 | 15,0 | 19,0 | 56,0 | 111,0 | 37,80 |
| 40 2040 100 | M 10 | • 10,5 | 19,0 | 19,0 | 23,0 | 64,0 | 127,0 | 56,55 |



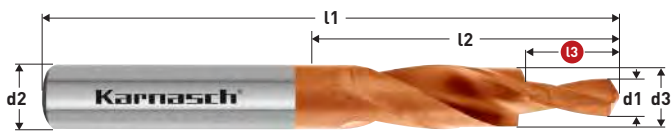
Verwendung: Besonders geeignet für NC-Maschinen, da hohe Positionsgenauigkeit, beste Zentriereigenschaft und sehr stabil. Das vorherige Zentrieren kann deshalb oft entfallen. Sehr stabile und enge Rundlauf-toleranzen zwischen Bohr- und Senkdurchmesser garantieren exakte Fluchtung. Für Schrauben-Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74, Blatt 1, Form A, Gütegrad fein. Für Schrauben nach ISO 2009, 2010, 7046, 7047 (DIN 963, 964, 965, 966).

Use: Particular suitable for NC machines due to high positional accuracy, excellent centering properties and great sturdiness. The preceding centering operation can thus often be omitted. Very sturdy and tight concentricity tolerances between drill Ø and counterbore Ø guarantee exact alignment. For through holes for screws to DIN-ISO 273 and countersinks to DIN 74, sheet 1 form A fine grade. For screws to ISO 2009, 2010, 7046, 7047 (DIN 963, 964, 965, 966)

HSS-XE + TITAN-TEC Kurzstufenbohrer für Durchgangsloch 180° (Zylinderkopf-Schrauben)
HSS-XE + TITAN-TEC stub subland drill for through holes 180° (socket-head screws)



40 2050



| Art. | Für Gewinde Ø For thread Ø | d1 h8 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-------------------------------|-------------|-------------|-------------|----------|----------|----------|-------|
| 40 2050 030 | M 3 | • 3,4 | 6,0 | 6,0 | 9,0 | 28,0 | 66,0 | 18,95 |
| 40 2050 040 | M 4 | • 4,5 | 8,0 | 8,0 | 11,0 | 37,0 | 79,0 | 21,50 |
| 40 2050 050 | M 5 | • 5,5 | 10,0 | 10,0 | 13,0 | 43,0 | 89,0 | 26,35 |
| 40 2050 060 | M 6 | • 6,6 | 11,0 | 11,0 | 15,0 | 47,0 | 95,0 | 30,70 |
| 40 2050 080 | M 8 | • 9,0 | 15,0 | 15,0 | 19,0 | 56,0 | 111,0 | 38,55 |
| 40 2050 100 | M 10 | • 11,0 | 18,0 | 18,0 | 23,0 | 62,0 | 123,0 | 58,80 |



Verwendung: Sehr stabile und enge Rundlauf-toleranzen zwischen Bohr- und Senkdurchmesser garantieren exakte Fluchtung. Für Schrauben-Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74, Blatt 2, Form H, J, K, Gütegrad mittel. Für Schrauben nach DIN 912, 6912, 7984, ISO 1207 (DIN 84).

Use: Very sturdy and tight concentricity tolerances between drill Ø and counterbore Ø guarantee exact alignment. For through holes for screws to DIN-ISO 273 and countersinking to DIN 74, sheet 2 form H, J, K, medium grade. For screws to DIN 912, 6912, 7984, ISO 1207 (DIN 84).

Schnittdaten
Cutting data



1319

Film
Movie



277



Index

ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | GFK/CFK |
| < 900 N | < 900 N | | > 10% Si | | Plastics GRP/CRP |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl „XE“ für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

Zum Senken in folgende Materialien:

- Edelstähle (V2A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

HSS-XE steel

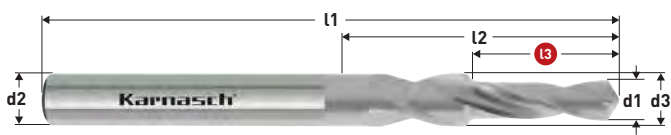
Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A)
- Steel
- Cast iron
- Non ferrous metals

40 1060

HSS-XE Kurzstufenbohrer für Kernloch, 90° Ansenkung
HSS-XE stub jobber drills for tapping holes, 90° countersink



| Art. | Für Gewinde Ø For thread | d1 h8 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|--------------------------|----------|----------|----------|-------|-------|-------|-------|
| 40 1060 030 | M 3 | • 2,5 | 3,4 | 3,4 | 8,8 | 20,0 | 52,0 | 13,65 |
| 40 1060 040 | M 4 | • 3,3 | 4,5 | 4,5 | 11,4 | 24,0 | 58,0 | 13,95 |
| 40 1060 050 | M 5 | • 4,2 | 5,5 | 5,5 | 13,6 | 28,0 | 66,0 | 14,90 |
| 40 1060 060 | M 6 | • 5,0 | 6,6 | 6,6 | 16,5 | 31,0 | 70,0 | 15,50 |
| 40 1060 080 | M 8 | • 6,8 | 9,0 | 9,0 | 21,0 | 40,0 | 84,0 | 18,30 |
| 40 1060 100 | M 10 | • 8,5 | 11,0 | 11,0 | 25,5 | 47,0 | 95,0 | 23,50 |
| 40 1060 120 | M 12 | • 10,2 | 13,5 | 13,5 | 30,0 | 54,0 | 107,0 | 30,20 |



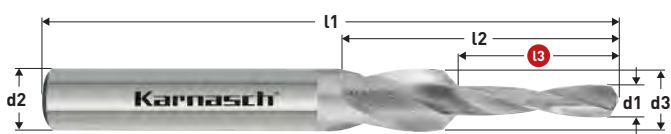
Verwendung: Bohrung und Senkung werden in einem Arbeitsgang genau fluchtend zueinander gefertigt. Daher sehr stabile und enge Rundlauf toleranzen.

Besonders geeignet für NC-Maschinen, da hohe Positionsgenauigkeit, beste Zentriereigenschaft und sehr stabil. Das vorherige Zentrieren kann deshalb oft entfallen. Für Gewindekernlochbohrungen nach DIN 336 Blatt 1 mit Ansenkung 90°. Der nachfolgende Gewindebohrer schneidet dadurch nicht an der scharfen Bohrkante an.

Use: Hole and countersink are produced in one operation and precisely aligned. Therefore very sturdy and tight concentricity tolerances. Particular suitable for NC machines due to high positional accuracy, excellent centering properties and great sturdiness. The preceding centering operation can thus often be omitted. For thread tapping drill holes to DIN 336 sheet 1 with 90° countersink. In the following operation, the tap therefore does not have to cut into the sharp edge of the hole

40 1070

HSS-XE Kurzstufenbohrer mit langer Bohrstufe für Durchgangsloch 90°
HSS-XE stub subland drill with long drilling step for through holes 90°

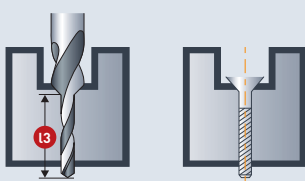


| Art. | Für Gewinde Ø For thread | d1 ± 0,05 mm | d2 h8 mm | d3 h9 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|--------------------------|--------------|----------|----------|-------|-------|-------|-------|
| 40 1070 040 | M 4 | • 4,3 | 8,6 | 8,6 | 30,0 | 55,0 | 110,0 | 31,05 |
| 40 1070 050 | M 5 | • 5,3 | 10,4 | 10,4 | 30,0 | 55,0 | 110,0 | 33,40 |
| 40 1070 060 | M 6 | • 6,4 | 12,4 | 12,4 | 30,0 | 55,0 | 110,0 | 36,30 |
| 40 1070 080 | M 8 | • 8,4 | 12,5 | 16,4 | 30,0 | 70,0 | 110,0 | 56,40 |
| 40 1070 100 | M 10 | • 10,5 | 12,5 | 20,4 | 30,0 | 70,0 | 110,0 | 71,00 |



Verwendung: Für Schrauben- und Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74 Blatt 1 Form A, Ausführung mittel. Für Schrauben nach ISO 2009, 2010, 7046, 7047 (DIN 963, 964, 966). Besonders geeignet für Bohrungen mit gleichzeitiger Ansenkung in Profilmaterial.

Use: For through holes for screws DIN-ISO 273 and countersinks to DIN 74, sheet 1 form A, medium grade. For screws to ISO 2009, 2010, 7047 (DIN 963, 964, 966). Especially suitable for holes with simultaneous countersinking in profile material.



Durchgangsloch mit Senkung für Schraubenkopf in einem Arbeitsgang gebohrt.

Through hole with counterbore for screw head drilled in one operation.

Schnittdaten
Cutting data

Film
Movie



1319

ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 900 N | < 900 N | | > 10% Si | | |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + TITAN-TEC beschichtet
 Gefertigt aus hochlegiertem Spezialstahl „XE“ für wesentlich höhere Standzeiten gegenüber HSS-Stähle.
 TITAN-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

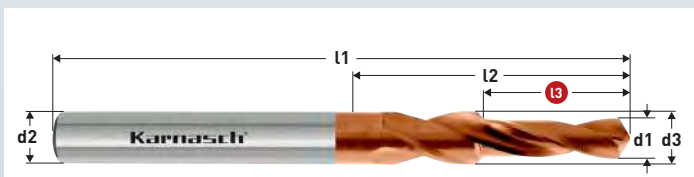
- Zum Senken in folgende Materialien:**
- Edelstähle (V2A / V4A)
 - Stahl
 - Guss
 - Bunt- und Leichtmetalle

HSS-XE steel + TITAN-TEC coated
 Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.
 TITAN-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

- For countersinking in materials:**
- High-alloyed chromium steel such as stainless (V2A / V4A)
 - Acid resistant steel
 - Steel
 - Cast iron
 - Non ferrous metals

HSS-XE + TITAN-TEC Kurzstufenbohrer für Kernloch, 90° Ansenkung
HSS-XE + TITAN-TEC stub jobber drills for tapping holes, 90° countersink

40 2060



| Art. | Für Gewinde For thread Ø | d1 h8 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|--------------------------|----------|----------|----------|-------|-------|-------|-------|
| 40 2060 030 | M 3 | • 2,5 | 3,4 | 3,4 | 8,8 | 20,0 | 52,0 | 16,65 |
| 40 2060 040 | M 4 | • 3,3 | 4,5 | 4,5 | 11,4 | 24,0 | 58,0 | 17,05 |
| 40 2060 050 | M 5 | • 4,2 | 5,5 | 5,5 | 13,6 | 28,0 | 66,0 | 18,25 |
| 40 2060 060 | M 6 | • 5,0 | 6,6 | 6,6 | 16,5 | 31,0 | 70,0 | 18,95 |
| 40 2060 080 | M 8 | • 6,8 | 9,0 | 9,0 | 21,0 | 40,0 | 84,0 | 22,50 |
| 40 2060 100 | M 10 | • 8,5 | 11,0 | 11,0 | 25,5 | 47,0 | 95,0 | 28,95 |
| 40 2060 120 | M 12 | • 10,2 | 13,5 | 13,5 | 30,0 | 54,0 | 107,0 | 37,35 |



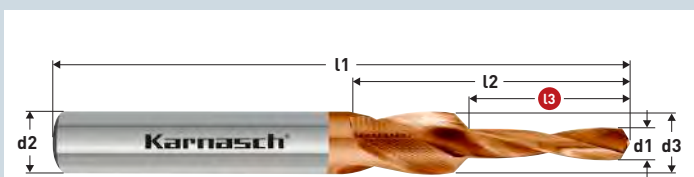
Verwendung: Bohrung und Senkung werden in einem Arbeitsgang genau fluchtend zueinander gefertigt. Daher sehr stabile und enge Rundlauf toleranzen.

Besonders geeignet für NC-Maschinen, da hohe Positionsgenauigkeit, beste Zentriereigenschaft und sehr stabil. Das vorherige Zentrieren kann deshalb oft entfallen. Für Gewindekernlochbohrungen nach DIN 336 Blatt 1 mit Ansenkung 90°. Der nachfolgende Gewindebohrer schneidet dadurch nicht an der scharfen Bohrkante an.

Use: Hole and countersink are produced in one operation and precisely aligned. Therefore very sturdy and tight concentricity tolerances. Particular suitable for NC machines due to high positional accuracy, excellent centering properties and great sturdiness. The preceding operation can thus often be omitted. For thread tapping drill holes to DIN 336 sheet 1 with 90° countersink. In the following operation, the tap therefore does not have to cut into the sharp edge of the hole

HSS-XE + TITAN-TEC Kurzstufenbohrer mit langer Bohrstufe für Durchgangsloch 90°
HSS-XE + TITAN-TEC stub subland drill with long drilling step for through holes 90°

40 2070

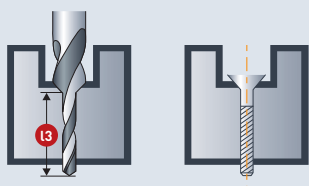


| Art. | Für Gewinde For thread Ø | d1 ± 0,05 mm | d2 h8 mm | d3 h9 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|--------------------------|--------------|----------|----------|-------|-------|-------|-------|
| 40 2070 040 | M 4 | • 4,3 | 8,6 | 8,6 | 30,0 | 55,0 | 110,0 | 37,25 |
| 40 2070 050 | M 5 | • 5,3 | 10,4 | 10,4 | 30,0 | 55,0 | 110,0 | 40,05 |
| 40 2070 060 | M 6 | • 6,4 | 12,4 | 12,4 | 30,0 | 55,0 | 110,0 | 43,55 |
| 40 2070 080 | M 8 | • 8,4 | 12,5 | 16,4 | 30,0 | 70,0 | 110,0 | 67,65 |
| 40 2070 100 | M 10 | • 10,5 | 12,5 | 20,4 | 30,0 | 70,0 | 110,0 | 85,20 |



Verwendung: Für Schrauben- und Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74 Blatt 1 Form A, Ausführung mittel. Für Schrauben nach ISO 2009, 2010, 7046, 7047 (DIN 963, 964, 966). Besonders geeignet für Bohrungen mit gleichzeitiger Ansenkung in Profilmaterial.

Use: For through holes for screws DIN-ISO 273 and countersinks to DIN 74, sheet 1 form A, medium grade. For screws to ISO 2009, 2010, 7047 (DIN 963, 964, 966). Especially suitable for holes with simultaneous countersinking in profile material.



Durchgangsloch mit Senkung für Schraubenkopf in einem Arbeitsgang gebohrt.

Through hole with counterbore for screw head drilled in one operation.

Schnittdaten
Cutting data



1319

Film
Movie



279



Index

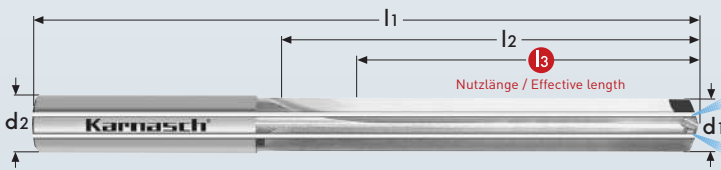
22 0526

PKD-bestückte Vollhartmetall-Hochleistungsbohrer Vierfasenbohrer
Solid carbide four-phase drill with PCD tips



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

| | |
|--|--|
| Aluminium > 6% Si | DURO-PLASTE DURO-PLASTICS |
| Aluminium < 6% Si | Aramid fiber AFK-SFK |
| Aluminium | Hybridstoffe hybrid materials |
| MESSING brass | CFK-ALU Composite CFRP-ALU Composites |
| Kupfer copper | GRAPHIT graphite |
| GFK-CFK GFRP-CFRP | NE METALLE non-ferrous |
| THERMO-PLAST THERMO-PLASTICS | |



| | |
|-------------------------------|----------------------------------|
| PKD PCD MICRO-GRAIN | DIN 6537 |
| SPEZIAL SPECIAL | DIN 6535 Form HAK |
| | |
| | HSC High-Speed-Cutting |
| | GELÄPPT LAPPED |
| | |

| Art. | d1 H7 | l3 | l2 | l1 | d2 ^{-0,002} / _{-0,005} | € |
|------------------|--------|------------|-----|-----|--|---------------|
| 22 0526 0800 094 | % 8,0 | 94 | 108 | 146 | 8,0 | 349,80 |
| 22 0526 1000 080 | % 10,0 | 80 | 95 | 142 | 10,0 | 353,11 |
| 22 0526 1000 110 | % 10,0 | 110 | 120 | 162 | 10,0 | 445,20 |
| 22 0526 1200 056 | % 12,0 | 56 | 71 | 118 | 12,0 | 321,31 |
| 22 0526 1200 096 | % 12,0 | 96 | 114 | 162 | 12,0 | 483,60 |
| 22 0526 1200 142 | % 12,0 | 142 | 156 | 204 | 12,0 | 616,80 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Schnittdaten
Cutting data

1254

Diamantbestückte Qualitätsprodukte.
Diamond tipped quality products.

Karnasch®
PROFESSIONAL TOOLS

DIAMOND TOOLS

Diamond tools



CBN



PKD
PCD



Naturdiamant
Natural Diamond
ND



Monokristallin Diamant
Monocrystalline
diamond MCD



CVD /
Diamant Beschichtung
Diamond coating

PKD/PCD **EXTREME**

High-Precision-Werkzeuge aus dem Hause Karnasch

High-Precision-Tools from Karnasch



Metallverarbeitende Unternehmen brauchen die absolute Gewissheit, mit hochwertigen, leistungsstarken und prozesssicheren Werkzeugen zu arbeiten. Karnasch Professional Tools bietet das, worauf es ankommt!

Wir sind ein weltweit agierendes Unternehmen mit Hauptsitz im badischen Heddeshheim sowie in Görsdorf (Brandenburg), das

- Hochleistungswerkzeuge zur Metallverarbeitung von herausragender Qualität produziert und vertreibt,
- seit 1961 auf dem Markt tätig ist und dementsprechend über große Erfahrung, umfassendes Know-how sowie überdurchschnittliche Kundenorientierung verfügt,
- durch intelligente Lagerhaltung jederzeit die sofortige Lieferbarkeit seiner Produkte garantiert,
- in vielen Regionen der Welt Vertriebspartner hat, damit auch für Ihre Auslandsniederlassungen eine permanente Versorgung und begleitender Service gewährleistet ist,
- Support groß schreibt und diesen Anspruch u.a. durch eine Service-Hotline auch erfüllt,
- mit der Eröffnung einer Niederlassung in Görsdorf (Brandenburg) bereits im Jahr 1992 auf gesamtdeutsche Präsenz gesetzt hat.

Weltweit zählen Kunden aus folgenden Bereichen auf Karnasch Professional Tools:

- Werkzeug- und Formenbau,
- Luft- und Raumfahrt,
- Automobilindustrie,
- Schiff- und Eisenbahnbau,
- Hoch-, Stahl- und Brückenbau,
- Dental.

Metal working companies require absolute certainty to work with high-quality, high-performance and reliable tools. Karnasch Professional Tools offers all that matters!

We are a family-run business that is actively involved on a worldwide scale, with our head office in Heddeshheim in Baden and Görsdorf (Brandenburg), which

- produces and distributes excellent quality, high performance tools for metal working,
- has been active in the market since 1961 and has accordingly obtained invaluable experience, comprehensive know-how and above average customer orientation,
- guarantees immediate availability of our products at any time thanks to intelligent stock-keeping,
- has sales partners in many regions of the world, and can thus also ensure a continuous and accompanying service for your overseas branches.
- places an emphasis on support and fulfils this claim via, amongst other things, a service hotline.
- cemented our presence throughout Germany with the opening of a branch in Görsdorf (Brandenburg) in 1992.

Our customers predominantly come from the following sectors:

- Tool and mould making,
- Aviation and astronautics,
- The automotive industry,
- Shipbuilding and railway construction,
- Structural engineering, steel construction and bridge building,
- Dental.

Weitere Informationen zu unserer kompletten Produktpalette erhalten Sie auch im Internet unter:

WWW.KARNASCH.TOOLS

1



2



3



4



5



6



7



8



9



Index



22 2025

Vollhartmetall-Maschinengewindebohrer 50 - 63 HRC, < 1,5xD
Solid carbide machine taps, metric 50 - 63 HRC



HRC 50-63

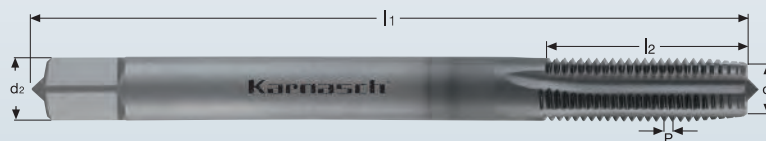
GJL

GJS

GTW GTS

GRAPHIT graphite

kurz-spanend short chip



Bearbeitungshinweis: Verwenden Sie ausschließlich Schneidpaste mit Hochdruckzusätzen wie Karnasch Art.-Nr. 60 1157 + 60 1159. Alternativ geeignetes Schneidöl, keine Emulsion.

Machining indication: Please use exclusively our cutting paste with the extreme pressure additive Karnasch art.-no. 60 1157 + 60 1159. Alternative suitable cutting oil, no emulsion.

Richtwerte für den Einsatz von VHM-Maschinengewindebohrern 50 - 63 HRC
Recommended cutting data for Micro Grain Maschine Taps 50 - 63 HRC

| | | |
|---------------------------------|---------------------------------|---------------------------------|
| 50 - 54 HRC Vc = 4 - 6 m/min | 55 - 59 HRC Vc = 3 - 5 m/min | 60 - 63 HRC Vc = 2 - 4 m/min |
|---------------------------------|---------------------------------|---------------------------------|

Vorausgesetzt werden stabile Maschinenverhältnisse. Wir empfehlen Synchronspindel. Keinesfalls von Hand schneiden. Prerequisite are stabil machines. Absolutely no manual use. We recommend Syncronspindl. Only with machine.

| | |
|--------------------|-----------------------|
| MICRO GRAIN | DIN 371 376 |
| M | ISO 2 6HX |
| 50-63 HRC | 4-5 x P Form D |
| | HHC |
| | XXM-1 |
| | |

| Art. | d1 Gewinde | P | l1 | l2 | d2 h6 | k | | € |
|------------|------------|------|----|----|-------|-----|-----|--------|
| 22 2025 03 | • M 3 | 0,5 | 56 | 14 | 3,5 | 2,7 | 2,6 | 193,00 |
| 22 2025 04 | • M 4 | 0,7 | 63 | 14 | 4,5 | 3,4 | 3,5 | 197,00 |
| 22 2025 05 | • M 5 | 0,8 | 70 | 20 | 6,0 | 4,9 | 4,4 | 205,00 |
| 22 2025 06 | • M 6 | 1,0 | 80 | 24 | 6,0 | 4,9 | 5,3 | 201,00 |
| 22 2025 08 | • M 8 | 1,25 | 90 | 24 | 8,0 | 6,2 | 7,1 | 216,00 |

22 2215

Vollhartmetall-Maschinengewindebohrer Feingewinde 50 - 63 HRC, < 1,5xD
Solid carbide machine taps, metric fine thread 50 - 63 HRC



HRC 50-63

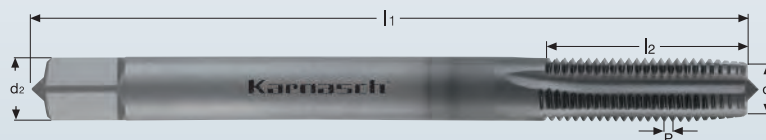
GJL

GJS

GTW GTS

GRAPHIT graphite

kurz-spanend short chip



Bearbeitungshinweis: Verwenden Sie ausschließlich Schneidpaste mit Hochdruckzusätzen wie Karnasch Art.-Nr. 60 1157 + 60 1159. Alternativ geeignetes Schneidöl, keine Emulsion.

Machining indication: Please use exclusively our cutting paste with the extreme pressure additive Karnasch art.-no. 60 1157 + 60 1159. Alternative suitable cutting oil, no emulsion.

Richtwerte für den Einsatz von VHM-Maschinengewindebohrern 50 - 63 HRC
Recommended cutting data for Micro Grain Maschine Taps 50 - 63 HRC

| | | |
|---------------------------------|---------------------------------|---------------------------------|
| 50 - 54 HRC Vc = 4 - 6 m/min | 55 - 59 HRC Vc = 3 - 5 m/min | 60 - 63 HRC Vc = 2 - 4 m/min |
|---------------------------------|---------------------------------|---------------------------------|

Vorausgesetzt werden stabile Maschinenverhältnisse. Wir empfehlen Synchronspindel. Keinesfalls von Hand schneiden. Prerequisite are stabil machines. Absolutely no manual use. We recommend Syncronspindl. Only with machine.

| | |
|--------------------|-----------------------|
| MICRO GRAIN | DIN 371 376 |
| MF | ISO 2 6HX |
| 50-63 HRC | 4,5 - P Form B |
| | HHC |
| | XXM-1 |
| | |

| Art. | d1 Gewinde | P | l1 | l2 | d2 | k | | € |
|--------------|------------|-----|-----|----|----|-----|------|--------|
| 22 2215 1215 | % M 12 | 1,5 | 100 | 18 | 9 | 7,0 | 10,8 | 390,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Vollhartmetall-Whitworth Rohrgewinde-Gewindebohrer 50 - 63 HRC, < 1,5xD
Solid carbide Whitworth screw tap 50 - 63 HRC



22 2239

HRC
50-63

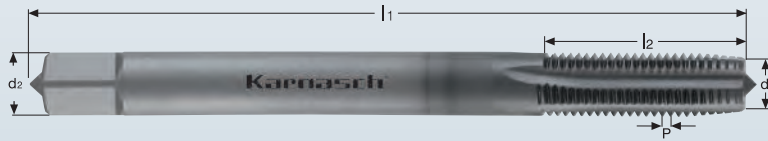
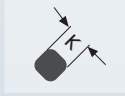
GJL

GJS

GTW
GTS

GRAPHIT
graphite

kurzspanend
short chip



Bearbeitungshinweis: Verwenden Sie ausschließlich Schneidpaste mit Hochdruckzusätzen wie Karnasch Art.-Nr. 60 1157 + 60 1159. Alternativ geeignetes Schneidöl, keine Emulsion.

Machining indication: Please use exclusively our cutting paste with the extreme pressure additive Karnasch art.-no. 60 1157 + 60 1159. Alternative suitable cutting oil, no emulsion.

Richtwerte für den Einsatz von VHM-Maschinengewindebohrern 50 - 63 HRC
Recommended cutting data for Micro Grain Maschine Taps 50 - 63 HRC

| | | |
|---------------------------------|---------------------------------|---------------------------------|
| 50 - 54 HRC Vc = 4 - 6 m/min | 55 - 59 HRC Vc = 3 - 5 m/min | 60 - 63 HRC Vc = 2 - 4 m/min |
|---------------------------------|---------------------------------|---------------------------------|

Vorausgesetzt werden stabile Maschinenverhältnisse. Wir empfehlen Synchronspindel. Keinesfalls von Hand schneiden. Prerequisite are stabil machines. Absolutely no manual use. We recommend Synchronspindel. Only with machine.

| | |
|--------------------|--------------------|
| MICRO GRAIN | DIN 5156 |
| G | ISO 228/BSP |
| HRC 50-63 | 4-5 x P |
| | HHC |
| | XXM-1 |
| | |

| Art. | d1 Gewinde | P | l1 | l2 | d2/h6 | k | | € |
|-------------|--------------|----|----|----|-------|-----|-----|---------------|
| 22 2239 1/8 | G 1/8 | 28 | 90 | 24 | 7 | 5,5 | 8,8 | 337,20 |

Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Schmierstoffe & Schneidöl
Lubricant & Cutting oil

60 1159

60 1157



125 g

Universal-SCHNEIDPASTE
Universal cutting paste

chlorfrei / silikonfrei
chlorine free / silicone free

60 1159



750 g

Universal-SCHNEIDPASTE
Universal cutting-paste

chlorfrei / silikonfrei
chlorine free / silicone free

60 1157

- Paste haftet am Werkzeug.
- Kein Tropfen und Umherspritzen.

Ideal zum Arbeiten in Zwangslagen wie z.B. „Überkopfeinsatz“ und bei Maschinen ohne Kühlmittleinrichtung.

Verwendung: Erhöht signifikant die Standzeiten und Oberflächengüte beim: Sägen, Fräsen, Gewindeschneiden, Reiben, Bohren, Drehen. Zum Zerspanen aller Stähle sowie schwierigster Materialien wie Titan-, Mangan-, Stahlguss-, Chrom-Nickel oder Molybdän-Stählen. Hervorragend auch für alle Nichteisenmetalle wie Alu, Kupfer, Messing.

- The paste sticks to the tool.
- No dripping or splashing

Ideal for working under difficult circumstances e.g. "Overhead use" and for machines without cooling device.

Application: Increases tool life and surface finish significantly when: sawing, milling, tapping, grinding, drilling.

For machining all kind of steels. Also excellent for extremely difficult materials such as titanium-, manganese-, cast steel-, chrome-nickel or molybdenum steels. Also excellent for all non-ferrous metals such as aluminum, copper, brass.

| Art. | g/Dose | Stück/piece | € |
|---------|--------|-------------|------|
| 60 1159 | 125 g | 1 | 6,95 |

| Art. | g/Dose | Stück/piece | € |
|---------|--------|-------------|-------|
| 60 1157 | 750 g | 1 | 25,45 |



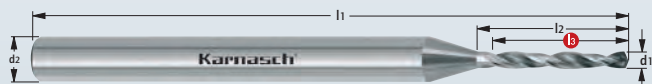
29 0060

PKD-Vollhartmetall-Micro-Hochleistungsbohrer
PCD equipped solid carbide high performance micro drill



- 1
- 2
- 3
- 4

| | |
|---------------------------------------|-----------------------------|
| COMPO-SITES | Sand-wich |
| Aramid fiber AFK-SFK | GF GF25 |
| Hybrid-stoffe hybrid materials | PVDF GF25 |
| CFK-ALU Composite CFRP-ALU Composites | GFK GFRP |
| Schicht-stoffe Laminates | CFK CFRP |
| Kevlar | PMMA GS |
| PA66 GF30 | Aluminium < 12% Si |
| PVDF GF30 | Aluminium > 12% Si |
| PEEK GF30 | GRAPHIT graphite |
| PEEK CF30 | ZIRKON OXID ZIRCONIA |



| | |
|------------------------|-------------------------------|
| PKD PCD | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | |
| | HSC High-Speed-Cutting |
| | POLIERT POLISHED |
| | |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h5 | € |
|------------------|-------|----|----|----|-------|--------|
| 29 0060 0080 080 | 0,80 | 8 | 9 | 38 | 3 | 193,20 |
| 29 0060 0110 090 | 1,10 | 9 | 10 | 38 | 3 | 193,20 |
| 29 0060 0120 090 | 1,20 | 9 | 10 | 38 | 3 | 201,60 |
| 29 0060 0130 080 | 1,30 | 8 | 10 | 38 | 3 | 201,60 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

- 5
- 6
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- 9

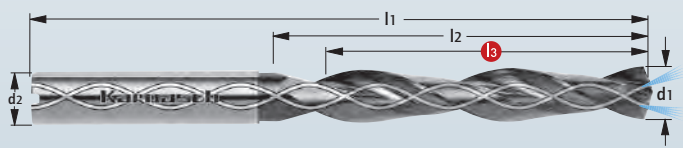
22 0415

Diamantbeschichtete VHM-Hochleistungsbohrer mit Innenkühlung geeignet für Gewindefräser Art. 23 2005 / 23 2006



Diamond coated solid carbide high performance twist drill with internal cooling, suitable for thread milling cutter article 23 2005 / 23 2006

| | |
|--|-----------------------------|
| COMPO-SITES | TI-CFK TI-CFRP |
| GRAPHIT graphite | PA66 GF30 |
| GFK GFRP | PVDF GF30 |
| CFK CFRP | PEEK GF30 |
| Hybrid-stoffe hybrid materials | PEEK CF30 |
| CFK-ALU Composite CFRP-ALU Composites | ZIRKON OXID ZIRCONIA |
| Schicht-stoffe Laminates | |



| | |
|------------------------|---------------------------------|
| DIAMANT DIAMOND | DIN 6537 |
| W | DIN 6535 Form HA |
| | |
| | HSC HPC |
| | DIAMANT DIAMOND DCC 0312 |
| | |

Richtwerte für den Einsatz von Karnasch diamantbeschichtete Hochleistungsbohrer
Recommended cutting data for twist drill with diamond coating

| Werkstoffgruppe Material group | Werkstoff Workpiece material | Schnittgeschwindigkeit Vc (m/min.) | VORSCHUB PRO UMDREHUNG (mm) | | |
|--------------------------------|------------------------------|------------------------------------|-----------------------------|-------------|--------------|
| | | | Ø 3,0 - 5,0 | Ø 5,1 - 8,0 | Ø 8,1 - 12,0 |
| 14 | Graphit < Grad 10 | 250 | 0,10 - 0,20 | 0,15 - 0,25 | 0,30 - 0,45 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|-------------------|----|----|-----|-------|--------|
| 22 0415 0330 023 | 3,3 / M4 x 0,7 | 23 | 28 | 66 | 6 | 51,60 |
| 22 0415 0680 043 | 6,8 / M8 x 1,25 | 43 | 53 | 91 | 8 | 73,80 |
| 22 0415 0850 049 | 8,5 / M10 x 1,50 | 49 | 61 | 103 | 10 | 85,20 |
| 22 0415 1030 056 | 10,3 / M12 x 1,75 | 56 | 71 | 118 | 12 | 111,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Schnittdaten
Cutting data



284

Nachfolgewerkzeug / Replacement article 29 0120 + 29 0121 + 29 0122 auf Seite / on page 288-291

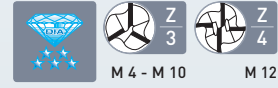
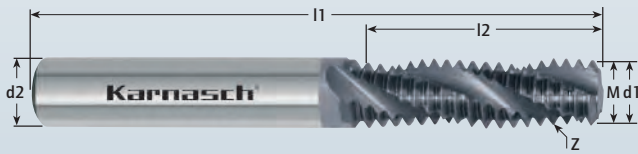
Diamantbeschichteter Vollhartmetall Gewindefräser, spiralisiert 30° für Innengewinde ohne Innenkühlung, ohne Senkstufe, metrisches ISO-Gewinde DIN 13 – 2,5xD



23 2005

Diamond coated solid carbide thread milling cutter, 30° spiral for internal threads, without internal cooling and without counter sunk stage, metric ISO-thread DIN 13 – 2,5xD

| | |
|--|----------------------------|
| COMPO-SITES | TI-CFK TI-CFRP |
| GRAPHIT graphite | PA66 GF30 |
| GFK GFRP | PVDF GF30 |
| CFK CFRP | PEEK GF30 |
| Hybrid- stoffe hybrid materials | PEEK CF30 |
| CFK-ALU Composite CFRP-ALU Composites | ZIRKON OXID ZIRCONIA |
| Schicht- stoffe Laminates | |



| | |
|--------------------|-------------------------------|
| DIAMANT DIAMOND | DIN 13 |
| M | DIN 6535 Form HA |
| | |
| | HSC High-Speed- Cutting |
| | DCC 0318 |
| | |

| Art. | M | Stg | x D | l2 | l1 | d1 | d2 h5 | Z | € |
|-------------------|--------|------|-------|-------|----|------|-------|---|--------|
| 23 2005 04 070 25 | • M 4 | 0,7 | 2,5xD | 10,85 | 55 | 3,15 | 6 | 3 | 163,00 |
| 23 2005 05 080 25 | • M 5 | 0,8 | 2,5xD | 13,15 | 55 | 4,00 | 6 | 3 | 166,00 |
| 23 2005 06 100 25 | • M 6 | 1,0 | 2,5xD | 16,50 | 55 | 4,80 | 6 | 3 | 172,00 |
| 23 2005 08 125 25 | • M 8 | 1,25 | 2,5xD | 21,80 | 55 | 6,00 | 6 | 3 | 183,00 |
| 23 2005 10 150 25 | • M 10 | 1,50 | 2,5xD | 26,20 | 65 | 8,00 | 8 | 3 | 218,00 |
| 23 2005 12 175 25 | • M 12 | 1,75 | 2,5xD | 30,60 | 75 | 9,90 | 10 | 4 | 257,00 |

PKD - CVD Gewindefräser kurzfristig lieferbar!

Schnittdaten
Cutting data

Zeichnungen
Drawings

1271

DXF/STEP

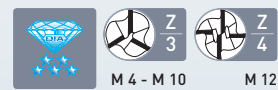
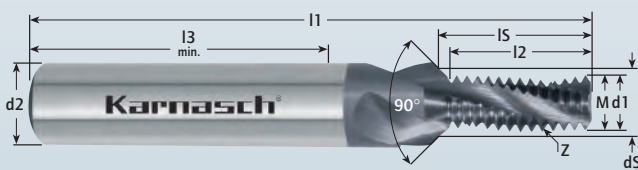
Diamantbeschichteter Vollhartmetall-Gewindefräser, spiralisiert für Innengewinde ohne Innenkühlung, mit 90° Senkstufe, metrisches ISO-Gewinde DIN 13 – 2,0xD



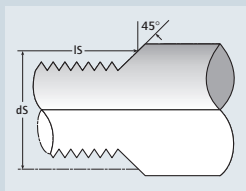
23 2006

Diamond coated solid carbide thread milling cutter, 30° spiral for internal threads, without internal cooling with 90° counter sunk stage, metric ISO-thread DIN 13 – 2,0xD

| | |
|--|----------------------------|
| COMPO-SITES | TI-CFK TI-CFRP |
| GRAPHIT graphite | PA66 GF30 |
| GFK GFRP | PVDF GF30 |
| CFK CFRP | PEEK GF30 |
| Hybrid- stoffe hybrid materials | PEEK CF30 |
| CFK-ALU Composite CFRP-ALU Composites | ZIRKON OXID ZIRCONIA |
| Schicht- stoffe Laminates | |



| | |
|--------------------|-------------------------------|
| DIAMANT DIAMOND | DIN 13 |
| M | DIN 6535 Form HA |
| | |
| | HSC High-Speed- Cutting |
| | DCC 0318 |
| | |



| Art. | M | Stg | x D | l2 | l3/min. | l1 | ds | ls | d1 | d2 h5 | Z | € |
|-------------------|--------|------|-------|-------|---------|----|------|------|------|-------|---|--------|
| 23 2006 04 070 20 | • M 4 | 0,7 | 2,0xD | 8,75 | 36 | 55 | 4,2 | 9,3 | 3,14 | 6 | 3 | 169,00 |
| 23 2006 05 080 20 | • M 5 | 0,8 | 2,0xD | 10,75 | 36 | 55 | 5,3 | 11,3 | 4,00 | 6 | 3 | 177,00 |
| 23 2006 06 100 20 | • M 6 | 1,0 | 2,0xD | 12,40 | 36 | 65 | 6,3 | 13,1 | 4,80 | 8 | 3 | 194,00 |
| 23 2006 08 125 20 | • M 8 | 1,25 | 2,0xD | 16,80 | 40 | 75 | 8,3 | 17,6 | 6,50 | 10 | 3 | 236,00 |
| 23 2006 10 150 20 | • M 10 | 1,50 | 2,0xD | 20,10 | 45 | 80 | 10,3 | 21,2 | 8,20 | 12 | 3 | 319,00 |
| 23 2006 12 175 20 | • M 12 | 1,75 | 2,0xD | 25,20 | 45 | 90 | 12,3 | 26,4 | 9,90 | 14 | 4 | 370,00 |

PKD - CVD Gewindefräser kurzfristig lieferbar!

Schnittdaten
Cutting data

Zeichnungen
Drawings

1271

DXF/STEP

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

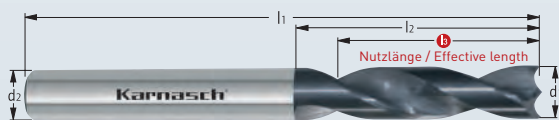
29 0080 A

29 0080 B

Vollhartmetall-Hochleistungsbohrer GFK/CFK
Solid carbide twist drill GFK/CFK

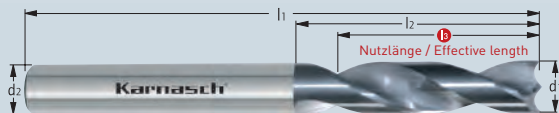


| | | |
|----------------------------------|--|--------------|
| COMPOSITES | CFK-ALU Composite CFRP-ALU Composites | PVDF GF30 |
| GFK-CFK GFRP-CFRP | Schichtstoffe Laminates | PEEK GF30 |
| THERMOPLAST THERMOPLASTICS | Kevlar | PEEK CF30 |
| DUROPLASTE DUROPLASTICS | AL/TI | GF GF25 |
| Aramid fiber AFK-SFK | TI-CFK TI-CFRP | PVDF GF25 |
| Hybridstoffe hybrid materials | PA66 GF30 | |



| | |
|----------------------------|----------------------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | Form HA |
| | |
| | HSC High-Speed-Cutting |
| | DCA-06 Polished |
| | |

| | | |
|-----------------------|--|----------------------------|
| GFK-CFK GFRP-CFRP | CFK-ALU Composite CFRP-ALU Composites | Kevlar |
| Kunststoff plastic | Schichtstoffe Laminates | Plexiglas acrylic glass |



Schnittdaten
Cutting data

Zeichnungen
Drawings



| d1 | l3 | l2 | l1 | d2h5 | DIAMANT DIAMOND DCA-06 | | POLIERT POLISHED | |
|--------|----|----|-----|------|------------------------------|--------|---------------------|--------|
| | | | | | Art. | € | Art. | € |
| • 3,0 | 12 | 16 | 45 | 3,0 | 29 0080A 0300 012 | 48,00 | 29 0080B 0300 012 | 27,00 |
| • 3,2 | 14 | 18 | 50 | 3,2 | 29 0080A 0320 014 | 61,00 | 29 0080B 0320 014 | 27,00 |
| • 3,3 | 14 | 18 | 50 | 3,2 | - | - | 29 0080B 0330 014 | 27,00 |
| • 3,5 | 15 | 20 | 50 | 3,5 | 29 0080A 0350 015 | 61,00 | 29 0080B 0350 015 | 27,00 |
| • 3,7 | 15 | 20 | 52 | 3,7 | - | - | 29 0080B 0370 015 | 27,00 |
| • 4,0 | 17 | 22 | 55 | 4,0 | 29 0080A 0400 017 | 61,00 | 29 0080B 0400 017 | 27,00 |
| • 4,2 | 17 | 22 | 55 | 4,2 | - | - | 29 0080B 0420 017 | 32,00 |
| • 4,5 | 18 | 25 | 57 | 4,5 | 29 0080A 0450 018 | 80,00 | 29 0080B 0450 018 | 32,00 |
| • 4,7 | 18 | 24 | 58 | 4,7 | - | - | 29 0080B 0470 018 | 39,00 |
| • 5,0 | 20 | 25 | 62 | 5,0 | 29 0080A 0500 020 | 87,00 | 29 0080B 0500 020 | 39,00 |
| • 5,3 | 20 | 26 | 62 | 5,3 | - | - | 29 0080B 0530 020 | 39,00 |
| • 5,5 | 20 | 28 | 65 | 5,5 | 29 0080A 0550 020 | 94,00 | 29 0080B 0550 020 | 46,00 |
| • 5,8 | 20 | 28 | 66 | 5,8 | - | - | 29 0080B 0580 020 | 46,00 |
| • 6,0 | 20 | 28 | 65 | 6,0 | 29 0080A 0600 020 | 94,00 | 29 0080B 0600 020 | 46,00 |
| • 6,5 | 22 | 30 | 70 | 6,5 | 29 0080A 0650 022 | 116,00 | 29 0080B 0650 022 | 50,00 |
| • 7,0 | 25 | 33 | 75 | 7,0 | 29 0080A 0700 025 | 122,00 | 29 0080B 0700 025 | 56,00 |
| • 7,5 | 25 | 33 | 74 | 7,5 | - | - | 29 0080B 0750 025 | 56,00 |
| • 8,0 | 27 | 36 | 80 | 8,0 | 29 0080A 0800 027 | 133,00 | 29 0080B 0800 027 | 67,00 |
| • 8,5 | 27 | 36 | 80 | 8,5 | 29 0080A 0850 027 | 149,00 | 29 0080B 0850 027 | 74,00 |
| • 9,0 | 30 | 40 | 85 | 9,0 | 29 0080A 0900 030 | 154,00 | 29 0080B 0900 030 | 78,00 |
| • 9,5 | 30 | 37 | 84 | 9,5 | - | - | 29 0080B 0950 030 | 86,00 |
| • 10,0 | 32 | 42 | 90 | 10,0 | 29 0080A 1000 032 | 166,00 | 29 0080B 1000 032 | 90,00 |
| • 10,5 | 32 | 42 | 90 | 10,5 | - | - | 29 0080B 1050 032 | 102,00 |
| • 11,0 | 34 | 47 | 95 | 11,0 | - | - | 29 0080B 1100 034 | 116,00 |
| • 11,5 | 34 | 47 | 95 | 11,5 | - | - | 29 0080B 1150 034 | 129,00 |
| • 12,0 | 35 | 50 | 100 | 12,0 | 29 0080A 1200 035 | 216,00 | 29 0080B 1200 035 | 129,00 |
| • 13,0 | 35 | 50 | 100 | 13,0 | - | - | 29 0080B 1300 035 | 129,00 |
| • 14,0 | 37 | 54 | 105 | 14,0 | - | - | 29 0080B 1400 037 | 129,00 |
| • 15,0 | 38 | 56 | 110 | 15,0 | - | - | 29 0080B 1500 038 | 129,00 |
| • 16,0 | 38 | 58 | 115 | 16,0 | - | - | 29 0080B 1600 038 | 129,00 |

| d1 tol. | 29 0080 A | 29 0080 B |
|---------|-----------------------------------|-----------------------------------|
| | Bohrertoleranz Drill tolerance | Bohrertoleranz Drill tolerance |
| > 3,0 | + 0,005 | + 0,000 |
| 6,0 | - 0,008 | - 0,012 |
| > 6,0 | + 0,005 | + 0,000 |
| 10,0 | - 0,010 | - 0,015 |
| > 10,0 | + 0,005 | + 0,000 |
| 14,0 | - 0,012 | - 0,018 |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

CFK-Bohrertest
CFK drill test



Karnasch Art. 29 0120 – 6,0 mm
Bohrungseintritt / drill entry
Material: CFK / CFRP

Schnittdaten / cutting data
Vc = 160 m/min
Vf = 850 mm/min
n(s) = 8493 min⁻¹
fz = 0,1 mm
ap = 20 mm



Karnasch Art. 29 0120 – 6,0 mm
Bohrungsausritt / drill exit
Material: CFK / CFRP

Vergrößerung / Magnification: 30x



CVD Bohrer 6,0 mm
Mitbewerber / competitor
Bohrungseintritt / drill entry
Material: CFK / CFRP

Schnittdaten / cutting data
Vc = 160 m/min
Vf = 850 mm/min
n(s) = 8493 min⁻¹
fz = 0,1 mm
ap = 20 mm



CVD Bohrer 6,0 mm
Mitbewerber / competitor
Bohrungsausritt / drill exit
Material: CFK / CFRP

Vergrößerung / Magnification: 30x



Karnasch®
PROFESSIONAL TOOLS

1



2



3



4



5



6



7



8

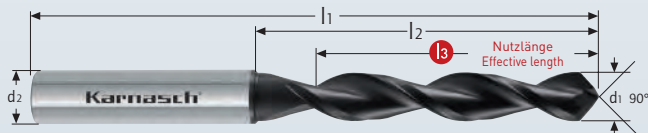


9

Index

29 0120

Diamantbeschichtete VHM-Hochleistungsbohrer für CFK/GFK – multidirektional – mit 90° Spitzwinkel vermeidet Delamination
 Diamond-coated solid-carbide drill for CFRP/GFRP – multidirectional – with 90° tip angle, prevents delamination



| | |
|--------------------|-------------------------|
| MICRO GRAIN | KARNASCH NORM |
| MF | DIN 6535 Form HA |
| | |
| | Composites |
| | DCC 0318 |
| | |

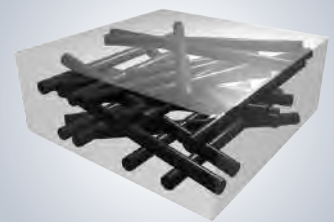
Empfohlene Schnittdaten / Recommended cutting data

| Werkstoffgruppe Material group | WERKSTOFF WORKPIECE MATERIAL | vc m/min | f mm/U | | | | |
|-----------------------------------|------------------------------------|----------|-------------|-------------|-------------|-------------|---------------|
| | | | Ø <3 | Ø 3,0 - 4,9 | Ø 5,0 - 7,9 | Ø 8,0 - 9,9 | Ø 10,0 - 12,0 |
| 8.3 | GFK / CFK Composites | 160 | 0,02 - 0,03 | 0,04 | 0,05 | 0,07 | 0,1 |

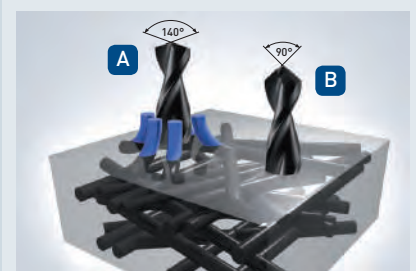
| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|---------|-----|-----|----|-------|--------|
| 29 0120 0050 0045 | • 0,5 | 4,5 | 5,5 | 55 | 3 | 67,00 |
| 29 0120 0060 0045 | • 0,6 | 4,5 | 5,5 | 55 | 3 | 67,00 |
| 29 0120 0070 0045 | • 0,7 | 4,5 | 5,5 | 55 | 3 | 67,00 |
| 29 0120 0080 0045 | • 0,8 | 4,5 | 5,5 | 55 | 3 | 67,00 |
| 29 0120 0090 0045 | • 0,9 | 4,5 | 5,5 | 55 | 3 | 67,00 |
| 29 0120 0100 005 | • 1,0 | 5 | 8 | 55 | 3 | 67,00 |
| 29 0120 0110 008 | • 1,1 | 8 | 12 | 55 | 3 | 67,00 |
| 29 0120 0120 008 | • 1,2 | 8 | 12 | 55 | 3 | 67,00 |
| 29 0120 0130 008 | • 1,3 | 8 | 12 | 55 | 3 | 67,00 |
| 29 0120 0140 008 | • 1,4 | 8 | 12 | 55 | 3 | 67,00 |
| 29 0120 0150 008 | • 1,5 | 8 | 12 | 55 | 3 | 67,00 |
| 29 0120 0160 011 | • 1,6 | 11 | 16 | 68 | 3 | 71,00 |
| 29 0120 0170 011 | • 1,7 | 11 | 16 | 68 | 3 | 71,00 |
| 29 0120 0180 011 | • 1,8 | 11 | 16 | 68 | 3 | 71,00 |
| 29 0120 0190 011 | • 1,9 | 11 | 16 | 68 | 3 | 71,00 |
| 29 0120 0200 011 | • 2,0 | 11 | 16 | 68 | 3 | 71,00 |
| 29 0120 0210 014 | • 2,1 | 14 | 20 | 74 | 3 | 73,00 |
| 29 0120 0220 014 | • 2,2 | 14 | 20 | 74 | 3 | 73,00 |
| 29 0120 0230 014 | • 2,3 | 14 | 20 | 74 | 3 | 73,00 |
| 29 0120 0240 014 | • 2,4 | 14 | 20 | 74 | 3 | 73,00 |
| 29 0120 0250 014 | • 2,5 | 14 | 20 | 74 | 3 | 73,00 |
| 29 0120 0260 016 | • 2,6 | 16 | 23 | 81 | 3 | 75,00 |
| 29 0120 0270 016 | • 2,7 | 16 | 23 | 81 | 3 | 75,00 |
| 29 0120 0280 016 | • 2,8 | 16 | 23 | 81 | 3 | 75,00 |
| 29 0120 0290 016 | • 2,9 | 16 | 23 | 81 | 3 | 75,00 |
| 29 0120 0300 023 | • 3,0 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0310 023 | • 3,1 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 03175 023 | • 3,175 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0320 023 | • 3,2 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0330 023 | • 3,3 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0340 023 | • 3,4 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0350 023 | • 3,5 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0360 023 | • 3,6 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0370 023 | • 3,7 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0380 023 | • 3,8 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0390 023 | • 3,9 | 23 | 28 | 66 | 6 | 123,00 |
| 29 0120 0400 029 | • 4,0 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0410 029 | • 4,1 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0420 029 | • 4,2 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0430 029 | • 4,3 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0440 029 | • 4,4 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0450 029 | • 4,5 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0460 029 | • 4,6 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0470 029 | • 4,7 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 04763 029 | • 4,763 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0480 029 | • 4,8 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0490 029 | • 4,9 | 29 | 36 | 74 | 6 | 129,00 |
| 29 0120 0500 035 | • 5,0 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0510 035 | • 5,1 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0520 035 | • 5,2 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0530 035 | • 5,3 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0540 035 | • 5,4 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0550 035 | • 5,5 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0560 035 | • 5,6 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0570 035 | • 5,7 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0580 035 | • 5,8 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0590 035 | • 5,9 | 35 | 44 | 82 | 6 | 129,00 |

| | | |
|------------------------------|---------------|-------------------------|
| Schnittdaten Cutting data | Film Movie | Zeichnungen Drawings |
| | | |
| 288 | | DXF/STEP |

MULTIDIREKTIONAL



Chaotische Ausrichtung des Faserverlaufs
 Chaotic alignment of fibre progress



A Delamination und Gratbildung mit konventionellen Bohrern.
B Sauberer Bohrungsaustritt durch optimierte Führungsfase des Bohrwerkzeuges.

Diamantbeschichtete VHM-Hochleistungsbohrer für CFK/GFK – multidirektional – mit 90° Spitzwinkel vermeidet Delamination
 Diamond-coated solid-carbide drill for CFRP/GFRP – multidirectional – with 90° tip angle, prevents delamination

29 0120

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|----------|----|----|-----|-------|--------|
| 29 0120 0600 035 | • 6,0 | 35 | 44 | 82 | 6 | 129,00 |
| 29 0120 0610 043 | • 6,1 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0620 043 | • 6,2 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0630 043 | • 6,3 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0635 043 | • 6,350 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0640 043 | • 6,4 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0650 043 | • 6,5 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0660 043 | • 6,6 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0670 043 | • 6,7 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0680 043 | • 6,8 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0690 043 | • 6,9 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0700 043 | • 7,0 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0710 043 | • 7,1 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0720 043 | • 7,2 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0730 043 | • 7,3 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0740 043 | • 7,4 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0750 043 | • 7,5 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0760 043 | • 7,6 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0770 043 | • 7,7 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0780 043 | • 7,8 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0790 043 | • 7,9 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 07938 043 | • 7,938 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0800 043 | • 8,0 | 43 | 53 | 91 | 8 | 195,00 |
| 29 0120 0810 049 | • 8,1 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0820 049 | • 8,2 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0830 049 | • 8,3 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0840 049 | • 8,4 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0850 049 | • 8,5 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0860 049 | • 8,6 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0870 049 | • 8,7 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0880 049 | • 8,8 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0890 049 | • 8,9 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0900 049 | • 9,0 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0910 049 | • 9,1 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0920 049 | • 9,2 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0930 049 | • 9,3 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0940 049 | • 9,4 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0950 049 | • 9,5 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 09525 049 | • 9,525 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0960 049 | • 9,6 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0970 049 | • 9,7 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0980 049 | • 9,8 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 0990 049 | • 9,9 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 1000 049 | • 10,0 | 49 | 61 | 103 | 10 | 231,00 |
| 29 0120 1010 056 | • 10,1 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1020 056 | • 10,2 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1030 056 | • 10,3 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1040 056 | • 10,4 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1050 056 | • 10,5 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1060 056 | • 10,6 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1070 056 | • 10,7 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1080 056 | • 10,8 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1090 056 | • 10,9 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1100 056 | • 11,0 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 11111 056 | • 11,111 | 56 | 71 | 118 | 12 | 251,00 |
| 29 0120 1200 056 | • 12,0 | 56 | 71 | 118 | 12 | 251,00 |

Material: CFK/CFRP Multidirectional
 Bohrer/Drill: 29 0120 Ø 8 mm

Karnasch®
 PROFESSIONAL TOOLS

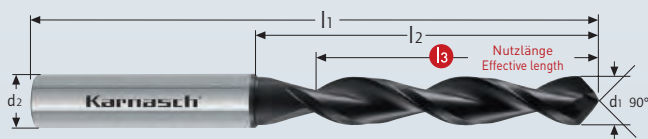


29 0121

Diamantbeschichtete VHM-Hochleistungsbohrer für CFK/GFK – unidirektional – mit 90° Spitzwinkel vermeidet Delamination



Diamond-coated solid-carbide drill for CFRP/GFRP – unidirectional – with 90° tip angle, prevents delamination



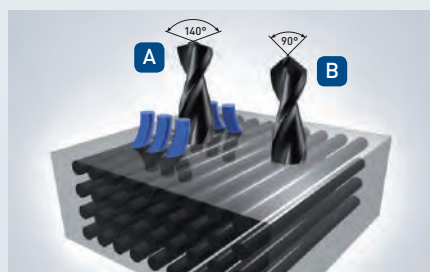
| | |
|--------------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| MF | DIN 6535 Form HA |
| | |
| | Composites |
| | DCC 0318 |
| | Air |

Empfohlene Schnittdaten / Recommended cutting data

| Werkstoffgruppe Material group | WERKSTOFF WORKPIECE MATERIAL | vc m/min | f mm/U | | | |
|-----------------------------------|------------------------------------|----------|-------------|-------------|-------------|---------------|
| | | | Ø 2,8 - 4,9 | Ø 5,0 - 7,9 | Ø 8,0 - 9,9 | Ø 10,0 - 12,0 |
| 8.3 | GFK / CFK Composites | 160 | 0,04 | 0,05 | 0,07 | 0,1 |



Faserverlauf in eine Richtung
Fibre progress in one direction



A Delamination und Gratbildung mit konventionellen Bohrern.

B Sauberer Bohrungsaustritt durch optimierte Führungsfase des Bohrwerkzeuges.

Schnittdaten
Cutting data

Zeichnungen
Drawings



290

DXF/STEP

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|---------|----|----|----|-------|--------|
| 29 0121 0280 019 | • 2,8 | 19 | 24 | 66 | 6 | 171,00 |
| 29 0121 0290 019 | • 2,9 | 19 | 24 | 66 | 6 | 171,00 |
| 29 0121 0300 023 | • 3,0 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0310 023 | • 3,1 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 03175 023 | • 3,175 | 23 | 28 | 66 | 6 | 174,00 |
| 29 0121 0320 023 | • 3,2 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0330 023 | • 3,3 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0340 023 | • 3,4 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0350 023 | • 3,5 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0360 023 | • 3,6 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0370 023 | • 3,7 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0380 023 | • 3,8 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0390 023 | • 3,9 | 23 | 28 | 66 | 6 | 171,00 |
| 29 0121 0400 029 | • 4,0 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0410 029 | • 4,1 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0420 029 | • 4,2 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0430 029 | • 4,3 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0440 029 | • 4,4 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0450 029 | • 4,5 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0460 029 | • 4,6 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0470 029 | • 4,7 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 04763 029 | • 4,763 | 29 | 36 | 74 | 6 | 177,00 |
| 29 0121 0480 029 | • 4,8 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0490 029 | • 4,9 | 29 | 36 | 74 | 6 | 174,00 |
| 29 0121 0500 035 | • 5,0 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0510 035 | • 5,1 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0520 035 | • 5,2 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0530 035 | • 5,3 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0540 035 | • 5,4 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0550 035 | • 5,5 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0560 035 | • 5,6 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0570 035 | • 5,7 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0580 035 | • 5,8 | 35 | 44 | 82 | 6 | 185,00 |
| 29 0121 0590 035 | • 5,9 | 35 | 44 | 82 | 6 | 185,00 |

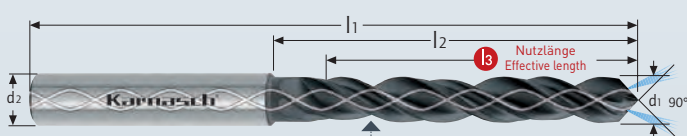
Diamantbeschichtete VHM-Hochleistungsbohrer mit Innenkühlung für CFK/GFK – unidirektional – mit 90° Spitzwinkel vermeidet Delamination



29 0122

Diamond-coated solid-carbide drill with interior cooling for CFRP/GFRP – unidirectional – with 90° tip angle, prevents delamination

| | |
|---------------------|-------------------------|
| GRAPHIT graphite | PVDF GF25 |
| COMPO-SITES | ZIRKON OXID ZIRCONIA |
| CFK CFRP | FR 4 |
| GFK GFRP | |
| PEEK CF30 | |
| PEEK GF30 | |
| GF GF25 | |



Durch 2 Führungsphasen ist eine sehr hohe Präzision der Bohrungen möglich, bei gleichzeitiger Vermeidung von Delamination.

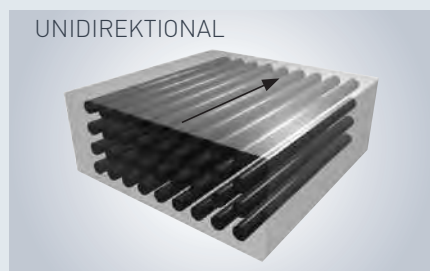
With 2 guide chamfer is a very high precision of the holes possible, by avoiding of delamination.

Empfohlene Schnittdaten / Recommended cutting data

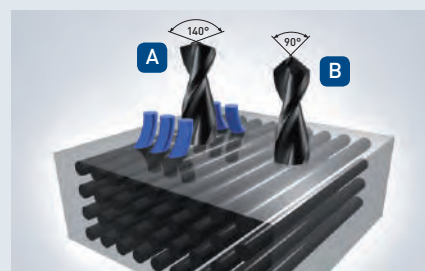
| Werkstoffgruppe Material group | WERKSTOFF WORKPIECE MATERIAL | vc m/min | f mm/U | | | |
|-----------------------------------|------------------------------------|----------|-------------|-------------|-------------|---------------|
| | | | Ø 3,0 - 4,9 | Ø 5,0 - 7,9 | Ø 8,0 - 9,9 | Ø 10,0 - 12,0 |
| 8.3 | GFK / CFK Composites | 160 | 0,04 | 0,05 | 0,07 | 0,1 |

Schnittdaten
Cutting data

Zeichnungen
Drawings



UNIDIREKTIONAL
Faserverlauf in eine Richtung
Fibre progress in one direction



A Delamination und Gratbildung mit konventionellen Bohrern.

B Sauberer Bohrsaustritt durch optimierte Führungsphase des Bohrwerkzeuges.

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|---------------|----|----|-----|-------|--------|
| 29 0122 0600 035 | • 6,00 | 35 | 44 | 82 | 6 | 232,00 |
| 29 0122 0610 043 | • 6,10 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0620 043 | • 6,20 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0630 043 | • 6,30 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0635 043 | • 6,350 1/4" | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0640 043 | • 6,40 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0650 043 | • 6,50 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0660 043 | • 6,60 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0670 043 | • 6,70 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0680 043 | • 6,80 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0690 043 | • 6,90 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0700 043 | • 7,00 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0710 043 | • 7,10 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0720 043 | • 7,20 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0730 043 | • 7,30 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0740 043 | • 7,40 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0750 043 | • 7,50 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0760 043 | • 7,60 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0770 043 | • 7,70 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0780 043 | • 7,80 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0790 043 | • 7,90 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 07938 043 | • 7,938 5/16" | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0800 043 | • 8,00 | 43 | 53 | 91 | 8 | 288,00 |
| 29 0122 0810 049 | • 8,10 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0820 049 | • 8,20 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0830 049 | • 8,30 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0840 049 | • 8,40 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0850 049 | • 8,50 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0860 049 | • 8,60 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0870 049 | • 8,70 | 49 | 61 | 103 | 10 | 351,00 |

| Art. | d1 m7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|----------------|----|----|-----|-------|--------|
| 29 0122 0880 049 | • 8,80 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0890 049 | • 8,90 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0900 049 | • 9,00 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0910 049 | • 9,10 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0920 049 | • 9,20 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0930 049 | • 9,30 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0940 049 | • 9,40 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0950 049 | • 9,50 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 09525 049 | • 9,525 3/8" | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0960 049 | • 9,60 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0970 049 | • 9,70 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0980 049 | • 9,80 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 0990 049 | • 9,90 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 1000 049 | • 10,00 | 49 | 61 | 103 | 10 | 351,00 |
| 29 0122 1010 056 | • 10,10 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1020 056 | • 10,20 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1030 056 | • 10,30 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1040 056 | • 10,40 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1050 056 | • 10,50 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1060 056 | • 10,60 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1070 056 | • 10,70 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1080 056 | • 10,80 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1090 056 | • 10,90 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1100 056 | • 11,00 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1111 056 | • 11,111 7/16" | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1150 056 | • 11,50 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1180 056 | • 11,8 | 56 | 71 | 118 | 12 | 391,00 |
| 29 0122 1200 056 | • 12,0 | 56 | 71 | 118 | 12 | 391,00 |

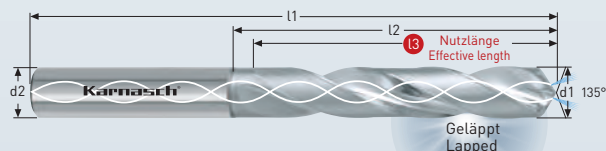


29 0200

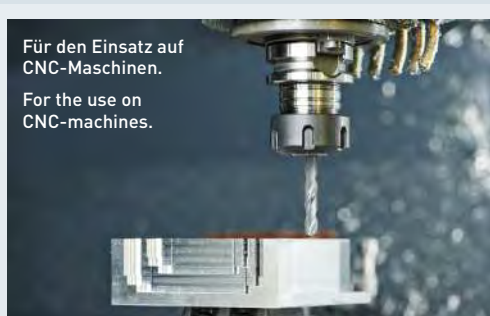
CNC-Stack-Drill, VHM-Hochleistungsbohrer mit Innenkühlung CFK/ALU – ALU/CFK
Solid carbide Stack-drill with interior cooling for CFRP/GFRP-Alu – Alu-CFRP/GFRP



| | |
|--|----------------------|
| | CFK/GFK - CFRP/GFRP |
| | Aluminium - Aluminum |
| | Aluminium - Aluminum |
| | CFK/GFK - CFRP/GFRP |



| | |
|------------------------|-----------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HAK |
| | |
| | HSC HPC |
| | GELÄPPT LAPPED |
| | MMKS |



| | |
|---------------------------|------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 1253 | |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|---------|----|----|----|-------|--------|
| 29 0200 0300 023 | • 3,0 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0310 023 | • 3,1 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0320 023 | • 3,2 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0330 023 | • 3,3 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0340 023 | • 3,4 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0350 023 | • 3,5 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0360 023 | • 3,6 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0370 023 | • 3,7 | 23 | 28 | 66 | 6 | 114,00 |
| 29 0200 0380 029 | • 3,8 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0390 029 | • 3,9 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0400 029 | • 4,0 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0410 029 | • 4,1 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 04176 029 | • 4,176 | 29 | 36 | 74 | 6 | 117,00 |
| 29 0200 0420 029 | • 4,2 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0430 029 | • 4,3 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0440 029 | • 4,4 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0450 029 | • 4,5 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0460 029 | • 4,6 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0470 029 | • 4,7 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 0480 029 | • 4,8 | 29 | 36 | 74 | 6 | 116,00 |
| 29 0200 04837 029 | • 4,837 | 29 | 36 | 74 | 6 | 117,00 |
| 29 0200 0490 035 | • 4,9 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0500 035 | • 5,0 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0510 035 | • 5,1 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0520 035 | • 5,2 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0530 035 | • 5,3 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0540 035 | • 5,4 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0550 035 | • 5,5 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 05550 035 | • 5,55 | 35 | 44 | 82 | 6 | 120,00 |
| 29 0200 05565 035 | • 5,565 | 35 | 44 | 82 | 6 | 120,00 |
| 29 0200 0560 035 | • 5,6 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0570 035 | • 5,7 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0580 035 | • 5,8 | 35 | 44 | 82 | 6 | 120,00 |
| 29 0200 0590 035 | • 5,9 | 35 | 44 | 82 | 6 | 119,00 |
| 29 0200 0600 035 | • 6,0 | 35 | 44 | 82 | 6 | 128,00 |
| 29 0200 0610 043 | • 6,1 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0620 043 | • 6,2 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0630 043 | • 6,3 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 06365 043 | • 6,365 | 43 | 53 | 91 | 8 | 129,00 |
| 29 0200 0640 043 | • 6,4 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0650 043 | • 6,5 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0660 043 | • 6,6 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0670 043 | • 6,7 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0680 043 | • 6,8 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0690 043 | • 6,9 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0700 043 | • 7,0 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0710 043 | • 7,1 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0720 043 | • 7,2 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0730 043 | • 7,3 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0740 043 | • 7,4 | 43 | 53 | 91 | 8 | 128,00 |

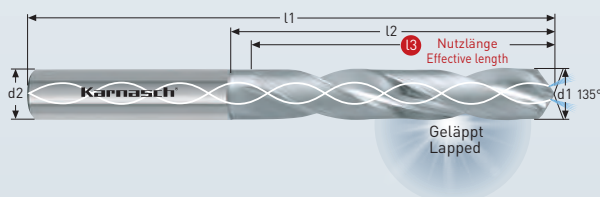
| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|----------|----|----|-----|-------|--------|
| 29 0200 0750 043 | • 7,5 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0760 043 | • 7,6 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0770 043 | • 7,7 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0780 043 | • 7,8 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0790 043 | • 7,9 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 07953 043 | • 7,953 | 43 | 53 | 91 | 8 | 129,00 |
| 29 0200 0800 043 | • 8,0 | 43 | 53 | 91 | 8 | 128,00 |
| 29 0200 0810 049 | • 8,1 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0820 049 | • 8,2 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0830 049 | • 8,3 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0840 049 | • 8,4 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0850 049 | • 8,5 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0860 049 | • 8,6 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0870 049 | • 8,7 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0880 049 | • 8,8 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0890 049 | • 8,9 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0900 049 | • 9,0 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0910 049 | • 9,1 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0920 049 | • 9,2 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0930 049 | • 9,3 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0940 049 | • 9,4 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0950 049 | • 9,5 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 09540 049 | • 9,540 | 49 | 61 | 103 | 10 | 187,00 |
| 29 0200 0960 049 | • 9,6 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0970 049 | • 9,7 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0980 049 | • 9,8 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 0990 049 | • 9,9 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 1000 049 | • 10,0 | 49 | 61 | 103 | 10 | 185,00 |
| 29 0200 1010 056 | • 10,1 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1020 056 | • 10,2 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1030 056 | • 10,3 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1040 056 | • 10,4 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1050 056 | • 10,5 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1060 056 | • 10,6 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1070 056 | • 10,7 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1080 056 | • 10,8 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1090 056 | • 10,9 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1100 056 | • 11,0 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1110 056 | • 11,1 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 11133 056 | • 11,133 | 56 | 71 | 118 | 12 | 259,00 |
| 29 0200 1120 056 | • 11,2 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1130 056 | • 11,3 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1140 056 | • 11,4 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1150 056 | • 11,5 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1160 056 | • 11,6 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1170 056 | • 11,7 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1180 056 | • 11,8 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1190 056 | • 11,9 | 56 | 71 | 118 | 12 | 256,00 |
| 29 0200 1200 056 | • 12,0 | 56 | 71 | 118 | 12 | 256,00 |

CNC-Stack-Drill, VHM-Hochleistungsbohrer mit Innenkühlung CFK/TITAN – TITAN/CFK
Solid carbide Stack-drill with interior cooling for CFRP/GFRP-Titan – Titan-CFRP/GFRP



29 0210

| | |
|----------|---------------------|
| C | CFK/GFK - CFRP/GFRP |
| T | Titan - Titanium |
| T | Titan - Titanium |
| C | CFK/GFK - CFRP/GFRP |



| | |
|------------------------|-----------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HAK |
| | |
| | HSC HPC |
| | GELÄPFT LAPPED |
| | MMKS |



Für den Einsatz auf CNC-Maschinen.

For the use on CNC-machines.

| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 1253 | |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|---------|----|----|----|-------|--------|
| 29 0210 0300 023 | • 3,0 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0310 023 | • 3,1 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0320 023 | • 3,2 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0330 023 | • 3,3 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0340 023 | • 3,4 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0350 023 | • 3,5 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0360 023 | • 3,6 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0370 023 | • 3,7 | 23 | 28 | 66 | 6 | 120,00 |
| 29 0210 0380 029 | • 3,8 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0390 029 | • 3,9 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0400 029 | • 4,0 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0410 029 | • 4,1 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 04176 029 | • 4,176 | 29 | 36 | 74 | 6 | 124,00 |
| 29 0210 0420 029 | • 4,2 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0430 029 | • 4,3 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0440 029 | • 4,4 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0450 029 | • 4,5 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0460 029 | • 4,6 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0470 029 | • 4,7 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 0480 029 | • 4,8 | 29 | 36 | 74 | 6 | 122,00 |
| 29 0210 04837 029 | • 4,837 | 29 | 36 | 74 | 6 | 124,00 |
| 29 0210 0490 035 | • 4,9 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0500 035 | • 5,0 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0510 035 | • 5,1 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0520 035 | • 5,2 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0530 035 | • 5,3 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0540 035 | • 5,4 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0550 035 | • 5,5 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0555 035 | • 5,55 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 05565 035 | • 5,565 | 35 | 44 | 82 | 6 | 127,00 |
| 29 0210 0560 035 | • 5,6 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0570 035 | • 5,7 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0580 035 | • 5,8 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0590 035 | • 5,9 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0600 035 | • 6,0 | 35 | 44 | 82 | 6 | 125,00 |
| 29 0210 0610 043 | • 6,1 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0620 043 | • 6,2 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0630 043 | • 6,3 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 06365 043 | • 6,365 | 43 | 53 | 91 | 8 | 136,00 |
| 29 0210 0640 043 | • 6,4 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0650 043 | • 6,5 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0660 043 | • 6,6 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0670 043 | • 6,7 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0680 043 | • 6,8 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0690 043 | • 6,9 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0700 043 | • 7,0 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0710 043 | • 7,1 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0720 043 | • 7,2 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0730 043 | • 7,3 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0740 043 | • 7,4 | 43 | 53 | 91 | 8 | 134,00 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|----------|----|----|-----|-------|--------|
| 29 0210 0750 043 | • 7,5 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0760 043 | • 7,6 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0770 043 | • 7,7 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0780 043 | • 7,8 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0790 043 | • 7,9 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 07953 043 | • 7,953 | 43 | 53 | 91 | 8 | 136,00 |
| 29 0210 0800 043 | • 8,0 | 43 | 53 | 91 | 8 | 134,00 |
| 29 0210 0810 049 | • 8,1 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0820 049 | • 8,2 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0830 049 | • 8,3 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0840 049 | • 8,4 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0850 049 | • 8,5 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0860 049 | • 8,6 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0870 049 | • 8,7 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0880 049 | • 8,8 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0890 049 | • 8,9 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0900 049 | • 9,0 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0910 049 | • 9,1 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0920 049 | • 9,2 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0930 049 | • 9,3 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0940 049 | • 9,4 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0950 049 | • 9,5 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 09540 049 | • 9,54 | 49 | 61 | 103 | 10 | 195,00 |
| 29 0210 0960 049 | • 9,6 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0970 049 | • 9,7 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0980 049 | • 9,8 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 0990 049 | • 9,9 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 1000 049 | • 10,0 | 49 | 61 | 103 | 10 | 193,00 |
| 29 0210 1010 056 | • 10,1 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1020 056 | • 10,2 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1030 056 | • 10,3 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1040 056 | • 10,4 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1050 056 | • 10,5 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1060 056 | • 10,6 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1070 056 | • 10,7 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1080 056 | • 10,8 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1090 056 | • 10,9 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1100 056 | • 11,0 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1110 056 | • 11,1 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 11133 056 | • 11,133 | 56 | 71 | 118 | 12 | 272,00 |
| 29 0210 1120 056 | • 11,2 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1130 056 | • 11,3 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1140 056 | • 11,4 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1150 056 | • 11,5 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1160 056 | • 11,6 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1170 056 | • 11,7 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1180 056 | • 11,8 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1190 056 | • 11,9 | 56 | 71 | 118 | 12 | 269,00 |
| 29 0210 1200 056 | • 12,0 | 56 | 71 | 118 | 12 | 269,00 |

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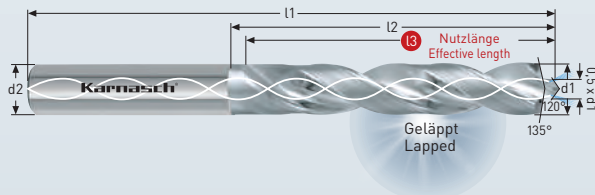
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29 0250

ROBO-Stack-Drill, VHM-Hochleistungsbohrer mit Innenkühlung CFK/ALU - ALU/CFK
Solid carbide ROBO-Stack-drill with interior cooling for CFRP/GFRP-Alu - Alu-CFRP/GFRP



| | |
|--|----------------------|
| | CFK/GFK - CFRP/GFRP |
| | Aluminium - Aluminum |
| | Aluminium - Aluminum |
| | CFK/GFK - CFRP/GFRP |



MICRO GRAIN KARNASCH NORM

SPEZIAL DIN 6535 Form HAK
SPECIAL

34° 135°

HSC HPC

GELÄPPT LAPPED

MMKS



Schnittdaten Cutting data [i](#)

Film Movie [▶](#)

1253

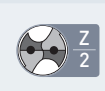
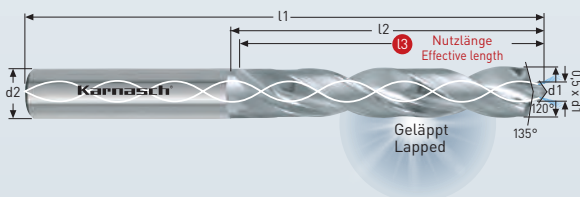
| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|----------|----|----|-----|-------|--------|
| 29 0250 0800 043 | • 8,0 | 43 | 53 | 91 | 8 | 142,00 |
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| 29 0250 0820 049 | • 8,2 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0830 049 | • 8,3 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0840 049 | • 8,4 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0850 049 | • 8,5 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0860 049 | • 8,6 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0870 049 | • 8,7 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0880 049 | • 8,8 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0890 049 | • 8,9 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0900 049 | • 9,0 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0910 049 | • 9,1 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0920 049 | • 9,2 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0930 049 | • 9,3 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0940 049 | • 9,4 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0950 049 | • 9,5 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0954 049 | • 9,54 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0960 049 | • 9,6 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0970 049 | • 9,7 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0980 049 | • 9,8 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 0990 049 | • 9,9 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 1000 049 | • 10,0 | 49 | 61 | 103 | 10 | 203,00 |
| 29 0250 1010 056 | • 10,1 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1020 056 | • 10,2 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1030 056 | • 10,3 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1040 056 | • 10,4 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1050 056 | • 10,5 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1060 056 | • 10,6 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1070 056 | • 10,7 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1080 056 | • 10,8 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1090 056 | • 10,9 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1100 056 | • 11,0 | 56 | 71 | 118 | 12 | 283,00 |
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| 29 0250 11133 056 | • 11,133 | 56 | 71 | 118 | 12 | 287,00 |
| 29 0250 1120 056 | • 11,2 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1130 056 | • 11,3 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1140 056 | • 11,4 | 56 | 71 | 118 | 12 | 283,00 |
| 29 0250 1150 056 | • 11,5 | 56 | 71 | 118 | 12 | 283,00 |
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| 29 0250 1230 060 | • 12,3 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1240 060 | • 12,4 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1250 060 | • 12,5 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1260 060 | • 12,6 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1270 060 | • 12,7 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1272 060 | • 12,72 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1280 060 | • 12,8 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1290 060 | • 12,9 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1300 060 | • 13,0 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1310 060 | • 13,1 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1320 060 | • 13,2 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1330 060 | • 13,3 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1340 060 | • 13,4 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1350 060 | • 13,5 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1360 060 | • 13,6 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1370 060 | • 13,7 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1380 060 | • 13,8 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1390 060 | • 13,9 | 60 | 77 | 124 | 14 | 380,00 |
| 29 0250 1400 060 | • 14,0 | 60 | 77 | 124 | 14 | 380,00 |


| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|----------|----|-----|-----|-------|--------|
| 29 0250 1410 063 | • 14,1 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1420 063 | • 14,2 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 14295 063 | • 14,295 | 63 | 83 | 133 | 16 | 476,00 |
| 29 0250 1430 063 | • 14,3 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1440 063 | • 14,4 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1450 063 | • 14,5 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1460 063 | • 14,6 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1470 063 | • 14,7 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1480 063 | • 14,8 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1490 063 | • 14,9 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1500 063 | • 15,0 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1510 063 | • 15,1 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1520 063 | • 15,2 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1530 063 | • 15,3 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1540 063 | • 15,4 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1550 063 | • 15,5 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1560 063 | • 15,6 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1570 063 | • 15,7 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1580 063 | • 15,8 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 15882 063 | • 15,882 | 63 | 83 | 133 | 16 | 476,00 |
| 29 0250 1590 063 | • 15,9 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1600 063 | • 16,0 | 63 | 83 | 133 | 16 | 469,00 |
| 29 0250 1610 071 | • 16,1 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1620 071 | • 16,2 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1630 071 | • 16,3 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1640 071 | • 16,4 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1650 071 | • 16,5 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1660 071 | • 16,6 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1670 071 | • 16,7 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1680 071 | • 16,8 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1690 071 | • 16,9 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1700 071 | • 17,0 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1710 071 | • 17,1 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1720 071 | • 17,2 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1730 071 | • 17,3 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1740 071 | • 17,4 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1750 071 | • 17,5 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1760 071 | • 17,6 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1770 071 | • 17,7 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1780 071 | • 17,8 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1790 071 | • 17,9 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1800 071 | • 18,0 | 71 | 93 | 143 | 18 | 620,00 |
| 29 0250 1810 077 | • 18,1 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1820 077 | • 18,2 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1830 077 | • 18,3 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1840 077 | • 18,4 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1850 077 | • 18,5 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1860 077 | • 18,6 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1870 077 | • 18,7 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1880 077 | • 18,8 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1890 077 | • 18,9 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1900 077 | • 19,0 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 19065 077 | • 19,065 | 77 | 101 | 153 | 20 | 775,00 |
| 29 0250 1910 077 | • 19,1 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1920 077 | • 19,2 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1930 077 | • 19,3 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1940 077 | • 19,4 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1950 077 | • 19,5 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1960 077 | • 19,6 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1970 077 | • 19,7 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1980 077 | • 19,8 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 1990 077 | • 19,9 | 77 | 101 | 153 | 20 | 763,00 |
| 29 0250 2000 077 | • 20,0 | 77 | 101 | 153 | 20 | 763,00 |


ROBO-Stack-Drill, VHM-Hochleistungsbohrer mit Innenkühlung CFK/TITAN – TITAN/CFK
Solid carbide ROBO-Stack-drill with interior cooling for CFRP/GFRP-Titan – Titan-CFRP/GFRP

 **29 0260**

-  CFK/GFK - CFRP/GFRP
-  Titan - Titanium
-  Titan - Titanium
-  CFK/GFK - CFRP/GFRP



Schnittdaten Cutting data  1253

Film Movie 

MICRO GRAIN KARNASCH NORM

SPEZIAL DIN 6535 Form HAK

HSC HPC

GELÄPPT LAPPED

MMKS

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|------------------|---------|----|----|-----|-------|--------|
| 29 0260 0800 043 | • 8,0 | 43 | 53 | 91 | 8 | 150,00 |
| 29 0260 0810 049 | • 8,1 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0820 049 | • 8,2 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0830 049 | • 8,3 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0840 049 | • 8,4 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0850 049 | • 8,5 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0860 049 | • 8,6 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0870 049 | • 8,7 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0880 049 | • 8,8 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0890 049 | • 8,9 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0900 049 | • 9,0 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0910 049 | • 9,1 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0920 049 | • 9,2 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0930 049 | • 9,3 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0940 049 | • 9,4 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0950 049 | • 9,5 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0954 049 | • 9,54 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0960 049 | • 9,6 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0970 049 | • 9,7 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0980 049 | • 9,8 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 0990 049 | • 9,9 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 1000 049 | • 10,0 | 49 | 61 | 103 | 10 | 212,00 |
| 29 0260 1010 056 | • 10,1 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1020 056 | • 10,2 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1030 056 | • 10,3 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1040 056 | • 10,4 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1050 056 | • 10,5 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1060 056 | • 10,6 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1070 056 | • 10,7 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1080 056 | • 10,8 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1090 056 | • 10,9 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1100 056 | • 11,0 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1110 056 | • 11,1 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1113 056 | • 11,13 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1120 056 | • 11,2 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1130 056 | • 11,3 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1140 056 | • 11,4 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1150 056 | • 11,5 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1160 056 | • 11,6 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1170 056 | • 11,7 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1180 056 | • 11,8 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1190 056 | • 11,9 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1200 056 | • 12,0 | 56 | 71 | 118 | 12 | 296,00 |
| 29 0260 1210 060 | • 12,1 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1220 060 | • 12,2 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1230 060 | • 12,3 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1240 060 | • 12,4 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1250 060 | • 12,5 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1260 060 | • 12,6 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1270 060 | • 12,7 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1272 060 | • 12,72 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1280 060 | • 12,8 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1290 060 | • 12,9 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1300 060 | • 13,0 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1310 060 | • 13,1 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1320 060 | • 13,2 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1330 060 | • 13,3 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1340 060 | • 13,4 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1350 060 | • 13,5 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1360 060 | • 13,6 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1370 060 | • 13,7 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1380 060 | • 13,8 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1390 060 | • 13,9 | 60 | 77 | 124 | 14 | 398,00 |
| 29 0260 1400 060 | • 14,0 | 60 | 77 | 124 | 14 | 398,00 |

| Art. | d1 h7 | l3 | l2 | l1 | d2 h6 | € |
|-------------------|----------|----|-----|-----|-------|--------|
| 29 0260 1410 063 | • 14,1 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1420 063 | • 14,2 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 14295 063 | • 14,295 | 63 | 83 | 133 | 16 | 499,00 |
| 29 0260 1430 063 | • 14,3 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1440 063 | • 14,4 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1450 063 | • 14,5 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1460 063 | • 14,6 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1470 063 | • 14,7 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1480 063 | • 14,8 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1490 063 | • 14,9 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1500 063 | • 15,0 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1510 063 | • 15,1 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1520 063 | • 15,2 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1530 063 | • 15,3 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1540 063 | • 15,4 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1550 063 | • 15,5 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1560 063 | • 15,6 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1570 063 | • 15,7 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1580 063 | • 15,8 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 15882 063 | • 15,882 | 63 | 83 | 133 | 16 | 499,00 |
| 29 0260 1590 063 | • 15,9 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1600 063 | • 16,0 | 63 | 83 | 133 | 16 | 491,00 |
| 29 0260 1610 071 | • 16,1 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1620 071 | • 16,2 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1630 071 | • 16,3 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1640 071 | • 16,4 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1650 071 | • 16,5 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1660 071 | • 16,6 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1670 071 | • 16,7 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1680 071 | • 16,8 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1690 071 | • 16,9 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1700 071 | • 17,0 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1710 071 | • 17,1 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1720 071 | • 17,2 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1730 071 | • 17,3 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1740 071 | • 17,4 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1750 071 | • 17,5 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1760 071 | • 17,6 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1770 071 | • 17,7 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1780 071 | • 17,8 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1790 071 | • 17,9 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1800 071 | • 18,0 | 71 | 93 | 143 | 18 | 650,00 |
| 29 0260 1810 077 | • 18,1 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1820 077 | • 18,2 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1830 077 | • 18,3 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1840 077 | • 18,4 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1850 077 | • 18,5 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1860 077 | • 18,6 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1870 077 | • 18,7 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1880 077 | • 18,8 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1890 077 | • 18,9 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1900 077 | • 19,0 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 19065 077 | • 19,065 | 77 | 101 | 153 | 20 | 810,00 |
| 29 0260 1910 077 | • 19,1 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1920 077 | • 19,2 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1930 077 | • 19,3 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1940 077 | • 19,4 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1950 077 | • 19,5 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1960 077 | • 19,6 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1970 077 | • 19,7 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1980 077 | • 19,8 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 1990 077 | • 19,9 | 77 | 101 | 153 | 20 | 798,00 |
| 29 0260 2000 077 | • 20,0 | 77 | 101 | 153 | 20 | 798,00 |

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2.2

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INHALTSVERZEICHNIS · TABLE OF CONTENTS

| Art. | Vollhartmetall Reibahlen / Solid carbide reamers | Material | | | | HSC High-Speed Cutting | HRC < 45 | HRC < 50 |
|---------|--|-------------|-----|---|---|------------------------------|-------------|-------------|
| 22 1450 | Ø 0,200 - 0,595 | MICRO GRAIN | 300 | | ✓ | ✓ | ✓ | |
| 22 1452 | Ø 0,60 - 3,50 | MICRO GRAIN | 301 | | ✓ | ✓ | ✓ | |
| 22 1490 | Ø 1,0 - 12,0 | MICRO GRAIN | 302 | ✓ | | | | |



- Lagerware / Stock tool
- Keine Lagerware, Lieferzeit und Preis auf Anfrage
No stock tool. Price and delivery on request
- ☐ Lieferzeit kurzfristig da Rohlinglager vorhanden
Short delivery deadline possible then blanks are on stock available

- 🏷️ Sonderpreis. Solange Vorrat reicht. Rückgabe nicht möglich.
Special price. While stocks last. Return not possible.
- 📅 2-3 Arbeitstage Lieferzeit / 2-3 work days delivery time

| HRC < 55 | HRC < 60 | HRC < 65 | HRC < 70 | STAHL <small>stap</small> <small>< 800 N/mm²</small> | INOX Edelstahl <small>STAINLESS STEEL</small> | INCONEL HASTELLOY TITANIUM | GJL | GJS | GTW GTS | NE METALLE <small>non-ferrous</small> | kurz- spanend <small>short chip</small> | lang- spanend <small>long chip</small> | MIT INNEN- KÜHLUNG <small>with internal cooling</small> | OHNE INNEN- KÜHLUNG <small>without internal cooling</small> | DIN 6535 Form HA | DIN 6535 Form HE | DIN 6535 Form HAK | DIN 6535 Form HEK |
|----------|----------|----------|----------|---|---|----------------------------------|-----|-----|------------|---|---|--|---|---|---------------------|---------------------|----------------------|----------------------|
| | | | | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | | | |
| | | | | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | | | |
| ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | | | ✓ | | | ✓ | ✓ | | | |

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4



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9



Index

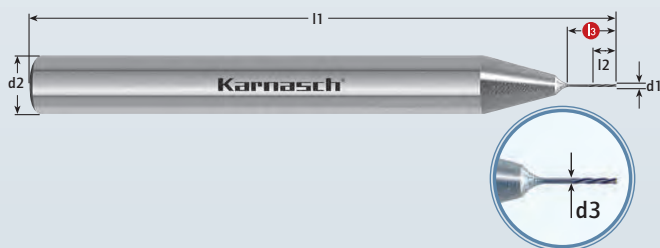
22 1450

Miniatur-Vollhartmetall-High-Speed-Präzisionsreibahlen HSR. Linksspirale, rechtsschneidend
Miniature Micro Grain high-speed reamers / HSR. Left hand spiral fluted, right hand cutting



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

| | |
|--|-----------------------------------|
| HRC < 45 | Alu-minium |
| INOX stainless steel < 900 N/mm ² ferritic | MESSING brass |
| INOX stainless steel > 900 N/mm ² martensitic | Kupfer copper |
| INOX stainless steel < 900 N/mm ² austenitic | kurz-spanend short chip |
| GG/G cast iron | lang-spanend long chip |
| TITAN TITANIUM < 1100 N/mm ² | |



| | |
|---------------------------|----------------------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | HSR HIGH SPEED REAMERS |
| | POLIERT POLISHED |
| | |

Schnittdaten Cutting data **1259**

Zeichnungen Drawings **DXF/STEP**

| Art. | d1 ± 0,001 | l3 | d2 h6 | l1 | l2 / - 0,1 | d3 -0,001 | Z | € |
|--------------|------------|-----|-------|----|------------|-----------|---|--------|
| 22 1450 0200 | • 0,200 | 2,0 | 3,0 | 40 | 1,0 | 0,199 | 4 | 115,50 |
| 22 1450 0205 | • 0,205 | 2,0 | 3,0 | 40 | 1,0 | 0,204 | 4 | 115,50 |
| 22 1450 0210 | • 0,210 | 2,0 | 3,0 | 40 | 1,0 | 0,209 | 4 | 115,50 |
| 22 1450 0215 | • 0,215 | 2,0 | 3,0 | 40 | 1,0 | 0,214 | 4 | 115,50 |
| 22 1450 0220 | • 0,220 | 2,0 | 3,0 | 40 | 1,0 | 0,219 | 4 | 115,50 |
| 22 1450 0225 | • 0,225 | 2,0 | 3,0 | 40 | 1,0 | 0,224 | 4 | 115,50 |
| 22 1450 0230 | • 0,230 | 2,0 | 3,0 | 40 | 1,0 | 0,229 | 4 | 115,50 |
| 22 1450 0235 | • 0,235 | 2,0 | 3,0 | 40 | 1,0 | 0,234 | 4 | 115,50 |
| 22 1450 0240 | • 0,240 | 2,0 | 3,0 | 40 | 1,0 | 0,239 | 4 | 115,50 |
| 22 1450 0245 | • 0,245 | 2,0 | 3,0 | 40 | 1,0 | 0,244 | 4 | 115,50 |
| 22 1450 0250 | • 0,250 | 2,5 | 3,0 | 40 | 1,2 | 0,249 | 4 | 114,50 |
| 22 1450 0255 | • 0,255 | 2,5 | 3,0 | 40 | 1,2 | 0,254 | 4 | 114,50 |
| 22 1450 0260 | • 0,260 | 2,5 | 3,0 | 40 | 1,2 | 0,259 | 4 | 114,50 |
| 22 1450 0265 | • 0,265 | 2,5 | 3,0 | 40 | 1,2 | 0,264 | 4 | 114,50 |
| 22 1450 0270 | • 0,270 | 2,5 | 3,0 | 40 | 1,2 | 0,269 | 4 | 114,50 |
| 22 1450 0275 | • 0,275 | 2,5 | 3,0 | 40 | 1,2 | 0,274 | 4 | 114,50 |
| 22 1450 0280 | • 0,280 | 2,5 | 3,0 | 40 | 1,2 | 0,279 | 4 | 114,50 |
| 22 1450 0285 | • 0,285 | 2,5 | 3,0 | 40 | 1,2 | 0,284 | 4 | 114,50 |
| 22 1450 0290 | • 0,290 | 2,5 | 3,0 | 40 | 1,2 | 0,289 | 4 | 114,50 |
| 22 1450 0295 | • 0,295 | 2,5 | 3,0 | 40 | 1,2 | 0,294 | 4 | 114,50 |
| 22 1450 0300 | • 0,300 | 3,0 | 3,0 | 40 | 1,5 | 0,299 | 4 | 113,00 |
| 22 1450 0305 | • 0,305 | 3,0 | 3,0 | 40 | 1,5 | 0,304 | 4 | 113,00 |
| 22 1450 0310 | • 0,310 | 3,0 | 3,0 | 40 | 1,5 | 0,309 | 4 | 113,00 |
| 22 1450 0315 | • 0,315 | 3,0 | 3,0 | 40 | 1,5 | 0,314 | 4 | 113,00 |
| 22 1450 0320 | • 0,320 | 3,0 | 3,0 | 40 | 1,5 | 0,319 | 4 | 113,00 |
| 22 1450 0325 | • 0,325 | 3,0 | 3,0 | 40 | 1,5 | 0,324 | 4 | 113,00 |
| 22 1450 0330 | • 0,330 | 3,0 | 3,0 | 40 | 1,5 | 0,329 | 4 | 113,00 |
| 22 1450 0335 | • 0,335 | 3,0 | 3,0 | 40 | 1,5 | 0,334 | 4 | 113,00 |
| 22 1450 0340 | • 0,340 | 3,0 | 3,0 | 40 | 1,5 | 0,339 | 4 | 113,00 |
| 22 1450 0345 | • 0,345 | 3,0 | 3,0 | 40 | 1,5 | 0,344 | 4 | 113,00 |
| 22 1450 0350 | • 0,350 | 3,5 | 3,0 | 40 | 1,8 | 0,349 | 4 | 112,00 |
| 22 1450 0355 | • 0,355 | 3,5 | 3,0 | 40 | 1,8 | 0,354 | 4 | 112,00 |
| 22 1450 0360 | • 0,360 | 3,5 | 3,0 | 40 | 1,8 | 0,359 | 4 | 112,00 |
| 22 1450 0365 | • 0,365 | 3,5 | 3,0 | 40 | 1,8 | 0,364 | 4 | 112,00 |
| 22 1450 0370 | • 0,370 | 3,5 | 3,0 | 40 | 1,8 | 0,369 | 4 | 112,00 |
| 22 1450 0375 | • 0,375 | 3,5 | 3,0 | 40 | 1,8 | 0,374 | 4 | 112,00 |
| 22 1450 0380 | • 0,380 | 3,5 | 3,0 | 40 | 1,8 | 0,379 | 4 | 112,00 |
| 22 1450 0385 | • 0,385 | 3,5 | 3,0 | 40 | 1,8 | 0,384 | 4 | 112,00 |
| 22 1450 0390 | • 0,390 | 3,5 | 3,0 | 40 | 1,8 | 0,389 | 4 | 112,00 |
| 22 1450 0395 | • 0,395 | 3,5 | 3,0 | 40 | 1,8 | 0,394 | 4 | 112,00 |

| Art. | d1 ± 0,001 | l3 | d2 h6 | l1 | l2 / - 0,1 | d3 -0,001 | Z | € |
|--------------|------------|-----|-------|----|------------|-----------|---|--------|
| 22 1450 0400 | • 0,400 | 4,0 | 3,0 | 40 | 2,0 | 0,399 | 4 | 111,00 |
| 22 1450 0405 | • 0,405 | 4,0 | 3,0 | 40 | 2,0 | 0,404 | 4 | 111,00 |
| 22 1450 0410 | • 0,410 | 4,0 | 3,0 | 40 | 2,0 | 0,409 | 4 | 111,00 |
| 22 1450 0415 | • 0,415 | 4,0 | 3,0 | 40 | 2,0 | 0,414 | 4 | 111,00 |
| 22 1450 0420 | • 0,420 | 4,0 | 3,0 | 40 | 2,0 | 0,419 | 4 | 111,00 |
| 22 1450 0425 | • 0,425 | 4,0 | 3,0 | 40 | 2,0 | 0,424 | 4 | 111,00 |
| 22 1450 0430 | • 0,430 | 4,0 | 3,0 | 40 | 2,0 | 0,429 | 4 | 111,00 |
| 22 1450 0435 | • 0,435 | 4,0 | 3,0 | 40 | 2,0 | 0,434 | 4 | 111,00 |
| 22 1450 0440 | • 0,440 | 4,0 | 3,0 | 40 | 2,0 | 0,439 | 4 | 111,00 |
| 22 1450 0445 | • 0,445 | 4,0 | 3,0 | 40 | 2,0 | 0,444 | 4 | 111,00 |
| 22 1450 0450 | • 0,450 | 4,0 | 3,0 | 40 | 2,0 | 0,449 | 4 | 111,00 |
| 22 1450 0455 | • 0,455 | 4,0 | 3,0 | 40 | 2,0 | 0,454 | 4 | 111,00 |
| 22 1450 0460 | • 0,460 | 4,0 | 3,0 | 40 | 2,0 | 0,459 | 4 | 111,00 |
| 22 1450 0465 | • 0,465 | 4,0 | 3,0 | 40 | 2,0 | 0,464 | 4 | 111,00 |
| 22 1450 0470 | • 0,470 | 4,0 | 3,0 | 40 | 2,0 | 0,469 | 4 | 111,00 |
| 22 1450 0475 | • 0,475 | 4,0 | 3,0 | 40 | 2,0 | 0,474 | 4 | 111,00 |
| 22 1450 0480 | • 0,480 | 4,0 | 3,0 | 40 | 2,0 | 0,479 | 4 | 111,00 |
| 22 1450 0485 | • 0,485 | 4,0 | 3,0 | 40 | 2,0 | 0,484 | 4 | 111,00 |
| 22 1450 0490 | • 0,490 | 4,0 | 3,0 | 40 | 2,0 | 0,489 | 4 | 111,00 |
| 22 1450 0495 | • 0,495 | 4,0 | 3,0 | 40 | 2,0 | 0,494 | 4 | 111,00 |
| 22 1450 0500 | • 0,500 | 5,0 | 3,0 | 40 | 2,4 | 0,499 | 4 | 110,00 |
| 22 1450 0505 | • 0,505 | 5,0 | 3,0 | 40 | 2,4 | 0,504 | 4 | 110,00 |
| 22 1450 0510 | • 0,510 | 5,0 | 3,0 | 40 | 2,4 | 0,509 | 4 | 110,00 |
| 22 1450 0515 | • 0,515 | 5,0 | 3,0 | 40 | 2,4 | 0,514 | 4 | 110,00 |
| 22 1450 0520 | • 0,520 | 5,0 | 3,0 | 40 | 2,4 | 0,519 | 4 | 110,00 |
| 22 1450 0525 | • 0,525 | 5,0 | 3,0 | 40 | 2,4 | 0,524 | 4 | 110,00 |
| 22 1450 0530 | • 0,530 | 5,0 | 3,0 | 40 | 2,4 | 0,529 | 4 | 110,00 |
| 22 1450 0535 | • 0,535 | 5,0 | 3,0 | 40 | 2,4 | 0,534 | 4 | 110,00 |
| 22 1450 0540 | • 0,540 | 5,0 | 3,0 | 40 | 2,4 | 0,539 | 4 | 110,00 |
| 22 1450 0545 | • 0,545 | 5,0 | 3,0 | 40 | 2,4 | 0,544 | 4 | 110,00 |
| 22 1450 0550 | • 0,550 | 5,0 | 3,0 | 40 | 2,4 | 0,549 | 4 | 110,00 |
| 22 1450 0555 | • 0,555 | 5,0 | 3,0 | 40 | 2,4 | 0,554 | 4 | 110,00 |
| 22 1450 0560 | • 0,560 | 5,0 | 3,0 | 40 | 2,4 | 0,559 | 4 | 110,00 |
| 22 1450 0565 | • 0,565 | 5,0 | 3,0 | 40 | 2,4 | 0,564 | 4 | 110,00 |
| 22 1450 0570 | • 0,570 | 5,0 | 3,0 | 40 | 2,4 | 0,569 | 4 | 110,00 |
| 22 1450 0575 | • 0,575 | 5,0 | 3,0 | 40 | 2,4 | 0,574 | 4 | 110,00 |
| 22 1450 0580 | • 0,580 | 5,0 | 3,0 | 40 | 2,4 | 0,579 | 4 | 110,00 |
| 22 1450 0585 | • 0,585 | 5,0 | 3,0 | 40 | 2,4 | 0,584 | 4 | 110,00 |
| 22 1450 0590 | • 0,590 | 5,0 | 3,0 | 40 | 2,4 | 0,589 | 4 | 110,00 |
| 22 1450 0595 | • 0,595 | 5,0 | 3,0 | 40 | 2,4 | 0,594 | 4 | 110,00 |

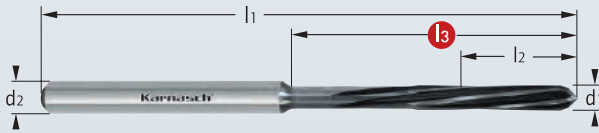
• ab Lager / stock
 Alle Abmessungen in µm-Abstufung lieferbar / Lieferzeit unbeschichtet ca. 5 Arbeitstage / beschichtet ca. 8 Tage
 All dimensions available in µm-steps / Delivery time without coating 5 working days / with coating 8 working days

Miniatur- Vollhartmetall- Präzisionsreibahlen HPC. Linksspirale, rechtsschneidend
 Miniature Micro Grain high-speed reamers / HPC. Left hand spiral fluted, right hand cutting



22 1452

- HRC < 45** MESSING brass
- INOX** stainless steel < 900 N/mm² ferritic KUPFER copper
- INOX** stainless steel > 900 N/mm² martensitic Gold gold
- INOX** stainless steel < 900 N/mm² austenitic kurz-spanend short chip
- GG/G** cast iron lang-spanend long chip
- Alu-minium**



Zwischenabmessungen und Sondertoleranzen sind auf Anfrage kurzfristig Lieferbar.

Intermediate sizes and special tolerances are available at short notice on request.

- MICRO GRAIN** KARNASCH NORM
- SPEZIAL** Form HA SPECIAL
- HPC**
- POLIERT** POLISHED

Schnittdaten Cutting data

| Art. | d1 | | l3 | d2 | l1 | l2 | Z | € |
|--------------|------|--------|----|------|----|----|---|-------|
| 22 1452 0080 | 0,80 | +0,003 | 10 | 0,80 | 34 | 7 | 4 | 37,20 |
| 22 1452 0090 | 0,90 | +0,003 | 10 | 0,90 | 34 | 7 | 4 | 37,20 |
| 22 1452 0098 | 0,98 | +0,004 | 21 | 4,0 | 50 | 6 | 3 | 36,60 |
| 22 1452 0101 | 1,01 | +0,004 | 21 | 4,0 | 50 | 6 | 3 | 36,60 |
| 22 1452 0102 | 1,02 | +0,004 | 21 | 4,0 | 50 | 6 | 3 | 36,60 |
| 22 1452 0103 | 1,03 | +0,004 | 21 | 4,0 | 50 | 6 | 3 | 36,60 |
| 22 1452 0148 | 1,48 | +0,004 | 21 | 4,0 | 50 | 9 | 3 | 36,60 |
| 22 1452 0151 | 1,51 | +0,004 | 21 | 4,0 | 50 | 9 | 3 | 36,60 |
| 22 1452 0152 | 1,52 | +0,004 | 21 | 4,0 | 50 | 9 | 3 | 36,60 |
| 22 1452 0160 | 1,60 | H7 | 21 | 4,0 | 50 | 12 | 3 | 40,80 |
| 22 1452 0198 | 1,98 | +0,004 | 21 | 4,0 | 50 | 12 | 4 | 36,60 |
| 22 1452 0201 | 2,01 | +0,004 | 21 | 4,0 | 50 | 12 | 4 | 36,60 |
| 22 1452 0248 | 2,48 | +0,004 | 31 | 4,0 | 60 | 16 | 4 | 36,60 |
| 22 1452 0249 | 2,49 | +0,004 | 31 | 4,0 | 60 | 16 | 4 | 36,60 |
| 22 1452 0250 | 2,50 | H7 | 31 | 4,0 | 60 | 16 | 4 | 36,60 |
| 22 1452 0280 | 2,80 | H7 | 35 | 4,0 | 63 | 16 | 6 | 42,00 |
| 22 1452 0297 | 2,97 | +0,004 | 35 | 4,0 | 63 | 16 | 6 | 38,40 |
| 22 1452 0298 | 2,98 | +0,004 | 35 | 4,0 | 63 | 16 | 6 | 38,40 |
| 22 1452 0301 | 3,01 | +0,004 | 35 | 4,0 | 63 | 16 | 6 | 38,40 |
| 22 1452 0302 | 3,02 | +0,004 | 35 | 4,0 | 63 | 16 | 6 | 38,40 |
| 22 1452 0303 | 3,03 | +0,004 | 35 | 4,0 | 63 | 16 | 6 | 38,40 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
 Special price / sale article. While stocks last.

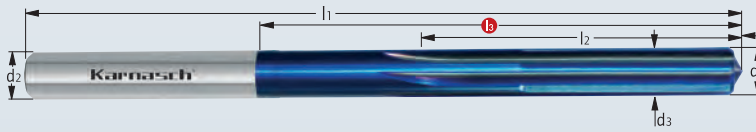
Alle Abmessungen in µm-Abstufung lieferbar / Lieferzeit 4-8 Arbeitstage
 All dimensions available in µm-steps / Delivery time 4-8 working days

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

22 1490

Vollhartmetall Maschinenreibahle für die Hartbearbeitung HHC, < 67 HRC, gerade genutet, rechtsschneidend
Micro grain machine reamers for high hard material HHC < 67 HRC straight fluted, right hand cut



| | |
|------------------------|------------------|
| MICRO GRAIN | KARNASCH NORM |
| SPEZIAL SPECIAL | DIN 6535 Form HA |
| | 30° 0° |
| | HHC |
| | FX-70 |
| | |

| Art. | d1 H7 | l3 | d2 h7 | l2 | l1 | Z | € |
|--------------|---------|-----|-------|----|-----|---|--------|
| 22 1490 0297 | • 2,97 | 30 | 4 | 16 | 65 | 4 | 90,00 |
| 22 1490 0298 | • 2,98 | 30 | 4 | 16 | 65 | 4 | 90,00 |
| 22 1490 0299 | • 2,99 | 30 | 4 | 16 | 65 | 4 | 90,00 |
| 22 1490 0300 | • 3,00 | 30 | 4 | 16 | 65 | 4 | 90,00 |
| 22 1490 0301 | • 3,01 | 30 | 4 | 16 | 65 | 4 | 90,00 |
| 22 1490 0302 | • 3,02 | 30 | 4 | 16 | 65 | 4 | 90,00 |
| 22 1490 0303 | • 3,03 | 30 | 4 | 16 | 65 | 4 | 90,00 |
| 22 1490 0397 | • 3,97 | 40 | 4 | 20 | 75 | 4 | 90,00 |
| 22 1490 0398 | • 3,98 | 40 | 4 | 20 | 75 | 4 | 90,00 |
| 22 1490 0399 | • 3,99 | 40 | 4 | 20 | 75 | 4 | 90,00 |
| 22 1490 0400 | • 4,00 | 40 | 4 | 20 | 75 | 4 | 90,00 |
| 22 1490 0401 | • 4,01 | 40 | 4 | 20 | 75 | 4 | 90,00 |
| 22 1490 0402 | • 4,02 | 40 | 4 | 20 | 75 | 4 | 90,00 |
| 22 1490 0403 | • 4,03 | 40 | 4 | 20 | 75 | 4 | 90,00 |
| 22 1490 0497 | • 4,97 | 50 | 6 | 25 | 92 | 6 | 111,00 |
| 22 1490 0498 | • 4,98 | 50 | 6 | 25 | 92 | 6 | 111,00 |
| 22 1490 0499 | • 4,99 | 50 | 6 | 25 | 92 | 6 | 111,00 |
| 22 1490 0500 | • 5,00 | 50 | 6 | 25 | 92 | 6 | 111,00 |
| 22 1490 0501 | • 5,01 | 50 | 6 | 25 | 92 | 6 | 111,00 |
| 22 1490 0502 | • 5,02 | 50 | 6 | 25 | 92 | 6 | 111,00 |
| 22 1490 0503 | • 5,03 | 50 | 6 | 25 | 92 | 6 | 111,00 |
| 22 1490 0597 | • 5,97 | 50 | 6 | 25 | 92 | 6 | 111,00 |
| 22 1490 0598 | • 5,98 | 50 | 6 | 25 | 92 | 6 | 111,00 |
| 22 1490 0599 | • 5,99 | 50 | 6 | 25 | 92 | 6 | 111,00 |
| 22 1490 0600 | • 6,00 | 50 | 6 | 25 | 92 | 6 | 111,00 |
| 22 1490 0601 | • 6,01 | 50 | 6 | 25 | 92 | 6 | 111,00 |
| 22 1490 0602 | • 6,02 | 50 | 6 | 25 | 92 | 6 | 111,00 |
| 22 1490 0603 | • 6,03 | 50 | 6 | 25 | 92 | 6 | 111,00 |
| 22 1490 0797 | • 7,97 | 75 | 8 | 30 | 115 | 6 | 138,00 |
| 22 1490 0798 | • 7,98 | 75 | 8 | 30 | 115 | 6 | 138,00 |
| 22 1490 0799 | • 7,99 | 75 | 8 | 30 | 115 | 6 | 138,00 |
| 22 1490 0800 | • 8,00 | 75 | 8 | 30 | 115 | 6 | 138,00 |
| 22 1490 0801 | • 8,01 | 75 | 8 | 30 | 115 | 6 | 138,00 |
| 22 1490 0802 | • 8,02 | 75 | 8 | 30 | 115 | 6 | 138,00 |
| 22 1490 0803 | • 8,03 | 75 | 8 | 30 | 115 | 6 | 138,00 |
| 22 1490 0997 | • 9,97 | 85 | 10 | 40 | 130 | 6 | 169,00 |
| 22 1490 0998 | • 9,98 | 85 | 10 | 40 | 130 | 6 | 169,00 |
| 22 1490 0999 | • 9,99 | 85 | 10 | 40 | 130 | 6 | 169,00 |
| 22 1490 1000 | • 10,00 | 85 | 10 | 40 | 130 | 6 | 169,00 |
| 22 1490 1001 | • 10,01 | 85 | 10 | 40 | 130 | 6 | 169,00 |
| 22 1490 1002 | • 10,02 | 85 | 10 | 40 | 130 | 6 | 169,00 |
| 22 1490 1003 | • 10,03 | 85 | 10 | 40 | 130 | 6 | 169,00 |
| 22 1490 1197 | • 11,97 | 100 | 12 | 45 | 150 | 6 | 221,00 |
| 22 1490 1198 | • 11,98 | 100 | 12 | 45 | 150 | 6 | 221,00 |
| 22 1490 1199 | • 11,99 | 100 | 12 | 45 | 150 | 6 | 221,00 |
| 22 1490 1200 | • 12,00 | 100 | 12 | 45 | 150 | 6 | 221,00 |
| 22 1490 1201 | • 12,01 | 100 | 12 | 45 | 150 | 6 | 221,00 |
| 22 1490 1202 | • 12,02 | 100 | 12 | 45 | 150 | 6 | 221,00 |
| 22 1490 1203 | • 12,03 | 100 | 12 | 45 | 150 | 6 | 221,00 |

Schnittdaten Cutting data
Zeichnungen Drawings

1259

Zwischenabmessungen auf Anfrage lieferbar / Intermediate dimensions available on request

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

SPATENBOHRER

SPADE DRILLS



2.3

KONTAKT | CONTACT

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INDUSTRIAL TOOLS DIVISION

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D-15848 Tauche/OT Görzdorf
mail@karnasch.tools

+49 (0) 33675 - 7265-0

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<http://shop.karnasch.tools>



ONLINE



WARUM SPATENBOHRER · WHY SPADE DRILLS

Reduzieren Sie Ihre Kosten pro Bohrung durch Karnasch Spatenbohrer

Spatenbohrer sind das Hauptprodukt von Karnasch im Bereich Bohrer mit auswechselbaren Schneidköpfen. Spatenbohrer sind hocheffiziente Bohrwerkzeuge mit herausragenden Leistungsparametern. Spatenbohrer ersetzen die veraltete Bohrtechnik der komplett aus HSS / HSS-Co Kobalt / Pulverstahl bestehenden Bohrwerkzeuge. Spatenbohrer sind eine hervorragende Ergänzung für den Bereich Vollhartmetallbohrer. Spatenbohrer bestehen aus 2 Teilen – Halter und Schneideinsätze.

Die Vorteile sind:

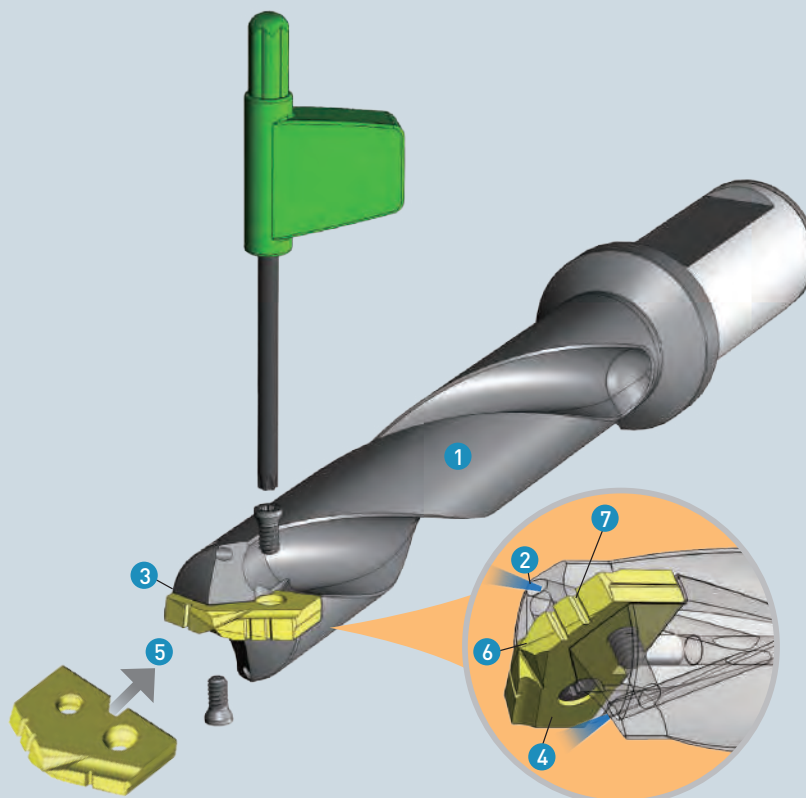
- 1 Es werden nur 14 Halter benötigt um den Durchmesserbereich Ø 9,5 – 114 mm abzudecken.
- 2 Innere Kühlmittelzufuhr für hervorragende Spanabfuhr auch bei tiefen Bohrungen.
- 3 Die hochpräzise Verbindung zwischen Halter und Schneideinsatz gewährleistet engste Toleranzen und leicht zu wechselnde Schneideinsätze.
- 4 Die Schneideinsätze sind aus Pulverstahl oder Hartmetall gefertigt, in Toleranz h8. Zusätzlich erhalten alle Schneideinsätze eine auf Ihren Einsatzzweck optimierte Beschichtung. Aus dieser Kombination resultieren wesentlich höhere Schnittleistungen / Standzeiten als bei konventionellen Bohrwerkzeugen. (Einsatzparameter siehe Seite 1304-1311)
- 5 Durch schnellen Austausch der Schneideinsätze ist der Spatenbohrer sofort wieder einsatzbereit. Nicht nötig (wie bei konventionellen Vollstahl-Bohrern) den kompletten Bohrer zur Aufarbeitung / Schärfen zu schicken.
- 6 Die optimierte XR-Schneidkante an den Schneideinsätzen reduziert erheblich die Zerspanungskräfte.
- 7 Unter anderem verfügen alle Schneideinsätze über eine „Spanbrecher-Funktion“ welche nochmals die Stabilität während des Bohrvorgangs erhöht.

Reduce your drilling cost by using KARNASCH spade drill

Spade drill is one of the main interchangeable insert drill from KARNASCH. It is a high efficient drilling tool with superior performance, designing to substitute those traditional hole drilling products with low efficiency and inconvenient usage. It consists of two parts – holder and inserts.

Its advantages are:

- 1 Only 14 holders can meet the demand for drilling holes from Ø 9.5 to Ø 114 mm.
- 2 Inner cooling design of holder enable excellent chip removal and good cooling when drilling deep holes.
- 3 High accuracy of the connections between the inserts and holders ensures high clamping accuracy, and easy to replace inserts.
- 4 Inserts are made of powder high speed steel or carbide, in tolerance h8, combined with various coatings. This improves extremely the tool life and drilling speed in comparison to normal twist drills (see cutting data page 1304-1311).
- 5 Replaceable structure, which is more convenient. No need of regrinding drill on the scene.
- 6 New type XR edge reduce the cutting resistance greatly.
- 7 Inserts have the function of chip-breaker, which improves the stability of holes drilling.



WARUM SPATENBOHRER · WHY SPADE DRILLS

Spatenbohrer sind das ideale Bohrwerkzeug für alle modernen CNC-Maschinen wie zum Beispiel:

- Numerisch gesteuerte Säulenbohrmaschinen / Radialbohrmaschinen
- Numerisch gesteuerte Drehmaschinen
- Bearbeitungszentren

Vorzugsweise werden hier Hartmetall-Einsätze angewendet

Spade drill is the perfect drilling tool match all kinds of modern CNC machines such as:

- Numerically controlled planar drill
- Numerically controlled lathe
- Machining centers

Preferably carbide insert are applied



Spatenbohrer sind das ideale Bohrwerkzeug für alle traditionellen / manuellen Bohrmaschinen wie zum Beispiel:

- Säulenbohrmaschinen
- Radialbohrmaschinen
- Alle Arten von vertikalen Bohrmaschinen
- Nicht numerisch gesteuerte Drehmaschinen

Vorzugsweise werden hier Pulverstahl-Einsätze angewendet

Spade drill is the perfect drilling tool match all kinds of traditional / manual drilling machines such as:

- Pillar drilling machines
- Radial drilling machines
- Vertical driller
- Non numerically controlled lathe

Preferably powder steel insert are applied



BESCHREIBUNG DES EINSATZES · DESCRIPTION OF INSERT MODEL

Spanbrecher

- Durch Spanbrecher bessere Spanabfuhr sowie weniger Schnittkräfte.

Chip breaker

- Chip breaking, better chip removal
- Reduce drilling torque

Beschichtung

Alle Einsätze erhalten spezielle Beschichtungen

Coating

All inserts receives special coatings

Spanteilerrillen

- Reduziert die Spanlänge.
- Dadurch bessere Spanabfuhr sowie reduzierte Schnittkräfte.

Chip dividing groove

- Reduce cutting width
- Better chip removal
- Reduce drilling torque

Durchmesser-Fase

- Verbessert die Stabilität des Schneideinsatzes.
- Reduziert den Verschleiß des Außendurchmessers am Schneideinsatz.
- Verbessert die Oberfläche am Werkstück.

Diameter chamferer

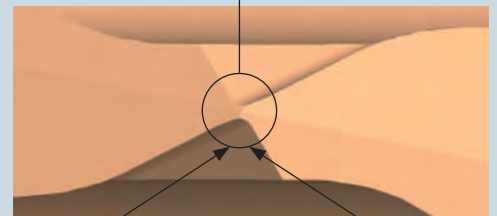
- Increase the strength of insert
- Reduce the wear & tear of outer diameter
- Improve the smoothness on the surface of workpiece

Bohrerspitze

- Durch ausgespitzte Zentrumsschneiden werden die axialen Kräfte bis zu 20% gegenüber konventionellen Bohrern reduziert.

Core drilling

- Thinner core drilling, which reduce 20% axial resistance compared with normal drilling products.
- Better self-centering



XR-Querschneid-Schliff

- Verbessert die Stabilität der Schneidkanten.
- Verbessert im Allgemeinen nochmals die Stabilität des gesamten Schneideinsatzes.

Zwei Rückenflankenflächen

- Reduziert die Reibung mit dem Werkstück.
- Verbessert die Selbstzentrierung.
- Reduziert die axialen Kräfte.

Two back flank surfaces

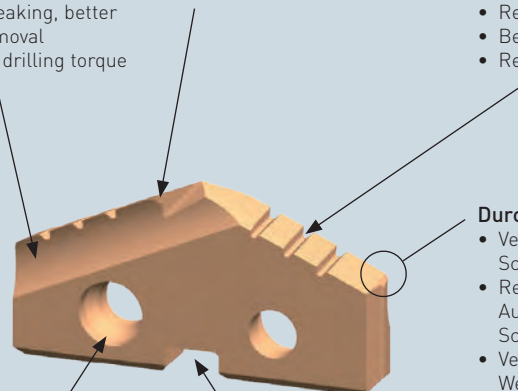
- Reduce the friction with the workpiece
- Better self-centering
- Reduce the axial resistance

Fix screw holes

- Safe and reliable clamping
- Ensure the stability during drilling

Location groove

- Ensure the accuracy of the radial direction



Befestigungsbohrungen

- Sichere und zuverlässige Befestigung der Schneideinsätze für höchste Stabilität während des Bohrvorgangs.

Positionierungs-Nut

- Gewährleistet die akkurate Positionierung der Schneideinsätze bei der radialen Drehbewegung.




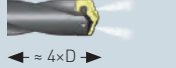
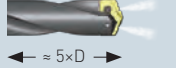
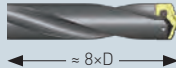


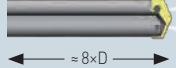
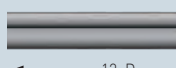

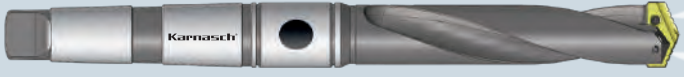


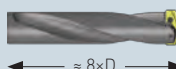



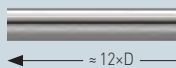
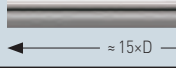

PULVERSTAHL-EINSÄTZE ANWENDUNG · POWDER STEEL INSERTS APPLICATION

| | | | |
|--|--|---|--|
|  <p>132°</p> <p>Ø 9,5-65 mm Ø 0.374-2.559"</p> | <p>22 2010</p> <p>Pulverstahl 25 STEEL-TEC beschichtet Für Edelstahl, Stahl, Guss</p> <p>Powder steel 25 STEEL-TEC coated For stainless steel, steel, cast iron</p> | <p>STAHL steel < 1400 N/mm²</p> <p>INOX Edelstahl stainless steel</p> <p>GG/G cast iron</p> | <p>Zum Bohren der meisten Stähle, Gusseisen bis zu einer Härte von 400 HBW (1365 Nmm²). Passen ebenfalls zu: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> <p>For drilling almost all sorts of steel, cast iron up to a hardness of 400 HBW (1365 Nmm²). Also suitable for: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> |
|  <p>144°</p> <p>Ø 64-114 mm Ø 2.520-4.488"</p> | <p>22 2510</p> <p>Pulverstahl 15 STEEL-TEC beschichtet Für legierte Stähle, Edelstahl, Stahl, Guss</p> <p>Powder steel 15 STEEL-TEC coated For alloy steel, stainless steel, steel, cast iron</p> | <p>STAHL steel < 1200 N/mm²</p> <p>INOX Edelstahl stainless steel</p> <p>GG/G cast iron</p> | <p>Zum Bohren der meisten Stähle, Gusseisen bis zu einer Härte von 350 HBW (1180 Nmm²). Passen ebenfalls zu: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> <p>For drilling almost all sorts of steel, cast iron up to a hardness of 350 HBW (1180 Nmm²). Also suitable for: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> |
|  <p>132°</p> <p>Ø 9,5-65 mm Ø 0.374-2.559"</p> | <p>22 3010</p> <p>Pulverstahl 25 ALU-TEC beschichtet Für Alu, Messing, Kupfer</p> <p>Powder steel 25 ALU-TEC coated For alu, brass, copper</p> | <p>Aluminium</p> <p>MESSING brass</p> <p>Kupfer copper</p> <p>Bronze bronze</p> | <p>Speziell zum Bohren aller Nicht-Eisen-Metalle wie Aluminium, Messing, Kupfer, Bronze ... Passen ebenfalls zu: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> <p>Special for drilling all non ferrous metals such as aluminum, brass, copper, bronze ... Also suitable for: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> |
|  <p>144°</p> <p>Ø 64-114 mm Ø 2.520-4.488"</p> | <p>22 3510</p> <p>Pulverstahl 15 ALU-TEC beschichtet Für Alu, Messing, Kupfer</p> <p>Powder steel 15 ALU-TEC coated For alloy steel, steel, cast iron</p> | <p>Aluminium</p> <p>MESSING brass</p> <p>Kupfer copper</p> <p>Bronze bronze</p> | <p>Speziell zum Bohren aller Nicht-Eisen-Metalle wie Aluminium, Messing, Kupfer, Bronze ... Passen ebenfalls zu: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> <p>Special for drilling all non ferrous metals such as aluminum, brass, copper, bronze ... Also suitable for: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> |

HARTMETALL-EINSÄTZE ANWENDUNG · CARBIDE INSERTS APPLICATION

| | | | |
|--|--|---|---|
|  <p>132°</p> <p>Ø 9,5-35 mm Ø 0.374-1.378"</p> | <p>22 4010</p> <p>Hartmetall 20/30 STEEL-TEC beschichtet Für Edelstahl, hochfester Stahl, gehärteter Stahl</p> <p>Carbide 20/30 STEEL-TEC coated For stainless steel, high strength alloys, hardened steel</p> | <p>HRC < 52</p> <p>INOX Edelstahl stainless steel</p> | <p>Zum Bohren von Automatenstahl, für Stähle mit mittlerem und niedrigem Kohlenstoffgehalt, Stahllegierungen, Werkzeugstahl, Hochfeste und gehärtete Stähle. Passen ebenfalls zu: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> <p>For drilling in free machining steel, in low and medium carbon steel, alloy steel, tool steel, high strength alloys, hardened steel. Also suitable for: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> |
|  <p>132° Guss Cast iron</p> <p>Ø 9,5-35 mm Ø 0.374-1.378"</p> | <p>22 4510</p> <p>Hartmetall 20/30 STEEL-TEC beschichtet Für alle Gussarten</p> <p>Carbide 20/30 STEEL-TEC coated For all kinds of cast iron</p> | <p>INCONEL HASTELLOY TITANIUM</p> <p>GJL</p> <p>GJS</p> <p>INOX Edelstahl stainless steel</p> | <p>Zum Bohren von Hochtemperatur- und Titanlegierungen, Gusseisen mit Kugelgraphit (schmiedbares Gusseisen), SG-Gusseisen, Grau- und Weißgusseisen, spezielle rostfreie Stähle. Passen ebenfalls zu: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> <p>For drilling in high-temperature and titanium alloys, all sorts of cast iron (nodular, grey, ductile cast iron), special stainless steels. Also suitable for: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> |
|  <p>132°</p> <p>Ø 9,5-35 mm Ø 0.374-1.378"</p> | <p>22 5010</p> <p>Hartmetall 20/30 ALU-TEC beschichtet Für Alu, Messing, Kupfer</p> <p>Carbide 20/30 ALU-TEC coated For alu, brass, copper</p> | <p>Aluminium < 12% Si</p> <p>Kupfer copper</p> <p>Ampco</p> <p>MESSING brass</p> | <p>Zum Bohren aller Nicht-Eisen-Metalle wie Aluminiumguss, Schmiedeleumium, Aluminiumbronze, Messing, Kupfer. Passen ebenfalls zu: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> <p>For drilling in all non ferrous metals such as cast aluminum, wrought aluminum, aluminum bronze, brass, copper. Also suitable for: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> |
|  <p>132°</p> <p>Ø 9,5-35 mm Ø 0.374-1.378"</p> | <p>22 5510</p> <p>Hartmetall 20/30 DIA-TEC beschichtet Für abrasive Materialien wie: GFK, CFK, Graphit</p> <p>Carbide 20/30 DIA-TEC coated For abrasive materials such as: fiberglass, carbon fiber, graphite</p> | <p>CFK CFRP</p> <p>CFK CFRP</p> <p>GRAPHIT graphite</p> | <p>Speziell zum Bohren abrasiver Materialien wie Glasfaser- und Kohlefaserwerkstoffe (GFK, CFK) sowie Graphit. Passen ebenfalls zu: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> <p>Special for drilling in abrasive materials such as glass fiber, carbon fiber (GFK, CFK), graphite and similar. Also suitable for: Allied Maxcut (AMEC), YG-1, ARNO-Shark-Drill</p> |

Detaillierte Anwendung siehe Seite 1304-1311 · Detailed application see page 1304-1311

| BESCHREIBUNG DER WERKZEUGHALTER · DESCRIPTION OF HOLDER MODELS | | ×D | Ø mm + Schnitttiefe Ø mm + cutting depths | |
|--|---|--|---|---------|
|  <p>Schaft DIN 1835-B Zylindrischer Schaft mit Spannfläche</p> <p>Schaft DIN 1835-B Lateral fixation type flange shank</p> | <p>Spiral genuted Bohrer rotiert, Werkstück steht still. Z.B. Säulenbohrmaschinen, Radialbohrmaschinen. Spiralgenutete Werkzeughalter sind die am meisten verwendeten.</p> <p>Helical flute Drills rotate, work piece does not rotate. E.g. vertical or radial drilling machines. The most commonly used holders are with helical flute.</p> |  <p>← ≈ 4×D →</p> | <p>Ø 18-24 mm = 117,5 mm Ø 25-35 mm = 136,5 mm Ø 36-47 mm = 165,1 mm</p> | 309 |
| | |  <p>← ≈ 5×D →</p> | <p>Ø 9,5-12,5 mm = 60,3 mm Ø 13-17,5 mm = 63,5 mm Ø 18-24 mm = 168,3 mm Ø 25-35 mm = 187,3 mm Ø 36-47 mm = 209,6 mm Ø 48-65 mm = 231,8 mm</p> | 311/313 |
| | |  <p>← ≈ 8×D →</p> | <p>Ø 9,5-12,5 mm = 111,1 mm Ø 13-17,5 mm = 114,3 mm Ø 18-24 mm = 269,9 mm Ø 25-35 mm = 288,9 mm</p> | 315 |
|  <p>Schaft DIN 1835-B Zylindrischer Schaft mit Spannfläche</p> <p>Schaft DIN 1835-B Lateral fixation type flange shank</p> | <p>Gerade genuted Bohrer steht still, Werkstück rotiert. Z.B. Drehmaschinen. Für Gussmaterialien ist die gerade genutete Version grundsätzlich besser, gleichgültig ob sich der Bohrer oder das Werkstück dreht.</p> <p>Straight flute Drills does not rotate, work piece rotates. E.g. lathe. For casting materials are the straight flute versions always better. It does not matter whether the drill or the work piece rotates.</p> |  <p>← ≈ 3×D →</p> | <p>Ø 9,5 - 12,5 mm = 31,8 mm Ø 13-17,5 mm = 34,9 mm Ø 18-24 mm = 66,7 mm Ø 25-35 mm = 85,7 mm Ø 36-47 mm = 120,7 mm Ø 48-65 mm = 130,2 mm</p> | 317/319 |
| | |  <p>← ≈ 8×D →</p> | <p>Ø 36-47 mm = 349,3 mm Ø 48-65 mm = 422,3 mm</p> | 321 |
| | |  <p>← ≈ 12×D →</p> | <p>Ø 9,5-11 mm = 222,0 mm Ø 11,5-12,5 mm = 222,3 mm Ø 13-17,5 mm = 295,0 mm Ø 18-24 mm = 457,0 mm Ø 25-35 mm = 511,0 mm Ø 36-47 mm = 558,8 mm Ø 48-65 mm = 625 mm</p> | 323/325 |
| | |  <p>← ≈ 15×D →</p> | <p>Ø 9,5-11 mm = 290,0 mm Ø 11,5-12,5 mm = 290,5 mm Ø 13-17,5 mm = 387,0 mm Ø 18-24 mm = 569,0 mm Ø 25-35 mm = 692,0 mm Ø 36-47 mm = 787,4 mm Ø 48-65 mm = 879,0 mm</p> | 327/329 |
|  <p>Morsekegel ISO 296 Typ BEK</p> <p>Morse taper shank ISO 296 type BEK</p> | <p>Spiral genuted Bohrer rotiert, Werkstück steht still. Z.B. Säulenbohrmaschinen, Radialbohrmaschinen. Spiralgenutete Werkzeughalter sind die am meisten verwendeten.</p> <p>Helical flute Drills rotate, work piece does not rotate. E.g. vertical or radial drilling machines. The most commonly used holders are with helical flute.</p> |  <p>← ≈ 4×D →</p> | <p>Ø 18-24 mm = 120,7 mm Ø 25-35 mm = 136,5 mm Ø 36-47 mm = 165,1 mm</p> | 331 |
| | |  <p>← ≈ 5×D →</p> | <p>Ø 9,5-12,5 mm = 60,3 mm Ø 13-17,5 mm = 63,5 mm Ø 18-24 mm = 171,5 mm Ø 25-35 mm = 187,3 mm Ø 36-47 mm = 209,5 mm Ø 48-65 mm = 231,8 mm</p> | 333/335 |
| | |  <p>← ≈ 8×D →</p> | <p>Ø 9,5-12,5 mm = 111,1 mm Ø 13-17,5 mm = 114,3 mm Ø 18-24 mm = 273,1 mm Ø 25-35 mm = 289,0 mm</p> | 337 |
|  <p>Morsekegel ISO 296 Typ BEK</p> <p>Morse taper shank ISO 296 type BEK</p> | <p>Gerade genuted Bohrer steht still, Werkstück rotiert. Z.B. Drehmaschinen. Für Gussmaterialien ist die gerade genutete Version grundsätzlich besser, gleichgültig ob sich der Bohrer oder das Werkstück dreht.</p> <p>Straight flute Drills does not rotate, work piece rotates. E.g. lathe. For casting materials are the straight flute versions always better. It does not matter whether the drill or the work piece rotates.</p> |  <p>← ≈ 3×D →</p> | <p>Ø 9,5-12,5 mm = 31,8 mm Ø 13-17,5 mm = 35 mm Ø 18-24 mm = 69,8 mm Ø 25-35 mm = 85,7 mm Ø 36-47 mm = 120,6 mm Ø 48-65 mm = 130,1 mm Ø 64-114 mm = 171,5 mm</p> | 339/341 |
| | |  <p>← ≈ 8×D →</p> | <p>Ø 36-47 mm = 349,3 mm Ø 48-65 mm = 422,3 mm Ø 64-88 mm = 463,6 mm Ø 90-114 mm = 555,6 mm</p> | 343/345 |
| | |  <p>← ≈ 12×D →</p> | <p>Ø 36-47 mm = 558,8 mm Ø 48-65 mm = 625,0 mm Ø 64-88 mm = 660,0 mm Ø 90-114 mm = 685,0 mm</p> | 347/349 |
| | |  <p>← ≈ 15×D →</p> | <p>Ø 36-47 mm = 787,4 mm Ø 48-65 mm = 879,0 mm Ø 64-88 mm = 889,0 mm Ø 90-114 mm = 939,0 mm</p> | 351/353 |
|  <p>Morsekegel ISO 296 Typ BEK</p> <p>Morse taper shank ISO 296 type BEK</p> | | <p>Sonderlösungen mit Pulverstahl Vollbohrern und Kernbohrer bis Ø 150 mm Ø 5.906"</p> <p>Special solutions with powder steel twist drill and annular cutter up to Ø 150 mm Ø 5.906"</p> | | 354/355 |

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9 



PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

| Ø mm d1 | Ø Zoll / Inch d1 | 132° | | 144° | | 132° | | 144° | | 132° | | Guss/Cast iron 132° | | 132° | | 132° | |
|------------|------------------------|--------------|-------|------|---|--------------|-------|------|---|--------------|-------|------------------------|-------|--------------|-------|--------------|--------|
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| • 18,00 | • 0.7087 | 22 2010 0180 | 36,00 | - | - | 22 3010 0180 | 40,35 | - | - | 22 4010 0180 | 44,80 | 22 4510 0180 | 44,80 | 22 5010 0180 | 48,90 | 22 5510 0180 | 102,55 |
| • 18,50 | • 0.7283 | 22 2010 0185 | 36,00 | - | - | 22 3010 0185 | 40,35 | - | - | 22 4010 0185 | 44,80 | 22 4510 0185 | 44,80 | 22 5010 0185 | 48,90 | 22 5510 0185 | 102,55 |
| • 19,00 | • 0.7480 | 22 2010 0190 | 36,00 | - | - | 22 3010 0190 | 40,35 | - | - | 22 4010 0190 | 44,80 | 22 4510 0190 | 44,80 | 22 5010 0190 | 48,90 | 22 5510 0190 | 102,55 |
| • 19,50 | • 0.7677 | 22 2010 0195 | 36,00 | - | - | 22 3010 0195 | 40,35 | - | - | 22 4010 0195 | 44,80 | 22 4510 0195 | 44,80 | 22 5010 0195 | 48,90 | 22 5510 0195 | 102,55 |
| • 20,00 | • 0.7874 | 22 2010 0200 | 36,00 | - | - | 22 3010 0200 | 40,35 | - | - | 22 4010 0200 | 44,80 | 22 4510 0200 | 44,80 | 22 5010 0200 | 48,90 | 22 5510 0200 | 102,55 |
| • 20,50 | • 0.8071 | 22 2010 0205 | 36,00 | - | - | 22 3010 0205 | 40,35 | - | - | 22 4010 0205 | 44,80 | 22 4510 0205 | 44,80 | 22 5010 0205 | 48,90 | 22 5510 0205 | 118,55 |
| • 21,00 | • 0.8268 | 22 2010 0210 | 36,00 | - | - | 22 3010 0210 | 40,35 | - | - | 22 4010 0210 | 44,80 | 22 4510 0210 | 44,80 | 22 5010 0210 | 48,90 | 22 5510 0210 | 118,55 |
| • 22,00 | • 0.8661 | 22 2010 0220 | 36,00 | - | - | 22 3010 0220 | 40,35 | - | - | 22 4010 0220 | 44,80 | 22 4510 0220 | 44,80 | 22 5010 0220 | 48,90 | 22 5510 0220 | 118,55 |
| • 23,00 | • 0.9055 | 22 2010 0230 | 36,00 | - | - | 22 3010 0230 | 40,35 | - | - | 22 4010 0230 | 44,80 | 22 4510 0230 | 44,80 | 22 5010 0230 | 48,90 | 22 5510 0230 | 118,55 |
| • 24,00 | • 0.9449 | 22 2010 0240 | 36,00 | - | - | 22 3010 0240 | 40,35 | - | - | 22 4010 0240 | 44,80 | 22 4510 0240 | 44,80 | 22 5010 0240 | 48,90 | 22 5510 0240 | 118,55 |
| • 25,00 | • 0.9843 | 22 2010 0250 | 42,15 | - | - | 22 3010 0250 | 45,45 | - | - | 22 4010 0250 | 52,45 | 22 4510 0250 | 52,45 | 22 5010 0250 | 55,55 | 22 5510 0250 | 125,20 |
| • 26,00 | • 1.0236 | 22 2010 0260 | 42,15 | - | - | 22 3010 0260 | 45,45 | - | - | 22 4010 0260 | 52,45 | 22 4510 0260 | 52,45 | 22 5010 0260 | 55,55 | 22 5510 0260 | 125,20 |
| • 26,50 | • 1.0433 | 22 2010 0265 | 42,15 | - | - | 22 3010 0265 | 45,45 | - | - | 22 4010 0265 | 52,45 | 22 4510 0265 | 52,45 | 22 5010 0265 | 55,55 | 22 5510 0265 | 125,20 |
| • 27,00 | • 1.0630 | 22 2010 0270 | 42,15 | - | - | 22 3010 0270 | 45,45 | - | - | 22 4010 0270 | 52,45 | 22 4510 0270 | 52,45 | 22 5010 0270 | 55,55 | 22 5510 0270 | 125,20 |
| • 28,00 | • 1.1024 | 22 2010 0280 | 42,15 | - | - | 22 3010 0280 | 45,45 | - | - | 22 4010 0280 | 52,45 | 22 4510 0280 | 52,45 | 22 5010 0280 | 55,55 | 22 5510 0280 | 125,20 |
| • 29,00 | • 1.1417 | 22 2010 0290 | 42,15 | - | - | 22 3010 0290 | 45,45 | - | - | 22 4010 0290 | 52,45 | 22 4510 0290 | 52,45 | 22 5010 0290 | 55,55 | 22 5510 0290 | 125,20 |
| • 30,00 | • 1.1811 | 22 2010 0300 | 42,15 | - | - | 22 3010 0300 | 45,45 | - | - | 22 4010 0300 | 52,45 | 22 4510 0300 | 52,45 | 22 5010 0300 | 55,55 | 22 5510 0300 | 125,20 |
| • 31,00 | • 1.2205 | 22 2010 0310 | 42,15 | - | - | 22 3010 0310 | 45,45 | - | - | 22 4010 0310 | 52,45 | 22 4510 0310 | 52,45 | 22 5010 0310 | 55,55 | 22 5510 0310 | 125,20 |
| • 32,00 | • 1.2598 | 22 2010 0320 | 42,15 | - | - | 22 3010 0320 | 45,45 | - | - | 22 4010 0320 | 52,45 | 22 4510 0320 | 52,45 | 22 5010 0320 | 55,55 | 22 5510 0320 | 125,20 |
| • 33,00 | • 1.2992 | 22 2010 0330 | 42,15 | - | - | 22 3010 0330 | 45,45 | - | - | 22 4010 0330 | 52,45 | 22 4510 0330 | 52,45 | 22 5010 0330 | 55,55 | 22 5510 0330 | 132,90 |
| • 34,00 | • 1.3386 | 22 2010 0340 | 42,15 | - | - | 22 3010 0340 | 45,45 | - | - | 22 4010 0340 | 52,45 | 22 4510 0340 | 52,45 | 22 5010 0340 | 55,55 | 22 5510 0340 | 132,90 |
| • 35,00 | • 1.3780 | 22 2010 0350 | 42,15 | - | - | 22 3010 0350 | 45,45 | - | - | 22 4010 0350 | 52,45 | 22 4510 0350 | 52,45 | 22 5010 0350 | 55,55 | 22 5510 0350 | 132,90 |
| • 36,00 | • 1.4173 | 22 2010 0360 | 57,75 | - | - | 22 3010 0360 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 37,00 | • 1.4567 | 22 2010 0370 | 57,75 | - | - | 22 3010 0370 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 38,00 | • 1.4961 | 22 2010 0380 | 57,75 | - | - | 22 3010 0380 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 39,00 | • 1.5354 | 22 2010 0390 | 57,75 | - | - | 22 3010 0390 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 40,00 | • 1.5748 | 22 2010 0400 | 57,75 | - | - | 22 3010 0400 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 41,00 | • 1.6142 | 22 2010 0410 | 57,75 | - | - | 22 3010 0410 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 42,00 | • 1.6535 | 22 2010 0420 | 57,75 | - | - | 22 3010 0420 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 43,00 | • 1.6929 | 22 2010 0430 | 57,75 | - | - | 22 3010 0430 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 44,00 | • 1.7323 | 22 2010 0440 | 57,75 | - | - | 22 3010 0440 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 45,00 | • 1.7717 | 22 2010 0450 | 57,75 | - | - | 22 3010 0450 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 46,00 | • 1.8110 | 22 2010 0460 | 57,75 | - | - | 22 3010 0460 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 47,00 | • 1.8504 | 22 2010 0470 | 57,75 | - | - | 22 3010 0470 | 59,50 | - | - | - | - | - | - | - | - | - | - |

Weitere Ø bis maximal Ø 65 mm | 2.5591" in 5xD siehe Seite 312
 Further Ø up to Ø 65 mm | 2.5591" in 5xD see page 312

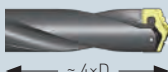
↓
 OIL



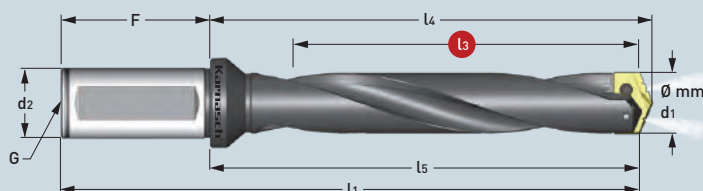
DIN 1835-B
Zylindrischer Schaft
mit Spannfläche ·
Lateral fixation type
flange shank



Spiral genutet ·
Helical flute



Mittel ·
Intermediate



22 1010

| Art. | € | l3 | l5 | l4 | l1 | d2 | F | G |
|---|--------|-------------------------------|----------------------------|------------------------------------|-------------------------------|---------------------|-----------------------------|---------------------|
| | | Nutzlänge Max. drill depth | Körperlänge Body-length | Neue REF.- Länge REF.-length | Gesamtlänge Overall length | Schaft-Ø Shank-Ø | Schaftlänge Shank length | Gewinde Pipe tap |
| | | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | |
| <ul style="list-style-type: none"> 22 1010 01175 0180 Ø 18,0-24,0 mm 0.7087-0.9449" MÖGLICH · POSSIBLE Ø 18,0-21,0 mm 0.7087-0.8268" OPTIMAL · OPTIMAL 22 1010 01175 0220 Ø 22,0-24,0 mm 0.8661-0.9449" OPTIMAL · OPTIMAL | 156,05 | 117,5 mm 4.6260" | 154,8 mm 6.0945" | 158,4 mm 6.2362" | 210,8 mm 8.2992 | 25,0 mm 0.9843" | 56,0 mm 2.2047" | 1/8" |
| <ul style="list-style-type: none"> 22 1010 01365 0255 Ø 25,0-35,0 mm 0.9843-1.3780" MÖGLICH · POSSIBLE Ø 25,0-29,0 mm 0.9843-1.1417" OPTIMAL · OPTIMAL 22 1010 01365 0300 Ø 30,0-35,0 mm 1.1811-1.3780" OPTIMAL · OPTIMAL | 203,30 | 136,5 mm 5.3740" | 179,4 mm 7.0630" | 183,0 mm 7.2047" | 239,4 mm 9.4252" | 32,0 mm 1.2598" | 60,0 mm 2.3622" | 1/4" |
| <ul style="list-style-type: none"> 22 1010 01651 0360 Ø 36,0-47,0 mm 1.4173-1.8504" MÖGLICH · POSSIBLE Ø 36,0-41,0 mm 1.4173-1.6142" OPTIMAL · OPTIMAL 22 1010 01651 0420 Ø 42,0-47,0 mm 1.6535-1.8504" OPTIMAL · OPTIMAL | 288,25 | 165,1 mm 6.5000" | 217,5 mm 8.5630" | 222,3 mm 8.7520" | 287,5 mm 11.3189" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |

Halter werden **ohne** Einsätze, inklusive 2x TORX Befestigungsschrauben und 1x TORX Schlüssel geliefert.
 Holders are delivered **without** inserts including 2x TORX-screws and 1x TORX wrench.

Ersatz-Torxschrauben und Schlüssel mit Drehmomentangabe
 Spare Torx-screws and wrench with torque specification

| Ø Diameter | | TORX | | max. Drehmoment / Torque (N/cm) | | Schlüssel / Wrench | | |
|------------|---------------|------|--------------|---------------------------------|------|--------------------|--------------|-------|
| mm | Zoll / Inch | | | € | | | | € |
| 9,5-11,0 | 0.3740-0.4331 | | 22 9010 0095 | 3,50 | 84 | | 22 9011 0084 | 9,90 |
| 11,5-12,5 | 0.4528-0.4921 | | 22 9010 0115 | 3,50 | 84 | | 22 9011 0175 | 9,90 |
| 13,0-17,5 | 0.5118-0.6890 | | 22 9010 0130 | 3,50 | 175 | | 22 9011 0305 | 10,90 |
| 18,0-24,0 | 0.7087-0.9449 | | 22 9010 0180 | 3,50 | 305 | | 22 9011 0690 | 11,70 |
| 25,0-35,0 | 0.9843-1.3780 | | 22 9010 0250 | 3,60 | 690 | | 22 9011 1370 | 12,70 |
| 36,0-65,0 | 1.4173-2.5591 | | 22 9010 0360 | 3,65 | 1370 | | 22 9011 1750 | 18,70 |
| 64,0-114,0 | 2.5197-4.4882 | | 22 9010 0640 | 3,70 | 1750 | | | |

Schnittdaten
Cutting data



Film
Movie



1302-1311

309

309



Index



PULVERSTAHL · POWDER STEEL

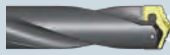
HARTMETALL · CARBIDE

| Ø mm d1 | Ø Zoll / Inch d1 | 132° | | | | 144° | | | | 132° | | | | 132° | | | |
|------------|------------------------|--------------|-------|------|---|--------------|-------|------|---|--------------|-------|--------------|-------|--------------|-------|--------------|--------|
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | | |
| ● 9,50 | 0.3740 | 22 2010 0095 | 24,85 | - | - | 22 3010 0095 | 26,05 | - | - | 22 4010 0095 | 29,30 | 22 4510 0095 | 29,30 | 22 5010 0095 | 30,45 | 22 5510 0095 | 66,40 |
| ○ 9,80 | 0.3858 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ● 10,00 | 0.3937 | 22 2010 0100 | 24,85 | - | - | 22 3010 0100 | 26,05 | - | - | 22 4010 0100 | 29,30 | 22 4510 0100 | 29,30 | 22 5010 0100 | 30,45 | 22 5510 0100 | 66,40 |
| ● 10,20 | 0.4016 | 22 2010 0102 | 24,85 | - | - | 22 3010 0102 | 26,05 | - | - | 22 4010 0102 | 29,30 | 22 4510 0102 | 29,30 | 22 5010 0102 | 30,45 | 22 5510 0102 | 66,40 |
| ● 10,50 | 0.4134 | 22 2010 0105 | 24,85 | - | - | 22 3010 0105 | 26,05 | - | - | 22 4010 0105 | 29,30 | 22 4510 0105 | 29,30 | 22 5010 0105 | 30,45 | 22 5510 0105 | 66,40 |
| ● 10,80 | 0.4252 | 22 2010 0108 | 24,85 | - | - | 22 3010 0108 | 26,05 | - | - | 22 4010 0108 | 29,30 | 22 4510 0108 | 29,30 | 22 5010 0108 | 30,45 | 22 5510 0108 | 66,40 |
| ● 11,00 | 0.4331 | 22 2010 0110 | 24,85 | - | - | 22 3010 0110 | 26,05 | - | - | 22 4010 0110 | 29,30 | 22 4510 0110 | 29,30 | 22 5010 0110 | 30,45 | 22 5510 0110 | 66,40 |
| ● 11,50 | 0.4528 | 22 2010 0115 | 24,85 | - | - | 22 3010 0115 | 26,05 | - | - | 22 4010 0115 | 29,30 | 22 4510 0115 | 29,30 | 22 5010 0115 | 30,45 | 22 5510 0115 | 66,40 |
| ● 12,00 | 0.4724 | 22 2010 0120 | 24,85 | - | - | 22 3010 0120 | 26,05 | - | - | 22 4010 0120 | 29,30 | 22 4510 0120 | 29,30 | 22 5010 0120 | 30,45 | 22 5510 0120 | 66,40 |
| ● 12,50 | 0.4921 | 22 2010 0125 | 24,85 | - | - | 22 3010 0125 | 26,05 | - | - | 22 4010 0125 | 29,30 | 22 4510 0125 | 29,30 | 22 5010 0125 | 30,45 | 22 5510 0125 | 66,40 |
| ● 13,00 | 0.5118 | 22 2010 0130 | 28,30 | - | - | 22 3010 0130 | 28,95 | - | - | 22 4010 0130 | 34,45 | 22 4510 0130 | 34,45 | 22 5010 0130 | 35,10 | 22 5510 0130 | 92,70 |
| ● 13,50 | 0.5315 | 22 2010 0135 | 28,30 | - | - | 22 3010 0135 | 28,95 | - | - | 22 4010 0135 | 34,45 | 22 4510 0135 | 34,45 | 22 5010 0135 | 35,10 | 22 5510 0135 | 92,70 |
| ● 14,00 | 0.5512 | 22 2010 0140 | 28,30 | - | - | 22 3010 0140 | 28,95 | - | - | 22 4010 0140 | 34,45 | 22 4510 0140 | 34,45 | 22 5010 0140 | 35,10 | 22 5510 0140 | 92,70 |
| ● 14,50 | 0.5709 | 22 2010 0145 | 28,30 | - | - | 22 3010 0145 | 28,95 | - | - | 22 4010 0145 | 34,45 | 22 4510 0145 | 34,45 | 22 5010 0145 | 35,10 | 22 5510 0145 | 92,70 |
| ● 15,00 | 0.5906 | 22 2010 0150 | 28,30 | - | - | 22 3010 0150 | 28,95 | - | - | 22 4010 0150 | 34,45 | 22 4510 0150 | 34,45 | 22 5010 0150 | 35,10 | 22 5510 0150 | 92,70 |
| ● 15,50 | 0.6102 | 22 2010 0155 | 28,30 | - | - | 22 3010 0155 | 28,95 | - | - | 22 4010 0155 | 34,45 | 22 4510 0155 | 34,45 | 22 5010 0155 | 35,10 | 22 5510 0155 | 92,70 |
| ● 16,00 | 0.6299 | 22 2010 0160 | 28,30 | - | - | 22 3010 0160 | 28,95 | - | - | 22 4010 0160 | 34,45 | 22 4510 0160 | 34,45 | 22 5010 0160 | 35,10 | 22 5510 0160 | 92,70 |
| ● 16,50 | 0.6496 | 22 2010 0165 | 28,30 | - | - | 22 3010 0165 | 28,95 | - | - | 22 4010 0165 | 34,45 | 22 4510 0165 | 34,45 | 22 5010 0165 | 35,10 | 22 5510 0165 | 92,70 |
| ● 17,00 | 0.6693 | 22 2010 0170 | 28,30 | - | - | 22 3010 0170 | 28,95 | - | - | 22 4010 0170 | 34,45 | 22 4510 0170 | 34,45 | 22 5010 0170 | 35,10 | 22 5510 0170 | 92,70 |
| ● 17,50 | 0.6890 | 22 2010 0175 | 28,30 | - | - | 22 3010 0175 | 28,95 | - | - | 22 4010 0175 | 34,45 | 22 4510 0175 | 34,45 | 22 5010 0175 | 35,10 | 22 5510 0175 | 92,70 |
| ● 18,00 | 0.7087 | 22 2010 0180 | 36,00 | - | - | 22 3010 0180 | 40,35 | - | - | 22 4010 0180 | 44,80 | 22 4510 0180 | 44,80 | 22 5010 0180 | 48,90 | 22 5510 0180 | 102,55 |
| ● 18,50 | 0.7283 | 22 2010 0185 | 36,00 | - | - | 22 3010 0185 | 40,35 | - | - | 22 4010 0185 | 44,80 | 22 4510 0185 | 44,80 | 22 5010 0185 | 48,90 | 22 5510 0185 | 102,55 |
| ● 19,00 | 0.7480 | 22 2010 0190 | 36,00 | - | - | 22 3010 0190 | 40,35 | - | - | 22 4010 0190 | 44,80 | 22 4510 0190 | 44,80 | 22 5010 0190 | 48,90 | 22 5510 0190 | 102,55 |
| ● 19,50 | 0.7677 | 22 2010 0195 | 36,00 | - | - | 22 3010 0195 | 40,35 | - | - | 22 4010 0195 | 44,80 | 22 4510 0195 | 44,80 | 22 5010 0195 | 48,90 | 22 5510 0195 | 102,55 |
| ● 20,00 | 0.7874 | 22 2010 0200 | 36,00 | - | - | 22 3010 0200 | 40,35 | - | - | 22 4010 0200 | 44,80 | 22 4510 0200 | 44,80 | 22 5010 0200 | 48,90 | 22 5510 0200 | 102,55 |
| ● 20,50 | 0.8071 | 22 2010 0205 | 36,00 | - | - | 22 3010 0205 | 40,35 | - | - | 22 4010 0205 | 44,80 | 22 4510 0205 | 44,80 | 22 5010 0205 | 48,90 | 22 5510 0205 | 118,55 |
| ● 21,00 | 0.8268 | 22 2010 0210 | 36,00 | - | - | 22 3010 0210 | 40,35 | - | - | 22 4010 0210 | 44,80 | 22 4510 0210 | 44,80 | 22 5010 0210 | 48,90 | 22 5510 0210 | 118,55 |
| ● 22,00 | 0.8661 | 22 2010 0220 | 36,00 | - | - | 22 3010 0220 | 40,35 | - | - | 22 4010 0220 | 44,80 | 22 4510 0220 | 44,80 | 22 5010 0220 | 48,90 | 22 5510 0220 | 118,55 |
| ● 23,00 | 0.9055 | 22 2010 0230 | 36,00 | - | - | 22 3010 0230 | 40,35 | - | - | 22 4010 0230 | 44,80 | 22 4510 0230 | 44,80 | 22 5010 0230 | 48,90 | 22 5510 0230 | 118,55 |
| ● 24,00 | 0.9449 | 22 2010 0240 | 36,00 | - | - | 22 3010 0240 | 40,35 | - | - | 22 4010 0240 | 44,80 | 22 4510 0240 | 44,80 | 22 5010 0240 | 48,90 | 22 5510 0240 | 118,55 |
| ● 25,00 | 0.9843 | 22 2010 0250 | 42,15 | - | - | 22 3010 0250 | 45,45 | - | - | 22 4010 0250 | 52,45 | 22 4510 0250 | 52,45 | 22 5010 0250 | 55,55 | 22 5510 0250 | 125,20 |
| ● 26,00 | 1.0236 | 22 2010 0260 | 42,15 | - | - | 22 3010 0260 | 45,45 | - | - | 22 4010 0260 | 52,45 | 22 4510 0260 | 52,45 | 22 5010 0260 | 55,55 | 22 5510 0260 | 125,20 |
| ● 26,50 | 1.0433 | 22 2010 0265 | 42,15 | - | - | 22 3010 0265 | 45,45 | - | - | 22 4010 0265 | 52,45 | 22 4510 0265 | 52,45 | 22 5010 0265 | 55,55 | 22 5510 0265 | 125,20 |
| ● 27,00 | 1.0630 | 22 2010 0270 | 42,15 | - | - | 22 3010 0270 | 45,45 | - | - | 22 4010 0270 | 52,45 | 22 4510 0270 | 52,45 | 22 5010 0270 | 55,55 | 22 5510 0270 | 125,20 |
| ● 28,00 | 1.1024 | 22 2010 0280 | 42,15 | - | - | 22 3010 0280 | 45,45 | - | - | 22 4010 0280 | 52,45 | 22 4510 0280 | 52,45 | 22 5010 0280 | 55,55 | 22 5510 0280 | 125,20 |
| ● 29,00 | 1.1417 | 22 2010 0290 | 42,15 | - | - | 22 3010 0290 | 45,45 | - | - | 22 4010 0290 | 52,45 | 22 4510 0290 | 52,45 | 22 5010 0290 | 55,55 | 22 5510 0290 | 125,20 |
| ● 30,00 | 1.1811 | 22 2010 0300 | 42,15 | - | - | 22 3010 0300 | 45,45 | - | - | 22 4010 0300 | 52,45 | 22 4510 0300 | 52,45 | 22 5010 0300 | 55,55 | 22 5510 0300 | 125,20 |
| ● 31,00 | 1.2205 | 22 2010 0310 | 42,15 | - | - | 22 3010 0310 | 45,45 | - | - | 22 4010 0310 | 52,45 | 22 4510 0310 | 52,45 | 22 5010 0310 | 55,55 | 22 5510 0310 | 125,20 |
| ● 32,00 | 1.2598 | 22 2010 0320 | 42,15 | - | - | 22 3010 0320 | 45,45 | - | - | 22 4010 0320 | 52,45 | 22 4510 0320 | 52,45 | 22 5010 0320 | 55,55 | 22 5510 0320 | 125,20 |
| ● 33,00 | 1.2992 | 22 2010 0330 | 42,15 | - | - | 22 3010 0330 | 45,45 | - | - | 22 4010 0330 | 52,45 | 22 4510 0330 | 52,45 | 22 5010 0330 | 55,55 | 22 5510 0330 | 132,90 |
| ● 34,00 | 1.3386 | 22 2010 0340 | 42,15 | - | - | 22 3010 0340 | 45,45 | - | - | 22 4010 0340 | 52,45 | 22 4510 0340 | 52,45 | 22 5010 0340 | 55,55 | 22 5510 0340 | 132,90 |
| ● 35,00 | 1.3780 | 22 2010 0350 | 42,15 | - | - | 22 3010 0350 | 45,45 | - | - | 22 4010 0350 | 52,45 | 22 4510 0350 | 52,45 | 22 5010 0350 | 55,55 | 22 5510 0350 | 132,90 |
| ● 36,00 | 1.4173 | 22 2010 0360 | 57,75 | - | - | 22 3010 0360 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 37,00 | 1.4567 | 22 2010 0370 | 57,75 | - | - | 22 3010 0370 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 38,00 | 1.4961 | 22 2010 0380 | 57,75 | - | - | 22 3010 0380 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 39,00 | 1.5354 | 22 2010 0390 | 57,75 | - | - | 22 3010 0390 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 40,00 | 1.5748 | 22 2010 0400 | 57,75 | - | - | 22 3010 0400 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 41,00 | 1.6142 | 22 2010 0410 | 57,75 | - | - | 22 3010 0410 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 42,00 | 1.6535 | 22 2010 0420 | 57,75 | - | - | 22 3010 0420 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 43,00 | 1.6929 | 22 2010 0430 | 57,75 | - | - | 22 3010 0430 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 44,00 | 1.7323 | 22 2010 0440 | 57,75 | - | - | 22 3010 0440 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 45,00 | 1.7717 | 22 2010 0450 | 57,75 | - | - | 22 3010 0450 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 46,00 | 1.8110 | 22 2010 0460 | 57,75 | - | - | 22 3010 0460 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 47,00 | 1.8504 | 22 2010 0470 | 57,75 | - | - | 22 3010 0470 | 59,50 | - | - | - | - | - | - | - | - | - | - |

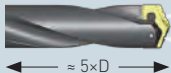
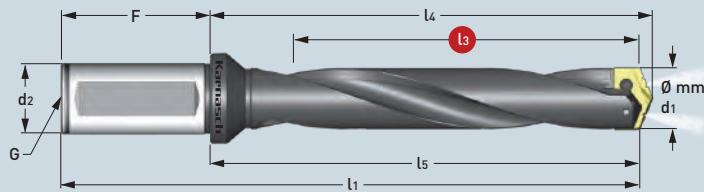
Fortsetzung Seite 312 · Continued page 312



DIN 1835-B
Zylindrischer Schaft
mit Spannfläche ·
Lateral fixation type
flange shank



Spiral genutet ·
Helical flute



Mittel-Lang ·
Intermediate-Long

| Art. | € | l3 Nutzlänge Max. drill depth | l5 Körperlänge Body-length | l4 Neue REF.- Länge REF.-length | l1 Gesamtlänge Overall length | d2 Schaft-Ø Shank-Ø | F Schaftlänge Shank length | G Gewinde Pipe tap |
|--|--------|--|---|---|--|----------------------------------|---|---------------------------------|
| | | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | |
| • 22 1010 00603 0095 Ø 9,5-11,0 mm 0.3740-0.4331" OPTIMAL · OPTIMAL | 122,75 | 60,3 mm 2.3740" | 89,7 mm 3.5315" | 92,1 mm 3.6260" | 139,7 mm 5.5000" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1010 00603 0115 Ø 11,5-12,5 mm 0.4528-0.4921" OPTIMAL · OPTIMAL | 122,75 | 60,3 mm 2.3740" | 89,7 mm 3.5315" | 92,1 mm 3.6260" | 139,7 mm 5.5000" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1010 00635 0130 Ø 13,0-17,5 mm 0.5118-0.6890" MÖGLICH · POSSIBLE Ø 13,0-15,0 mm 0.5118-0.5906" OPTIMAL · OPTIMAL | 129,90 | 63,5 mm 2.5000" | 92,1 mm 3.6260" | 94,9 mm 3.7362" | 142,1 mm 5.5945" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1010 00635 0155 Ø 15,5-17,5 mm 0.6102-0.6890" OPTIMAL · OPTIMAL | 129,90 | 63,5 mm 2.5000" | 92,1 mm 3.6260" | 94,9 mm 3.7362" | 142,1 mm 5.5945" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1010 01683 0180 Ø 18,0-24,0 mm 0.7087-0.9449" MÖGLICH · POSSIBLE Ø 18,0-21,0 mm 0.7087-0.8268" OPTIMAL · OPTIMAL | 178,80 | 168,3 mm 6.6260" | 205,6 mm 8.0945" | 209,2 mm 8.2362" | 261,6 mm 10.2992" | 25,0 mm 0.9843" | 56,0 mm 2.2047" | 1/8" |
| • 22 1010 01683 0220 Ø 22,0-24,0 mm 0.8661-0.9449" OPTIMAL · OPTIMAL | 178,80 | 168,3 mm 6.6260" | 205,6 mm 8.0945" | 209,2 mm 8.2362" | 261,6 mm 10.2992" | 25,0 mm 0.9843" | 56,0 mm 2.2047" | 1/8" |
| • 22 1010 01873 0250 Ø 25,0-35,0 mm 0.9843-1.3780" MÖGLICH · POSSIBLE Ø 25,0-29,0 mm 0.9843-1.1417" OPTIMAL · OPTIMAL | 229,35 | 187,3 mm 7.3740" | 230,2 mm 9.0630" | 233,8 mm 9.2047" | 290,2 mm 11.4252" | 32,0 mm 1.2598" | 60,0 mm 2.3622" | 1/4" |
| • 22 1010 01873 0300 Ø 30,0-35,0 mm 1.1811-1.3780" OPTIMAL · OPTIMAL | 229,35 | 187,3 mm 7.3740" | 230,2 mm 9.0630" | 233,8 mm 9.2047" | 290,2 mm 11.4252" | 32,0 mm 1.2598" | 60,0 mm 2.3622" | 1/4" |
| • 22 1010 02096 0360 Ø 36,0-47,0 mm 1.4173-1.8504" MÖGLICH · POSSIBLE Ø 36,0-41,0 mm 1.4173-1.6142" OPTIMAL · OPTIMAL | 310,85 | 209,6 mm 8.2520" | 261,9 mm 10.3110" | 266,7 mm 10.5000" | 331,9 mm 13.0669" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |
| • 22 1010 02096 0420 Ø 42,0-47,0 mm 1.6535-1.8504" OPTIMAL · OPTIMAL | 310,85 | 209,6 mm 8.2520" | 261,9 mm 10.3110" | 266,7 mm 10.5000" | 331,9 mm 13.0669" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |

Schnittdaten
Cutting data

Film
Movie



1302-1311



- 1 
- 2 
- 3 
- 4 
- 5 
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- 9 

PULVERSTAHL · POWDER STEEL

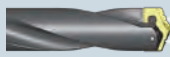
HARTMETALL · CARBIDE

| | |  | |  | |  | |  | |  | |  | |  | |  | |
|------------|------------------------|--|-------|--|---|--|-------|--|---|--|---|--|---|--|---|---|---|
| Ø mm d1 | Ø Zoll / Inch d1 | 22 2010  | | 22 2510  | | 22 3010  | | 22 3510  | | 22 4010  | | 22 4510  | | 22 5010  | | 22 5510  | |
| | | Pulverstahl 25 STEEL-TEC beschichtet Für Edelstahl, Stahl, Guss | | Pulverstahl 15 STEEL-TEC beschichtet Für legierte Stähle, Edelstahl, Stahl, Guss | | Pulverstahl 25 ALU-TEC beschichtet Für Alu, Messing, Kupfer | | Pulverstahl 15 ALU-TEC beschichtet Für Alu, Messing, Kupfer | | Hartmetall 20/30 STEEL-TEC beschichtet Für Edelstahl, hochfester Stahl, gehärteter Stahl | | Hartmetall 20/30 STEEL-TEC beschichtet Für alle Gussarten | | Hartmetall 20/30 ALU-TEC beschichtet Für Alu, Messing, Kupfer | | Hartmetall 20/30 DIA-TEC beschichtet Für abrasive Materialien wie: GFK, CFK, Graphit | |
| | | Powder steel 25 STEEL-TEC coated For stainless steel, steel, cast iron | | Powder steel 15 STEEL-TEC coated For alloy steel, stainless steel, steel, cast iron | | Powder steel 25 ALU-TEC coated For alu, brass, copper | | Powder steel 15 ALU-TEC coated For alloy steel, steel, cast iron | | Carbide 20/30 STEEL-TEC coated For stainless steel, high strength alloys, hardened steel | | Carbide 20/30 STEEL-TEC coated For all kinds of cast iron | | Carbide 20/30 ALU-TEC coated For alu, brass, copper | | Carbide 20/30 DIA-TEC coated For abrasive materials such as: fiberglass, carbon fiber, graphite | |
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| • 48,00 | 1.8898 | 22 2010 0480 | 82,65 | - | - | 22 3010 0480 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 49,00 | 1.9291 | 22 2010 0490 | 82,65 | - | - | 22 3010 0490 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 50,00 | 1.9685 | 22 2010 0500 | 82,65 | - | - | 22 3010 0500 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 51,00 | 2.0079 | 22 2010 0510 | 82,65 | - | - | 22 3010 0510 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 52,00 | 2.0472 | 22 2010 0520 | 82,65 | - | - | 22 3010 0520 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 53,00 | 2.0866 | 22 2010 0530 | 82,65 | - | - | 22 3010 0530 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 54,00 | 2.1260 | 22 2010 0540 | 82,65 | - | - | 22 3010 0540 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 55,00 | 2.1654 | 22 2010 0550 | 82,65 | - | - | 22 3010 0550 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 56,00 | 2.2047 | 22 2010 0560 | 82,65 | - | - | 22 3010 0560 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 57,00 | 2.2441 | 22 2010 0570 | 82,65 | - | - | 22 3010 0570 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 58,00 | 2.2835 | 22 2010 0580 | 82,65 | - | - | 22 3010 0580 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 59,00 | 2.3228 | 22 2010 0590 | 82,65 | - | - | 22 3010 0590 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 60,00 | 2.3622 | 22 2010 0600 | 82,65 | - | - | 22 3010 0600 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 61,00 | 2.4016 | 22 2010 0610 | 82,65 | - | - | 22 3010 0610 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 62,00 | 2.4409 | 22 2010 0620 | 82,65 | - | - | 22 3010 0620 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 63,00 | 2.4803 | 22 2010 0630 | 82,65 | - | - | 22 3010 0630 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 64,00 | 2.5197 | 22 2010 0640 | 82,65 | - | - | 22 3010 0640 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 65,00 | 2.5591 | 22 2010 0650 | 82,65 | - | - | 22 3010 0650 | 82,65 | - | - | - | - | - | - | - | - | - | - |

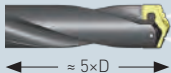
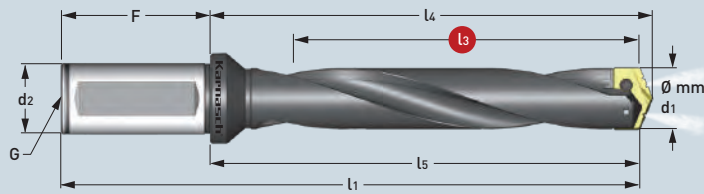
 **22 1010**



DIN 1835-B
Zylindrischer Schaft
mit Spannfläche ·
Lateral fixation type
flange shank



Spiral genutet ·
Helical flute




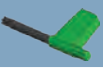
















≈ 5×D
Mittel-Lang ·
Intermediate-Long

| Art. | € | l3 Nutzlänge Max. drill depth | l5 Körperlänge Body-length | l4 Neue REF.- Länge REF.-length | l1 Gesamtlänge Overall length | d2 Schaft-Ø Shank-Ø | F Schaftlänge Shank length | G Gewinde Pipe tap |
|--|--------|--|---|---|--|----------------------------------|---|---------------------------------|
| | | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | |
| • 22 1010 02318 0480 Ø 48,0-65,0 mm 1.8898-2.5591" MÖGLICH · POSSIBLE Ø 48,0-55,0 mm 1.8898-2.1654" OPTIMAL · OPTIMAL | 333,70 | 231,8 mm 9.1260" | 281,0 mm 11.0630" | 285,8 mm 11.2520" | 351,0 mm 13.8189" | 40 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |
| • 22 1010 02318 0560 Ø 56,0-65,0 mm 2.2047-2.5591" OPTIMAL · OPTIMAL | 333,70 | 231,8 mm 9.1260" | 281,0 mm 11.0630" | 285,8 mm 11.2520" | 351,0 mm 13.8189" | 40 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |

Halter werden **ohne** Einsätze, inklusive 2× TORX Befestigungsschrauben und 1× TORX Schlüssel geliefert.
 Holders are delivered **without** inserts including 2× TORX-screws and 1× TORX wrench.

Ersatz-Torxschrauben und Schlüssel mit Drehmomentangabe
 Spare Torx-screws and wrench with torque specification

| Ø Diameter | | TORX | | max. Drehmoment / Torque (N/cm) | Schlüssel / Wrench | | |
|------------|---------------|---|---|------------------------------------|---|---|---|
| mm | Zoll / Inch |  |  | | € |  |  |
| 9,5-11,0 | 0.3740-0.4331 |  | 22 9010 0095 | 84 |  | 22 9011 0084 | 9,90 |
| 11,5-12,5 | 0.4528-0.4921 |  | 22 9010 0115 | 84 |  | 22 9011 0175 | 9,90 |
| 13,0-17,5 | 0.5118-0.6890 |  | 22 9010 0130 | 175 |  | 22 9011 0305 | 10,90 |
| 18,0-24,0 | 0.7087-0.9449 |  | 22 9010 0180 | 305 |  | 22 9011 0690 | 11,70 |
| 25,0-35,0 | 0.9843-1.3780 |  | 22 9010 0250 | 690 |  | 22 9011 1370 | 12,70 |
| 36,0-65,0 | 1.4173-2.5591 |  | 22 9010 0360 | 1370 |  | 22 9011 1750 | 18,70 |
| 64,0-114,0 | 2.5197-4.4882 |  | 22 9010 0640 | 1750 |  | | |

Schnittdaten
Cutting data



Film
Movie



 1302-1311



PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

| Ø mm d1 | Ø Zoll / Inch d1 | 22 2010 | | 22 2510 | | 22 3010 | | 22 3510 | | 22 4010 | | 22 4510 | | 22 5010 | | 22 5510 | |
|------------|------------------------|--------------|-------|---------|---|--------------|-------|---------|---|--------------|-------|--------------|-------|--------------|-------|--------------|--------|
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| ● 9,50 | 0.3740 | 22 2010 0095 | 24,85 | - | - | 22 3010 0095 | 26,05 | - | - | 22 4010 0095 | 29,30 | 22 4510 0095 | 29,30 | 22 5010 0095 | 30,45 | 22 5510 0095 | 66,40 |
| ○ 9,80 | 0.3858 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ● 10,00 | 0.3937 | 22 2010 0100 | 24,85 | - | - | 22 3010 0100 | 26,05 | - | - | 22 4010 0100 | 29,30 | 22 4510 0100 | 29,30 | 22 5010 0100 | 30,45 | 22 5510 0100 | 66,40 |
| ● 10,20 | 0.4016 | 22 2010 0102 | 24,85 | - | - | 22 3010 0102 | 26,05 | - | - | 22 4010 0102 | 29,30 | 22 4510 0102 | 29,30 | 22 5010 0102 | 30,45 | 22 5510 0102 | 66,40 |
| ● 10,50 | 0.4134 | 22 2010 0105 | 24,85 | - | - | 22 3010 0105 | 26,05 | - | - | 22 4010 0105 | 29,30 | 22 4510 0105 | 29,30 | 22 5010 0105 | 30,45 | 22 5510 0105 | 66,40 |
| ● 10,80 | 0.4252 | 22 2010 0108 | 24,85 | - | - | 22 3010 0108 | 26,05 | - | - | 22 4010 0108 | 29,30 | 22 4510 0108 | 29,30 | 22 5010 0108 | 30,45 | 22 5510 0108 | 66,40 |
| ● 11,00 | 0.4331 | 22 2010 0110 | 24,85 | - | - | 22 3010 0110 | 26,05 | - | - | 22 4010 0110 | 29,30 | 22 4510 0110 | 29,30 | 22 5010 0110 | 30,45 | 22 5510 0110 | 66,40 |
| ● 11,50 | 0.4528 | 22 2010 0115 | 24,85 | - | - | 22 3010 0115 | 26,05 | - | - | 22 4010 0115 | 29,30 | 22 4510 0115 | 29,30 | 22 5010 0115 | 30,45 | 22 5510 0115 | 66,40 |
| ● 12,00 | 0.4724 | 22 2010 0120 | 24,85 | - | - | 22 3010 0120 | 26,05 | - | - | 22 4010 0120 | 29,30 | 22 4510 0120 | 29,30 | 22 5010 0120 | 30,45 | 22 5510 0120 | 66,40 |
| ● 12,50 | 0.4921 | 22 2010 0125 | 24,85 | - | - | 22 3010 0125 | 26,05 | - | - | 22 4010 0125 | 29,30 | 22 4510 0125 | 29,30 | 22 5010 0125 | 30,45 | 22 5510 0125 | 66,40 |
| ● 13,00 | 0.5118 | 22 2010 0130 | 28,30 | - | - | 22 3010 0130 | 28,95 | - | - | 22 4010 0130 | 34,45 | 22 4510 0130 | 34,45 | 22 5010 0130 | 35,10 | 22 5510 0130 | 92,70 |
| ● 13,50 | 0.5315 | 22 2010 0135 | 28,30 | - | - | 22 3010 0135 | 28,95 | - | - | 22 4010 0135 | 34,45 | 22 4510 0135 | 34,45 | 22 5010 0135 | 35,10 | 22 5510 0135 | 92,70 |
| ● 14,00 | 0.5512 | 22 2010 0140 | 28,30 | - | - | 22 3010 0140 | 28,95 | - | - | 22 4010 0140 | 34,45 | 22 4510 0140 | 34,45 | 22 5010 0140 | 35,10 | 22 5510 0140 | 92,70 |
| ● 14,50 | 0.5709 | 22 2010 0145 | 28,30 | - | - | 22 3010 0145 | 28,95 | - | - | 22 4010 0145 | 34,45 | 22 4510 0145 | 34,45 | 22 5010 0145 | 35,10 | 22 5510 0145 | 92,70 |
| ● 15,00 | 0.5906 | 22 2010 0150 | 28,30 | - | - | 22 3010 0150 | 28,95 | - | - | 22 4010 0150 | 34,45 | 22 4510 0150 | 34,45 | 22 5010 0150 | 35,10 | 22 5510 0150 | 92,70 |
| ● 15,50 | 0.6102 | 22 2010 0155 | 28,30 | - | - | 22 3010 0155 | 28,95 | - | - | 22 4010 0155 | 34,45 | 22 4510 0155 | 34,45 | 22 5010 0155 | 35,10 | 22 5510 0155 | 92,70 |
| ● 16,00 | 0.6299 | 22 2010 0160 | 28,30 | - | - | 22 3010 0160 | 28,95 | - | - | 22 4010 0160 | 34,45 | 22 4510 0160 | 34,45 | 22 5010 0160 | 35,10 | 22 5510 0160 | 92,70 |
| ● 16,50 | 0.6496 | 22 2010 0165 | 28,30 | - | - | 22 3010 0165 | 28,95 | - | - | 22 4010 0165 | 34,45 | 22 4510 0165 | 34,45 | 22 5010 0165 | 35,10 | 22 5510 0165 | 92,70 |
| ● 17,00 | 0.6693 | 22 2010 0170 | 28,30 | - | - | 22 3010 0170 | 28,95 | - | - | 22 4010 0170 | 34,45 | 22 4510 0170 | 34,45 | 22 5010 0170 | 35,10 | 22 5510 0170 | 92,70 |
| ● 17,50 | 0.6890 | 22 2010 0175 | 28,30 | - | - | 22 3010 0175 | 28,95 | - | - | 22 4010 0175 | 34,45 | 22 4510 0175 | 34,45 | 22 5010 0175 | 35,10 | 22 5510 0175 | 92,70 |
| ● 18,00 | 0.7087 | 22 2010 0180 | 36,00 | - | - | 22 3010 0180 | 40,35 | - | - | 22 4010 0180 | 44,80 | 22 4510 0180 | 44,80 | 22 5010 0180 | 48,90 | 22 5510 0180 | 102,55 |
| ● 18,50 | 0.7283 | 22 2010 0185 | 36,00 | - | - | 22 3010 0185 | 40,35 | - | - | 22 4010 0185 | 44,80 | 22 4510 0185 | 44,80 | 22 5010 0185 | 48,90 | 22 5510 0185 | 102,55 |
| ● 19,00 | 0.7480 | 22 2010 0190 | 36,00 | - | - | 22 3010 0190 | 40,35 | - | - | 22 4010 0190 | 44,80 | 22 4510 0190 | 44,80 | 22 5010 0190 | 48,90 | 22 5510 0190 | 102,55 |
| ● 19,50 | 0.7677 | 22 2010 0195 | 36,00 | - | - | 22 3010 0195 | 40,35 | - | - | 22 4010 0195 | 44,80 | 22 4510 0195 | 44,80 | 22 5010 0195 | 48,90 | 22 5510 0195 | 102,55 |
| ● 20,00 | 0.7874 | 22 2010 0200 | 36,00 | - | - | 22 3010 0200 | 40,35 | - | - | 22 4010 0200 | 44,80 | 22 4510 0200 | 44,80 | 22 5010 0200 | 48,90 | 22 5510 0200 | 102,55 |
| ● 20,50 | 0.8071 | 22 2010 0205 | 36,00 | - | - | 22 3010 0205 | 40,35 | - | - | 22 4010 0205 | 44,80 | 22 4510 0205 | 44,80 | 22 5010 0205 | 48,90 | 22 5510 0205 | 102,55 |
| ● 21,00 | 0.8268 | 22 2010 0210 | 36,00 | - | - | 22 3010 0210 | 40,35 | - | - | 22 4010 0210 | 44,80 | 22 4510 0210 | 44,80 | 22 5010 0210 | 48,90 | 22 5510 0210 | 102,55 |
| ● 22,00 | 0.8661 | 22 2010 0220 | 36,00 | - | - | 22 3010 0220 | 40,35 | - | - | 22 4010 0220 | 44,80 | 22 4510 0220 | 44,80 | 22 5010 0220 | 48,90 | 22 5510 0220 | 102,55 |
| ● 23,00 | 0.9055 | 22 2010 0230 | 36,00 | - | - | 22 3010 0230 | 40,35 | - | - | 22 4010 0230 | 44,80 | 22 4510 0230 | 44,80 | 22 5010 0230 | 48,90 | 22 5510 0230 | 102,55 |
| ● 24,00 | 0.9449 | 22 2010 0240 | 36,00 | - | - | 22 3010 0240 | 40,35 | - | - | 22 4010 0240 | 44,80 | 22 4510 0240 | 44,80 | 22 5010 0240 | 48,90 | 22 5510 0240 | 102,55 |
| ● 25,00 | 0.9843 | 22 2010 0250 | 42,15 | - | - | 22 3010 0250 | 45,45 | - | - | 22 4010 0250 | 52,45 | 22 4510 0250 | 52,45 | 22 5010 0250 | 55,55 | 22 5510 0250 | 125,20 |
| ● 26,00 | 1.0236 | 22 2010 0260 | 42,15 | - | - | 22 3010 0260 | 45,45 | - | - | 22 4010 0260 | 52,45 | 22 4510 0260 | 52,45 | 22 5010 0260 | 55,55 | 22 5510 0260 | 125,20 |
| ● 26,50 | 1.0433 | 22 2010 0265 | 42,15 | - | - | 22 3010 0265 | 45,45 | - | - | 22 4010 0265 | 52,45 | 22 4510 0265 | 52,45 | 22 5010 0265 | 55,55 | 22 5510 0265 | 125,20 |
| ● 27,00 | 1.0630 | 22 2010 0270 | 42,15 | - | - | 22 3010 0270 | 45,45 | - | - | 22 4010 0270 | 52,45 | 22 4510 0270 | 52,45 | 22 5010 0270 | 55,55 | 22 5510 0270 | 125,20 |
| ● 28,00 | 1.1024 | 22 2010 0280 | 42,15 | - | - | 22 3010 0280 | 45,45 | - | - | 22 4010 0280 | 52,45 | 22 4510 0280 | 52,45 | 22 5010 0280 | 55,55 | 22 5510 0280 | 125,20 |
| ● 29,00 | 1.1417 | 22 2010 0290 | 42,15 | - | - | 22 3010 0290 | 45,45 | - | - | 22 4010 0290 | 52,45 | 22 4510 0290 | 52,45 | 22 5010 0290 | 55,55 | 22 5510 0290 | 125,20 |
| ● 30,00 | 1.1811 | 22 2010 0300 | 42,15 | - | - | 22 3010 0300 | 45,45 | - | - | 22 4010 0300 | 52,45 | 22 4510 0300 | 52,45 | 22 5010 0300 | 55,55 | 22 5510 0300 | 125,20 |
| ● 31,00 | 1.2205 | 22 2010 0310 | 42,15 | - | - | 22 3010 0310 | 45,45 | - | - | 22 4010 0310 | 52,45 | 22 4510 0310 | 52,45 | 22 5010 0310 | 55,55 | 22 5510 0310 | 125,20 |
| ● 32,00 | 1.2598 | 22 2010 0320 | 42,15 | - | - | 22 3010 0320 | 45,45 | - | - | 22 4010 0320 | 52,45 | 22 4510 0320 | 52,45 | 22 5010 0320 | 55,55 | 22 5510 0320 | 125,20 |
| ● 33,00 | 1.2992 | 22 2010 0330 | 42,15 | - | - | 22 3010 0330 | 45,45 | - | - | 22 4010 0330 | 52,45 | 22 4510 0330 | 52,45 | 22 5010 0330 | 55,55 | 22 5510 0330 | 132,90 |
| ● 34,00 | 1.3386 | 22 2010 0340 | 42,15 | - | - | 22 3010 0340 | 45,45 | - | - | 22 4010 0340 | 52,45 | 22 4510 0340 | 52,45 | 22 5010 0340 | 55,55 | 22 5510 0340 | 132,90 |
| ● 35,00 | 1.3780 | 22 2010 0350 | 42,15 | - | - | 22 3010 0350 | 45,45 | - | - | 22 4010 0350 | 52,45 | 22 4510 0350 | 52,45 | 22 5010 0350 | 55,55 | 22 5510 0350 | 132,90 |

Schnittdaten
Cutting data

Film
Movie

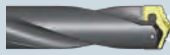


1302-1311

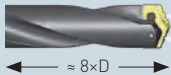
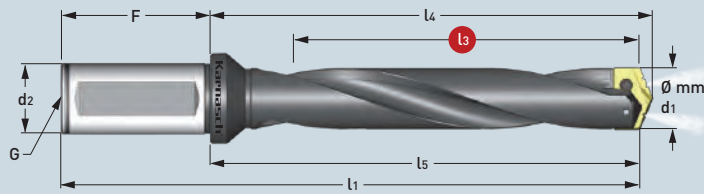




DIN 1835-B
Zylindrischer Schaft
mit Spannfläche ·
Lateral fixation type
flange shank



Spiral genutet ·
Helical flute



Lang · Long
≈ 8×D

| Art. | € | l3 | l5 | l4 | l1 | d2 | F | G |
|--|--------|-------------------------------|----------------------------|------------------------------------|-------------------------------|---------------------|-----------------------------|---------------------|
| | | Nutzlänge Max. drill depth | Körperlänge Body-length | Neue REF.- Länge REF.-length | Gesamtlänge Overall length | Schaft-Ø Shank-Ø | Schaftlänge Shank length | Gewinde Pipe tap |
| | | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | |
| • 22 1010 01111 0095 Ø 9,5-11,0 mm 0.3740-0.4331" OPTIMAL · OPTIMAL | 146,55 | 111,1 mm 4.3740" | 140,5 mm 5.5315" | 142,9 mm 5.6260" | 190,5 mm 7.5000" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1010 01111 0115 Ø 11,5-12,5 mm 0.4528-0.4921" OPTIMAL · OPTIMAL | 146,55 | 111,1 mm 4.3740" | 140,5 mm 5.5315" | 142,9 mm 5.6260" | 190,5 mm 7.5000" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1010 01143 0130 Ø 13,0-17,5 mm 0.5118-0.6890" MÖGLICH · POSSIBLE Ø 13,0-15,0 mm 0.5118-0.5906" OPTIMAL · OPTIMAL | 156,15 | 114,3 mm 4.5000" | 142,9 mm 5.6260" | 145,7 mm 5.7362" | 192,9 mm 7.5945" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1010 01143 0155 Ø 15,5-17,5 mm 0.6102-0.6890" OPTIMAL · OPTIMAL | 156,15 | 114,3 mm 4.5000" | 142,9 mm 5.6260" | 145,7 mm 5.7362" | 192,9 mm 7.5945" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1010 02699 0180 Ø 18,0-24,0 mm 0.7087-0.9449" MÖGLICH · POSSIBLE Ø 18,0-21,0 mm 0.7087-0.8268" OPTIMAL · OPTIMAL | 224,35 | 269,9 mm 10.6260" | 307,2 mm 12.0945" | 310,8 mm 12.2362" | 363,2 mm 14.2992" | 25,0 mm 0.9843" | 56,0 mm 2.2047" | 1/8" |
| • 22 1010 02699 0220 Ø 22,0-24,0 mm 0.8661-0.9449" OPTIMAL · OPTIMAL | 224,35 | 269,9 mm 10.6260" | 307,2 mm 12.0945" | 310,8 mm 12.2362" | 363,2 mm 14.2992" | 25,0 mm 0.9843" | 56,0 mm 2.2047" | 1/8" |
| • 22 1010 02889 0250 Ø 25,0-35,0 mm 0.9843-1.3780" MÖGLICH · POSSIBLE Ø 25,0-29,0 mm 0.9843-1.1417" OPTIMAL · OPTIMAL | 274,80 | 288,9 mm 11.3740" | 331,8 mm 13.0630" | 335,4 mm 13.2047" | 391,8 mm 15.4252" | 32,0 mm 1.2598" | 60,0 mm 2.3622" | 1/4" |
| • 22 1010 02889 0300 Ø 30,0-35,0 mm 1.1811-1.3780" OPTIMAL · OPTIMAL | 274,80 | 288,9 mm 11.3740" | 331,8 mm 13.0630" | 335,4 mm 13.2047" | 391,8 mm 15.4252" | 32,0 mm 1.2598" | 60,0 mm 2.3622" | 1/4" |

Halter werden **ohne** Einsätze, inklusive 2× TORX Befestigungsschrauben und 1× TORX Schlüssel geliefert.
 Holders are delivered **without** inserts including 2× TORX-screws and 1× TORX wrench.

Ersatz-Torxschrauben und Schlüssel mit Drehmomentangabe
 Spare Torx-screws and wrench with torque specification

| Ø Diameter | | TORX | max. Drehmoment / Torque (N/cm) | Schlüssel / Wrench | |
|------------|---------------|--------------|------------------------------------|--------------------|-------|
| mm | Zoll / Inch | | | | € |
| 9,5-11,0 | 0.3740-0.4331 | 22 9010 0095 | 84 | 22 9011 0084 | 9,90 |
| 11,5-12,5 | 0.4528-0.4921 | 22 9010 0115 | 84 | 22 9011 0175 | 9,90 |
| 13,0-17,5 | 0.5118-0.6890 | 22 9010 0130 | 175 | 22 9011 0305 | 10,90 |
| 18,0-24,0 | 0.7087-0.9449 | 22 9010 0180 | 305 | 22 9011 0690 | 11,70 |
| 25,0-35,0 | 0.9843-1.3780 | 22 9010 0250 | 690 | 22 9011 1370 | 12,70 |
| 36,0-65,0 | 1.4173-2.5591 | 22 9010 0360 | 1370 | 22 9011 1750 | 18,70 |
| 64,0-114,0 | 2.5197-4.4882 | 22 9010 0640 | 1750 | | |



PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

| Ø mm d1 | Ø Zoll / Inch d1 | PULVERSTAHL · POWDER STEEL | | | | HARTMETALL · CARBIDE | | | | | | | | | | | |
|------------|------------------------|----------------------------|-------|------|---|----------------------|-------|------|---|--------------|-------|--------------|-------|--------------|-------|--------------|--------|
| | | Art. | € | Art. | € | Art. | € | Art. | € | | | | | | | | |
| • 9,50 | 0.3740 | 22 2010 0095 | 24,85 | - | - | 22 3010 0095 | 26,05 | - | - | 22 4010 0095 | 29,30 | 22 4510 0095 | 29,30 | 22 5010 0095 | 30,45 | 22 5510 0095 | 66,40 |
| ○ 9,80 | 0.3858 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| • 10,00 | 0.3937 | 22 2010 0100 | 24,85 | - | - | 22 3010 0100 | 26,05 | - | - | 22 4010 0100 | 29,30 | 22 4510 0100 | 29,30 | 22 5010 0100 | 30,45 | 22 5510 0100 | 66,40 |
| • 10,20 | 0.4016 | 22 2010 0102 | 24,85 | - | - | 22 3010 0102 | 26,05 | - | - | 22 4010 0102 | 29,30 | 22 4510 0102 | 29,30 | 22 5010 0102 | 30,45 | 22 5510 0102 | 66,40 |
| • 10,50 | 0.4134 | 22 2010 0105 | 24,85 | - | - | 22 3010 0105 | 26,05 | - | - | 22 4010 0105 | 29,30 | 22 4510 0105 | 29,30 | 22 5010 0105 | 30,45 | 22 5510 0105 | 66,40 |
| • 10,80 | 0.4252 | 22 2010 0108 | 24,85 | - | - | 22 3010 0108 | 26,05 | - | - | 22 4010 0108 | 29,30 | 22 4510 0108 | 29,30 | 22 5010 0108 | 30,45 | 22 5510 0108 | 66,40 |
| • 11,00 | 0.4331 | 22 2010 0110 | 24,85 | - | - | 22 3010 0110 | 26,05 | - | - | 22 4010 0110 | 29,30 | 22 4510 0110 | 29,30 | 22 5010 0110 | 30,45 | 22 5510 0110 | 66,40 |
| • 11,50 | 0.4528 | 22 2010 0115 | 24,85 | - | - | 22 3010 0115 | 26,05 | - | - | 22 4010 0115 | 29,30 | 22 4510 0115 | 29,30 | 22 5010 0115 | 30,45 | 22 5510 0115 | 66,40 |
| • 12,00 | 0.4724 | 22 2010 0120 | 24,85 | - | - | 22 3010 0120 | 26,05 | - | - | 22 4010 0120 | 29,30 | 22 4510 0120 | 29,30 | 22 5010 0120 | 30,45 | 22 5510 0120 | 66,40 |
| • 12,50 | 0.4921 | 22 2010 0125 | 24,85 | - | - | 22 3010 0125 | 26,05 | - | - | 22 4010 0125 | 29,30 | 22 4510 0125 | 29,30 | 22 5010 0125 | 30,45 | 22 5510 0125 | 66,40 |
| • 13,00 | 0.5118 | 22 2010 0130 | 28,30 | - | - | 22 3010 0130 | 28,95 | - | - | 22 4010 0130 | 34,45 | 22 4510 0130 | 34,45 | 22 5010 0130 | 35,10 | 22 5510 0130 | 92,70 |
| • 13,50 | 0.5315 | 22 2010 0135 | 28,30 | - | - | 22 3010 0135 | 28,95 | - | - | 22 4010 0135 | 34,45 | 22 4510 0135 | 34,45 | 22 5010 0135 | 35,10 | 22 5510 0135 | 92,70 |
| • 14,00 | 0.5512 | 22 2010 0140 | 28,30 | - | - | 22 3010 0140 | 28,95 | - | - | 22 4010 0140 | 34,45 | 22 4510 0140 | 34,45 | 22 5010 0140 | 35,10 | 22 5510 0140 | 92,70 |
| • 14,50 | 0.5709 | 22 2010 0145 | 28,30 | - | - | 22 3010 0145 | 28,95 | - | - | 22 4010 0145 | 34,45 | 22 4510 0145 | 34,45 | 22 5010 0145 | 35,10 | 22 5510 0145 | 92,70 |
| • 15,00 | 0.5906 | 22 2010 0150 | 28,30 | - | - | 22 3010 0150 | 28,95 | - | - | 22 4010 0150 | 34,45 | 22 4510 0150 | 34,45 | 22 5010 0150 | 35,10 | 22 5510 0150 | 92,70 |
| • 15,50 | 0.6102 | 22 2010 0155 | 28,30 | - | - | 22 3010 0155 | 28,95 | - | - | 22 4010 0155 | 34,45 | 22 4510 0155 | 34,45 | 22 5010 0155 | 35,10 | 22 5510 0155 | 92,70 |
| • 16,00 | 0.6299 | 22 2010 0160 | 28,30 | - | - | 22 3010 0160 | 28,95 | - | - | 22 4010 0160 | 34,45 | 22 4510 0160 | 34,45 | 22 5010 0160 | 35,10 | 22 5510 0160 | 92,70 |
| • 16,50 | 0.6496 | 22 2010 0165 | 28,30 | - | - | 22 3010 0165 | 28,95 | - | - | 22 4010 0165 | 34,45 | 22 4510 0165 | 34,45 | 22 5010 0165 | 35,10 | 22 5510 0165 | 92,70 |
| • 17,00 | 0.6693 | 22 2010 0170 | 28,30 | - | - | 22 3010 0170 | 28,95 | - | - | 22 4010 0170 | 34,45 | 22 4510 0170 | 34,45 | 22 5010 0170 | 35,10 | 22 5510 0170 | 92,70 |
| • 17,50 | 0.6890 | 22 2010 0175 | 28,30 | - | - | 22 3010 0175 | 28,95 | - | - | 22 4010 0175 | 34,45 | 22 4510 0175 | 34,45 | 22 5010 0175 | 35,10 | 22 5510 0175 | 92,70 |
| • 18,00 | 0.7087 | 22 2010 0180 | 36,00 | - | - | 22 3010 0180 | 40,35 | - | - | 22 4010 0180 | 44,80 | 22 4510 0180 | 44,80 | 22 5010 0180 | 48,90 | 22 5510 0180 | 102,55 |
| • 18,50 | 0.7283 | 22 2010 0185 | 36,00 | - | - | 22 3010 0185 | 40,35 | - | - | 22 4010 0185 | 44,80 | 22 4510 0185 | 44,80 | 22 5010 0185 | 48,90 | 22 5510 0185 | 102,55 |
| • 19,00 | 0.7480 | 22 2010 0190 | 36,00 | - | - | 22 3010 0190 | 40,35 | - | - | 22 4010 0190 | 44,80 | 22 4510 0190 | 44,80 | 22 5010 0190 | 48,90 | 22 5510 0190 | 102,55 |
| • 19,50 | 0.7677 | 22 2010 0195 | 36,00 | - | - | 22 3010 0195 | 40,35 | - | - | 22 4010 0195 | 44,80 | 22 4510 0195 | 44,80 | 22 5010 0195 | 48,90 | 22 5510 0195 | 102,55 |
| • 20,00 | 0.7874 | 22 2010 0200 | 36,00 | - | - | 22 3010 0200 | 40,35 | - | - | 22 4010 0200 | 44,80 | 22 4510 0200 | 44,80 | 22 5010 0200 | 48,90 | 22 5510 0200 | 102,55 |
| • 20,50 | 0.8071 | 22 2010 0205 | 36,00 | - | - | 22 3010 0205 | 40,35 | - | - | 22 4010 0205 | 44,80 | 22 4510 0205 | 44,80 | 22 5010 0205 | 48,90 | 22 5510 0205 | 118,55 |
| • 21,00 | 0.8268 | 22 2010 0210 | 36,00 | - | - | 22 3010 0210 | 40,35 | - | - | 22 4010 0210 | 44,80 | 22 4510 0210 | 44,80 | 22 5010 0210 | 48,90 | 22 5510 0210 | 118,55 |
| • 22,00 | 0.8661 | 22 2010 0220 | 36,00 | - | - | 22 3010 0220 | 40,35 | - | - | 22 4010 0220 | 44,80 | 22 4510 0220 | 44,80 | 22 5010 0220 | 48,90 | 22 5510 0220 | 118,55 |
| • 23,00 | 0.9055 | 22 2010 0230 | 36,00 | - | - | 22 3010 0230 | 40,35 | - | - | 22 4010 0230 | 44,80 | 22 4510 0230 | 44,80 | 22 5010 0230 | 48,90 | 22 5510 0230 | 118,55 |
| • 24,00 | 0.9449 | 22 2010 0240 | 36,00 | - | - | 22 3010 0240 | 40,35 | - | - | 22 4010 0240 | 44,80 | 22 4510 0240 | 44,80 | 22 5010 0240 | 48,90 | 22 5510 0240 | 118,55 |
| • 25,00 | 0.9843 | 22 2010 0250 | 42,15 | - | - | 22 3010 0250 | 45,45 | - | - | 22 4010 0250 | 52,45 | 22 4510 0250 | 52,45 | 22 5010 0250 | 55,55 | 22 5510 0250 | 125,20 |
| • 26,00 | 1.0236 | 22 2010 0260 | 42,15 | - | - | 22 3010 0260 | 45,45 | - | - | 22 4010 0260 | 52,45 | 22 4510 0260 | 52,45 | 22 5010 0260 | 55,55 | 22 5510 0260 | 125,20 |
| • 26,50 | 1.0433 | 22 2010 0265 | 42,15 | - | - | 22 3010 0265 | 45,45 | - | - | 22 4010 0265 | 52,45 | 22 4510 0265 | 52,45 | 22 5010 0265 | 55,55 | 22 5510 0265 | 125,20 |
| • 27,00 | 1.0630 | 22 2010 0270 | 42,15 | - | - | 22 3010 0270 | 45,45 | - | - | 22 4010 0270 | 52,45 | 22 4510 0270 | 52,45 | 22 5010 0270 | 55,55 | 22 5510 0270 | 125,20 |
| • 28,00 | 1.1024 | 22 2010 0280 | 42,15 | - | - | 22 3010 0280 | 45,45 | - | - | 22 4010 0280 | 52,45 | 22 4510 0280 | 52,45 | 22 5010 0280 | 55,55 | 22 5510 0280 | 125,20 |
| • 29,00 | 1.1417 | 22 2010 0290 | 42,15 | - | - | 22 3010 0290 | 45,45 | - | - | 22 4010 0290 | 52,45 | 22 4510 0290 | 52,45 | 22 5010 0290 | 55,55 | 22 5510 0290 | 125,20 |
| • 30,00 | 1.1811 | 22 2010 0300 | 42,15 | - | - | 22 3010 0300 | 45,45 | - | - | 22 4010 0300 | 52,45 | 22 4510 0300 | 52,45 | 22 5010 0300 | 55,55 | 22 5510 0300 | 125,20 |
| • 31,00 | 1.2205 | 22 2010 0310 | 42,15 | - | - | 22 3010 0310 | 45,45 | - | - | 22 4010 0310 | 52,45 | 22 4510 0310 | 52,45 | 22 5010 0310 | 55,55 | 22 5510 0310 | 125,20 |
| • 32,00 | 1.2598 | 22 2010 0320 | 42,15 | - | - | 22 3010 0320 | 45,45 | - | - | 22 4010 0320 | 52,45 | 22 4510 0320 | 52,45 | 22 5010 0320 | 55,55 | 22 5510 0320 | 125,20 |
| • 33,00 | 1.2992 | 22 2010 0330 | 42,15 | - | - | 22 3010 0330 | 45,45 | - | - | 22 4010 0330 | 52,45 | 22 4510 0330 | 52,45 | 22 5010 0330 | 55,55 | 22 5510 0330 | 132,90 |
| • 34,00 | 1.3386 | 22 2010 0340 | 42,15 | - | - | 22 3010 0340 | 45,45 | - | - | 22 4010 0340 | 52,45 | 22 4510 0340 | 52,45 | 22 5010 0340 | 55,55 | 22 5510 0340 | 132,90 |
| • 35,00 | 1.3780 | 22 2010 0350 | 42,15 | - | - | 22 3010 0350 | 45,45 | - | - | 22 4010 0350 | 52,45 | 22 4510 0350 | 52,45 | 22 5010 0350 | 55,55 | 22 5510 0350 | 132,90 |
| • 36,00 | 1.4173 | 22 2010 0360 | 57,75 | - | - | 22 3010 0360 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 37,00 | 1.4567 | 22 2010 0370 | 57,75 | - | - | 22 3010 0370 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 38,00 | 1.4961 | 22 2010 0380 | 57,75 | - | - | 22 3010 0380 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 39,00 | 1.5354 | 22 2010 0390 | 57,75 | - | - | 22 3010 0390 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 40,00 | 1.5748 | 22 2010 0400 | 57,75 | - | - | 22 3010 0400 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 41,00 | 1.6142 | 22 2010 0410 | 57,75 | - | - | 22 3010 0410 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 42,00 | 1.6535 | 22 2010 0420 | 57,75 | - | - | 22 3010 0420 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 43,00 | 1.6929 | 22 2010 0430 | 57,75 | - | - | 22 3010 0430 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 44,00 | 1.7323 | 22 2010 0440 | 57,75 | - | - | 22 3010 0440 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 45,00 | 1.7717 | 22 2010 0450 | 57,75 | - | - | 22 3010 0450 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 46,00 | 1.8110 | 22 2010 0460 | 57,75 | - | - | 22 3010 0460 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 47,00 | 1.8504 | 22 2010 0470 | 57,75 | - | - | 22 3010 0470 | 59,50 | - | - | - | - | - | - | - | - | - | - |

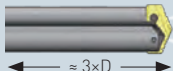
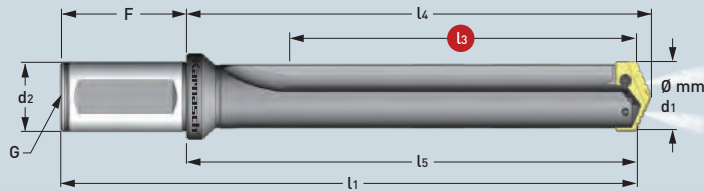
Fortsetzung Seite 318 · Continued page 318



DIN 1835-B
Zylindrischer Schaft
mit Spannfläche ·
Lateral fixation type
flange shank



Gerade genutet ·
Straight flute



Kurz · Short

| Art. | € | l3 | | l5 | | l4 | | l1 | | d2 | | F | | G | |
|--|--------|---------------------|---------------------|---------------------|---------------------|--------------------|--------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch |
| • 22 1020 00318 0095 Ø 9,5-11,0 mm 0.3740-0.4331" OPTIMAL · OPTIMAL | 111,95 | 31,8 mm 1.2520" | 61,1 mm 2.4055" | 63,5 mm 2.5000" | 111,1 mm 4.3740" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" | | | | | | | |
| • 22 1020 00318 0115 Ø 11,5-12,5 mm 0.4528-0.4921" OPTIMAL · OPTIMAL | 111,95 | 31,8 mm 1.2520" | 61,1 mm 2.4055" | 63,5 mm 2.5000" | 111,1 mm 4.3740" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" | | | | | | | |
| • 22 1020 00349 0135 Ø 13,0-17,5 mm 0.5118-0.6890" MÖGLICH · POSSIBLE Ø 13,0-15,0 mm 0.5118-0.5906" OPTIMAL · OPTIMAL | 122,50 | 34,9 mm 1.3740" | 63,5 mm 2.5000" | 66,3 mm 2.6102" | 113,5 mm 4.4685" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" | | | | | | | |
| • 22 1020 00349 0155 Ø 15,5-17,5 mm 0.6102-0.6890" OPTIMAL · OPTIMAL | 122,50 | 34,9 mm 1.3740" | 63,5 mm 2.5000" | 66,3 mm 2.6102" | 113,5 mm 4.4685" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" | | | | | | | |
| • 22 1020 00667 0180 Ø 18,0-24,0 mm 0.7087-0.9449" MÖGLICH · POSSIBLE Ø 18,0-21,0 mm 0.7087-0.8268" OPTIMAL · OPTIMAL | 136,90 | 66,7 mm 2.6260" | 107,2 mm 4.2205" | 110,7 mm 4.3583" | 163,2 mm 6.4252" | 25,0 mm 0.9842" | 56,0 mm 2.2047" | 1/8" | | | | | | | |
| • 22 1020 00667 0220 Ø 22,0-24,0 mm 0.8661-0.9449" OPTIMAL · OPTIMAL | 136,90 | 66,7 mm 2.6260" | 107,2 mm 4.2205" | 110,7 mm 4.3583" | 163,2 mm 6.4252" | 25,0 mm 0.9842" | 56,0 mm 2.2047" | 1/8" | | | | | | | |
| • 22 1020 00857 0250 Ø 25,0-35,0 mm 0.9843-1.3780" MÖGLICH · POSSIBLE Ø 25,0-29,0 mm 0.9843-1.1417" OPTIMAL · OPTIMAL | 166,25 | 85,7 mm 3.3740" | 128,6 mm 5.0630" | 132,2 mm 5.2047" | 188,6 mm 7.4252" | 32,0 mm 1.2598" | 60,0 mm 2.3622" | 1/4" | | | | | | | |
| • 22 1020 00857 0300 Ø 30,0-35,0 mm 1.1811-1.3780" OPTIMAL · OPTIMAL | 166,25 | 85,7 mm 3.3740" | 128,6 mm 5.0630" | 132,2 mm 5.2047" | 188,6 mm 7.4252" | 32,0 mm 1.2598" | 60,0 mm 2.3622" | 1/4" | | | | | | | |
| • 22 1020 01207 0360 Ø 36,0-47,0 mm 1.4173-1.8504" MÖGLICH · POSSIBLE Ø 36,0-41,0 mm 1.4173-1.6142" OPTIMAL · OPTIMAL | 224,05 | 120,7 mm 4.7520" | 173,0 mm 6.8110" | 177,8 mm 7.0000" | 243,0 mm 9.5669" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" | | | | | | | |
| • 22 1020 01207 0420 Ø 42,0-47,0 mm 1.6535-1.8504" OPTIMAL · OPTIMAL | 224,05 | 120,7 mm 4.7520" | 173,0 mm 6.8110" | 177,8 mm 7.0000" | 243,0 mm 9.5669" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" | | | | | | | |

Schnittdaten
Cutting data

Film
Movie



1302-1311





| PULVERSTAHL · POWDER STEEL | | | | | | | | | | HARTMETALL · CARBIDE | | | | | | | | | |
|----------------------------|--------|------------------------|-------|---|---|---|-------|---|---|---|---|---|---|--|---|---|---|--|---|
| Ø mm d1 | | Ø Zoll / Inch d1 | | 22 2010 | | 22 2510 | | 22 3010 | | 22 3510 | | 22 4010 | | 22 4510 | | 22 5010 | | 22 5510 | |
| | | | | Pulverstahl 25 STEEL-TEC beschichtet Für Edelstahl, Stahl, Guss | | Pulverstahl 15 STEEL-TEC beschichtet Für legierte Stähle, Edelstahl, Stahl, Guss | | Pulverstahl 25 ALU-TEC beschichtet Für Alu, Messing, Kupfer | | Pulverstahl 15 ALU-TEC beschichtet Für Alu, Messing, Kupfer | | Hartmetall 20/30 STEEL-TEC beschichtet Für Edelstahl, hochfester Stahl, gehärteter Stahl | | Hartmetall 20/30 STEEL-TEC beschichtet Für alle Gussarten | | Hartmetall 20/30 ALU-TEC beschichtet Für Alu, Messing, Kupfer | | Hartmetall 20/30 DIA-TEC beschichtet Für abrasive Materialien wie: GFK, CFK, Graphit | |
| | | | | Powder steel 25 STEEL-TEC coated For stainless steel, steel, cast iron | | Powder steel 15 STEEL-TEC coated For alloy steel, stainless steel, steel, cast iron | | Powder steel 25 ALU-TEC coated For alu, brass, copper | | Powder steel 15 ALU-TEC coated For alloy steel, steel, cast iron | | Carbide 20/30 STEEL-TEC coated For stainless steel, high strength alloys, hardened steel | | Carbide 20/30 STEEL-TEC coated For all kinds of cast iron | | Carbide 20/30 ALU-TEC coated For alu, brass, copper | | Carbide 20/30 DIA-TEC coated For abrasive materials such as: fiberglass, carbon fiber, graphite | |
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| • 48,00 | 1.8898 | 22 2010 0480 | 82,65 | - | - | 22 3010 0480 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 49,00 | 1.9291 | 22 2010 0490 | 82,65 | - | - | 22 3010 0490 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 50,00 | 1.9685 | 22 2010 0500 | 82,65 | - | - | 22 3010 0500 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 51,00 | 2.0079 | 22 2010 0510 | 82,65 | - | - | 22 3010 0510 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 52,00 | 2.0472 | 22 2010 0520 | 82,65 | - | - | 22 3010 0520 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 53,00 | 2.0866 | 22 2010 0530 | 82,65 | - | - | 22 3010 0530 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 54,00 | 2.1260 | 22 2010 0540 | 82,65 | - | - | 22 3010 0540 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 55,00 | 2.1654 | 22 2010 0550 | 82,65 | - | - | 22 3010 0550 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 56,00 | 2.2047 | 22 2010 0560 | 82,65 | - | - | 22 3010 0560 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 57,00 | 2.2441 | 22 2010 0570 | 82,65 | - | - | 22 3010 0570 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 58,00 | 2.2835 | 22 2010 0580 | 82,65 | - | - | 22 3010 0580 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 59,00 | 2.3228 | 22 2010 0590 | 82,65 | - | - | 22 3010 0590 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 60,00 | 2.3622 | 22 2010 0600 | 82,65 | - | - | 22 3010 0600 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 61,00 | 2.4016 | 22 2010 0610 | 82,65 | - | - | 22 3010 0610 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 62,00 | 2.4409 | 22 2010 0620 | 82,65 | - | - | 22 3010 0620 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 63,00 | 2.4803 | 22 2010 0630 | 82,65 | - | - | 22 3010 0630 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 64,00 | 2.5197 | 22 2010 0640 | 82,65 | - | - | 22 3010 0640 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 65,00 | 2.5591 | 22 2010 0650 | 82,65 | - | - | 22 3010 0650 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |

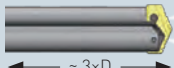
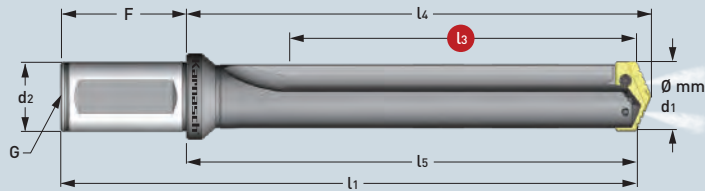
 **22 1020**



DIN 1835-B
Zylindrischer Schaft
mit Spannfläche ·
Lateral fixation type
flange shank



Gerade genutet ·
Straight flute




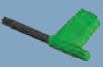
















← ≈ 3×D →
Kurz · Short

| | l₃ | l₅ | l₄ | l₁ | d₂ | F | G |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------|--------------------|
| | Nutzlänge | Körperlänge | Neue REF.- Länge | Gesamtlänge | Schaft-Ø | Schaftlänge | Gewinde |
| | Max. drill depth | Body-length | REF.-length | Overall length | Shank-Ø | Shank length | Pipe tap |
| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | |
| • 22 1020 01302 0480 Ø 48,0-65,0 mm 1.8898-2.5591" MÖGLICH · POSSIBLE Ø 48,0-55,0 mm 1.8898-2.1654" OPTIMAL · OPTIMAL | 238,60 | 130,2 mm 5.1260" | 179,4 mm 7.0630" | 184,2 mm 7.2520" | 249,4 mm 9.8189" | 40,0 mm 1.5748" | 70,0 mm 2.7559" |
| • 22 1020 01302 0560 Ø 56,0-65,0 mm 2.2047-2.5591" OPTIMAL · OPTIMAL | 238,60 | 130,2 mm 5.1260" | 179,4 mm 7.0630" | 184,2 mm 7.2520" | 249,4 mm 9.8189" | 40,0 mm 1.5748" | 70,0 mm 2.7559" |

Halter werden **ohne** Einsätze, inklusive 2× TORX Befestigungsschrauben und 1× TORX Schlüssel geliefert.
 Holders are delivered **without** inserts including 2× TORX-screws and 1× TORX wrench.

Ersatz-Torxschrauben und Schlüssel mit Drehmomentangabe
 Spare Torx-screws and wrench with torque specification

| Ø Diameter | | TORX | | max. Drehmoment / Torque (N/cm) | Schlüssel / Wrench | | |
|------------|---------------|---|---|------------------------------------|---|---|---|
| mm | Zoll / Inch |  |  | | € |  |  |
| 9,5-11,0 | 0.3740-0.4331 |  | 22 9010 0095 | 84 |  | 22 9011 0084 | 9,90 |
| 11,5-12,5 | 0.4528-0.4921 |  | 22 9010 0115 | 84 |  | 22 9011 0175 | 9,90 |
| 13,0-17,5 | 0.5118-0.6890 |  | 22 9010 0130 | 175 |  | 22 9011 0305 | 10,90 |
| 18,0-24,0 | 0.7087-0.9449 |  | 22 9010 0180 | 305 |  | 22 9011 0690 | 11,70 |
| 25,0-35,0 | 0.9843-1.3780 |  | 22 9010 0250 | 690 |  | 22 9011 1370 | 12,70 |
| 36,0-65,0 | 1.4173-2.5591 |  | 22 9010 0360 | 1370 |  | 22 9011 1750 | 18,70 |
| 64,0-114,0 | 2.5197-4.4882 |  | 22 9010 0640 | 1750 |  | | |

Schnittdaten
Cutting data



Film
Movie



 1302-1311



319



Index



PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

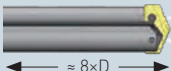
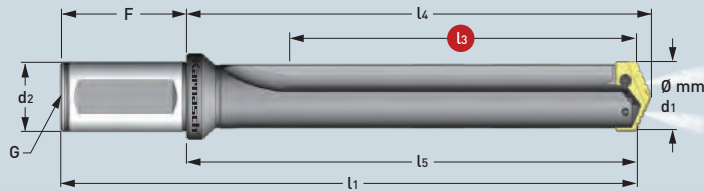
| Ø mm d1 | Ø Zoll / Inch d1 | 22 2010 | | 22 2510 | | 22 3010 | | 22 3510 | | 22 4010 | | 22 4510 | | 22 5010 | | 22 5510 | |
|------------|------------------------|--------------|-------|---------|---|--------------|-------|---------|---|---------|---|---------|---|---------|---|---------|---|
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| • 36,00 | 1.4173 | 22 2010 0360 | 57,75 | - | - | 22 3010 0360 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 37,00 | 1.4567 | 22 2010 0370 | 57,75 | - | - | 22 3010 0370 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 38,00 | 1.4961 | 22 2010 0380 | 57,75 | - | - | 22 3010 0380 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 39,00 | 1.5354 | 22 2010 0390 | 57,75 | - | - | 22 3010 0390 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 40,00 | 1.5748 | 22 2010 0400 | 57,75 | - | - | 22 3010 0400 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 41,00 | 1.6142 | 22 2010 0410 | 57,75 | - | - | 22 3010 0410 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 42,00 | 1.6535 | 22 2010 0420 | 57,75 | - | - | 22 3010 0420 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 43,00 | 1.6929 | 22 2010 0430 | 57,75 | - | - | 22 3010 0430 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 44,00 | 1.7323 | 22 2010 0440 | 57,75 | - | - | 22 3010 0440 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 45,00 | 1.7717 | 22 2010 0450 | 57,75 | - | - | 22 3010 0450 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 46,00 | 1.8110 | 22 2010 0460 | 57,75 | - | - | 22 3010 0460 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 47,00 | 1.8504 | 22 2010 0470 | 57,75 | - | - | 22 3010 0470 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 48,00 | 1.8898 | 22 2010 0480 | 82,65 | - | - | 22 3010 0480 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 49,00 | 1.9291 | 22 2010 0490 | 82,65 | - | - | 22 3010 0490 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 50,00 | 1.9685 | 22 2010 0500 | 82,65 | - | - | 22 3010 0500 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 51,00 | 2.0079 | 22 2010 0510 | 82,65 | - | - | 22 3010 0510 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 52,00 | 2.0472 | 22 2010 0520 | 82,65 | - | - | 22 3010 0520 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 53,00 | 2.0866 | 22 2010 0530 | 82,65 | - | - | 22 3010 0530 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 54,00 | 2.1260 | 22 2010 0540 | 82,65 | - | - | 22 3010 0540 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 55,00 | 2.1654 | 22 2010 0550 | 82,65 | - | - | 22 3010 0550 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 56,00 | 2.2047 | 22 2010 0560 | 82,65 | - | - | 22 3010 0560 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 57,00 | 2.2441 | 22 2010 0570 | 82,65 | - | - | 22 3010 0570 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 58,00 | 2.2835 | 22 2010 0580 | 82,65 | - | - | 22 3010 0580 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 59,00 | 2.3228 | 22 2010 0590 | 82,65 | - | - | 22 3010 0590 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 60,00 | 2.3622 | 22 2010 0600 | 82,65 | - | - | 22 3010 0600 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 61,00 | 2.4016 | 22 2010 0610 | 82,65 | - | - | 22 3010 0610 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 62,00 | 2.4409 | 22 2010 0620 | 82,65 | - | - | 22 3010 0620 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 63,00 | 2.4803 | 22 2010 0630 | 82,65 | - | - | 22 3010 0630 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 64,00 | 2.5197 | 22 2010 0640 | 82,65 | - | - | 22 3010 0640 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 65,00 | 2.5591 | 22 2010 0650 | 82,65 | - | - | 22 3010 0650 | 82,65 | - | - | - | - | - | - | - | - | - | - |



DIN 1835-B
Zylindrischer Schaft
mit Spannfläche ·
Lateral fixation type
flange shank



Gerade genutet ·
Straight flute



Lang · Long

| L3 | L5 | L4 | L1 | d2 | F | G |
|---------------------|-------------|---------------------|----------------|-----------|--------------|----------|
| Nutzlänge | Körperlänge | Neue REF.- Länge | Gesamtlänge | Schaft-Ø | Schaftlänge | Gewinde |
| Max. drill depth | Body-length | REF.-length | Overall length | Shank-Ø | Shank length | Pipe tap |

| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | | | |
|-----------------------------|--------|--|---|----------------------|----------------------|----------------------|----------------------|--------------------|--------------------|------|
| • 22 1020 03493 0360 | 424,05 | Ø 36,0-47,0 mm 1.4173-1.8504" Ø 36,0-41,0 mm 1.4173-1.6142" | MÖGLICH · POSSIBLE OPTIMAL · OPTIMAL | 349,3 mm 13.7520" | 401,6 mm 15.8110" | 406,4 mm 16.0000" | 471,6 mm 18.5669" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |
| • 22 1020 03493 0420 | 424,05 | Ø 42,0-47,0 mm 1.6535-1.8504" | OPTIMAL · OPTIMAL | | | | | | | |
| • 22 1020 04223 0480 | 480,10 | Ø 48,0-65,0 mm 1.8898-2.5591" Ø 48,0-55,0 mm 1.8898-2.1654" | MÖGLICH · POSSIBLE OPTIMAL · OPTIMAL | 422,3 mm 16.6260" | 471,5 mm 18.5630" | 476,3 mm 18.7520" | 541,5 mm 21.3189" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |
| • 22 1020 04223 0560 | 480,10 | Ø 56,0-65,0 mm 2.2047-2.5591" | OPTIMAL · OPTIMAL | 422,3 mm 16.6260" | 471,5 mm 18.5630" | 476,3 mm 18.7520" | 541,5 mm 21.3189" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |

Halter werden **ohne** Einsätze, inklusive 2x TORX Befestigungsschrauben und 1x TORX Schlüssel geliefert.
 Holders are delivered **without** inserts including 2x TORX-screws and 1x TORX wrench.

Ersatz-Torxschrauben und Schlüssel mit Drehmomentangabe
 Spare Torx-screws and wrench with torque specification

| Ø Diameter | | TORX | | max. Drehmoment / Torque (N/cm) | | Schlüssel / Wrench | | |
|------------|---------------|------|--------------|---------------------------------|------|--------------------|--------------|-------|
| mm | Zoll / Inch | | | € | | | | € |
| 9,5-11,0 | 0.3740-0.4331 | | 22 9010 0095 | 3,50 | 84 | | 22 9011 0084 | 9,90 |
| 11,5-12,5 | 0.4528-0.4921 | | 22 9010 0115 | 3,50 | 84 | | 22 9011 0175 | 9,90 |
| 13,0-17,5 | 0.5118-0.6890 | | 22 9010 0130 | 3,50 | 175 | | 22 9011 0305 | 10,90 |
| 18,0-24,0 | 0.7087-0.9449 | | 22 9010 0180 | 3,50 | 305 | | 22 9011 0690 | 11,70 |
| 25,0-35,0 | 0.9843-1.3780 | | 22 9010 0250 | 3,60 | 690 | | 22 9011 1370 | 12,70 |
| 36,0-65,0 | 1.4173-2.5591 | | 22 9010 0360 | 3,65 | 1370 | | 22 9011 1750 | 18,70 |
| 64,0-114,0 | 2.5197-4.4882 | | 22 9010 0640 | 3,70 | 1750 | | | |

Schnittdaten
Cutting data



Film
Movie



1302-1311

321



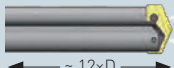
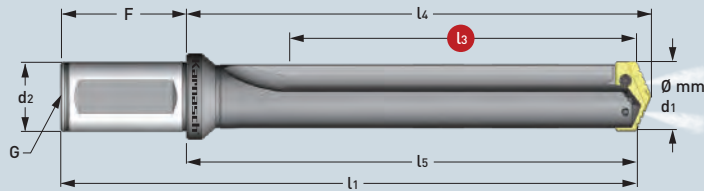
Index



DIN 1835-B
Zylindrischer Schaft
mit Spannfläche ·
Lateral fixation type
flange shank



Gerade genutet ·
Straight flute



Überlang · Overlength

| Art. | € | l3 Nutzlänge Max. drill depth | l5 Körperlänge Body-length | l4 Neue REF.- Länge REF.-length | l1 Gesamtlänge Overall length | d2 Schaft-Ø Shank-Ø | F Schaftlänge Shank length | G Gewinde Pipe tap |
|--|--------|--|---|---|--|----------------------------------|---|---------------------------------|
| | | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | |
| • 22 1020 02220 0095 Ø 9,5-11,0 mm 0.3740-0.4331" OPTIMAL · OPTIMAL | 196,40 | 222,0 mm 8.7401" | 251,7 mm 9.9094" | 254,1 mm 10.0039" | 301,7 mm 11.8780" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1020 02223 0115 Ø 11,5-12,5 mm 0.4528-0.4921" OPTIMAL · OPTIMAL | 196,40 | 222,3 mm 8.7519" | 251,7 mm 9.9094" | 254,1 mm 10.0039" | 301,7 mm 11.8780" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1020 02950 0130 Ø 13,0-17,5 mm 0.5118-0.6890" MÖGLICH · POSSIBLE Ø 13,0-15,0 mm 0.5118-0.5906" OPTIMAL · OPTIMAL | 245,40 | 295,0 mm 11.6142" | 323,9 mm 12.7520" | 326,7 mm 12.8622" | 373,9 mm 14.7205" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1020 02950 0155 Ø 15,5-17,5 mm 0.6102-0.6890" OPTIMAL · OPTIMAL | 245,40 | 295,0 mm 11.6142" | 323,9 mm 12.7520" | 326,7 mm 12.8622" | 373,9 mm 14.7205" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1020 04570 0180 Ø 18,0-24,0 mm 0.7087-0.9449" MÖGLICH · POSSIBLE Ø 18,0-21,0 mm 0.7087-0.8268" OPTIMAL · OPTIMAL | 337,50 | 457,0 mm 17.9921" | 494,5 mm 19.4685" | 498,1 mm 19.6102" | 550,5 mm 21.6732" | 25,0 mm 0.9842" | 56,0 mm 2.2047" | 1/8" |
| • 22 1020 04570 0220 Ø 22,0-24,0 mm 0.8661-0.9449" OPTIMAL · OPTIMAL | 337,50 | 457,0 mm 17.9921" | 494,5 mm 19.4685" | 498,1 mm 19.6102" | 550,5 mm 21.6732" | 25,0 mm 0.9842" | 56,0 mm 2.2047" | 1/8" |
| • 22 1020 05110 0250 Ø 25,0-35,0 mm 0.9843-1.3780" MÖGLICH · POSSIBLE Ø 25,0-29,0 mm 0.9843-1.1417" OPTIMAL · OPTIMAL | 406,80 | 511,0 mm 20.1181" | 554,1 mm 21.8150" | 557,7 mm 21.9567" | 614,1 mm 24.1772" | 32,0 mm 1.2598" | 60,0 mm 2.3622" | 1/4" |
| • 22 1020 05110 0300 Ø 30,0-35,0 mm 1.1811-1.3780" OPTIMAL · OPTIMAL | 406,80 | 511,0 mm 20.1181" | 554,1 mm 21.8150" | 557,7 mm 21.9567" | 614,1 mm 24.1772" | 32,0 mm 1.2598" | 60,0 mm 2.3622" | 1/4" |
| • 22 1020 05588 0360 Ø 36,0-47,0 mm 1.4173-1.8504" MÖGLICH · POSSIBLE Ø 36,0-41,0 mm 1.4173-1.6142" OPTIMAL · OPTIMAL | 595,05 | 558,8 mm 22.0000" | 611,1 mm 24.0591" | 615,9 mm 24.2480" | 681,1 mm 26.8150" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |
| • 22 1020 05588 0420 Ø 42,0-47,0 mm 1.6535-1.8504" OPTIMAL · OPTIMAL | 595,05 | 558,8 mm 22.0000" | 611,1 mm 24.0591" | 615,9 mm 24.2480" | 681,1 mm 26.8150" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |



Schnittdaten
Cutting data

Film
Movie



1302-1311

323

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

| Ø mm d1 | Ø Zoll / Inch d1 | 22 2010  | | 22 2510  | | 22 3010  | | 22 3510  | | 22 4010  | | 22 4510  | | 22 5010  | | 22 5510  | |
|------------|------------------------|---|-------|---|---|---|-------|---|---|---|---|---|---|---|---|---|---|
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| • 48,00 | 1.8898 | 22 2010 0480 | 82,65 | - | - | 22 3010 0480 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 49,00 | 1.9291 | 22 2010 0490 | 82,65 | - | - | 22 3010 0490 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 50,00 | 1.9685 | 22 2010 0500 | 82,65 | - | - | 22 3010 0500 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 51,00 | 2.0079 | 22 2010 0510 | 82,65 | - | - | 22 3010 0510 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 52,00 | 2.0472 | 22 2010 0520 | 82,65 | - | - | 22 3010 0520 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 53,00 | 2.0866 | 22 2010 0530 | 82,65 | - | - | 22 3010 0530 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 54,00 | 2.1260 | 22 2010 0540 | 82,65 | - | - | 22 3010 0540 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 55,00 | 2.1654 | 22 2010 0550 | 82,65 | - | - | 22 3010 0550 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 56,00 | 2.2047 | 22 2010 0560 | 82,65 | - | - | 22 3010 0560 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 57,00 | 2.2441 | 22 2010 0570 | 82,65 | - | - | 22 3010 0570 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 58,00 | 2.2835 | 22 2010 0580 | 82,65 | - | - | 22 3010 0580 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 59,00 | 2.3228 | 22 2010 0590 | 82,65 | - | - | 22 3010 0590 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 60,00 | 2.3622 | 22 2010 0600 | 82,65 | - | - | 22 3010 0600 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 61,00 | 2.4016 | 22 2010 0610 | 82,65 | - | - | 22 3010 0610 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 62,00 | 2.4409 | 22 2010 0620 | 82,65 | - | - | 22 3010 0620 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 63,00 | 2.4803 | 22 2010 0630 | 82,65 | - | - | 22 3010 0630 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 64,00 | 2.5197 | 22 2010 0640 | 82,65 | - | - | 22 3010 0640 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 65,00 | 2.5591 | 22 2010 0650 | 82,65 | - | - | 22 3010 0650 | 82,65 | - | - | - | - | - | - | - | - | - | - |

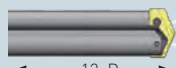
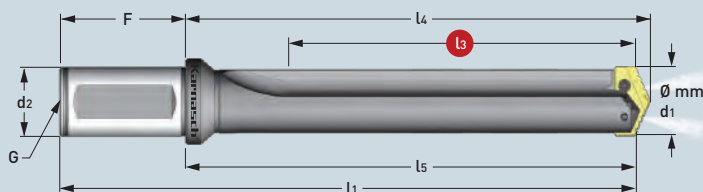
 **22 1020**



DIN 1835-B
Zylindrischer Schaft
mit Spannfläche ·
Lateral fixation type
flange shank



Gerade genutet ·
Straight flute












Überlang · Overlength

| | l₃ | l₅ | l₄ | l₁ | d₂ | F | G | |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------|--------------------|------|
| | Nutzlänge | Körperlänge | Neue REF.- Länge | Gesamtlänge | Schaft-Ø | Schaftlänge | Gewinde | |
| | Max. drill depth | Body-length | REF.-length | Overall length | Shank-Ø | Shank length | Pipe tap | |
| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | | |
| • 22 1020 06250 0480 Ø 48,0-65,0 mm 1.8898-2.5591" MÖGLICH · POSSIBLE Ø 48,0-55,0 mm 1.8898-2.1654" OPTIMAL · OPTIMAL | 728,80 | 625,0 mm 24.6063" | 674,7 mm 26.5630" | 679,5 mm 26.7520" | 744,7 mm 29.3189" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |
| • 22 1020 06250 0560 Ø 56,0-65,0 mm 2.2047-2.5591" OPTIMAL · OPTIMAL | 728,80 | 625,0 mm 24.6063" | 674,7 mm 26.5630" | 679,5 mm 26.7520" | 744,7 mm 29.3189" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |

Halter werden **ohne** Einsätze, inklusive 2x TORX Befestigungsschrauben und 1x TORX Schlüssel geliefert.
 Holders are delivered **without** inserts including 2x TORX-screws and 1x TORX wrench.

Ersatz-Torxschrauben und Schlüssel mit Drehmomentangabe
 Spare Torx-screws and wrench with torque specification

| Ø Diameter | | TORX | | max. Drehmoment / Torque (N/cm) | | Schlüssel / Wrench | | |
|------------|---------------|---|---|---------------------------------|------|---|---|-------|
| mm | Zoll / Inch |  |  | € | |  |  | € |
| 9,5-11,0 | 0.3740-0.4331 |  | 22 9010 0095 | 3,50 | 84 |  | 22 9011 0084 | 9,90 |
| 11,5-12,5 | 0.4528-0.4921 |  | 22 9010 0115 | 3,50 | 84 |  | 22 9011 0175 | 9,90 |
| 13,0-17,5 | 0.5118-0.6890 |  | 22 9010 0130 | 3,50 | 175 |  | 22 9011 0305 | 10,90 |
| 18,0-24,0 | 0.7087-0.9449 |  | 22 9010 0180 | 3,50 | 305 |  | 22 9011 0690 | 11,70 |
| 25,0-35,0 | 0.9843-1.3780 |  | 22 9010 0250 | 3,60 | 690 |  | 22 9011 1370 | 12,70 |
| 36,0-65,0 | 1.4173-2.5591 |  | 22 9010 0360 | 3,65 | 1370 |  | 22 9011 1750 | 18,70 |
| 64,0-114,0 | 2.5197-4.4882 |  | 22 9010 0640 | 3,70 | 1750 |  | | |

Schnittdaten
Cutting data



1302-1311

Film
Movie



325



Index



PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

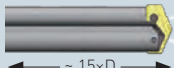
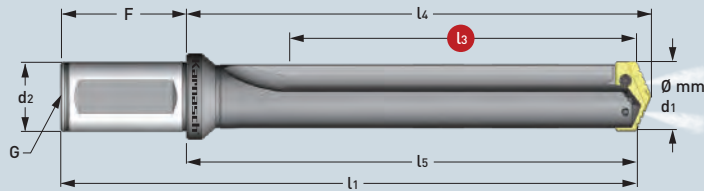
| Ø mm d1 | Ø Zoll / Inch d1 | PULVERSTAHL 25 STEEL-TEC beschichtet | | | | PULVERSTAHL 15 STEEL-TEC beschichtet | | | | PULVERSTAHL 25 ALU-TEC beschichtet | | | | PULVERSTAHL 15 ALU-TEC beschichtet | | | | HARTMETALL 20/30 STEEL-TEC beschichtet | | HARTMETALL 20/30 ALU-TEC beschichtet | | HARTMETALL 20/30 DIA-TEC beschichtet | |
|------------|------------------------|--------------------------------------|-------|------|---|--------------------------------------|-------|------|---|------------------------------------|-------|--------------|-------|------------------------------------|-------|--------------|--------|--|---|--------------------------------------|---|--------------------------------------|---|
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| ● 9,50 | 0.3740 | 22 2010 0095 | 24,85 | - | - | 22 3010 0095 | 26,05 | - | - | 22 4010 0095 | 29,30 | 22 4510 0095 | 29,30 | 22 5010 0095 | 30,45 | 22 5510 0095 | 66,40 | | | | | | |
| ○ 9,80 | 0.3858 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ● 10,00 | 0.3937 | 22 2010 0100 | 24,85 | - | - | 22 3010 0100 | 26,05 | - | - | 22 4010 0100 | 29,30 | 22 4510 0100 | 29,30 | 22 5010 0100 | 30,45 | 22 5510 0100 | 66,40 | | | | | | |
| ● 10,20 | 0.4016 | 22 2010 0102 | 24,85 | - | - | 22 3010 0102 | 26,05 | - | - | 22 4010 0102 | 29,30 | 22 4510 0102 | 29,30 | 22 5010 0102 | 30,45 | 22 5510 0102 | 66,40 | | | | | | |
| ● 10,50 | 0.4134 | 22 2010 0105 | 24,85 | - | - | 22 3010 0105 | 26,05 | - | - | 22 4010 0105 | 29,30 | 22 4510 0105 | 29,30 | 22 5010 0105 | 30,45 | 22 5510 0105 | 66,40 | | | | | | |
| ● 10,80 | 0.4252 | 22 2010 0108 | 24,85 | - | - | 22 3010 0108 | 26,05 | - | - | 22 4010 0108 | 29,30 | 22 4510 0108 | 29,30 | 22 5010 0108 | 30,45 | 22 5510 0108 | 66,40 | | | | | | |
| ● 11,00 | 0.4331 | 22 2010 0110 | 24,85 | - | - | 22 3010 0110 | 26,05 | - | - | 22 4010 0110 | 29,30 | 22 4510 0110 | 29,30 | 22 5010 0110 | 30,45 | 22 5510 0110 | 66,40 | | | | | | |
| ● 11,50 | 0.4528 | 22 2010 0115 | 24,85 | - | - | 22 3010 0115 | 26,05 | - | - | 22 4010 0115 | 29,30 | 22 4510 0115 | 29,30 | 22 5010 0115 | 30,45 | 22 5510 0115 | 66,40 | | | | | | |
| ● 12,00 | 0.4724 | 22 2010 0120 | 24,85 | - | - | 22 3010 0120 | 26,05 | - | - | 22 4010 0120 | 29,30 | 22 4510 0120 | 29,30 | 22 5010 0120 | 30,45 | 22 5510 0120 | 66,40 | | | | | | |
| ● 12,50 | 0.4921 | 22 2010 0125 | 24,85 | - | - | 22 3010 0125 | 26,05 | - | - | 22 4010 0125 | 29,30 | 22 4510 0125 | 29,30 | 22 5010 0125 | 30,45 | 22 5510 0125 | 66,40 | | | | | | |
| ● 13,00 | 0.5118 | 22 2010 0130 | 28,30 | - | - | 22 3010 0130 | 28,95 | - | - | 22 4010 0130 | 34,45 | 22 4510 0130 | 34,45 | 22 5010 0130 | 35,10 | 22 5510 0130 | 92,70 | | | | | | |
| ● 13,50 | 0.5315 | 22 2010 0135 | 28,30 | - | - | 22 3010 0135 | 28,95 | - | - | 22 4010 0135 | 34,45 | 22 4510 0135 | 34,45 | 22 5010 0135 | 35,10 | 22 5510 0135 | 92,70 | | | | | | |
| ● 14,00 | 0.5512 | 22 2010 0140 | 28,30 | - | - | 22 3010 0140 | 28,95 | - | - | 22 4010 0140 | 34,45 | 22 4510 0140 | 34,45 | 22 5010 0140 | 35,10 | 22 5510 0140 | 92,70 | | | | | | |
| ● 14,50 | 0.5709 | 22 2010 0145 | 28,30 | - | - | 22 3010 0145 | 28,95 | - | - | 22 4010 0145 | 34,45 | 22 4510 0145 | 34,45 | 22 5010 0145 | 35,10 | 22 5510 0145 | 92,70 | | | | | | |
| ● 15,00 | 0.5906 | 22 2010 0150 | 28,30 | - | - | 22 3010 0150 | 28,95 | - | - | 22 4010 0150 | 34,45 | 22 4510 0150 | 34,45 | 22 5010 0150 | 35,10 | 22 5510 0150 | 92,70 | | | | | | |
| ● 15,50 | 0.6102 | 22 2010 0155 | 28,30 | - | - | 22 3010 0155 | 28,95 | - | - | 22 4010 0155 | 34,45 | 22 4510 0155 | 34,45 | 22 5010 0155 | 35,10 | 22 5510 0155 | 92,70 | | | | | | |
| ● 16,00 | 0.6299 | 22 2010 0160 | 28,30 | - | - | 22 3010 0160 | 28,95 | - | - | 22 4010 0160 | 34,45 | 22 4510 0160 | 34,45 | 22 5010 0160 | 35,10 | 22 5510 0160 | 92,70 | | | | | | |
| ● 16,50 | 0.6496 | 22 2010 0165 | 28,30 | - | - | 22 3010 0165 | 28,95 | - | - | 22 4010 0165 | 34,45 | 22 4510 0165 | 34,45 | 22 5010 0165 | 35,10 | 22 5510 0165 | 92,70 | | | | | | |
| ● 17,00 | 0.6693 | 22 2010 0170 | 28,30 | - | - | 22 3010 0170 | 28,95 | - | - | 22 4010 0170 | 34,45 | 22 4510 0170 | 34,45 | 22 5010 0170 | 35,10 | 22 5510 0170 | 92,70 | | | | | | |
| ● 17,50 | 0.6890 | 22 2010 0175 | 28,30 | - | - | 22 3010 0175 | 28,95 | - | - | 22 4010 0175 | 34,45 | 22 4510 0175 | 34,45 | 22 5010 0175 | 35,10 | 22 5510 0175 | 92,70 | | | | | | |
| ● 18,00 | 0.7087 | 22 2010 0180 | 36,00 | - | - | 22 3010 0180 | 40,35 | - | - | 22 4010 0180 | 44,80 | 22 4510 0180 | 44,80 | 22 5010 0180 | 48,90 | 22 5510 0180 | 102,55 | | | | | | |
| ● 18,50 | 0.7283 | 22 2010 0185 | 36,00 | - | - | 22 3010 0185 | 40,35 | - | - | 22 4010 0185 | 44,80 | 22 4510 0185 | 44,80 | 22 5010 0185 | 48,90 | 22 5510 0185 | 102,55 | | | | | | |
| ● 19,00 | 0.7480 | 22 2010 0190 | 36,00 | - | - | 22 3010 0190 | 40,35 | - | - | 22 4010 0190 | 44,80 | 22 4510 0190 | 44,80 | 22 5010 0190 | 48,90 | 22 5510 0190 | 102,55 | | | | | | |
| ● 19,50 | 0.7677 | 22 2010 0195 | 36,00 | - | - | 22 3010 0195 | 40,35 | - | - | 22 4010 0195 | 44,80 | 22 4510 0195 | 44,80 | 22 5010 0195 | 48,90 | 22 5510 0195 | 102,55 | | | | | | |
| ● 20,00 | 0.7874 | 22 2010 0200 | 36,00 | - | - | 22 3010 0200 | 40,35 | - | - | 22 4010 0200 | 44,80 | 22 4510 0200 | 44,80 | 22 5010 0200 | 48,90 | 22 5510 0200 | 102,55 | | | | | | |
| ● 20,50 | 0.8071 | 22 2010 0205 | 36,00 | - | - | 22 3010 0205 | 40,35 | - | - | 22 4010 0205 | 44,80 | 22 4510 0205 | 44,80 | 22 5010 0205 | 48,90 | 22 5510 0205 | 118,55 | | | | | | |
| ● 21,00 | 0.8268 | 22 2010 0210 | 36,00 | - | - | 22 3010 0210 | 40,35 | - | - | 22 4010 0210 | 44,80 | 22 4510 0210 | 44,80 | 22 5010 0210 | 48,90 | 22 5510 0210 | 118,55 | | | | | | |
| ● 22,00 | 0.8661 | 22 2010 0220 | 36,00 | - | - | 22 3010 0220 | 40,35 | - | - | 22 4010 0220 | 44,80 | 22 4510 0220 | 44,80 | 22 5010 0220 | 48,90 | 22 5510 0220 | 118,55 | | | | | | |
| ● 23,00 | 0.9055 | 22 2010 0230 | 36,00 | - | - | 22 3010 0230 | 40,35 | - | - | 22 4010 0230 | 44,80 | 22 4510 0230 | 44,80 | 22 5010 0230 | 48,90 | 22 5510 0230 | 118,55 | | | | | | |
| ● 24,00 | 0.9449 | 22 2010 0240 | 36,00 | - | - | 22 3010 0240 | 40,35 | - | - | 22 4010 0240 | 44,80 | 22 4510 0240 | 44,80 | 22 5010 0240 | 48,90 | 22 5510 0240 | 118,55 | | | | | | |
| ● 25,00 | 0.9843 | 22 2010 0250 | 42,15 | - | - | 22 3010 0250 | 45,45 | - | - | 22 4010 0250 | 52,45 | 22 4510 0250 | 52,45 | 22 5010 0250 | 55,55 | 22 5510 0250 | 125,20 | | | | | | |
| ● 26,00 | 1.0236 | 22 2010 0260 | 42,15 | - | - | 22 3010 0260 | 45,45 | - | - | 22 4010 0260 | 52,45 | 22 4510 0260 | 52,45 | 22 5010 0260 | 55,55 | 22 5510 0260 | 125,20 | | | | | | |
| ● 26,50 | 1.0433 | 22 2010 0265 | 42,15 | - | - | 22 3010 0265 | 45,45 | - | - | 22 4010 0265 | 52,45 | 22 4510 0265 | 52,45 | 22 5010 0265 | 55,55 | 22 5510 0265 | 125,20 | | | | | | |
| ● 27,00 | 1.0630 | 22 2010 0270 | 42,15 | - | - | 22 3010 0270 | 45,45 | - | - | 22 4010 0270 | 52,45 | 22 4510 0270 | 52,45 | 22 5010 0270 | 55,55 | 22 5510 0270 | 125,20 | | | | | | |
| ● 28,00 | 1.1024 | 22 2010 0280 | 42,15 | - | - | 22 3010 0280 | 45,45 | - | - | 22 4010 0280 | 52,45 | 22 4510 0280 | 52,45 | 22 5010 0280 | 55,55 | 22 5510 0280 | 125,20 | | | | | | |
| ● 29,00 | 1.1417 | 22 2010 0290 | 42,15 | - | - | 22 3010 0290 | 45,45 | - | - | 22 4010 0290 | 52,45 | 22 4510 0290 | 52,45 | 22 5010 0290 | 55,55 | 22 5510 0290 | 125,20 | | | | | | |
| ● 30,00 | 1.1811 | 22 2010 0300 | 42,15 | - | - | 22 3010 0300 | 45,45 | - | - | 22 4010 0300 | 52,45 | 22 4510 0300 | 52,45 | 22 5010 0300 | 55,55 | 22 5510 0300 | 125,20 | | | | | | |
| ● 31,00 | 1.2205 | 22 2010 0310 | 42,15 | - | - | 22 3010 0310 | 45,45 | - | - | 22 4010 0310 | 52,45 | 22 4510 0310 | 52,45 | 22 5010 0310 | 55,55 | 22 5510 0310 | 125,20 | | | | | | |
| ● 32,00 | 1.2598 | 22 2010 0320 | 42,15 | - | - | 22 3010 0320 | 45,45 | - | - | 22 4010 0320 | 52,45 | 22 4510 0320 | 52,45 | 22 5010 0320 | 55,55 | 22 5510 0320 | 125,20 | | | | | | |
| ● 33,00 | 1.2992 | 22 2010 0330 | 42,15 | - | - | 22 3010 0330 | 45,45 | - | - | 22 4010 0330 | 52,45 | 22 4510 0330 | 52,45 | 22 5010 0330 | 55,55 | 22 5510 0330 | 132,90 | | | | | | |
| ● 34,00 | 1.3386 | 22 2010 0340 | 42,15 | - | - | 22 3010 0340 | 45,45 | - | - | 22 4010 0340 | 52,45 | 22 4510 0340 | 52,45 | 22 5010 0340 | 55,55 | 22 5510 0340 | 132,90 | | | | | | |
| ● 35,00 | 1.3780 | 22 2010 0350 | 42,15 | - | - | 22 3010 0350 | 45,45 | - | - | 22 4010 0350 | 52,45 | 22 4510 0350 | 52,45 | 22 5010 0350 | 55,55 | 22 5510 0350 | 132,90 | | | | | | |
| ● 36,00 | 1.4173 | 22 2010 0360 | 57,75 | - | - | 22 3010 0360 | 59,50 | - | - | - | - | - | - | - | - | - | - | | | | | | |
| ● 37,00 | 1.4567 | 22 2010 0370 | 57,75 | - | - | 22 3010 0370 | 59,50 | - | - | - | - | - | - | - | - | - | - | | | | | | |
| ● 38,00 | 1.4961 | 22 2010 0380 | 57,75 | - | - | 22 3010 0380 | 59,50 | - | - | - | - | - | - | - | - | - | - | | | | | | |
| ● 39,00 | 1.5354 | 22 2010 0390 | 57,75 | - | - | 22 3010 0390 | 59,50 | - | - | - | - | - | - | - | - | - | - | | | | | | |
| ● 40,00 | 1.5748 | 22 2010 0400 | 57,75 | - | - | 22 3010 0400 | 59 | | | | | | | | | | | | | | | | |



DIN 1835-B
Zylindrischer Schaft
mit Spannfläche ·
Lateral fixation type
flange shank



Gerade genutet ·
Straight flute



~ 15×D
Ultralang · Ultralength

| L3 | L5 | L4 | L1 | d2 | F | G |
|---------------------|-------------|---------------------|----------------|-----------|--------------|----------|
| Nutzlänge | Körperlänge | Neue REF.- Länge | Gesamtlänge | Schaft-Ø | Schaftlänge | Gewinde |
| Max. drill depth | Body-length | REF.-length | Overall length | Shank-Ø | Shank length | Pipe tap |

| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch |
|--|--------|----------------------|----------------------|----------------------|----------------------|--------------------|--------------------|------------------|
| • 22 1020 02900 0095 Ø 9,5-11,0 mm 0.3740-0.4331" OPTIMAL · OPTIMAL | 245,65 | 290,0 mm 11.4173" | 319,9 mm 12.5945" | 322,3 mm 12.6890" | 369,9 mm 14.5630" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1020 02905 0115 Ø 11,5-12,5 mm 0.4528-0.4921" OPTIMAL · OPTIMAL | 245,65 | 290,0 mm 11.4173" | 319,9 mm 12.5945" | 322,3 mm 12.6890" | 369,9 mm 14.5630" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1020 03870 0130 Ø 13,0-17,5 mm 0.5118-0.6890" MÖGLICH · POSSIBLE Ø 13,0-15,0 mm 0.5118-0.5906" OPTIMAL · OPTIMAL | 306,55 | 387,0 mm 15.2362" | 416,0 mm 16.3780" | 418,8 mm 16.4882" | 466,0 mm 18.3465" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1020 03870 0155 Ø 15,5-17,5 mm 0.6102-0.6890" OPTIMAL · OPTIMAL | 306,55 | 387,0 mm 15.2362" | 416,0 mm 16.3780" | 418,8 mm 16.4882" | 466,0 mm 18.3465" | 20,0 mm 0.7874" | 50,0 mm 1.9685" | 1/8" |
| • 22 1020 05690 0180 Ø 18,0-24,0 mm 0.7087-0.9449" MÖGLICH · POSSIBLE Ø 18,0-21,0 mm 0.7087-0.8268" OPTIMAL · OPTIMAL | 436,75 | 569,0 mm 22.4016" | 602,5 mm 23.7205" | 606,1 mm 23.8622" | 658,5 mm 25.9252" | 25,0 mm 0.9842" | 56,0 mm 2.2047" | 1/8" |
| • 22 1020 05690 0220 Ø 22,0-24,0 mm 0.8661-0.9449" OPTIMAL · OPTIMAL | 436,75 | 569,0 mm 22.4016" | 602,5 mm 23.7205" | 606,1 mm 23.8622" | 658,5 mm 25.9252" | 25,0 mm 0.9842" | 56,0 mm 2.2047" | 1/8" |
| • 22 1020 06920 0250 Ø 25,0-35,0 mm 0.9843-1.3780" MÖGLICH · POSSIBLE Ø 25,0-29,0 mm 0.9843-1.1417" OPTIMAL · OPTIMAL | 551,05 | 692,0 mm 27.2441" | 735,1 mm 28.9409" | 738,7 mm 29.0827" | 795,1 mm 31.3031" | 32,0 mm 1.2598" | 60,0 mm 2.3622" | 1/4" |
| • 22 1020 06920 0300 Ø 30,0-35,0 mm 1.1811-1.3780" OPTIMAL · OPTIMAL | 551,05 | 692,0 mm 27.2441" | 735,1 mm 28.9409" | 738,7 mm 29.0827" | 795,1 mm 31.3031" | 32,0 mm 1.2598" | 60,0 mm 2.3622" | 1/4" |
| • 22 1020 07874 0360 Ø 36,0-47,0 mm 1.4173-1.8504" MÖGLICH · POSSIBLE Ø 36,0-41,0 mm 1.4173-1.6142" OPTIMAL · OPTIMAL | 797,35 | 787,4 mm 31.0000" | 839,7 mm 33.0591" | 844,5 mm 33.2480" | 909,7 mm 35.8150" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |
| • 22 1020 07874 0420 Ø 42,0-47,0 mm 1.6535-1.8504" OPTIMAL · OPTIMAL | 797,35 | 787,4 mm 31.0000" | 839,7 mm 33.0591" | 844,5 mm 33.2480" | 909,7 mm 35.8150" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |

Schnittdaten
Cutting data

Film
Movie



1302-1311





| PULVERSTAHL · POWDER STEEL | | | | | | | | | | HARTMETALL · CARBIDE | | | | | | | | | |
|----------------------------|--------|------------------------|-------|---|---|---|-------|---|---|---|---|---|---|--|---|---|---|--|---|
| Ø mm d1 | | Ø Zoll / Inch d1 | | 22 2010 | | 22 2510 | | 22 3010 | | 22 3510 | | 22 4010 | | 22 4510 | | 22 5010 | | 22 5510 | |
| | | | | Pulverstahl 25 STEEL-TEC beschichtet Für Edelstahl, Stahl, Guss | | Pulverstahl 15 STEEL-TEC beschichtet Für legierte Stähle, Edelstahl, Stahl, Guss | | Pulverstahl 25 ALU-TEC beschichtet Für Alu, Messing, Kupfer | | Pulverstahl 15 ALU-TEC beschichtet Für Alu, Messing, Kupfer | | Hartmetall 20/30 STEEL-TEC beschichtet Für Edelstahl, hochfester Stahl, gehärteter Stahl | | Hartmetall 20/30 STEEL-TEC beschichtet Für alle Gussarten | | Hartmetall 20/30 ALU-TEC beschichtet Für Alu, Messing, Kupfer | | Hartmetall 20/30 DIA-TEC beschichtet Für abrasive Materialien wie: GFK, CFK, Graphit | |
| | | | | Powder steel 25 STEEL-TEC coated For stainless steel, steel, cast iron | | Powder steel 15 STEEL-TEC coated For alloy steel, stainless steel, steel, cast iron | | Powder steel 25 ALU-TEC coated For alu, brass, copper | | Powder steel 15 ALU-TEC coated For alloy steel, steel, cast iron | | Carbide 20/30 STEEL-TEC coated For stainless steel, high strength alloys, hardened steel | | Carbide 20/30 STEEL-TEC coated For all kinds of cast iron | | Carbide 20/30 ALU-TEC coated For alu, brass, copper | | Carbide 20/30 DIA-TEC coated For abrasive materials such as: fiberglass, carbon fiber, graphite | |
| Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| • 48,00 | 1.8898 | 22 2010 0480 | 82,65 | - | - | 22 3010 0480 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 49,00 | 1.9291 | 22 2010 0490 | 82,65 | - | - | 22 3010 0490 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 50,00 | 1.9685 | 22 2010 0500 | 82,65 | - | - | 22 3010 0500 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 51,00 | 2.0079 | 22 2010 0510 | 82,65 | - | - | 22 3010 0510 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 52,00 | 2.0472 | 22 2010 0520 | 82,65 | - | - | 22 3010 0520 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 53,00 | 2.0866 | 22 2010 0530 | 82,65 | - | - | 22 3010 0530 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 54,00 | 2.1260 | 22 2010 0540 | 82,65 | - | - | 22 3010 0540 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 55,00 | 2.1654 | 22 2010 0550 | 82,65 | - | - | 22 3010 0550 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 56,00 | 2.2047 | 22 2010 0560 | 82,65 | - | - | 22 3010 0560 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 57,00 | 2.2441 | 22 2010 0570 | 82,65 | - | - | 22 3010 0570 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 58,00 | 2.2835 | 22 2010 0580 | 82,65 | - | - | 22 3010 0580 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 59,00 | 2.3228 | 22 2010 0590 | 82,65 | - | - | 22 3010 0590 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 60,00 | 2.3622 | 22 2010 0600 | 82,65 | - | - | 22 3010 0600 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 61,00 | 2.4016 | 22 2010 0610 | 82,65 | - | - | 22 3010 0610 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 62,00 | 2.4409 | 22 2010 0620 | 82,65 | - | - | 22 3010 0620 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 63,00 | 2.4803 | 22 2010 0630 | 82,65 | - | - | 22 3010 0630 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 64,00 | 2.5197 | 22 2010 0640 | 82,65 | - | - | 22 3010 0640 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 65,00 | 2.5591 | 22 2010 0650 | 82,65 | - | - | 22 3010 0650 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |

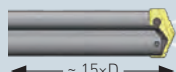
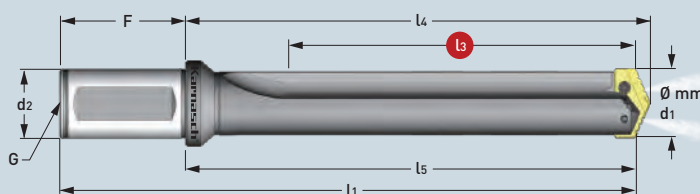
 **22 1020**



DIN 1835-B
Zylindrischer Schaft
mit Spannfläche ·
Lateral fixation type
flange shank



Gerade genutet ·
Straight flute








Ultralang · Ultralength

| | l₃ | l₅ | l₄ | l₁ | d₂ | F | G | |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------|--------------------|------|
| | Nutzlänge | Körperlänge | Neue REF.- Länge | Gesamtlänge | Schaft-Ø | Schaftlänge | Gewinde | |
| | Max. drill depth | Body-length | REF.-length | Overall length | Shank-Ø | Shank length | Pipe tap | |
| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | | |
| • 22 1020 08790 0480 Ø 48,0-65,0 mm 1.8898-2.5591" MÖGLICH · POSSIBLE Ø 48,0-55,0 mm 1.8898-2.1654" OPTIMAL · OPTIMAL | 975,85 | 879,0 mm 34.6063" | 928,7 mm 36.5630" | 933,5 mm 36.7520" | 998,7 mm 39.3189" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |
| • 22 1020 08790 0560 Ø 56,0-65,0 mm 2.2047-2.5591" OPTIMAL · OPTIMAL | 975,85 | 879,0 mm 34.6063" | 928,7 mm 36.5630" | 933,5 mm 36.7520" | 998,7 mm 39.3189" | 40,0 mm 1.5748" | 70,0 mm 2.7559" | 1/4" |

Halter werden **ohne** Einsätze, inklusive 2x TORX Befestigungsschrauben und 1x TORX Schlüssel geliefert.
 Holders are delivered **without** inserts including 2x TORX-screws and 1x TORX wrench.

Ersatz-Torxschrauben und Schlüssel mit Drehmomentangabe
 Spare Torx-screws and wrench with torque specification

| Ø Diameter | | TORX | | max. Drehmoment / Torque (N/cm) | Schlüssel / Wrench | | |
|------------|---------------|---|---|------------------------------------|---|---|---|
| mm | Zoll / Inch |  |  | | € |  |  |
| 9,5-11,0 | 0.3740-0.4331 |  | 22 9010 0095 | 84 |  | 22 9011 0084 | 9,90 |
| 11,5-12,5 | 0.4528-0.4921 |  | 22 9010 0115 | 84 |  | 22 9011 0175 | 9,90 |
| 13,0-17,5 | 0.5118-0.6890 |  | 22 9010 0130 | 175 |  | 22 9011 0305 | 10,90 |
| 18,0-24,0 | 0.7087-0.9449 |  | 22 9010 0180 | 305 |  | 22 9011 0690 | 11,70 |
| 25,0-35,0 | 0.9843-1.3780 |  | 22 9010 0250 | 690 |  | 22 9011 1370 | 12,70 |
| 36,0-65,0 | 1.4173-2.5591 |  | 22 9010 0360 | 1370 |  | 22 9011 1750 | 18,70 |
| 64,0-114,0 | 2.5197-4.4882 |  | 22 9010 0640 | 1750 |  | | |

Schnittdaten
Cutting data



1302-1311

Film
Movie



329



Index

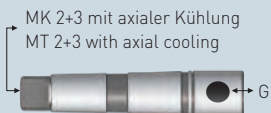


PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

| Ø mm d1 | Ø Zoll / Inch d1 | 22 2010 | | 22 2510 | | 22 3010 | | 22 3510 | | 22 4010 | | 22 4510 | | 22 5010 | | 22 5510 | |
|------------|------------------------|--------------|-------|---------|---|--------------|-------|---------|---|--------------|-------|--------------|-------|--------------|-------|--------------|--------|
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| • 18,00 | • 0.7087 | 22 2010 0180 | 36,00 | - | - | 22 3010 0180 | 40,35 | - | - | 22 4010 0180 | 44,80 | 22 4510 0180 | 44,80 | 22 5010 0180 | 48,90 | 22 5510 0180 | 102,55 |
| • 18,50 | • 0.7283 | 22 2010 0185 | 36,00 | - | - | 22 3010 0185 | 40,35 | - | - | 22 4010 0185 | 44,80 | 22 4510 0185 | 44,80 | 22 5010 0185 | 48,90 | 22 5510 0185 | 102,55 |
| • 19,00 | • 0.7480 | 22 2010 0190 | 36,00 | - | - | 22 3010 0190 | 40,35 | - | - | 22 4010 0190 | 44,80 | 22 4510 0190 | 44,80 | 22 5010 0190 | 48,90 | 22 5510 0190 | 102,55 |
| • 19,50 | • 0.7677 | 22 2010 0195 | 36,00 | - | - | 22 3010 0195 | 40,35 | - | - | 22 4010 0195 | 44,80 | 22 4510 0195 | 44,80 | 22 5010 0195 | 48,90 | 22 5510 0195 | 102,55 |
| • 20,00 | • 0.7874 | 22 2010 0200 | 36,00 | - | - | 22 3010 0200 | 40,35 | - | - | 22 4010 0200 | 44,80 | 22 4510 0200 | 44,80 | 22 5010 0200 | 48,90 | 22 5510 0200 | 102,55 |
| • 20,50 | • 0.8071 | 22 2010 0205 | 36,00 | - | - | 22 3010 0205 | 40,35 | - | - | 22 4010 0205 | 44,80 | 22 4510 0205 | 44,80 | 22 5010 0205 | 48,90 | 22 5510 0205 | 118,55 |
| • 21,00 | • 0.8268 | 22 2010 0210 | 36,00 | - | - | 22 3010 0210 | 40,35 | - | - | 22 4010 0210 | 44,80 | 22 4510 0210 | 44,80 | 22 5010 0210 | 48,90 | 22 5510 0210 | 118,55 |
| • 22,00 | • 0.8661 | 22 2010 0220 | 36,00 | - | - | 22 3010 0220 | 40,35 | - | - | 22 4010 0220 | 44,80 | 22 4510 0220 | 44,80 | 22 5010 0220 | 48,90 | 22 5510 0220 | 118,55 |
| • 23,00 | • 0.9055 | 22 2010 0230 | 36,00 | - | - | 22 3010 0230 | 40,35 | - | - | 22 4010 0230 | 44,80 | 22 4510 0230 | 44,80 | 22 5010 0230 | 48,90 | 22 5510 0230 | 118,55 |
| • 24,00 | • 0.9449 | 22 2010 0240 | 36,00 | - | - | 22 3010 0240 | 40,35 | - | - | 22 4010 0240 | 44,80 | 22 4510 0240 | 44,80 | 22 5010 0240 | 48,90 | 22 5510 0240 | 118,55 |
| • 25,00 | • 0.9843 | 22 2010 0250 | 42,15 | - | - | 22 3010 0250 | 45,45 | - | - | 22 4010 0250 | 52,45 | 22 4510 0250 | 52,45 | 22 5010 0250 | 55,55 | 22 5510 0250 | 125,20 |
| • 26,00 | • 1.0236 | 22 2010 0260 | 42,15 | - | - | 22 3010 0260 | 45,45 | - | - | 22 4010 0260 | 52,45 | 22 4510 0260 | 52,45 | 22 5010 0260 | 55,55 | 22 5510 0260 | 125,20 |
| • 26,50 | • 1.0433 | 22 2010 0265 | 42,15 | - | - | 22 3010 0265 | 45,45 | - | - | 22 4010 0265 | 52,45 | 22 4510 0265 | 52,45 | 22 5010 0265 | 55,55 | 22 5510 0265 | 125,20 |
| • 27,00 | • 1.0630 | 22 2010 0270 | 42,15 | - | - | 22 3010 0270 | 45,45 | - | - | 22 4010 0270 | 52,45 | 22 4510 0270 | 52,45 | 22 5010 0270 | 55,55 | 22 5510 0270 | 125,20 |
| • 28,00 | • 1.1024 | 22 2010 0280 | 42,15 | - | - | 22 3010 0280 | 45,45 | - | - | 22 4010 0280 | 52,45 | 22 4510 0280 | 52,45 | 22 5010 0280 | 55,55 | 22 5510 0280 | 125,20 |
| • 29,00 | • 1.1417 | 22 2010 0290 | 42,15 | - | - | 22 3010 0290 | 45,45 | - | - | 22 4010 0290 | 52,45 | 22 4510 0290 | 52,45 | 22 5010 0290 | 55,55 | 22 5510 0290 | 125,20 |
| • 30,00 | • 1.1811 | 22 2010 0300 | 42,15 | - | - | 22 3010 0300 | 45,45 | - | - | 22 4010 0300 | 52,45 | 22 4510 0300 | 52,45 | 22 5010 0300 | 55,55 | 22 5510 0300 | 125,20 |
| • 31,00 | • 1.2205 | 22 2010 0310 | 42,15 | - | - | 22 3010 0310 | 45,45 | - | - | 22 4010 0310 | 52,45 | 22 4510 0310 | 52,45 | 22 5010 0310 | 55,55 | 22 5510 0310 | 125,20 |
| • 32,00 | • 1.2598 | 22 2010 0320 | 42,15 | - | - | 22 3010 0320 | 45,45 | - | - | 22 4010 0320 | 52,45 | 22 4510 0320 | 52,45 | 22 5010 0320 | 55,55 | 22 5510 0320 | 125,20 |
| • 33,00 | • 1.2992 | 22 2010 0330 | 42,15 | - | - | 22 3010 0330 | 45,45 | - | - | 22 4010 0330 | 52,45 | 22 4510 0330 | 52,45 | 22 5010 0330 | 55,55 | 22 5510 0330 | 132,90 |
| • 34,00 | • 1.3386 | 22 2010 0340 | 42,15 | - | - | 22 3010 0340 | 45,45 | - | - | 22 4010 0340 | 52,45 | 22 4510 0340 | 52,45 | 22 5010 0340 | 55,55 | 22 5510 0340 | 132,90 |
| • 35,00 | • 1.3780 | 22 2010 0350 | 42,15 | - | - | 22 3010 0350 | 45,45 | - | - | 22 4010 0350 | 52,45 | 22 4510 0350 | 52,45 | 22 5010 0350 | 55,55 | 22 5510 0350 | 132,90 |
| • 36,00 | • 1.4173 | 22 2010 0360 | 57,75 | - | - | 22 3010 0360 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 37,00 | • 1.4567 | 22 2010 0370 | 57,75 | - | - | 22 3010 0370 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 38,00 | • 1.4961 | 22 2010 0380 | 57,75 | - | - | 22 3010 0380 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 39,00 | • 1.5354 | 22 2010 0390 | 57,75 | - | - | 22 3010 0390 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 40,00 | • 1.5748 | 22 2010 0400 | 57,75 | - | - | 22 3010 0400 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 41,00 | • 1.6142 | 22 2010 0410 | 57,75 | - | - | 22 3010 0410 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 42,00 | • 1.6535 | 22 2010 0420 | 57,75 | - | - | 22 3010 0420 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 43,00 | • 1.6929 | 22 2010 0430 | 57,75 | - | - | 22 3010 0430 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 44,00 | • 1.7323 | 22 2010 0440 | 57,75 | - | - | 22 3010 0440 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 45,00 | • 1.7717 | 22 2010 0450 | 57,75 | - | - | 22 3010 0450 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 46,00 | • 1.8110 | 22 2010 0460 | 57,75 | - | - | 22 3010 0460 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 47,00 | • 1.8504 | 22 2010 0470 | 57,75 | - | - | 22 3010 0470 | 59,50 | - | - | - | - | - | - | - | - | - | - |

Weitere Ø bis maximal Ø 65 mm | 2.5591" in 5xD siehe Seite 334/335
 Further Ø up to Ø 65 mm | 2.5591" in 5xD see page 334/335



Bei Morsekonus 2+3 ist eine axiale Kühlung ohne Kühlmittelring möglich.
 Hierzu muss das Gewinde des Kühlmittelringes (G) mit einer Schraube geschlossen werden.
 With morse cone 2+3, axial cooling without coolant ring is possible.
 For this, the thread of the coolant ring (G) must be closed with a screw.

- Schraube für MK 2 / Screw for MT 2 = RC 1/16" **22 1030 0231 802 € 0,30**
- Schraube für MK 3 / Screw for MT 3 = RC 1/8" **22 1030 0231 803 € 0,30**

Schnittdaten
Cutting data

Film
Movie

1302-1311

22 1030

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



MK 2,3,4,5 – Radiale Kühlung
mit Kühlmittelring
MT 2,3,4,5 – Radial coolant
with oil ring

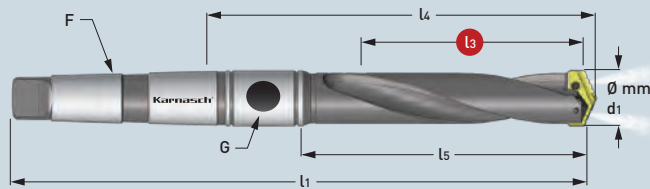
Morsekegel
ISO 296 Typ BEK ·
Morse taper shank
ISO 296 type BEK



~ 4xD
Mittel - Intermediate



Spiral genutet ·
Helical flute



| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | F | G | Art. | € |
|---|--------|---------------------|---------------------|---------------------|----------------------|---|------------------------------------|-----------------|-------|
| <ul style="list-style-type: none"> 22 1030 01207 0180 Ø 18,0-24,0 mm 0.7087-0.9449" MÖGLICH · POSSIBLE Ø 18,0-21,0 mm 0.7087-0.8268" OPTIMAL · OPTIMAL 22 1030 01207 0220 Ø 22,0-24,0 mm 0.8661-0.9449" OPTIMAL · OPTIMAL | 164,35 | 120,7 mm 4.7519" | 149,2 mm 5.8740" | 193,3 mm 7.6102" | 283,3 mm 11.1535" | 3 | 1/8" | • 22 9002 02540 | 24,85 |
| <ul style="list-style-type: none"> 22 1030 01365 0250 Ø 25,0-35,0 mm 0.9843-1.3780" MÖGLICH · POSSIBLE Ø 25,0-29,0 mm 0.9843-1.1417" OPTIMAL · OPTIMAL 22 1030 01365 0300 Ø 30,0-35,0 mm 1.1811-1.3780" OPTIMAL · OPTIMAL | 212,80 | 136,5 mm 5.3740" | 165,1 mm 6.5000" | 218,4 mm 8.5984" | 331,8 mm 13.0630" | 4 | 1/8" Halter Holder 25,0-35,0 mm | • 22 9002 03175 | 32,20 |
| <ul style="list-style-type: none"> 22 1030 01651 0360 Ø 36,0-47,0 mm 1.4173-1.8504" MÖGLICH · POSSIBLE Ø 36,0-41,0 mm 1.4173-1.6142" OPTIMAL · OPTIMAL 22 1030 01651 0420 Ø 42,0-47,0 mm 1.6535-1.8504" OPTIMAL · OPTIMAL | 300,15 | 165,1 mm 6.5000" | 196,9 mm 7.7519" | 250,9 mm 9.8779" | 363,6 mm 14.3150" | 4 | 1/4" | | |

Halter werden **ohne** Einsätze, inklusive 2x TORX Befestigungsschrauben und 1x TORX Schlüssel geliefert.
Holders are delivered **without** inserts including 2x TORX-screws and 1x TORX wrench.

Für Maschinen ohne axiale/radiale Kühlmittelzufuhr kann ein Kühlmittelring auf den Halter montiert werden. Details siehe Seite 356
For machines without radial/axial coolant supply a oil ring can be mounted on the holder. Details see page 356



Ersatz-Torxschrauben und Schlüssel mit Drehmomentangabe
Spare Torx-screws and wrench with torque specification

| Ø Diameter | | TORX | max. Drehmoment / Torque (N/cm) | Schlüssel / Wrench |
|------------|---------------|--------------|---------------------------------|--------------------|
| mm | Zoll / Inch | | € | |
| 9,5-11,0 | 0.3740-0.4331 | 22 9010 0095 | 3,50 | 22 9011 0084 |
| 11,5-12,5 | 0.4528-0.4921 | 22 9010 0115 | 3,50 | 22 9011 0175 |
| 13,0-17,5 | 0.5118-0.6890 | 22 9010 0130 | 3,50 | 22 9011 0305 |
| 18,0-24,0 | 0.7087-0.9449 | 22 9010 0180 | 3,50 | 22 9011 0690 |
| 25,0-35,0 | 0.9843-1.3780 | 22 9010 0250 | 3,60 | 22 9011 1370 |
| 36,0-65,0 | 1.4173-2.5591 | 22 9010 0360 | 3,65 | 22 9011 1750 |
| 64,0-114,0 | 2.5197-4.4882 | 22 9010 0640 | 3,70 | |





PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

| Ø mm d1 | Ø Zoll / Inch d1 | 132° | | | | 144° | | | | 132° | | | | 132° | | | |
|------------|------------------------|--------------|-------|------|---|--------------|-------|------|---|--------------|-------|--------------|-------|--------------|-------|--------------|--------|
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | | |
| ● 9,50 | 0.3740 | 22 2010 0095 | 24,85 | - | - | 22 3010 0095 | 26,05 | - | - | 22 4010 0095 | 29,30 | 22 4510 0095 | 29,30 | 22 5010 0095 | 30,45 | 22 5510 0095 | 66,40 |
| ○ 9,80 | 0.3858 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ● 10,00 | 0.3937 | 22 2010 0100 | 24,85 | - | - | 22 3010 0100 | 26,05 | - | - | 22 4010 0100 | 29,30 | 22 4510 0100 | 29,30 | 22 5010 0100 | 30,45 | 22 5510 0100 | 66,40 |
| ● 10,20 | 0.4016 | 22 2010 0102 | 24,85 | - | - | 22 3010 0102 | 26,05 | - | - | 22 4010 0102 | 29,30 | 22 4510 0102 | 29,30 | 22 5010 0102 | 30,45 | 22 5510 0102 | 66,40 |
| ● 10,50 | 0.4134 | 22 2010 0105 | 24,85 | - | - | 22 3010 0105 | 26,05 | - | - | 22 4010 0105 | 29,30 | 22 4510 0105 | 29,30 | 22 5010 0105 | 30,45 | 22 5510 0105 | 66,40 |
| ● 10,80 | 0.4252 | 22 2010 0108 | 24,85 | - | - | 22 3010 0108 | 26,05 | - | - | 22 4010 0108 | 29,30 | 22 4510 0108 | 29,30 | 22 5010 0108 | 30,45 | 22 5510 0108 | 66,40 |
| ● 11,00 | 0.4331 | 22 2010 0110 | 24,85 | - | - | 22 3010 0110 | 26,05 | - | - | 22 4010 0110 | 29,30 | 22 4510 0110 | 29,30 | 22 5010 0110 | 30,45 | 22 5510 0110 | 66,40 |
| ● 11,50 | 0.4528 | 22 2010 0115 | 24,85 | - | - | 22 3010 0115 | 26,05 | - | - | 22 4010 0115 | 29,30 | 22 4510 0115 | 29,30 | 22 5010 0115 | 30,45 | 22 5510 0115 | 66,40 |
| ● 12,00 | 0.4724 | 22 2010 0120 | 24,85 | - | - | 22 3010 0120 | 26,05 | - | - | 22 4010 0120 | 29,30 | 22 4510 0120 | 29,30 | 22 5010 0120 | 30,45 | 22 5510 0120 | 66,40 |
| ● 12,50 | 0.4921 | 22 2010 0125 | 24,85 | - | - | 22 3010 0125 | 26,05 | - | - | 22 4010 0125 | 29,30 | 22 4510 0125 | 29,30 | 22 5010 0125 | 30,45 | 22 5510 0125 | 66,40 |
| ● 13,00 | 0.5118 | 22 2010 0130 | 28,30 | - | - | 22 3010 0130 | 28,95 | - | - | 22 4010 0130 | 34,45 | 22 4510 0130 | 34,45 | 22 5010 0130 | 35,10 | 22 5510 0130 | 92,70 |
| ● 13,50 | 0.5315 | 22 2010 0135 | 28,30 | - | - | 22 3010 0135 | 28,95 | - | - | 22 4010 0135 | 34,45 | 22 4510 0135 | 34,45 | 22 5010 0135 | 35,10 | 22 5510 0135 | 92,70 |
| ● 14,00 | 0.5512 | 22 2010 0140 | 28,30 | - | - | 22 3010 0140 | 28,95 | - | - | 22 4010 0140 | 34,45 | 22 4510 0140 | 34,45 | 22 5010 0140 | 35,10 | 22 5510 0140 | 92,70 |
| ● 14,50 | 0.5709 | 22 2010 0145 | 28,30 | - | - | 22 3010 0145 | 28,95 | - | - | 22 4010 0145 | 34,45 | 22 4510 0145 | 34,45 | 22 5010 0145 | 35,10 | 22 5510 0145 | 92,70 |
| ● 15,00 | 0.5906 | 22 2010 0150 | 28,30 | - | - | 22 3010 0150 | 28,95 | - | - | 22 4010 0150 | 34,45 | 22 4510 0150 | 34,45 | 22 5010 0150 | 35,10 | 22 5510 0150 | 92,70 |
| ● 15,50 | 0.6102 | 22 2010 0155 | 28,30 | - | - | 22 3010 0155 | 28,95 | - | - | 22 4010 0155 | 34,45 | 22 4510 0155 | 34,45 | 22 5010 0155 | 35,10 | 22 5510 0155 | 92,70 |
| ● 16,00 | 0.6299 | 22 2010 0160 | 28,30 | - | - | 22 3010 0160 | 28,95 | - | - | 22 4010 0160 | 34,45 | 22 4510 0160 | 34,45 | 22 5010 0160 | 35,10 | 22 5510 0160 | 92,70 |
| ● 16,50 | 0.6496 | 22 2010 0165 | 28,30 | - | - | 22 3010 0165 | 28,95 | - | - | 22 4010 0165 | 34,45 | 22 4510 0165 | 34,45 | 22 5010 0165 | 35,10 | 22 5510 0165 | 92,70 |
| ● 17,00 | 0.6693 | 22 2010 0170 | 28,30 | - | - | 22 3010 0170 | 28,95 | - | - | 22 4010 0170 | 34,45 | 22 4510 0170 | 34,45 | 22 5010 0170 | 35,10 | 22 5510 0170 | 92,70 |
| ● 17,50 | 0.6890 | 22 2010 0175 | 28,30 | - | - | 22 3010 0175 | 28,95 | - | - | 22 4010 0175 | 34,45 | 22 4510 0175 | 34,45 | 22 5010 0175 | 35,10 | 22 5510 0175 | 92,70 |
| ● 18,00 | 0.7087 | 22 2010 0180 | 36,00 | - | - | 22 3010 0180 | 40,35 | - | - | 22 4010 0180 | 44,80 | 22 4510 0180 | 44,80 | 22 5010 0180 | 48,90 | 22 5510 0180 | 102,55 |
| ● 18,50 | 0.7283 | 22 2010 0185 | 36,00 | - | - | 22 3010 0185 | 40,35 | - | - | 22 4010 0185 | 44,80 | 22 4510 0185 | 44,80 | 22 5010 0185 | 48,90 | 22 5510 0185 | 102,55 |
| ● 19,00 | 0.7480 | 22 2010 0190 | 36,00 | - | - | 22 3010 0190 | 40,35 | - | - | 22 4010 0190 | 44,80 | 22 4510 0190 | 44,80 | 22 5010 0190 | 48,90 | 22 5510 0190 | 102,55 |
| ● 19,50 | 0.7677 | 22 2010 0195 | 36,00 | - | - | 22 3010 0195 | 40,35 | - | - | 22 4010 0195 | 44,80 | 22 4510 0195 | 44,80 | 22 5010 0195 | 48,90 | 22 5510 0195 | 102,55 |
| ● 20,00 | 0.7874 | 22 2010 0200 | 36,00 | - | - | 22 3010 0200 | 40,35 | - | - | 22 4010 0200 | 44,80 | 22 4510 0200 | 44,80 | 22 5010 0200 | 48,90 | 22 5510 0200 | 102,55 |
| ● 20,50 | 0.8071 | 22 2010 0205 | 36,00 | - | - | 22 3010 0205 | 40,35 | - | - | 22 4010 0205 | 44,80 | 22 4510 0205 | 44,80 | 22 5010 0205 | 48,90 | 22 5510 0205 | 118,55 |
| ● 21,00 | 0.8268 | 22 2010 0210 | 36,00 | - | - | 22 3010 0210 | 40,35 | - | - | 22 4010 0210 | 44,80 | 22 4510 0210 | 44,80 | 22 5010 0210 | 48,90 | 22 5510 0210 | 118,55 |
| ● 22,00 | 0.8661 | 22 2010 0220 | 36,00 | - | - | 22 3010 0220 | 40,35 | - | - | 22 4010 0220 | 44,80 | 22 4510 0220 | 44,80 | 22 5010 0220 | 48,90 | 22 5510 0220 | 118,55 |
| ● 23,00 | 0.9055 | 22 2010 0230 | 36,00 | - | - | 22 3010 0230 | 40,35 | - | - | 22 4010 0230 | 44,80 | 22 4510 0230 | 44,80 | 22 5010 0230 | 48,90 | 22 5510 0230 | 118,55 |
| ● 24,00 | 0.9449 | 22 2010 0240 | 36,00 | - | - | 22 3010 0240 | 40,35 | - | - | 22 4010 0240 | 44,80 | 22 4510 0240 | 44,80 | 22 5010 0240 | 48,90 | 22 5510 0240 | 118,55 |
| ● 25,00 | 0.9843 | 22 2010 0250 | 42,15 | - | - | 22 3010 0250 | 45,45 | - | - | 22 4010 0250 | 52,45 | 22 4510 0250 | 52,45 | 22 5010 0250 | 55,55 | 22 5510 0250 | 125,20 |
| ● 26,00 | 1.0236 | 22 2010 0260 | 42,15 | - | - | 22 3010 0260 | 45,45 | - | - | 22 4010 0260 | 52,45 | 22 4510 0260 | 52,45 | 22 5010 0260 | 55,55 | 22 5510 0260 | 125,20 |
| ● 26,50 | 1.0433 | 22 2010 0265 | 42,15 | - | - | 22 3010 0265 | 45,45 | - | - | 22 4010 0265 | 52,45 | 22 4510 0265 | 52,45 | 22 5010 0265 | 55,55 | 22 5510 0265 | 125,20 |
| ● 27,00 | 1.0630 | 22 2010 0270 | 42,15 | - | - | 22 3010 0270 | 45,45 | - | - | 22 4010 0270 | 52,45 | 22 4510 0270 | 52,45 | 22 5010 0270 | 55,55 | 22 5510 0270 | 125,20 |
| ● 28,00 | 1.1024 | 22 2010 0280 | 42,15 | - | - | 22 3010 0280 | 45,45 | - | - | 22 4010 0280 | 52,45 | 22 4510 0280 | 52,45 | 22 5010 0280 | 55,55 | 22 5510 0280 | 125,20 |
| ● 29,00 | 1.1417 | 22 2010 0290 | 42,15 | - | - | 22 3010 0290 | 45,45 | - | - | 22 4010 0290 | 52,45 | 22 4510 0290 | 52,45 | 22 5010 0290 | 55,55 | 22 5510 0290 | 125,20 |
| ● 30,00 | 1.1811 | 22 2010 0300 | 42,15 | - | - | 22 3010 0300 | 45,45 | - | - | 22 4010 0300 | 52,45 | 22 4510 0300 | 52,45 | 22 5010 0300 | 55,55 | 22 5510 0300 | 125,20 |
| ● 31,00 | 1.2205 | 22 2010 0310 | 42,15 | - | - | 22 3010 0310 | 45,45 | - | - | 22 4010 0310 | 52,45 | 22 4510 0310 | 52,45 | 22 5010 0310 | 55,55 | 22 5510 0310 | 125,20 |
| ● 32,00 | 1.2598 | 22 2010 0320 | 42,15 | - | - | 22 3010 0320 | 45,45 | - | - | 22 4010 0320 | 52,45 | 22 4510 0320 | 52,45 | 22 5010 0320 | 55,55 | 22 5510 0320 | 125,20 |
| ● 33,00 | 1.2992 | 22 2010 0330 | 42,15 | - | - | 22 3010 0330 | 45,45 | - | - | 22 4010 0330 | 52,45 | 22 4510 0330 | 52,45 | 22 5010 0330 | 55,55 | 22 5510 0330 | 132,90 |
| ● 34,00 | 1.3386 | 22 2010 0340 | 42,15 | - | - | 22 3010 0340 | 45,45 | - | - | 22 4010 0340 | 52,45 | 22 4510 0340 | 52,45 | 22 5010 0340 | 55,55 | 22 5510 0340 | 132,90 |
| ● 35,00 | 1.3780 | 22 2010 0350 | 42,15 | - | - | 22 3010 0350 | 45,45 | - | - | 22 4010 0350 | 52,45 | 22 4510 0350 | 52,45 | 22 5010 0350 | 55,55 | 22 5510 0350 | 132,90 |
| ● 36,00 | 1.4173 | 22 2010 0360 | 57,75 | - | - | 22 3010 0360 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 37,00 | 1.4567 | 22 2010 0370 | 57,75 | - | - | 22 3010 0370 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 38,00 | 1.4961 | 22 2010 0380 | 57,75 | - | - | 22 3010 0380 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 39,00 | 1.5354 | 22 2010 0390 | 57,75 | - | - | 22 3010 0390 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 40,00 | 1.5748 | 22 2010 0400 | 57,75 | - | - | 22 3010 0400 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 41,00 | 1.6142 | 22 2010 0410 | 57,75 | - | - | 22 3010 0410 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 42,00 | 1.6535 | 22 2010 0420 | 57,75 | - | - | 22 3010 0420 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 43,00 | 1.6929 | 22 2010 0430 | 57,75 | - | - | 22 3010 0430 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 44,00 | 1.7323 | 22 2010 0440 | 57,75 | - | - | 22 3010 0440 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 45,00 | 1.7717 | 22 2010 0450 | 57,75 | - | - | 22 3010 0450 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 46,00 | 1.8110 | 22 2010 0460 | 57,75 | - | - | 22 3010 0460 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| ● 47,00 | 1.8504 | 22 2010 0470 | 57,75 | - | - | 22 3010 0470 | 59,50 | - | - | - | - | - | - | - | - | - | - |

Fortsetzung Seite 334 · Continued page 334

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



MK 2,3,4,5 – Radiale Kühlung
mit Kühlmittelring
MT 2,3,4,5 – Radial coolant
with oil ring

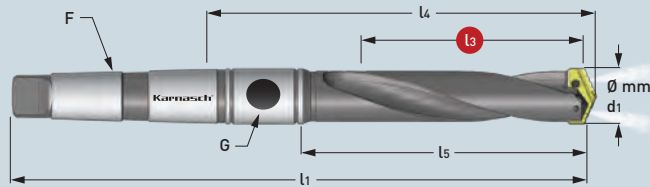
Morsekegel
ISO 296 Typ BEK ·
Morse taper shank
ISO 296 type BEK



← ≈ 5×D →
Mittel · Intermediate



Spiral genutet ·
Helical flute



| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | F | G | Art. | € |
|--|--------|---------------------|---------------------|----------------------|----------------------|-------------|------------------------------------|-----------------|-------|
| | | | | | | | | | |
| | | Max. drill depth | Body-length | Neue REF.-Länge | Gesamtlänge | Morsekegel | Gewinde | | |
| | | | | REF.-length | Overall length | Morse taper | Pipe tap | | |
| • 22 1030 00603 0095 Ø 9,5-11,0 mm 0.3740-0.4331" OPTIMAL · OPTIMAL | 127,50 | 60,3 mm 2.3740" | 80,2 mm 3.1574" | 116,7 mm 4.5944" | 188,9 mm 7.4370" | 2 | 1/16" | • 22 9002 01905 | 22,10 |
| • 22 1030 00603 0115 Ø 11,5-12,5 mm 0.4528-0.4921" OPTIMAL · OPTIMAL | 127,50 | 60,3 mm 2.3740" | 80,2 mm 3.1574" | 116,7 mm 4.5944" | 188,9 mm 7.4370" | 2 | 1/16" | | |
| • 22 1030 00635 0130 Ø 13,0-17,5 mm 0.5118-0.6890" MÖGLICH · POSSIBLE Ø 13,0-15,0 mm 0.5118-0.5906" OPTIMAL · OPTIMAL | 134,65 | 63,5 mm 2.5000" | 84,1 mm 3.3110" | 121,0 mm 4.7637" | 192,9 mm 7.5944" | 2 | 1/16" | | |
| • 22 1030 00635 0155 Ø 15,5-17,5 mm 0.6102-0.6890" OPTIMAL · OPTIMAL | 134,65 | | | | | | | | |
| • 22 1030 01715 0180 Ø 18,0-24,0 mm 0.7087-0.9449" MÖGLICH · POSSIBLE Ø 18,0-21,0 mm 0.7087-0.8268" OPTIMAL · OPTIMAL | 185,90 | 171,5 mm 6.7519" | 200,0 mm 7.8740" | 244,1 mm 9.6102" | 334,2 mm 13.1575" | 3 | 1/8" | • 22 9002 02540 | 24,85 |
| • 22 1030 01715 0220 Ø 22,0-24,0 mm 0.8661-0.9449" OPTIMAL · OPTIMAL | 185,90 | | | | | | | | |
| • 22 1030 01873 0250 Ø 25,0-35,0 mm 0.9843-1.3780" MÖGLICH · POSSIBLE Ø 25,0-29,0 mm 0.9843-1.1417" OPTIMAL · OPTIMAL | 236,50 | | | 262,0 mm 10.3150" | 375,4 mm 14.7795" | 4 | 1/8" Halter Holder 25,0-35,0 mm | | |
| • 22 1030 01873 0300 Ø 30,0-35,0 mm 1.1811-1.3780" OPTIMAL · OPTIMAL | 236,50 | 187,3 mm 7.3740" | 215,9 mm 8.5000" | | | 4 | 1/4" Halter Holder 30,0-35,0 mm | • 22 9002 03175 | 32,20 |
| • 22 1030 02095 0360 Ø 36,0-47,0 mm 1.4173-1.8504" MÖGLICH · POSSIBLE Ø 36,0-41,0 mm 1.4173-1.6142" OPTIMAL · OPTIMAL | 322,75 | | | | | | | | |
| • 22 1030 02095 0420 Ø 42,0-47,0 mm 1.6535-1.8504" OPTIMAL · OPTIMAL | 322,75 | 209,5 mm 8.2480" | 241,3 mm 9.5000" | 295,3 mm 11.6260" | 408,0 mm 16.0630" | 4 | 1/4" | | |



- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

| Ø mm d1 | Ø Zoll / Inch d1 | 22 2010  | | 22 2510  | | 22 3010  | | 22 3510  | | 22 4010  | | 22 4510  | | 22 5010  | | 22 5510  | |
|------------|------------------------|---|-------|---|---|---|-------|---|---|---|---|---|---|---|---|---|---|
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| • 48,00 | 1.8898 | 22 2010 0480 | 82,65 | - | - | 22 3010 0480 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 49,00 | 1.9291 | 22 2010 0490 | 82,65 | - | - | 22 3010 0490 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 50,00 | 1.9685 | 22 2010 0500 | 82,65 | - | - | 22 3010 0500 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 51,00 | 2.0079 | 22 2010 0510 | 82,65 | - | - | 22 3010 0510 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 52,00 | 2.0472 | 22 2010 0520 | 82,65 | - | - | 22 3010 0520 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 53,00 | 2.0866 | 22 2010 0530 | 82,65 | - | - | 22 3010 0530 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 54,00 | 2.1260 | 22 2010 0540 | 82,65 | - | - | 22 3010 0540 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 55,00 | 2.1654 | 22 2010 0550 | 82,65 | - | - | 22 3010 0550 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 56,00 | 2.2047 | 22 2010 0560 | 82,65 | - | - | 22 3010 0560 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 57,00 | 2.2441 | 22 2010 0570 | 82,65 | - | - | 22 3010 0570 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 58,00 | 2.2835 | 22 2010 0580 | 82,65 | - | - | 22 3010 0580 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 59,00 | 2.3228 | 22 2010 0590 | 82,65 | - | - | 22 3010 0590 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 60,00 | 2.3622 | 22 2010 0600 | 82,65 | - | - | 22 3010 0600 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 61,00 | 2.4016 | 22 2010 0610 | 82,65 | - | - | 22 3010 0610 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 62,00 | 2.4409 | 22 2010 0620 | 82,65 | - | - | 22 3010 0620 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 63,00 | 2.4803 | 22 2010 0630 | 82,65 | - | - | 22 3010 0630 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 64,00 | 2.5197 | 22 2010 0640 | 82,65 | - | - | 22 3010 0640 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 65,00 | 2.5591 | 22 2010 0650 | 82,65 | - | - | 22 3010 0650 | 82,65 | - | - | - | - | - | - | - | - | - | - |

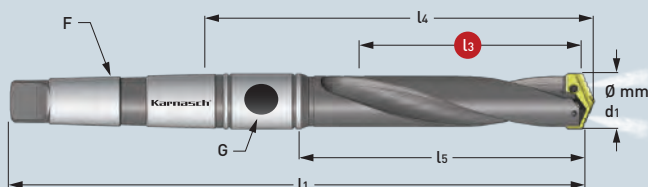
22 1030

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



MK 2,3,4,5 - Radiale Kühlung
mit Kühlmittelring
MT 2,3,4,5 - Radial coolant
with oil ring

Morsekegel
ISO 296 Typ BEK ·
Morse taper shank
ISO 296 type BEK



← ~ 5×D →
Mittel - Intermediate

Spiral genutet ·
Helical flute

| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | | Art. | € | |
|-----------------------------|--------|--|---------------------|----------------------|----------------------|----------------------|------|------|-------------------------|
| • 22 1030 02318 0480 | 345,60 | Ø 48,0-65,0 mm 1.8898-2.5591" Ø 48,0-55,0 mm 1.8898-2.1654" | 231,8 mm 9.1259" | 266,7 mm 10.5000" | 320,7 mm 12.6260" | 465,1 mm 18.3110" | 5 | 1/4" | • 22 9002 04445 42,30 |
| • 22 1030 02318 0560 | 345,60 | Ø 56,0-65,0 mm 2.2047-2.5591" | 231,8 mm 9.1259" | 266,7 mm 10.5000" | 320,7 mm 12.6260" | 465,1 mm 18.3110" | 5 | 1/4" | |

Halter werden **ohne** Einsätze, inklusive 2× TORX Befestigungsschrauben und 1× TORX Schlüssel geliefert.
Holders are delivered **without** inserts including 2× TORX-screws and 1× TORX wrench.

Für Maschinen ohne axiale/radiale Kühlmittelzufuhr kann ein Kühlmittelring auf den Halter montiert werden. Details siehe Seite 356
For machines without radial/axial coolant supply a oil ring can be mounted on the holder. Details see page 356



Ersatz-Torxschrauben und Schlüssel mit Drehmomentangabe
Spare Torx-screws and wrench with torque specification

| Ø Diameter | | TORX | | max. Drehmoment / Torque (N/cm) | | Schlüssel / Wrench | | |
|------------|---------------|------|--|---------------------------------|------|--------------------|--|-------|
| mm | Zoll / Inch | | | € | | | | € |
| 9,5-11,0 | 0.3740-0.4331 | | | 3,50 | 84 | | | 9,90 |
| 11,5-12,5 | 0.4528-0.4921 | | | 3,50 | 84 | | | 9,90 |
| 13,0-17,5 | 0.5118-0.6890 | | | 3,50 | 175 | | | 10,90 |
| 18,0-24,0 | 0.7087-0.9449 | | | 3,50 | 305 | | | 11,70 |
| 25,0-35,0 | 0.9843-1.3780 | | | 3,65 | 690 | | | 12,70 |
| 36,0-65,0 | 1.4173-2.5591 | | | 3,70 | 1370 | | | 18,70 |
| 64,0-114,0 | 2.5197-4.4882 | | | | 1750 | | | |

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



Bei Morsekonus 2+3 ist eine axiale Kühlung ohne Kühlmittelring möglich.
Hierzu muss das Gewinde des Kühlmittelringes (G) mit einer Schraube geschlossen werden.

With morse cone 2+3, axial cooling without coolant ring is possible.
For this, the thread of the coolant ring (G) must be closed with a screw.

Schraube für MK 2 / Screw for MT 2 = RC 1/16" **22 1030 0231 802** € 0,30

Schraube für MK 3 / Screw for MT 3 = RC 1/8" **22 1030 0231 803** € 0,30

Schnittdaten
Cutting data



Film
Movie



1302-1311

335



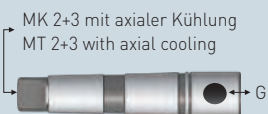
Index



PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

| Ø mm d1 | Ø Zoll / Inch d1 | PULVERSTAHL · POWDER STEEL | | | | HARTMETALL · CARBIDE | | | | | | | | | | | |
|------------|------------------------|----------------------------|-------|------|---|----------------------|-------|------|---|--------------|-------|--------------|-------|--------------|-------|--------------|--------|
| | | Art. | € | Art. | € | Art. | € | Art. | € | | | | | | | | |
| ● 9,50 | 0.3740 | 22 2010 0095 | 24,85 | - | - | 22 3010 0095 | 26,05 | - | - | 22 4010 0095 | 29,30 | 22 4510 0095 | 29,30 | 22 5010 0095 | 30,45 | 22 5510 0095 | 66,40 |
| ○ 9,80 | 0.3858 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ● 10,00 | 0.3937 | 22 2010 0100 | 24,85 | - | - | 22 3010 0100 | 26,05 | - | - | 22 4010 0100 | 29,30 | 22 4510 0100 | 29,30 | 22 5010 0100 | 30,45 | 22 5510 0100 | 66,40 |
| ● 10,20 | 0.4016 | 22 2010 0102 | 24,85 | - | - | 22 3010 0102 | 26,05 | - | - | 22 4010 0102 | 29,30 | 22 4510 0102 | 29,30 | 22 5010 0102 | 30,45 | 22 5510 0102 | 66,40 |
| ● 10,50 | 0.4134 | 22 2010 0105 | 24,85 | - | - | 22 3010 0105 | 26,05 | - | - | 22 4010 0105 | 29,30 | 22 4510 0105 | 29,30 | 22 5010 0105 | 30,45 | 22 5510 0105 | 66,40 |
| ● 10,80 | 0.4252 | 22 2010 0108 | 24,85 | - | - | 22 3010 0108 | 26,05 | - | - | 22 4010 0108 | 29,30 | 22 4510 0108 | 29,30 | 22 5010 0108 | 30,45 | 22 5510 0108 | 66,40 |
| ● 11,00 | 0.4331 | 22 2010 0110 | 24,85 | - | - | 22 3010 0110 | 26,05 | - | - | 22 4010 0110 | 29,30 | 22 4510 0110 | 29,30 | 22 5010 0110 | 30,45 | 22 5510 0110 | 66,40 |
| ● 11,50 | 0.4528 | 22 2010 0115 | 24,85 | - | - | 22 3010 0115 | 26,05 | - | - | 22 4010 0115 | 29,30 | 22 4510 0115 | 29,30 | 22 5010 0115 | 30,45 | 22 5510 0115 | 66,40 |
| ● 12,00 | 0.4724 | 22 2010 0120 | 24,85 | - | - | 22 3010 0120 | 26,05 | - | - | 22 4010 0120 | 29,30 | 22 4510 0120 | 29,30 | 22 5010 0120 | 30,45 | 22 5510 0120 | 66,40 |
| ● 12,50 | 0.4921 | 22 2010 0125 | 24,85 | - | - | 22 3010 0125 | 26,05 | - | - | 22 4010 0125 | 29,30 | 22 4510 0125 | 29,30 | 22 5010 0125 | 30,45 | 22 5510 0125 | 66,40 |
| ● 13,00 | 0.5118 | 22 2010 0130 | 28,30 | - | - | 22 3010 0130 | 28,95 | - | - | 22 4010 0130 | 34,45 | 22 4510 0130 | 34,45 | 22 5010 0130 | 35,10 | 22 5510 0130 | 92,70 |
| ● 13,50 | 0.5315 | 22 2010 0135 | 28,30 | - | - | 22 3010 0135 | 28,95 | - | - | 22 4010 0135 | 34,45 | 22 4510 0135 | 34,45 | 22 5010 0135 | 35,10 | 22 5510 0135 | 92,70 |
| ● 14,00 | 0.5512 | 22 2010 0140 | 28,30 | - | - | 22 3010 0140 | 28,95 | - | - | 22 4010 0140 | 34,45 | 22 4510 0140 | 34,45 | 22 5010 0140 | 35,10 | 22 5510 0140 | 92,70 |
| ● 14,50 | 0.5709 | 22 2010 0145 | 28,30 | - | - | 22 3010 0145 | 28,95 | - | - | 22 4010 0145 | 34,45 | 22 4510 0145 | 34,45 | 22 5010 0145 | 35,10 | 22 5510 0145 | 92,70 |
| ● 15,00 | 0.5906 | 22 2010 0150 | 28,30 | - | - | 22 3010 0150 | 28,95 | - | - | 22 4010 0150 | 34,45 | 22 4510 0150 | 34,45 | 22 5010 0150 | 35,10 | 22 5510 0150 | 92,70 |
| ● 15,50 | 0.6102 | 22 2010 0155 | 28,30 | - | - | 22 3010 0155 | 28,95 | - | - | 22 4010 0155 | 34,45 | 22 4510 0155 | 34,45 | 22 5010 0155 | 35,10 | 22 5510 0155 | 92,70 |
| ● 16,00 | 0.6299 | 22 2010 0160 | 28,30 | - | - | 22 3010 0160 | 28,95 | - | - | 22 4010 0160 | 34,45 | 22 4510 0160 | 34,45 | 22 5010 0160 | 35,10 | 22 5510 0160 | 92,70 |
| ● 16,50 | 0.6496 | 22 2010 0165 | 28,30 | - | - | 22 3010 0165 | 28,95 | - | - | 22 4010 0165 | 34,45 | 22 4510 0165 | 34,45 | 22 5010 0165 | 35,10 | 22 5510 0165 | 92,70 |
| ● 17,00 | 0.6693 | 22 2010 0170 | 28,30 | - | - | 22 3010 0170 | 28,95 | - | - | 22 4010 0170 | 34,45 | 22 4510 0170 | 34,45 | 22 5010 0170 | 35,10 | 22 5510 0170 | 92,70 |
| ● 17,50 | 0.6890 | 22 2010 0175 | 28,30 | - | - | 22 3010 0175 | 28,95 | - | - | 22 4010 0175 | 34,45 | 22 4510 0175 | 34,45 | 22 5010 0175 | 35,10 | 22 5510 0175 | 92,70 |
| ● 18,00 | 0.7087 | 22 2010 0180 | 36,00 | - | - | 22 3010 0180 | 40,35 | - | - | 22 4010 0180 | 44,80 | 22 4510 0180 | 44,80 | 22 5010 0180 | 48,90 | 22 5510 0180 | 102,55 |
| ● 18,50 | 0.7283 | 22 2010 0185 | 36,00 | - | - | 22 3010 0185 | 40,35 | - | - | 22 4010 0185 | 44,80 | 22 4510 0185 | 44,80 | 22 5010 0185 | 48,90 | 22 5510 0185 | 102,55 |
| ● 19,00 | 0.7480 | 22 2010 0190 | 36,00 | - | - | 22 3010 0190 | 40,35 | - | - | 22 4010 0190 | 44,80 | 22 4510 0190 | 44,80 | 22 5010 0190 | 48,90 | 22 5510 0190 | 102,55 |
| ● 19,50 | 0.7677 | 22 2010 0195 | 36,00 | - | - | 22 3010 0195 | 40,35 | - | - | 22 4010 0195 | 44,80 | 22 4510 0195 | 44,80 | 22 5010 0195 | 48,90 | 22 5510 0195 | 102,55 |
| ● 20,00 | 0.7874 | 22 2010 0200 | 36,00 | - | - | 22 3010 0200 | 40,35 | - | - | 22 4010 0200 | 44,80 | 22 4510 0200 | 44,80 | 22 5010 0200 | 48,90 | 22 5510 0200 | 102,55 |
| ● 20,50 | 0.8071 | 22 2010 0205 | 36,00 | - | - | 22 3010 0205 | 40,35 | - | - | 22 4010 0205 | 44,80 | 22 4510 0205 | 44,80 | 22 5010 0205 | 48,90 | 22 5510 0205 | 118,55 |
| ● 21,00 | 0.8268 | 22 2010 0210 | 36,00 | - | - | 22 3010 0210 | 40,35 | - | - | 22 4010 0210 | 44,80 | 22 4510 0210 | 44,80 | 22 5010 0210 | 48,90 | 22 5510 0210 | 118,55 |
| ● 22,00 | 0.8661 | 22 2010 0220 | 36,00 | - | - | 22 3010 0220 | 40,35 | - | - | 22 4010 0220 | 44,80 | 22 4510 0220 | 44,80 | 22 5010 0220 | 48,90 | 22 5510 0220 | 118,55 |
| ● 23,00 | 0.9055 | 22 2010 0230 | 36,00 | - | - | 22 3010 0230 | 40,35 | - | - | 22 4010 0230 | 44,80 | 22 4510 0230 | 44,80 | 22 5010 0230 | 48,90 | 22 5510 0230 | 118,55 |
| ● 24,00 | 0.9449 | 22 2010 0240 | 36,00 | - | - | 22 3010 0240 | 40,35 | - | - | 22 4010 0240 | 44,80 | 22 4510 0240 | 44,80 | 22 5010 0240 | 48,90 | 22 5510 0240 | 118,55 |
| ● 25,00 | 0.9843 | 22 2010 0250 | 42,15 | - | - | 22 3010 0250 | 45,45 | - | - | 22 4010 0250 | 52,45 | 22 4510 0250 | 52,45 | 22 5010 0250 | 55,55 | 22 5510 0250 | 125,20 |
| ● 26,00 | 1.0236 | 22 2010 0260 | 42,15 | - | - | 22 3010 0260 | 45,45 | - | - | 22 4010 0260 | 52,45 | 22 4510 0260 | 52,45 | 22 5010 0260 | 55,55 | 22 5510 0260 | 125,20 |
| ● 26,50 | 1.0433 | 22 2010 0265 | 42,15 | - | - | 22 3010 0265 | 45,45 | - | - | 22 4010 0265 | 52,45 | 22 4510 0265 | 52,45 | 22 5010 0265 | 55,55 | 22 5510 0265 | 125,20 |
| ● 27,00 | 1.0630 | 22 2010 0270 | 42,15 | - | - | 22 3010 0270 | 45,45 | - | - | 22 4010 0270 | 52,45 | 22 4510 0270 | 52,45 | 22 5010 0270 | 55,55 | 22 5510 0270 | 125,20 |
| ● 28,00 | 1.1024 | 22 2010 0280 | 42,15 | - | - | 22 3010 0280 | 45,45 | - | - | 22 4010 0280 | 52,45 | 22 4510 0280 | 52,45 | 22 5010 0280 | 55,55 | 22 5510 0280 | 125,20 |
| ● 29,00 | 1.1417 | 22 2010 0290 | 42,15 | - | - | 22 3010 0290 | 45,45 | - | - | 22 4010 0290 | 52,45 | 22 4510 0290 | 52,45 | 22 5010 0290 | 55,55 | 22 5510 0290 | 125,20 |
| ● 30,00 | 1.1811 | 22 2010 0300 | 42,15 | - | - | 22 3010 0300 | 45,45 | - | - | 22 4010 0300 | 52,45 | 22 4510 0300 | 52,45 | 22 5010 0300 | 55,55 | 22 5510 0300 | 125,20 |
| ● 31,00 | 1.2205 | 22 2010 0310 | 42,15 | - | - | 22 3010 0310 | 45,45 | - | - | 22 4010 0310 | 52,45 | 22 4510 0310 | 52,45 | 22 5010 0310 | 55,55 | 22 5510 0310 | 125,20 |
| ● 32,00 | 1.2598 | 22 2010 0320 | 42,15 | - | - | 22 3010 0320 | 45,45 | - | - | 22 4010 0320 | 52,45 | 22 4510 0320 | 52,45 | 22 5010 0320 | 55,55 | 22 5510 0320 | 125,20 |
| ● 33,00 | 1.2992 | 22 2010 0330 | 42,15 | - | - | 22 3010 0330 | 45,45 | - | - | 22 4010 0330 | 52,45 | 22 4510 0330 | 52,45 | 22 5010 0330 | 55,55 | 22 5510 0330 | 132,90 |
| ● 34,00 | 1.3386 | 22 2010 0340 | 42,15 | - | - | 22 3010 0340 | 45,45 | - | - | 22 4010 0340 | 52,45 | 22 4510 0340 | 52,45 | 22 5010 0340 | 55,55 | 22 5510 0340 | 132,90 |
| ● 35,00 | 1.3780 | 22 2010 0350 | 42,15 | - | - | 22 3010 0350 | 45,45 | - | - | 22 4010 0350 | 52,45 | 22 4510 0350 | 52,45 | 22 5010 0350 | 55,55 | 22 5510 0350 | 132,90 |



Bei Morsekonus 2+3 ist eine axiale Kühlung ohne Kühlmittelring möglich. Hierzu muss das Gewinde des Kühlmittelringes (G) mit einer Schraube geschlossen werden.

With morse cone 2+3, axial cooling without coolant ring is possible. For this, the thread of the coolant ring (G) must be closed with a screw.

Schraube für MK 2 / Screw for MT 2 = RC 1/16" **22 1030 0231 802 € 0,30**

Schraube für MK 3 / Screw for MT 3 = RC 1/8" **22 1030 0231 803 € 0,30**

Schnittdaten
Cutting data

Film
Movie

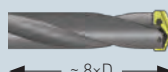
1302-1311

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



MK 2,3,4,5 – Radiale Kühlung
mit Kühlmittelring
MT 2,3,4,5 – Radial coolant
with oil ring

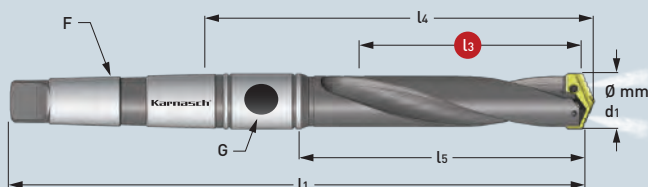
Morsekegel
ISO 296 Typ BEK ·
Morse taper shank
ISO 296 type BEK



← ≈ 8×D →



Spiral genutet ·
Helical flute



| Art. | € | l3 Nutzlänge Max. drill depth | l5 Körperlänge Body-length | l4 Neue REF.- Länge REF.-length | l1 Gesamtlänge Overall length | F Morsekegel Morse taper | G Gewinde Pipe tap | Kühlmittelring Oil ring |
|--|--------|-------------------------------------|----------------------------------|--|-------------------------------------|--------------------------------|--|--------------------------------|
| | | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | | | Art. € |
| • 22 1030 01111 0095 Ø 9,5-11,0 mm 0.3740-0.4331" OPTIMAL · OPTIMAL | 151,30 | 111,1 mm 4.3740" | 130,9 mm 5.1535" | 167,4 mm 6.5905" | 239,7 mm 9.4370" | 2 | 1/16" | • 22 9002 01905 22,10 |
| • 22 1030 01111 0115 Ø 11,5-12,5 mm 0.4528-0.4921" OPTIMAL · OPTIMAL | 151,30 | 111,1 mm 4.3740" | 130,9 mm 5.1535" | 167,4 mm 6.5905" | 239,7 mm 9.4370" | 2 | 1/16" | |
| • 22 1030 01143 0130 Ø 13,0-17,5 mm 0.5118-0.6890" MÖGLICH · POSSIBLE Ø 13,0-15,0 mm 0.5118-0.5906" OPTIMAL · OPTIMAL | 163,30 | 114,3 mm 4.5000" | 135,0 mm 5.3150" | 171,8 mm 6.7638" | 243,7 mm 9.5945" | 2 | 1/16" | |
| • 22 1030 01143 0155 Ø 15,5-17,5 mm 0.6102-0.6890" OPTIMAL · OPTIMAL | 163,30 | 114,3 mm 4.5000" | 135,0 mm 5.3150" | 171,8 mm 6.7638" | 243,7 mm 9.5945" | 2 | 1/16" | |
| • 22 1030 02731 0180 Ø 18,0-24,0 mm 0.7087-0.9449" MÖGLICH · POSSIBLE Ø 18,0-21,0 mm 0.7087-0.8268" OPTIMAL · OPTIMAL | 231,50 | 273,1 mm 10.7520" | 301,6 mm 11.8740" | 345,7 mm 13.6102" | 435,8 mm 17.1575" | 3 | 1/8" | • 22 9002 02540 24,85 |
| • 22 1030 02731 0220 Ø 22,0-24,0 mm 0.8661-0.9449" OPTIMAL · OPTIMAL | 231,50 | 273,1 mm 10.7520" | 301,6 mm 11.8740" | 345,7 mm 13.6102" | 435,8 mm 17.1575" | 3 | 1/8" | |
| • 22 1030 02890 0250 Ø 25,0-35,0 mm 0.9843-1.3780" MÖGLICH · POSSIBLE Ø 25,0-29,0 mm 0.9843-1.1417" OPTIMAL · OPTIMAL | 286,70 | 289,0 mm 11.3780" | 317,5 mm 12.5000" | 363,6 mm 14.3150" | 477,0 mm 18.7795" | 4 | 1/8" Halter Holder 25,0-35,0 mm | |
| • 22 1030 02890 0300 Ø 30,0-35,0 mm 1.1811-1.3780" OPTIMAL · OPTIMAL | 286,70 | 289,0 mm 11.3780" | 317,5 mm 12.5000" | 370,8 mm 14.5984" | 484,2 mm 19.0630" | 4 | 1/4" Halter Holder 30,0-35,0 mm | • 22 9002 03175 32,20 |

Ersatz-Torxschrauben und Schlüssel mit Drehmomentangabe
Spare Torx-screws and wrench with torque specification

| Ø Diameter | | TORX | | max. Drehmoment / Torque (N/cm) | Schlüssel / Wrench | |
|------------|---------------|--------------|------|---------------------------------|--------------------|-------|
| mm | Zoll / Inch | | € | | | € |
| 9,5-11,0 | 0.3740-0.4331 | 22 9010 0095 | 3,50 | 84 | 22 9011 0084 | 9,90 |
| 11,5-12,5 | 0.4528-0.4921 | 22 9010 0115 | 3,50 | 84 | 22 9011 0175 | 9,90 |
| 13,0-17,5 | 0.5118-0.6890 | 22 9010 0130 | 3,50 | 175 | 22 9011 0305 | 10,90 |
| 18,0-24,0 | 0.7087-0.9449 | 22 9010 0180 | 3,50 | 305 | 22 9011 0690 | 11,70 |
| 25,0-35,0 | 0.9843-1.3780 | 22 9010 0250 | 3,60 | 690 | 22 9011 1370 | 12,70 |
| 36,0-65,0 | 1.4173-2.5591 | 22 9010 0360 | 3,65 | 1370 | 22 9011 1750 | 18,70 |
| 64,0-114,0 | 2.5197-4.4882 | 22 9010 0640 | 3,70 | 1750 | | |





PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

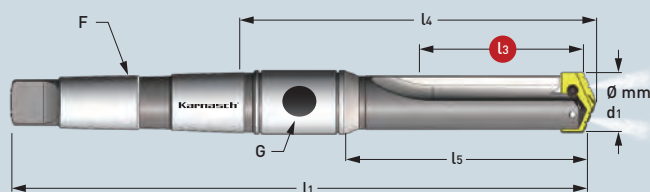
| Ø mm d1 | Ø Zoll / Inch d1 | PULVERSTAHL 25 STEEL-TEC beschichtet | | | | PULVERSTAHL 15 STEEL-TEC beschichtet | | | | PULVERSTAHL 25 ALU-TEC beschichtet | | | | PULVERSTAHL 15 ALU-TEC beschichtet | | | | HARTMETALL 20/30 STEEL-TEC beschichtet | | HARTMETALL 20/30 ALU-TEC beschichtet | | HARTMETALL 20/30 DIA-TEC beschichtet | | | |
|------------|------------------------|--------------------------------------|-------|------|---|--------------------------------------|---------|------|---|------------------------------------|-------|--------------|-------|------------------------------------|-------|--------------|--------|--|---|--------------------------------------|---|--------------------------------------|---|------|---|
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| ● 9,50 | 0.3740 | 22 2010 0095 | 24,85 | - | - | 22 3010 0095 | 26,05 | - | - | 22 4010 0095 | 29,30 | 22 4510 0095 | 29,30 | 22 5010 0095 | 30,45 | 22 5510 0095 | 66,40 | - | - | - | - | - | - | - | - |
| ○ 9,80 | 0.3858 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| ● 10,00 | 0.3937 | 22 2010 0100 | 24,85 | - | - | 22 3010 0100 | 26,05 | - | - | 22 4010 0100 | 29,30 | 22 4510 0100 | 29,30 | 22 5010 0100 | 30,45 | 22 5510 0100 | 66,40 | - | - | - | - | - | - | - | - |
| ● 10,20 | 0.4016 | 22 2010 0102 | 24,85 | - | - | 22 3010 0102 | 26,05 | - | - | 22 4010 0102 | 29,30 | 22 4510 0102 | 29,30 | 22 5010 0102 | 30,45 | 22 5510 0102 | 66,40 | - | - | - | - | - | - | - | - |
| ● 10,50 | 0.4134 | 22 2010 0105 | 24,85 | - | - | 22 3010 0105 | 26,05 | - | - | 22 4010 0105 | 29,30 | 22 4510 0105 | 29,30 | 22 5010 0105 | 30,45 | 22 5510 0105 | 66,40 | - | - | - | - | - | - | - | - |
| ● 10,80 | 0.4252 | 22 2010 0108 | 24,85 | - | - | 22 3010 0108 | 26,05 | - | - | 22 4010 0108 | 29,30 | 22 4510 0108 | 29,30 | 22 5010 0108 | 30,45 | 22 5510 0108 | 66,40 | - | - | - | - | - | - | - | - |
| ● 11,00 | 0.4331 | 22 2010 0110 | 24,85 | - | - | 22 3010 0110 | 26,05 | - | - | 22 4010 0110 | 29,30 | 22 4510 0110 | 29,30 | 22 5010 0110 | 30,45 | 22 5510 0110 | 66,40 | - | - | - | - | - | - | - | - |
| ● 11,50 | 0.4528 | 22 2010 0115 | 24,85 | - | - | 22 3010 0115 | 26,05 | - | - | 22 4010 0115 | 29,30 | 22 4510 0115 | 29,30 | 22 5010 0115 | 30,45 | 22 5510 0115 | 66,40 | - | - | - | - | - | - | - | - |
| ● 12,00 | 0.4724 | 22 2010 0120 | 24,85 | - | - | 22 3010 0120 | 26,05 | - | - | 22 4010 0120 | 29,30 | 22 4510 0120 | 29,30 | 22 5010 0120 | 30,45 | 22 5510 0120 | 66,40 | - | - | - | - | - | - | - | - |
| ● 12,50 | 0.4921 | 22 2010 0125 | 24,85 | - | - | 22 3010 0125 | 26,05 | - | - | 22 4010 0125 | 29,30 | 22 4510 0125 | 29,30 | 22 5010 0125 | 30,45 | 22 5510 0125 | 66,40 | - | - | - | - | - | - | - | - |
| ● 13,00 | 0.5118 | 22 2010 0130 | 28,30 | - | - | 22 3010 0130 | 28,95 | - | - | 22 4010 0130 | 34,45 | 22 4510 0130 | 34,45 | 22 5010 0130 | 35,10 | 22 5510 0130 | 92,70 | - | - | - | - | - | - | - | - |
| ● 13,50 | 0.5315 | 22 2010 0135 | 28,30 | - | - | 22 3010 0135 | 28,95 | - | - | 22 4010 0135 | 34,45 | 22 4510 0135 | 34,45 | 22 5010 0135 | 35,10 | 22 5510 0135 | 92,70 | - | - | - | - | - | - | - | - |
| ● 14,00 | 0.5512 | 22 2010 0140 | 28,30 | - | - | 22 3010 0140 | 28,95 | - | - | 22 4010 0140 | 34,45 | 22 4510 0140 | 34,45 | 22 5010 0140 | 35,10 | 22 5510 0140 | 92,70 | - | - | - | - | - | - | - | - |
| ● 14,50 | 0.5709 | 22 2010 0145 | 28,30 | - | - | 22 3010 0145 | 28,95 | - | - | 22 4010 0145 | 34,45 | 22 4510 0145 | 34,45 | 22 5010 0145 | 35,10 | 22 5510 0145 | 92,70 | - | - | - | - | - | - | - | - |
| ● 15,00 | 0.5906 | 22 2010 0150 | 28,30 | - | - | 22 3010 0150 | 28,95 | - | - | 22 4010 0150 | 34,45 | 22 4510 0150 | 34,45 | 22 5010 0150 | 35,10 | 22 5510 0150 | 92,70 | - | - | - | - | - | - | - | - |
| ● 15,50 | 0.6102 | 22 2010 0155 | 28,30 | - | - | 22 3010 0155 | 28,95 | - | - | 22 4010 0155 | 34,45 | 22 4510 0155 | 34,45 | 22 5010 0155 | 35,10 | 22 5510 0155 | 92,70 | - | - | - | - | - | - | - | - |
| ● 16,00 | 0.6299 | 22 2010 0160 | 28,30 | - | - | 22 3010 0160 | 28,95 | - | - | 22 4010 0160 | 34,45 | 22 4510 0160 | 34,45 | 22 5010 0160 | 35,10 | 22 5510 0160 | 92,70 | - | - | - | - | - | - | - | - |
| ● 16,50 | 0.6496 | 22 2010 0165 | 28,30 | - | - | 22 3010 0165 | 28,95 | - | - | 22 4010 0165 | 34,45 | 22 4510 0165 | 34,45 | 22 5010 0165 | 35,10 | 22 5510 0165 | 92,70 | - | - | - | - | - | - | - | - |
| ● 17,00 | 0.6693 | 22 2010 0170 | 28,30 | - | - | 22 3010 0170 | 28,95 | - | - | 22 4010 0170 | 34,45 | 22 4510 0170 | 34,45 | 22 5010 0170 | 35,10 | 22 5510 0170 | 92,70 | - | - | - | - | - | - | - | - |
| ● 17,50 | 0.6890 | 22 2010 0175 | 28,30 | - | - | 22 3010 0175 | 28,95 | - | - | 22 4010 0175 | 34,45 | 22 4510 0175 | 34,45 | 22 5010 0175 | 35,10 | 22 5510 0175 | 92,70 | - | - | - | - | - | - | - | - |
| ● 18,00 | 0.7087 | 22 2010 0180 | 36,00 | - | - | 22 3010 0180 | 40,35 | - | - | 22 4010 0180 | 44,80 | 22 4510 0180 | 44,80 | 22 5010 0180 | 48,90 | 22 5510 0180 | 102,55 | - | - | - | - | - | - | - | - |
| ● 18,50 | 0.7283 | 22 2010 0185 | 36,00 | - | - | 22 3010 0185 | 40,35 | - | - | 22 4010 0185 | 44,80 | 22 4510 0185 | 44,80 | 22 5010 0185 | 48,90 | 22 5510 0185 | 102,55 | - | - | - | - | - | - | - | - |
| ● 19,00 | 0.7480 | 22 2010 0190 | 36,00 | - | - | 22 3010 0190 | 40,35 | - | - | 22 4010 0190 | 44,80 | 22 4510 0190 | 44,80 | 22 5010 0190 | 48,90 | 22 5510 0190 | 102,55 | - | - | - | - | - | - | - | - |
| ● 19,50 | 0.7677 | 22 2010 0195 | 36,00 | - | - | 22 3010 0195 | 40,35 | - | - | 22 4010 0195 | 44,80 | 22 4510 0195 | 44,80 | 22 5010 0195 | 48,90 | 22 5510 0195 | 102,55 | - | - | - | - | - | - | - | - |
| ● 20,00 | 0.7874 | 22 2010 0200 | 36,00 | - | - | 22 3010 0200 | 40,35 | - | - | 22 4010 0200 | 44,80 | 22 4510 0200 | 44,80 | 22 5010 0200 | 48,90 | 22 5510 0200 | 102,55 | - | - | - | - | - | - | - | - |
| ● 20,50 | 0.8071 | 22 2010 0205 | 36,00 | - | - | 22 3010 0205 | 40,35 | - | - | 22 4010 0205 | 44,80 | 22 4510 0205 | 44,80 | 22 5010 0205 | 48,90 | 22 5510 0205 | 118,55 | - | - | - | - | - | - | - | - |
| ● 21,00 | 0.8268 | 22 2010 0210 | 36,00 | - | - | 22 3010 0210 | 40,35 | - | - | 22 4010 0210 | 44,80 | 22 4510 0210 | 44,80 | 22 5010 0210 | 48,90 | 22 5510 0210 | 118,55 | - | - | - | - | - | - | - | - |
| ● 22,00 | 0.8661 | 22 2010 0220 | 36,00 | - | - | 22 3010 0220 | 40,35 | - | - | 22 4010 0220 | 44,80 | 22 4510 0220 | 44,80 | 22 5010 0220 | 48,90 | 22 5510 0220 | 118,55 | - | - | - | - | - | - | - | - |
| ● 23,00 | 0.9055 | 22 2010 0230 | 36,00 | - | - | 22 3010 0230 | 40,35 | - | - | 22 4010 0230 | 44,80 | 22 4510 0230 | 44,80 | 22 5010 0230 | 48,90 | 22 5510 0230 | 118,55 | - | - | - | - | - | - | - | - |
| ● 24,00 | 0.9449 | 22 2010 0240 | 36,00 | - | - | 22 3010 0240 | 40,35 | - | - | 22 4010 0240 | 44,80 | 22 4510 0240 | 44,80 | 22 5010 0240 | 48,90 | 22 5510 0240 | 118,55 | - | - | - | - | - | - | - | - |
| ● 25,00 | 0.9843 | 22 2010 0250 | 42,15 | - | - | 22 3010 0250 | 45,45 | - | - | 22 4010 0250 | 52,45 | 22 4510 0250 | 52,45 | 22 5010 0250 | 55,55 | 22 5510 0250 | 125,20 | - | - | - | - | - | - | - | - |
| ● 26,00 | 1.0236 | 22 2010 0260 | 42,15 | - | - | 22 3010 0260 | 45,45 | - | - | 22 4010 0260 | 52,45 | 22 4510 0260 | 52,45 | 22 5010 0260 | 55,55 | 22 5510 0260 | 125,20 | - | - | - | - | - | - | - | - |
| ● 26,50 | 1.0433 | 22 2010 0265 | 42,15 | - | - | 22 3010 0265 | 45,45 | - | - | 22 4010 0265 | 52,45 | 22 4510 0265 | 52,45 | 22 5010 0265 | 55,55 | 22 5510 0265 | 125,20 | - | - | - | - | - | - | - | - |
| ● 27,00 | 1.0630 | 22 2010 0270 | 42,15 | - | - | 22 3010 0270 | 45,45 | - | - | 22 4010 0270 | 52,45 | 22 4510 0270 | 52,45 | 22 5010 0270 | 55,55 | 22 5510 0270 | 125,20 | - | - | - | - | - | - | - | - |
| ● 28,00 | 1.1024 | 22 2010 0280 | 42,15 | - | - | 22 3010 0280 | 45,45 | - | - | 22 4010 0280 | 52,45 | 22 4510 0280 | 52,45 | 22 5010 0280 | 55,55 | 22 5510 0280 | 125,20 | - | - | - | - | - | - | - | - |
| ● 29,00 | 1.1417 | 22 2010 0290 | 42,15 | - | - | 22 3010 0290 | 45,45 | - | - | 22 4010 0290 | 52,45 | 22 4510 0290 | 52,45 | 22 5010 0290 | 55,55 | 22 5510 0290 | 125,20 | - | - | - | - | - | - | - | - |
| ● 30,00 | 1.1811 | 22 2010 0300 | 42,15 | - | - | 22 3010 0300 | 45,45 | - | - | 22 4010 0300 | 52,45 | 22 4510 0300 | 52,45 | 22 5010 0300 | 55,55 | 22 5510 0300 | 125,20 | - | - | - | - | - | - | - | - |
| ● 31,00 | 1.2205 | 22 2010 0310 | 42,15 | - | - | 22 3010 0310 | 45,45 | - | - | 22 4010 0310 | 52,45 | 22 4510 0310 | 52,45 | 22 5010 0310 | 55,55 | 22 5510 0310 | 125,20 | - | - | - | - | - | - | - | - |
| ● 32,00 | 1.2598 | 22 2010 0320 | 42,15 | - | - | 22 3010 0320 | 45,45 | - | - | 22 4010 0320 | 52,45 | 22 4510 0320 | 52,45 | 22 5010 0320 | 55,55 | 22 5510 0320 | 125,20 | - | - | - | - | - | - | - | - |
| ● 33,00 | 1.2992 | 22 2010 0330 | 42,15 | - | - | 22 3010 0330 | 45,45 | - | - | 22 4010 0330 | 52,45 | 22 4510 0330 | 52,45 | 22 5010 0330 | 55,55 | 22 5510 0330 | 132,90 | - | - | - | - | - | - | - | - |
| ● 34,00 | 1.3386 | 22 2010 0340 | 42,15 | - | - | 22 3010 0340 | 45,45 | - | - | 22 4010 0340 | 52,45 | 22 4510 0340 | 52,45 | 22 5010 0340 | 55,55 | 22 5510 0340 | 132,90 | - | - | - | - | - | - | - | - |
| ● 35,00 | 1.3780 | 22 2010 0350 | 42,15 | - | - | 22 3010 0350 | 45,45 | - | - | 22 4010 0350 | 52,45 | 22 4510 0350 | 52,45 | 22 5010 0350 | 55,55 | 22 5510 0350 | 132,90 | - | - | - | - | - | - | - | - |
| ● 36,00 | 1.4173 | 22 2010 0360 | 57,75 | - | - | 22 3010 0360 | 59,50</ | | | | | | | | | | | | | | | | | | |

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



MK 2,3,4,5 – Radiale Kühlung
mit Kühlmittelring
MT 2,3,4,5 – Radial coolant
with oil ring

Morsekegel
ISO 296 Typ BEK ·
Morse taper shank
ISO 296 type BEK



~ 3xD
Mittel · Intermediate

Gerade genutet ·
Straight flute

| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | | | Art. | € |
|--|--------|---------------------|---------------------|---------------------|----------------------|---|------------------------------------|-----------------|-------|
| • 22 1040 00318 0095 Ø 9,5-11,0 mm 0.3740-0.4331" OPTIMAL · OPTIMAL | 118,80 | 31,8 mm 1.2520" | 51,5 mm 2.0276" | 88,0 mm 3.4646" | 160,3 mm 6.3110" | 2 | 1/16" | • 22 9002 01905 | 22,10 |
| • 22 1040 00318 0115 Ø 11,5-12,5 mm 0.4528-0.4921" OPTIMAL · OPTIMAL | 118,80 | 31,8 mm 1.2520" | 51,5 mm 2.0276" | 88,0 mm 3.4646" | 160,3 mm 6.3110" | 2 | 1/16" | | |
| • 22 1040 00350 0130 Ø 13,0-17,5 mm 0.5118-0.6890" MÖGLICH · POSSIBLE Ø 13,0-15,0 mm 0.5118-0.5906" OPTIMAL · OPTIMAL | 128,20 | 35,0 mm 1.3780" | 55,5 mm 2.1850" | 92,4 mm 3.6378" | 164,3 mm 6.4685" | 2 | 1/16" | | |
| • 22 1040 00350 0155 Ø 15,5-17,5 mm 0.6102-0.6890" OPTIMAL · OPTIMAL | 128,20 | | | | | | | | |
| • 22 1040 00698 0180 Ø 18,0-24,0 mm 0.7087-0.9449" MÖGLICH · POSSIBLE Ø 18,0-21,0 mm 0.7087-0.8268" OPTIMAL · OPTIMAL | 141,20 | 69,8 mm 2.7480" | 98,4 mm 3.8740" | 142,5 mm 5.6102" | 232,5 mm 9.1535" | 3 | 1/8" | • 22 9002 02540 | 24,85 |
| • 22 1040 00698 0220 Ø 22,0-24,0 mm 0.8661-0.9449" OPTIMAL · OPTIMAL | 141,20 | | | | | | | | |
| • 22 1040 00857 0250 Ø 25,0-35,0 mm 0.9843-1.3780" MÖGLICH · POSSIBLE Ø 25,0-29,0 mm 0.9843-1.1417" OPTIMAL · OPTIMAL | 166,90 | | | 160,4 mm 6.3150" | 273,8 mm 10.7795" | 4 | 1/8" Halter Holder 25,0-35,0 mm | | |
| • 22 1040 00857 0300 Ø 30,0-35,0 mm 1.1811-1.3780" OPTIMAL · OPTIMAL | 166,90 | 85,7 mm 3.3740" | 114,3 mm 4.5000" | 167,6 mm 6.5984" | 281,0 mm 11.0630" | 4 | 1/4" Halter Holder 30,0-35,0 mm | • 22 9002 03175 | 32,20 |
| • 22 1040 01206 0360 Ø 36,0-47,0 mm 1.4173-1.8504" MÖGLICH · POSSIBLE Ø 36,0-41,0 mm 1.4173-1.6142" OPTIMAL · OPTIMAL | 224,25 | | | | | | | | |
| • 22 1040 01206 0420 Ø 42,0-47,0 mm 1.6535-1.8504" OPTIMAL · OPTIMAL | 224,25 | 120,6 mm 4.7480" | 152,4 mm 6.0000" | 206,4 mm 8.1259" | 319,1 mm 12.5630" | 4 | 1/4" | | |





PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

| Ø mm d1 | | Ø Zoll / Inch d1 | | 22 2010 | | 22 2510 | | 22 3010 | | 22 3510 | | 22 4010 | | 22 4510 | | 22 5010 | | 22 5510 | |
|------------|--------|------------------------|-------|---|--------|---|-------|---|--------|---|---|---|---|--|---|---|---|--|---|
| | | | | Pulverstahl 25 STEEL-TEC beschichtet Für Edelstahl, Stahl, Guss | | Pulverstahl 15 STEEL-TEC beschichtet Für legierte Stähle, Edelstahl, Stahl, Guss | | Pulverstahl 25 ALU-TEC beschichtet Für Alu, Messing, Kupfer | | Pulverstahl 15 ALU-TEC beschichtet Für Alu, Messing, Kupfer | | Hartmetall 20/30 STEEL-TEC beschichtet Für Edelstahl, hochfester Stahl, gehärteter Stahl | | Hartmetall 20/30 STEEL-TEC beschichtet Für alle Gussarten | | Hartmetall 20/30 ALU-TEC beschichtet Für Alu, Messing, Kupfer | | Hartmetall 20/30 DIA-TEC beschichtet Für abrasive Materialien wie: GFK, CFK, Graphit | |
| | | | | Powder steel 25 STEEL-TEC coated For stainless steel, steel, cast iron | | Powder steel 15 STEEL-TEC coated For alloy steel, stainless steel, steel, cast iron | | Powder steel 25 ALU-TEC coated For alu, brass, copper | | Powder steel 15 ALU-TEC coated For alloy steel, steel, cast iron | | Carbide 20/30 STEEL-TEC coated For stainless steel, high strength alloys, hardened steel | | Carbide 20/30 STEEL-TEC coated For all kinds of cast iron | | Carbide 20/30 ALU-TEC coated For alu, brass, copper | | Carbide 20/30 DIA-TEC coated For abrasive materials such as: fiberglass, carbon fiber, graphite | |
| Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| 48,00 | 1.8898 | 22 2010 0480 | 82,65 | - | - | 22 3010 0480 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 49,00 | 1.9291 | 22 2010 0490 | 82,65 | - | - | 22 3010 0490 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 50,00 | 1.9685 | 22 2010 0500 | 82,65 | - | - | 22 3010 0500 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 51,00 | 2.0079 | 22 2010 0510 | 82,65 | - | - | 22 3010 0510 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 52,00 | 2.0472 | 22 2010 0520 | 82,65 | - | - | 22 3010 0520 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 53,00 | 2.0866 | 22 2010 0530 | 82,65 | - | - | 22 3010 0530 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 54,00 | 2.1260 | 22 2010 0540 | 82,65 | - | - | 22 3010 0540 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 55,00 | 2.1654 | 22 2010 0550 | 82,65 | - | - | 22 3010 0550 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 56,00 | 2.2047 | 22 2010 0560 | 82,65 | - | - | 22 3010 0560 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 57,00 | 2.2441 | 22 2010 0570 | 82,65 | - | - | 22 3010 0570 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 58,00 | 2.2835 | 22 2010 0580 | 82,65 | - | - | 22 3010 0580 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 59,00 | 2.3228 | 22 2010 0590 | 82,65 | - | - | 22 3010 0590 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 60,00 | 2.3622 | 22 2010 0600 | 82,65 | - | - | 22 3010 0600 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 61,00 | 2.4016 | 22 2010 0610 | 82,65 | - | - | 22 3010 0610 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 62,00 | 2.4409 | 22 2010 0620 | 82,65 | - | - | 22 3010 0620 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 63,00 | 2.4803 | 22 2010 0630 | 82,65 | - | - | 22 3010 0630 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 64,00 | 2.5197 | 22 2010 0640 | 82,65 | - | - | 22 3010 0640 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 65,00 | 2.5591 | 22 2010 0650 | 82,65 | - | - | 22 3010 0650 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| 64,00 | 2.5197 | - | - | 22 2510 0640 | 103,90 | - | - | 22 3510 0640 | 97,15 | - | - | - | - | - | - | - | - | - | - |
| 66,00 | 2.5984 | - | - | 22 2510 0660 | 103,90 | - | - | 22 3510 0660 | 97,15 | - | - | - | - | - | - | - | - | - | - |
| 68,00 | 2.6772 | - | - | 22 2510 0680 | 103,90 | - | - | 22 3510 0680 | 97,15 | - | - | - | - | - | - | - | - | - | - |
| 70,00 | 2.7559 | - | - | 22 2510 0700 | 103,90 | - | - | 22 3510 0700 | 97,15 | - | - | - | - | - | - | - | - | - | - |
| 72,00 | 2.8346 | - | - | 22 2510 0720 | 103,90 | - | - | 22 3510 0720 | 97,15 | - | - | - | - | - | - | - | - | - | - |
| 74,00 | 2.9134 | - | - | 22 2510 0740 | 103,90 | - | - | 22 3510 0740 | 97,15 | - | - | - | - | - | - | - | - | - | - |
| 76,00 | 2.9921 | - | - | 22 2510 0760 | 103,90 | - | - | 22 3510 0760 | 97,15 | - | - | - | - | - | - | - | - | - | - |
| 78,00 | 3.0709 | - | - | 22 2510 0780 | 114,75 | - | - | 22 3510 0780 | 108,00 | - | - | - | - | - | - | - | - | - | - |
| 80,00 | 3.1496 | - | - | 22 2510 0800 | 114,75 | - | - | 22 3510 0800 | 108,00 | - | - | - | - | - | - | - | - | - | - |
| 82,00 | 3.2283 | - | - | 22 2510 0820 | 114,75 | - | - | 22 3510 0820 | 108,00 | - | - | - | - | - | - | - | - | - | - |
| 84,00 | 3.3071 | - | - | 22 2510 0840 | 114,75 | - | - | 22 3510 0840 | 108,00 | - | - | - | - | - | - | - | - | - | - |
| 86,00 | 3.3858 | - | - | 22 2510 0860 | 114,75 | - | - | 22 3510 0860 | 108,00 | - | - | - | - | - | - | - | - | - | - |
| 88,00 | 3.4646 | - | - | 22 2510 0880 | 114,75 | - | - | 22 3510 0880 | 108,00 | - | - | - | - | - | - | - | - | - | - |
| 90,00 | 3.5433 | - | - | 22 2510 0900 | 134,70 | - | - | 22 3510 0900 | 127,85 | - | - | - | - | - | - | - | - | - | - |
| 92,00 | 3.6220 | - | - | 22 2510 0920 | 134,70 | - | - | 22 3510 0920 | 127,85 | - | - | - | - | - | - | - | - | - | - |
| 94,00 | 3.7008 | - | - | 22 2510 0940 | 134,70 | - | - | 22 3510 0940 | 127,85 | - | - | - | - | - | - | - | - | - | - |
| 96,00 | 3.7795 | - | - | 22 2510 0960 | 134,70 | - | - | 22 3510 0960 | 127,85 | - | - | - | - | - | - | - | - | - | - |
| 98,00 | 3.8583 | - | - | 22 2510 0980 | 134,70 | - | - | 22 3510 0980 | 127,85 | - | - | - | - | - | - | - | - | - | - |
| 100,00 | 3.9370 | - | - | 22 2510 1000 | 134,70 | - | - | 22 3510 1000 | 127,85 | - | - | - | - | - | - | - | - | - | - |
| 102,00 | 4.0157 | - | - | 22 2510 1020 | 153,50 | - | - | 22 3510 1020 | 146,65 | - | - | - | - | - | - | - | - | - | - |
| 104,00 | 4.0945 | - | - | 22 2510 1040 | 153,50 | - | - | 22 3510 1040 | 146,65 | - | - | - | - | - | - | - | - | - | - |
| 106,00 | 4.1732 | - | - | 22 2510 1060 | 153,50 | - | - | 22 3510 1060 | 146,65 | - | - | - | - | - | - | - | - | - | - |
| 108,00 | 4.2520 | - | - | 22 2510 1080 | 153,50 | - | - | 22 3510 1080 | 146,65 | - | - | - | - | - | - | - | - | - | - |
| 110,00 | 4.3307 | - | - | 22 2510 1100 | 153,50 | - | - | 22 3510 1100 | 146,65 | - | - | - | - | - | - | - | - | - | - |
| 112,00 | 4.4094 | - | - | 22 2510 1120 | 153,50 | - | - | 22 3510 1120 | 146,65 | - | - | - | - | - | - | - | - | - | - |
| 114,00 | 4.4882 | - | - | 22 2510 1140 | 153,50 | - | - | 22 3510 1140 | 146,65 | - | - | - | - | - | - | - | - | - | - |



Bei Morsekonus 2+3 ist eine axiale Kühlung ohne Kühlmittellring möglich.
Hierzu muss das Gewinde des Kühlmittellringes (G) mit einer Schraube geschlossen werden.

With morse cone 2+3, axial cooling without coolant ring is possible.
For this, the thread of the coolant ring (G) must be closed with a screw.

- Schraube für MK 2 / Screw for MT 2 = RC 1/16" **22 1030 0231 802 € 0,30**
- Schraube für MK 3 / Screw for MT 3 = RC 1/8" **22 1030 0231 803 € 0,30**

Schnittdaten
Cutting data

Film
Movie

1302-1311

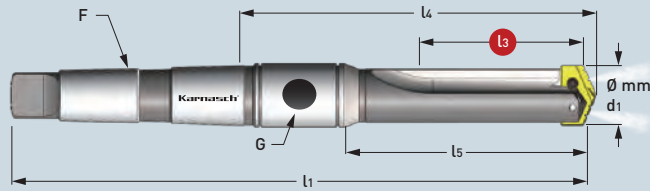
22 1040

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



MK 2,3,4,5 – Radiale Kühlung
mit Kühlmittelring
MT 2,3,4,5 – Radial coolant
with oil ring

Morsekegel
ISO 296 Typ BEK ·
Morse taper shank
ISO 296 type BEK



~ 3xD
Mittel - Intermediate

Gerade genutet ·
Straight flute

| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | F | G | Art. | € | |
|-----------------------------|--------|--|---------------------|---------------------|----------------------|----------------------|---|------|-----------------|-------|
| • 22 1040 01301 0480 | 256,10 | Ø 48,0-65,0 mm 1.8898-2.5591" Ø 48,0-55,0 mm 1.8898-2.1654" | 130,1 mm 5.1220" | 165,1 mm 6.5000" | 219,1 mm 8.6260" | 363,5 mm 14.3110" | 5 | 1/4" | • 22 9002 04445 | 42,30 |
| • 22 1040 01301 0560 | 256,10 | Ø 56,0-65,0 mm 2.2047-2.5591" | 130,1 mm 5.1220" | 165,1 mm 6.5000" | 219,1 mm 8.6260" | 363,5 mm 14.3110" | 5 | 1/4" | | |
| • 22 1040 01715 0640 | 399,15 | Ø 64,0-88,0 mm 2.5197-3.4646" Ø 64,0-76,0 mm 2.5197-2.9921" | 171,5 mm 6.7519" | 215,9 mm 8.5000" | 287,3 mm 11.3110" | 430,2 mm 16.9370" | 5 | 1/2" | • 22 9002 05715 | 58,25 |
| • 22 1040 01715 0780 | 399,15 | Ø 78,0-88,0 mm 3.0709-3.4646" | 171,5 mm 6.7519" | 215,9 mm 8.5000" | 287,3 mm 11.3110" | 430,2 mm 16.9370" | 5 | 1/2" | | |
| • 22 1040 01715 0900 | 539,35 | Ø 90,0-114,0 mm 3.5433-4.4882" Ø 90,0-100,0 mm 3.5433-3.9370" | 171,5 mm 6.7519" | 225,4 mm 8.8740" | 296,8 mm 11.6850" | 439,7 mm 17.3110" | 5 | 1/2" | | |
| • 22 1040 01715 1020 | 539,35 | Ø 102,0-114,0 mm 4.0157-4.4882" | 171,5 mm 6.7519" | 225,4 mm 8.8740" | 296,8 mm 11.6850" | 439,7 mm 17.3110" | 5 | 1/2" | | |

Halter werden **ohne** Einsätze, inklusive 2x TORX Befestigungsschrauben und 1x TORX Schlüssel geliefert.
Holders are delivered **without** inserts including 2x TORX-screws and 1x TORX wrench.

Für Maschinen ohne axiale/radiale Kühlmittelzufuhr kann ein Kühlmittelring auf den Halter montiert werden. Details siehe Seite 356
For machines without radial/axial coolant supply a oil ring can be mounted on the holder. Details see page 356



Ersatz-Torxschrauben und Schlüssel mit Drehmomentangabe
Spare Torx-screws and wrench with torque specification

| Ø Diameter | | TORX | max. Drehmoment / Torque (N/cm) | | Schlüssel / Wrench | |
|------------|---------------|--------------|---------------------------------|------|--------------------|-------|
| mm | Zoll / Inch | | € | | | € |
| 9,5-11,0 | 0.3740-0.4331 | 22 9010 0095 | 3,50 | 84 | 22 9011 0084 | 9,90 |
| 11,5-12,5 | 0.4528-0.4921 | 22 9010 0115 | 3,50 | 84 | 22 9011 0175 | 9,90 |
| 13,0-17,5 | 0.5118-0.6890 | 22 9010 0130 | 3,50 | 175 | 22 9011 0305 | 10,90 |
| 18,0-24,0 | 0.7087-0.9449 | 22 9010 0180 | 3,50 | 305 | 22 9011 0690 | 11,70 |
| 25,0-35,0 | 0.9843-1.3780 | 22 9010 0250 | 3,60 | 690 | 22 9011 1370 | 12,70 |
| 36,0-65,0 | 1.4173-2.5591 | 22 9010 0360 | 3,65 | 1370 | 22 9011 1750 | 18,70 |
| 64,0-114,0 | 2.5197-4.4882 | 22 9010 0640 | 3,70 | 1750 | | |





| PULVERSTAHL · POWDER STEEL | | | | | | | | | | HARTMETALL · CARBIDE | | | | | | | | | |
|----------------------------|--------|------------------------|-------|--|---|--|-------|---|---|--|---|---|---|--|---|---|---|--|---|
| Ø mm d1 | | Ø Zoll / Inch d1 | | 22 2010 | | 22 2510 | | 22 3010 | | 22 3510 | | 22 4010 | | 22 4510 | | 22 5010 | | 22 5510 | |
| | | | | Pulverstahl 25 STEEL-TEC beschichtet Für Edelstahl, Stahl, Guss Powder steel 25 STEEL-TEC coated For stainless steel, steel, cast iron | | Pulverstahl 15 STEEL-TEC beschichtet Für legierte Stähle, Edelstahl, Stahl, Guss Powder steel 15 STEEL-TEC coated For alloy steel, stainless steel, steel, cast iron | | Pulverstahl 25 ALU-TEC beschichtet Für Alu, Messing, Kupfer Powder steel 25 ALU-TEC coated For alu, brass, copper | | Pulverstahl 15 ALU-TEC beschichtet Für Alu, Messing, Kupfer Powder steel 15 ALU-TEC coated For alloy steel, steel, cast iron | | Hartmetall 20/30 STEEL-TEC beschichtet Für Edelstahl, hochfester Stahl, gehärteter Stahl Carbide 20/30 STEEL-TEC coated For stainless steel, high strength alloys, hardened steel | | Guss/Cast iron 132° Hartmetall 20/30 STEEL-TEC beschichtet Für alle Gussarten Carbide 20/30 STEEL-TEC coated For all kinds of cast iron | | 132° Hartmetall 20/30 ALU-TEC beschichtet Für Alu, Messing, Kupfer Carbide 20/30 ALU-TEC coated For alu, brass, copper | | 132° Hartmetall 20/30 DIA-TEC beschichtet Für abrasive Materialien wie: GFK, CFK, Graphit Carbide 20/30 DIA-TEC coated For abrasive materials such as: fiberglass, carbon fiber, graphite | |
| • 36,00 | 1.4173 | 22 2010 0360 | 57,75 | - | - | 22 3010 0360 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 37,00 | 1.4567 | 22 2010 0370 | 57,75 | - | - | 22 3010 0370 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 38,00 | 1.4961 | 22 2010 0380 | 57,75 | - | - | 22 3010 0380 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 39,00 | 1.5354 | 22 2010 0390 | 57,75 | - | - | 22 3010 0390 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 40,00 | 1.5748 | 22 2010 0400 | 57,75 | - | - | 22 3010 0400 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 41,00 | 1.6142 | 22 2010 0410 | 57,75 | - | - | 22 3010 0410 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 42,00 | 1.6535 | 22 2010 0420 | 57,75 | - | - | 22 3010 0420 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 43,00 | 1.6929 | 22 2010 0430 | 57,75 | - | - | 22 3010 0430 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 44,00 | 1.7323 | 22 2010 0440 | 57,75 | - | - | 22 3010 0440 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 45,00 | 1.7717 | 22 2010 0450 | 57,75 | - | - | 22 3010 0450 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 46,00 | 1.8110 | 22 2010 0460 | 57,75 | - | - | 22 3010 0460 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 47,00 | 1.8504 | 22 2010 0470 | 57,75 | - | - | 22 3010 0470 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 48,00 | 1.8898 | 22 2010 0480 | 82,65 | - | - | 22 3010 0480 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 49,00 | 1.9291 | 22 2010 0490 | 82,65 | - | - | 22 3010 0490 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 50,00 | 1.9685 | 22 2010 0500 | 82,65 | - | - | 22 3010 0500 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 51,00 | 2.0079 | 22 2010 0510 | 82,65 | - | - | 22 3010 0510 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 52,00 | 2.0472 | 22 2010 0520 | 82,65 | - | - | 22 3010 0520 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 53,00 | 2.0866 | 22 2010 0530 | 82,65 | - | - | 22 3010 0530 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 54,00 | 2.1260 | 22 2010 0540 | 82,65 | - | - | 22 3010 0540 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 55,00 | 2.1654 | 22 2010 0550 | 82,65 | - | - | 22 3010 0550 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 56,00 | 2.2047 | 22 2010 0560 | 82,65 | - | - | 22 3010 0560 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 57,00 | 2.2441 | 22 2010 0570 | 82,65 | - | - | 22 3010 0570 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 58,00 | 2.2835 | 22 2010 0580 | 82,65 | - | - | 22 3010 0580 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 59,00 | 2.3228 | 22 2010 0590 | 82,65 | - | - | 22 3010 0590 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 60,00 | 2.3622 | 22 2010 0600 | 82,65 | - | - | 22 3010 0600 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 61,00 | 2.4016 | 22 2010 0610 | 82,65 | - | - | 22 3010 0610 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 62,00 | 2.4409 | 22 2010 0620 | 82,65 | - | - | 22 3010 0620 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 63,00 | 2.4803 | 22 2010 0630 | 82,65 | - | - | 22 3010 0630 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 64,00 | 2.5197 | 22 2010 0640 | 82,65 | - | - | 22 3010 0640 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 65,00 | 2.5591 | 22 2010 0650 | 82,65 | - | - | 22 3010 0650 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |

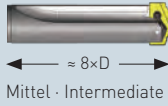
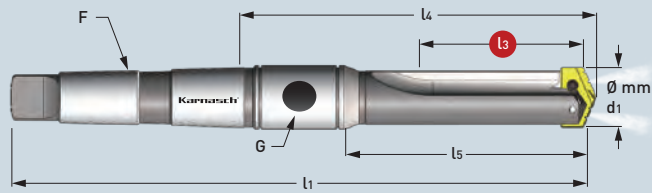
Fortsetzung Seite 344 · Continued page 344

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



MK 2,3,4,5 – Radiale Kühlung
mit Kühlmittelring
MT 2,3,4,5 – Radial coolant
with oil ring

Morsekegel
ISO 296 Typ BEK ·
Morse taper shank
ISO 296 type BEK



Mittel · Intermediate

| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | F | G | Art. | € |
|--|--------|----------------------|----------------------|----------------------|----------------------|---|------|---|---|
| | | | | | | | | | |
| | | | | | | | | | |
| <ul style="list-style-type: none"> 22 1040 03493 0360 Ø 36,0-47,0 mm 1.4173-1.8504" MÖGLICH · POSSIBLE Ø 36,0-41,0 mm 1.4173-1.6142" OPTIMAL · OPTIMAL 22 1040 03493 0420 Ø 42,0-47,0 mm 1.6535-1.8504" OPTIMAL · OPTIMAL | 437,00 | | | | | | | <ul style="list-style-type: none"> • 22 9002 03175 32,20 | |
| | 437,00 | 349,3 mm 13.7520" | 381,0 mm 15.0000" | 435,0 mm 17.1260" | 547,7 mm 21.5630" | 4 | 1/4" | | |
| <ul style="list-style-type: none"> 22 1040 04223 0480 Ø 48,0-65,0 mm 1.8898-2.5591" MÖGLICH · POSSIBLE Ø 48,0-55,0 mm 1.8898-2.1654" OPTIMAL · OPTIMAL | 559,70 | 422,3 mm 16.6260" | 457,2 mm 18.0000" | 511,2 mm 20.1260" | 655,6 mm 25.8110" | 5 | 1/4" | <ul style="list-style-type: none"> • 22 9002 04445 42,30 | |
| <ul style="list-style-type: none"> 22 1040 04223 0560 Ø 56,0-65,0 mm 2.2047-2.5591" OPTIMAL · OPTIMAL | 559,70 | 422,3 mm 16.6260" | 457,2 mm 18.0000" | 511,2 mm 20.1260" | 655,6 mm 25.8110" | 5 | 1/4" | | |

Fortsetzung Seite 345 · Continued page 345

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



Bei Morsekonus 2+3 ist eine axiale Kühlung ohne Kühlmittelring möglich.
Hierzu muss das Gewinde des Kühlmittelringes (G) mit einer Schraube geschlossen werden.

With morse cone 2+3, axial cooling without coolant ring is possible.
For this, the thread of the coolant ring (G) must be closed with a screw.

Schraube für MK 2 / Screw for MT 2 = RC 1/16" **22 1030 0231 802** € 0,30

Schraube für MK 3 / Screw for MT 3 = RC 1/8" **22 1030 0231 803** € 0,30

Schnittdaten
Cutting data



Film
Movie



1302-1311

343



Index



PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

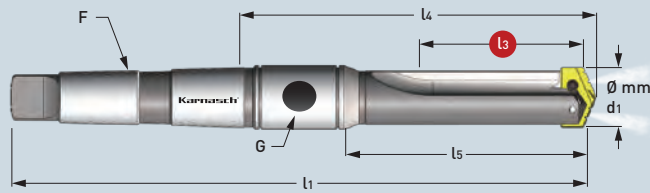
| Ø mm d1 | Ø Zoll / Inch d1 | 22 2010 | | 22 2510 | | 22 3010 | | 22 3510 | | 22 4010 | | 22 4510 | | 22 5010 | | 22 5510 | |
|------------|------------------------|---------|---|--------------|--------|---------|---|--------------|--------|---------|---|---------|---|---------|---|---------|---|
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| • 64,00 | 2.5197 | - | - | 22 2510 0640 | 103,90 | - | - | 22 3510 0640 | 97,15 | - | - | - | - | - | - | - | - |
| • 66,00 | 2.5984 | - | - | 22 2510 0660 | 103,90 | - | - | 22 3510 0660 | 97,15 | - | - | - | - | - | - | - | - |
| • 68,00 | 2.6772 | - | - | 22 2510 0680 | 103,90 | - | - | 22 3510 0680 | 97,15 | - | - | - | - | - | - | - | - |
| • 70,00 | 2.7559 | - | - | 22 2510 0700 | 103,90 | - | - | 22 3510 0700 | 97,15 | - | - | - | - | - | - | - | - |
| • 72,00 | 2.8346 | - | - | 22 2510 0720 | 103,90 | - | - | 22 3510 0720 | 97,15 | - | - | - | - | - | - | - | - |
| • 74,00 | 2.9134 | - | - | 22 2510 0740 | 103,90 | - | - | 22 3510 0740 | 97,15 | - | - | - | - | - | - | - | - |
| • 76,00 | 2.9921 | - | - | 22 2510 0760 | 103,90 | - | - | 22 3510 0760 | 97,15 | - | - | - | - | - | - | - | - |
| • 78,00 | 3.0709 | - | - | 22 2510 0780 | 114,75 | - | - | 22 3510 0780 | 108,00 | - | - | - | - | - | - | - | - |
| • 80,00 | 3.1496 | - | - | 22 2510 0800 | 114,75 | - | - | 22 3510 0800 | 108,00 | - | - | - | - | - | - | - | - |
| • 82,00 | 3.2283 | - | - | 22 2510 0820 | 114,75 | - | - | 22 3510 0820 | 108,00 | - | - | - | - | - | - | - | - |
| • 84,00 | 3.3071 | - | - | 22 2510 0840 | 114,75 | - | - | 22 3510 0840 | 108,00 | - | - | - | - | - | - | - | - |
| • 86,00 | 3.3858 | - | - | 22 2510 0860 | 114,75 | - | - | 22 3510 0860 | 108,00 | - | - | - | - | - | - | - | - |
| • 88,00 | 3.4646 | - | - | 22 2510 0880 | 114,75 | - | - | 22 3510 0880 | 108,00 | - | - | - | - | - | - | - | - |
| • 90,00 | 3.5433 | - | - | 22 2510 0900 | 134,70 | - | - | 22 3510 0900 | 127,85 | - | - | - | - | - | - | - | - |
| • 92,00 | 3.6220 | - | - | 22 2510 0920 | 134,70 | - | - | 22 3510 0920 | 127,85 | - | - | - | - | - | - | - | - |
| • 94,00 | 3.7008 | - | - | 22 2510 0940 | 134,70 | - | - | 22 3510 0940 | 127,85 | - | - | - | - | - | - | - | - |
| • 96,00 | 3.7795 | - | - | 22 2510 0960 | 134,70 | - | - | 22 3510 0960 | 127,85 | - | - | - | - | - | - | - | - |
| • 98,00 | 3.8583 | - | - | 22 2510 0980 | 134,70 | - | - | 22 3510 0980 | 127,85 | - | - | - | - | - | - | - | - |
| • 100,00 | 3.9370 | - | - | 22 2510 1000 | 134,70 | - | - | 22 3510 1000 | 127,85 | - | - | - | - | - | - | - | - |
| • 102,00 | 4.0157 | - | - | 22 2510 1020 | 153,50 | - | - | 22 3510 1020 | 146,65 | - | - | - | - | - | - | - | - |
| • 104,00 | 4.0945 | - | - | 22 2510 1040 | 153,50 | - | - | 22 3510 1040 | 146,65 | - | - | - | - | - | - | - | - |
| • 106,00 | 4.1732 | - | - | 22 2510 1060 | 153,50 | - | - | 22 3510 1060 | 146,65 | - | - | - | - | - | - | - | - |
| • 108,00 | 4.2520 | - | - | 22 2510 1080 | 153,50 | - | - | 22 3510 1080 | 146,65 | - | - | - | - | - | - | - | - |
| • 110,00 | 4.3307 | - | - | 22 2510 1100 | 153,50 | - | - | 22 3510 1100 | 146,65 | - | - | - | - | - | - | - | - |
| • 112,00 | 4.4094 | - | - | 22 2510 1120 | 153,50 | - | - | 22 3510 1120 | 146,65 | - | - | - | - | - | - | - | - |
| • 114,00 | 4.4882 | - | - | 22 2510 1140 | 153,50 | - | - | 22 3510 1140 | 146,65 | - | - | - | - | - | - | - | - |

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



MK 2,3,4,5 – Radiale Kühlung
mit Kühlmittelring
MT 2,3,4,5 – Radial coolant
with oil ring

Morsekegel
ISO 296 Typ BEK ·
Morse taper shank
ISO 296 type BEK



Mittel · Intermediate
~ 8xD

Gerade genutet ·
Straight flute

| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | | | Art. | € |
|-----------------------------------|--------|----------------------|----------------------|----------------------|----------------------|---|------|-----------------|-------|
| • 22 1040 04636 0640 | 614,80 | | | | | | | • 22 9002 05715 | 58,25 |
| Ø 64,0-88,0 mm 2.5197-3.4646" | | | | | | | | | |
| Ø 64,0-76,0 mm 2.5197-2.9921" | | | | | | | | | |
| • 22 1040 04636 0780 | 614,80 | 463,6 mm 18.2520" | 508,0 mm 20.0000" | 579,4 mm 22.8110" | 722,3 mm 28.4370" | 5 | 1/2" | | |
| Ø 78,0-88,0 mm 3.0709-3.4646" | | | | | | | | | |
| • 22 1040 05556 0900 | 882,95 | | | | | | | | |
| Ø 90,0-114,0 mm 3.5433-4.4882" | | | | | | | | | |
| Ø 90,0-100,0 mm 3.5433-3.9370" | | | | | | | | | |
| • 22 1040 05556 1020 | 882,95 | 555,6 mm 21.8740" | 609,6 mm 24.0000" | 681,1 mm 26.8150" | 823,9 mm 32.4370" | 5 | 1/2" | | |
| Ø 102,0-114,0 mm 4.0157-4.4882" | | | | | | | | | |

Halter werden **ohne** Einsätze, inklusive 2x TORX Befestigungsschrauben und 1x TORX Schlüssel geliefert.
Holders are delivered **without** inserts including 2x TORX-screws and 1x TORX wrench.

Für Maschinen ohne axiale/radiale Kühlmittelzufuhr kann ein Kühlmittelring auf den Halter montiert werden. Details siehe Seite 356
For machines without radial/axial coolant supply a oil ring can be mounted on the holder. Details see page 356



Ersatz-Torxschrauben und Schlüssel mit Drehmomentangabe
Spare Torx-screws and wrench with torque specification

| Ø Diameter | | TORX | max. Drehmoment / Torque (N/cm) | Schlüssel / Wrench |
|------------|---------------|--------------|---------------------------------|--------------------|
| mm | Zoll / Inch | | € | |
| 9,5-11,0 | 0.3740-0.4331 | 22 9010 0095 | 3,50 | 22 9011 0084 |
| 11,5-12,5 | 0.4528-0.4921 | 22 9010 0115 | 3,50 | 22 9011 0175 |
| 13,0-17,5 | 0.5118-0.6890 | 22 9010 0130 | 3,50 | 22 9011 0305 |
| 18,0-24,0 | 0.7087-0.9449 | 22 9010 0180 | 3,50 | 22 9011 0690 |
| 25,0-35,0 | 0.9843-1.3780 | 22 9010 0250 | 3,60 | 22 9011 1370 |
| 36,0-65,0 | 1.4173-2.5591 | 22 9010 0360 | 3,65 | 22 9011 1750 |
| 64,0-114,0 | 2.5197-4.4882 | 22 9010 0640 | 3,70 | |

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



Schraube für MK 2 / Screw for MT 2 = RC 1/16"

22 1030 0231 802 € 0,30

Schraube für MK 3 / Screw for MT 3 = RC 1/8"

22 1030 0231 803 € 0,30

Bei Morsekonus 2+3 ist eine axiale Kühlung ohne Kühlmittelring möglich.
Hierzu muss das Gewinde des Kühlmittelringes (G) mit einer Schraube geschlossen werden.

With morse cone 2+3, axial cooling without coolant ring is possible.
For this, the thread of the coolant ring (G) must be closed with a screw.

Schnittdaten
Cutting data



Film
Movie



1302-1311

345



Index



| PULVERSTAHL · POWDER STEEL | | | | | | | | | | HARTMETALL · CARBIDE | | | | | | | | | |
|----------------------------|--------|------------------------|-------|--|---|--|-------|---|---|--|---|---|---|--|---|---|---|--|---|
| Ø mm d1 | | Ø Zoll / Inch d1 | | 22 2010 | | 22 2510 | | 22 3010 | | 22 3510 | | 22 4010 | | 22 4510 | | 22 5010 | | 22 5510 | |
| | | | | Pulverstahl 25 STEEL-TEC beschichtet Für Edelstahl, Stahl, Guss Powder steel 25 STEEL-TEC coated For stainless steel, steel, cast iron | | Pulverstahl 15 STEEL-TEC beschichtet Für legierte Stähle, Edelstahl, Stahl, Guss Powder steel 15 STEEL-TEC coated For alloy steel, stainless steel, steel, cast iron | | Pulverstahl 25 ALU-TEC beschichtet Für Alu, Messing, Kupfer Powder steel 25 ALU-TEC coated For alu, brass, copper | | Pulverstahl 15 ALU-TEC beschichtet Für Alu, Messing, Kupfer Powder steel 15 ALU-TEC coated For alloy steel, steel, cast iron | | Hartmetall 20/30 STEEL-TEC beschichtet Für Edelstahl, hochfester Stahl, gehärteter Stahl Carbide 20/30 STEEL-TEC coated For stainless steel, high strength alloys, hardened steel | | Guss/Cast iron 132° Hartmetall 20/30 STEEL-TEC beschichtet Für alle Gussarten Carbide 20/30 STEEL-TEC coated For all kinds of cast iron | | 132° Hartmetall 20/30 ALU-TEC beschichtet Für Alu, Messing, Kupfer Carbide 20/30 ALU-TEC coated For alu, brass, copper | | 132° Hartmetall 20/30 DIA-TEC beschichtet Für abrasive Materialien wie: GFK, CFK, Graphit Carbide 20/30 DIA-TEC coated For abrasive materials such as: fiberglass, carbon fiber, graphite | |
| Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| • 36,00 | 1.4173 | 22 2010 0360 | 57,75 | - | - | 22 3010 0360 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 37,00 | 1.4567 | 22 2010 0370 | 57,75 | - | - | 22 3010 0370 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 38,00 | 1.4961 | 22 2010 0380 | 57,75 | - | - | 22 3010 0380 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 39,00 | 1.5354 | 22 2010 0390 | 57,75 | - | - | 22 3010 0390 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 40,00 | 1.5748 | 22 2010 0400 | 57,75 | - | - | 22 3010 0400 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 41,00 | 1.6142 | 22 2010 0410 | 57,75 | - | - | 22 3010 0410 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 42,00 | 1.6535 | 22 2010 0420 | 57,75 | - | - | 22 3010 0420 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 43,00 | 1.6929 | 22 2010 0430 | 57,75 | - | - | 22 3010 0430 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 44,00 | 1.7323 | 22 2010 0440 | 57,75 | - | - | 22 3010 0440 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 45,00 | 1.7717 | 22 2010 0450 | 57,75 | - | - | 22 3010 0450 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 46,00 | 1.8110 | 22 2010 0460 | 57,75 | - | - | 22 3010 0460 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 47,00 | 1.8504 | 22 2010 0470 | 57,75 | - | - | 22 3010 0470 | 59,50 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 48,00 | 1.8898 | 22 2010 0480 | 82,65 | - | - | 22 3010 0480 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 49,00 | 1.9291 | 22 2010 0490 | 82,65 | - | - | 22 3010 0490 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 50,00 | 1.9685 | 22 2010 0500 | 82,65 | - | - | 22 3010 0500 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 51,00 | 2.0079 | 22 2010 0510 | 82,65 | - | - | 22 3010 0510 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 52,00 | 2.0472 | 22 2010 0520 | 82,65 | - | - | 22 3010 0520 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 53,00 | 2.0866 | 22 2010 0530 | 82,65 | - | - | 22 3010 0530 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 54,00 | 2.1260 | 22 2010 0540 | 82,65 | - | - | 22 3010 0540 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 55,00 | 2.1654 | 22 2010 0550 | 82,65 | - | - | 22 3010 0550 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 56,00 | 2.2047 | 22 2010 0560 | 82,65 | - | - | 22 3010 0560 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 57,00 | 2.2441 | 22 2010 0570 | 82,65 | - | - | 22 3010 0570 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 58,00 | 2.2835 | 22 2010 0580 | 82,65 | - | - | 22 3010 0580 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 59,00 | 2.3228 | 22 2010 0590 | 82,65 | - | - | 22 3010 0590 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 60,00 | 2.3622 | 22 2010 0600 | 82,65 | - | - | 22 3010 0600 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 61,00 | 2.4016 | 22 2010 0610 | 82,65 | - | - | 22 3010 0610 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 62,00 | 2.4409 | 22 2010 0620 | 82,65 | - | - | 22 3010 0620 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 63,00 | 2.4803 | 22 2010 0630 | 82,65 | - | - | 22 3010 0630 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 64,00 | 2.5197 | 22 2010 0640 | 82,65 | - | - | 22 3010 0640 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |
| • 65,00 | 2.5591 | 22 2010 0650 | 82,65 | - | - | 22 3010 0650 | 82,65 | - | - | - | - | - | - | - | - | - | - | - | - |

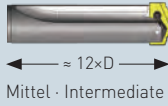
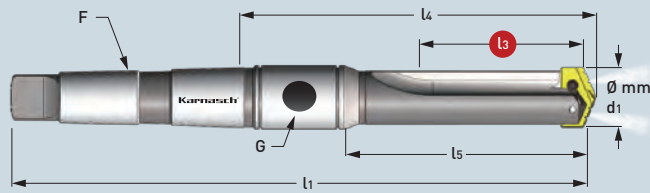
Fortsetzung Seite 348 · Continued page 348

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



Morsekegel
ISO 296 Typ BEK
Morse taper shank
ISO 296 type BEK

MK 2,3,4,5 – Radiale Kühlung
mit Kühlmittelring
MT 2,3,4,5 – Radial coolant
with oil ring



| l3 | l5 | l4 | l1 | F | G | |
|-------------------------------|----------------------------|------------------------------------|-------------------------------|---------------------------|---------------------|----------------------------|
| Nutzlänge Max. drill depth | Körperlänge Body-length | Neue REF.- Länge REF.-length | Gesamtlänge Overall length | Morsekegel Morse taper | Gewinde Pipe tap | Kühlmittelring Oil ring |

| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | | | Art. | € |
|--|--------|---|----------------------|----------------------|----------------------|---|------|-----------------|-------|
| • 22 1040 05558 0360 | 613,75 | | | | | | | • 22 9002 03175 | 32,20 |
| Ø 36,0-47,0 mm 1.4173-1.8504" Ø 36,0-41,0 mm 1.4173-1.6142" | | | | | | | | | |
| | | MÖGLICH · POSSIBLE OPTIMAL · OPTIMAL | | | | | | | |
| • 22 1040 05558 0420 | 613,75 | 558,8 mm 22.0000" | 590,6 mm 23.2520" | 644,6 mm 25.3780" | 757,2 mm 29.8110" | 4 | 1/4" | | |
| Ø 42,0-47,0 mm 1.6535-1.8504" | | | | | | | | | |
| | | OPTIMAL · OPTIMAL | | | | | | | |
| • 22 1040 06250 0480 | 756,15 | 625,0 mm 24.6063" | 660,4 mm 26.0000" | 714,4 mm 28.1260" | 858,8 mm 33.8110" | 5 | 1/4" | • 22 9002 04445 | 42,30 |
| Ø 48,0-65,0 mm 1.8898-2.5591" Ø 48,0-55,0 mm 1.8898-2.1654" | | | | | | | | | |
| | | MÖGLICH · POSSIBLE OPTIMAL · OPTIMAL | | | | | | | |
| • 22 1040 06250 0560 | 756,15 | 625,0 mm 24.6063" | 660,4 mm 26.0000" | 714,4 mm 28.1260" | 858,8 mm 33.8110" | 5 | 1/4" | | |
| Ø 56,0-65,0 mm 2.2047-2.5591" | | | | | | | | | |
| | | OPTIMAL · OPTIMAL | | | | | | | |

Fortsetzung Seite 349 · Continued page 349

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



Bei Morsekonus 2+3 ist eine axiale Kühlung ohne Kühlmittelring möglich.
Hierzu muss das Gewinde des Kühlmittelringes (G) mit einer Schraube geschlossen werden.

With morse cone 2+3, axial cooling without coolant ring is possible.
For this, the thread of the coolant ring (G) must be closed with a screw.

Schraube für MK 2 / Screw for MT 2 = RC 1/16" **22 1030 0231 802** € 0,30

Schraube für MK 3 / Screw for MT 3 = RC 1/8" **22 1030 0231 803** € 0,30

Schnittdaten
Cutting data



Film
Movie



1302-1311

347



Index

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

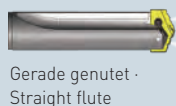
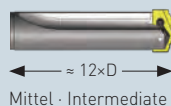
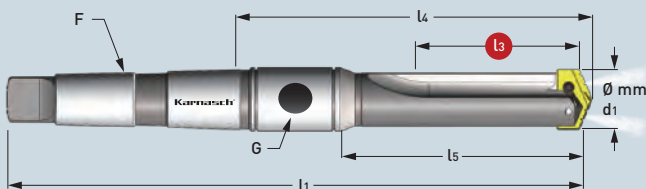
| Ø mm d1 | Ø Zoll / Inch d1 | 22 2010 | | 22 2510 | | 22 3010 | | 22 3510 | | 22 4010 | | 22 4510 | | 22 5010 | | 22 5510 | |
|------------|------------------------|---------|---|--------------|--------|---------|---|--------------|--------|---------|---|---------|---|---------|---|---------|---|
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| • 64,00 | 2.5197 | - | - | 22 2510 0640 | 103,90 | - | - | 22 3510 0640 | 97,15 | - | - | - | - | - | - | - | - |
| • 66,00 | 2.5984 | - | - | 22 2510 0660 | 103,90 | - | - | 22 3510 0660 | 97,15 | - | - | - | - | - | - | - | - |
| • 68,00 | 2.6772 | - | - | 22 2510 0680 | 103,90 | - | - | 22 3510 0680 | 97,15 | - | - | - | - | - | - | - | - |
| • 70,00 | 2.7559 | - | - | 22 2510 0700 | 103,90 | - | - | 22 3510 0700 | 97,15 | - | - | - | - | - | - | - | - |
| • 72,00 | 2.8346 | - | - | 22 2510 0720 | 103,90 | - | - | 22 3510 0720 | 97,15 | - | - | - | - | - | - | - | - |
| • 74,00 | 2.9134 | - | - | 22 2510 0740 | 103,90 | - | - | 22 3510 0740 | 97,15 | - | - | - | - | - | - | - | - |
| • 76,00 | 2.9921 | - | - | 22 2510 0760 | 103,90 | - | - | 22 3510 0760 | 97,15 | - | - | - | - | - | - | - | - |
| • 78,00 | 3.0709 | - | - | 22 2510 0780 | 114,75 | - | - | 22 3510 0780 | 108,00 | - | - | - | - | - | - | - | - |
| • 80,00 | 3.1496 | - | - | 22 2510 0800 | 114,75 | - | - | 22 3510 0800 | 108,00 | - | - | - | - | - | - | - | - |
| • 82,00 | 3.2283 | - | - | 22 2510 0820 | 114,75 | - | - | 22 3510 0820 | 108,00 | - | - | - | - | - | - | - | - |
| • 84,00 | 3.3071 | - | - | 22 2510 0840 | 114,75 | - | - | 22 3510 0840 | 108,00 | - | - | - | - | - | - | - | - |
| • 86,00 | 3.3858 | - | - | 22 2510 0860 | 114,75 | - | - | 22 3510 0860 | 108,00 | - | - | - | - | - | - | - | - |
| • 88,00 | 3.4646 | - | - | 22 2510 0880 | 114,75 | - | - | 22 3510 0880 | 108,00 | - | - | - | - | - | - | - | - |
| • 90,00 | 3.5433 | - | - | 22 2510 0900 | 134,70 | - | - | 22 3510 0900 | 127,85 | - | - | - | - | - | - | - | - |
| • 92,00 | 3.6220 | - | - | 22 2510 0920 | 134,70 | - | - | 22 3510 0920 | 127,85 | - | - | - | - | - | - | - | - |
| • 94,00 | 3.7008 | - | - | 22 2510 0940 | 134,70 | - | - | 22 3510 0940 | 127,85 | - | - | - | - | - | - | - | - |
| • 96,00 | 3.7795 | - | - | 22 2510 0960 | 134,70 | - | - | 22 3510 0960 | 127,85 | - | - | - | - | - | - | - | - |
| • 98,00 | 3.8583 | - | - | 22 2510 0980 | 134,70 | - | - | 22 3510 0980 | 127,85 | - | - | - | - | - | - | - | - |
| • 100,00 | 3.9370 | - | - | 22 2510 1000 | 134,70 | - | - | 22 3510 1000 | 127,85 | - | - | - | - | - | - | - | - |
| • 102,00 | 4.0157 | - | - | 22 2510 1020 | 153,50 | - | - | 22 3510 1020 | 146,65 | - | - | - | - | - | - | - | - |
| • 104,00 | 4.0945 | - | - | 22 2510 1040 | 153,50 | - | - | 22 3510 1040 | 146,65 | - | - | - | - | - | - | - | - |
| • 106,00 | 4.1732 | - | - | 22 2510 1060 | 153,50 | - | - | 22 3510 1060 | 146,65 | - | - | - | - | - | - | - | - |
| • 108,00 | 4.2520 | - | - | 22 2510 1080 | 153,50 | - | - | 22 3510 1080 | 146,65 | - | - | - | - | - | - | - | - |
| • 110,00 | 4.3307 | - | - | 22 2510 1100 | 153,50 | - | - | 22 3510 1100 | 146,65 | - | - | - | - | - | - | - | - |
| • 112,00 | 4.4094 | - | - | 22 2510 1120 | 153,50 | - | - | 22 3510 1120 | 146,65 | - | - | - | - | - | - | - | - |
| • 114,00 | 4.4882 | - | - | 22 2510 1140 | 153,50 | - | - | 22 3510 1140 | 146,65 | - | - | - | - | - | - | - | - |

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



MK 2,3,4,5 – Radiale Kühlung
mit Kühlmittelring
MT 2,3,4,5 – Radial coolant
with oil ring

Morsekegel
ISO 296 Typ BEK ·
Morse taper shank
ISO 296 type BEK



| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | | | Art. | € |
|-----------------------------------|----------|----------------------|----------------------|----------------------|----------------------|---|------|-----------------|-------|
| • 22 1040 06600 0640 | 799,40 | | | | | | | • 22 9002 05715 | 58,25 |
| Ø 64,0-88,0 mm 2.5197-3.4646" | | | | | | | | | |
| Ø 64,0-76,0 mm 2.5197-2.9921" | | | | | | | | | |
| • 22 1040 06600 0780 | 799,40 | 660,0 mm 25.9843" | 704,8 mm 27.7480" | 776,2 mm 30.5591" | 919,1 mm 36.1850" | 5 | 1/2" | | |
| Ø 78,0-88,0 mm 3.0709-3.4646" | | | | | | | | | |
| • 22 1040 06850 0900 | 1.101,00 | | | | | | | | |
| Ø 90,0-114,0 mm 3.5433-4.4882" | | | | | | | | | |
| Ø 90,0-100,0 mm 3.5433-3.9370" | | | | | | | | | |
| • 22 1040 06850 1020 | 1.101,00 | 685,0 mm 26.9685" | 739,7 mm 29.1220" | 811,2 mm 31.9370" | 954,0 mm 37.5591" | 5 | 1/2" | | |
| Ø 102,0-114,0 mm 4.0157-4.4882" | | | | | | | | | |

Halter werden **ohne** Einsätze, inklusive 2x TORX Befestigungsschrauben und 1x TORX Schlüssel geliefert.
Holders are delivered **without** inserts including 2x TORX-screws and 1x TORX wrench.

Für Maschinen ohne axiale/radiale Kühlmittelzufuhr kann ein Kühlmittelring auf den Halter montiert werden. Details siehe Seite 356
For machines without radial/axial coolant supply a oil ring can be mounted on the holder. Details see page 356



Ersatz-Torxschrauben und Schlüssel mit Drehmomentangabe
Spare Torx-screws and wrench with torque specification

| Ø Diameter | | TORX | max. Drehmoment / Torque (N/cm) | Schlüssel / Wrench |
|------------|---------------|--------------|---------------------------------|--------------------|
| mm | Zoll / Inch | | € | |
| 9,5-11,0 | 0.3740-0.4331 | 22 9010 0095 | 3,50 | 22 9011 0084 |
| 11,5-12,5 | 0.4528-0.4921 | 22 9010 0115 | 3,50 | 22 9011 0175 |
| 13,0-17,5 | 0.5118-0.6890 | 22 9010 0130 | 3,50 | 22 9011 0305 |
| 18,0-24,0 | 0.7087-0.9449 | 22 9010 0180 | 3,50 | 22 9011 0690 |
| 25,0-35,0 | 0.9843-1.3780 | 22 9010 0250 | 3,60 | 22 9011 1370 |
| 36,0-65,0 | 1.4173-2.5591 | 22 9010 0360 | 3,65 | 22 9011 1750 |
| 64,0-114,0 | 2.5197-4.4882 | 22 9010 0640 | 3,70 | |

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



Schraube für MK 2 / Screw for MT 2 = RC 1/16"

22 1030 0231 802 € 0,30

Schraube für MK 3 / Screw for MT 3 = RC 1/8"

22 1030 0231 803 € 0,30

Bei Morsekonus 2+3 ist eine axiale Kühlung ohne Kühlmittelring möglich.
Hierzu muss das Gewinde des Kühlmittelringes (G) mit einer Schraube geschlossen werden.
With morse cone 2+3, axial cooling without coolant ring is possible.
For this, the thread of the coolant ring (G) must be closed with a screw.

Schnittdaten
Cutting data



1302-1311

Film
Movie



349





PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

| Ø mm d1 | Ø Zoll / Inch d1 | 132° | | 144° | | 132° | | 144° | | 132° | | Guss/Cast iron 132° | | 132° | | 132° | |
|------------|------------------------|--------------|-------|------|---|--------------|-------|------|---|------|---|------------------------|---|------|---|------|---|
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| • 36,00 | 1.4173 | 22 2010 0360 | 57,75 | - | - | 22 3010 0360 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 37,00 | 1.4567 | 22 2010 0370 | 57,75 | - | - | 22 3010 0370 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 38,00 | 1.4961 | 22 2010 0380 | 57,75 | - | - | 22 3010 0380 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 39,00 | 1.5354 | 22 2010 0390 | 57,75 | - | - | 22 3010 0390 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 40,00 | 1.5748 | 22 2010 0400 | 57,75 | - | - | 22 3010 0400 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 41,00 | 1.6142 | 22 2010 0410 | 57,75 | - | - | 22 3010 0410 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 42,00 | 1.6535 | 22 2010 0420 | 57,75 | - | - | 22 3010 0420 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 43,00 | 1.6929 | 22 2010 0430 | 57,75 | - | - | 22 3010 0430 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 44,00 | 1.7323 | 22 2010 0440 | 57,75 | - | - | 22 3010 0440 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 45,00 | 1.7717 | 22 2010 0450 | 57,75 | - | - | 22 3010 0450 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 46,00 | 1.8110 | 22 2010 0460 | 57,75 | - | - | 22 3010 0460 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 47,00 | 1.8504 | 22 2010 0470 | 57,75 | - | - | 22 3010 0470 | 59,50 | - | - | - | - | - | - | - | - | - | - |
| • 48,00 | 1.8898 | 22 2010 0480 | 82,65 | - | - | 22 3010 0480 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 49,00 | 1.9291 | 22 2010 0490 | 82,65 | - | - | 22 3010 0490 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 50,00 | 1.9685 | 22 2010 0500 | 82,65 | - | - | 22 3010 0500 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 51,00 | 2.0079 | 22 2010 0510 | 82,65 | - | - | 22 3010 0510 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 52,00 | 2.0472 | 22 2010 0520 | 82,65 | - | - | 22 3010 0520 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 53,00 | 2.0866 | 22 2010 0530 | 82,65 | - | - | 22 3010 0530 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 54,00 | 2.1260 | 22 2010 0540 | 82,65 | - | - | 22 3010 0540 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 55,00 | 2.1654 | 22 2010 0550 | 82,65 | - | - | 22 3010 0550 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 56,00 | 2.2047 | 22 2010 0560 | 82,65 | - | - | 22 3010 0560 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 57,00 | 2.2441 | 22 2010 0570 | 82,65 | - | - | 22 3010 0570 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 58,00 | 2.2835 | 22 2010 0580 | 82,65 | - | - | 22 3010 0580 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 59,00 | 2.3228 | 22 2010 0590 | 82,65 | - | - | 22 3010 0590 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 60,00 | 2.3622 | 22 2010 0600 | 82,65 | - | - | 22 3010 0600 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 61,00 | 2.4016 | 22 2010 0610 | 82,65 | - | - | 22 3010 0610 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 62,00 | 2.4409 | 22 2010 0620 | 82,65 | - | - | 22 3010 0620 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 63,00 | 2.4803 | 22 2010 0630 | 82,65 | - | - | 22 3010 0630 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 64,00 | 2.5197 | 22 2010 0640 | 82,65 | - | - | 22 3010 0640 | 82,65 | - | - | - | - | - | - | - | - | - | - |
| • 65,00 | 2.5591 | 22 2010 0650 | 82,65 | - | - | 22 3010 0650 | 82,65 | - | - | - | - | - | - | - | - | - | - |

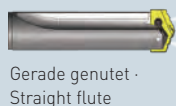
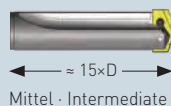
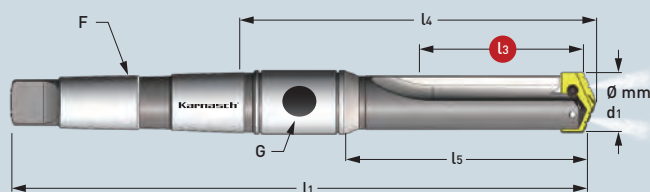
Fortsetzung Seite 352 · Continued page 352

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



MK 2,3,4,5 – Radiale Kühlung
mit Kühlmittelring
MT 2,3,4,5 – Radial coolant
with oil ring

Morsekegel
ISO 296 Typ BEK ·
Morse taper shank
ISO 296 type BEK



~ 15xD

Gerade genutet ·
Straight flute

Mittel · Intermediate

| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | | | Art. | € |
|---|--------|----------------------|----------------------|----------------------|-----------------------|---|------|-----------------|-------|
| • 22 1040 07874 0360 | 797,85 | | | | | | | • 22 9002 03175 | 32,20 |
| Ø 36,0-47,0 mm 1.4173-1.8504" MÖGLICH · POSSIBLE Ø 36,0-41,0 mm 1.4173-1.6142" OPTIMAL · OPTIMAL | | | | | | | | | |
| • 22 1040 07874 0420 | 797,85 | 787,4 mm 31.0000" | 819,2 mm 32.2520" | 873,2 mm 34.3780" | 985,8 mm 38.8110" | 4 | 1/4" | | |
| Ø 42,0-47,0 mm 1.6535-1.8504" OPTIMAL · OPTIMAL | | | | | | | | | |
| • 22 1040 08790 0480 | 945,35 | 879,0 mm 34.6063" | 914,4 mm 36.0000" | 968,4 mm 38.1260" | 1112,8 mm 43.8110" | 5 | 1/4" | • 22 9002 04445 | 42,30 |
| Ø 48,0-65,0 mm 1.8898-2.5591" MÖGLICH · POSSIBLE Ø 48,0-55,0 mm 1.8898-2.1654" OPTIMAL · OPTIMAL | | | | | | | | | |
| • 22 1040 08790 0560 | 945,35 | 879,0 mm 34.6063" | 914,4 mm 36.0000" | 968,4 mm 38.1260" | 1112,8 mm 43.8110" | 5 | 1/4" | | |
| Ø 56,0-65,0 mm 2.2047-2.5591" OPTIMAL · OPTIMAL | | | | | | | | | |

Fortsetzung Seite 353 · Continued page 353

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



Bei Morsekonus 2+3 ist eine axiale Kühlung ohne Kühlmittelring möglich.
Hierzu muss das Gewinde des Kühlmittelringes (G) mit einer Schraube geschlossen werden.

With morse cone 2+3, axial cooling without coolant ring is possible.
For this, the thread of the coolant ring (G) must be closed with a screw.

Schraube für MK 2 / Screw for MT 2 = RC 1/16" **22 1030 0231 802** € 0,30

Schraube für MK 3 / Screw for MT 3 = RC 1/8" **22 1030 0231 803** € 0,30

Schnittdaten
Cutting data



Film
Movie



1302-1311

351

351



Index

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

PULVERSTAHL · POWDER STEEL

HARTMETALL · CARBIDE

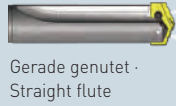
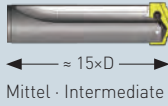
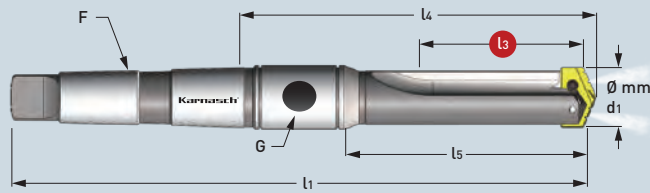
| Ø mm d1 | Ø Zoll / Inch d1 | 22 2010 | | 22 2510 | | 22 3010 | | 22 3510 | | 22 4010 | | 22 4510 | | 22 5010 | | 22 5510 | |
|------------|------------------------|---------|---|--------------|--------|---------|---|--------------|--------|---------|---|---------|---|---------|---|---------|---|
| | | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € | Art. | € |
| • 64,00 | 2.5197 | - | - | 22 2510 0640 | 103,90 | - | - | 22 3510 0640 | 97,15 | - | - | - | - | - | - | - | - |
| • 66,00 | 2.5984 | - | - | 22 2510 0660 | 103,90 | - | - | 22 3510 0660 | 97,15 | - | - | - | - | - | - | - | - |
| • 68,00 | 2.6772 | - | - | 22 2510 0680 | 103,90 | - | - | 22 3510 0680 | 97,15 | - | - | - | - | - | - | - | - |
| • 70,00 | 2.7559 | - | - | 22 2510 0700 | 103,90 | - | - | 22 3510 0700 | 97,15 | - | - | - | - | - | - | - | - |
| • 72,00 | 2.8346 | - | - | 22 2510 0720 | 103,90 | - | - | 22 3510 0720 | 97,15 | - | - | - | - | - | - | - | - |
| • 74,00 | 2.9134 | - | - | 22 2510 0740 | 103,90 | - | - | 22 3510 0740 | 97,15 | - | - | - | - | - | - | - | - |
| • 76,00 | 2.9921 | - | - | 22 2510 0760 | 103,90 | - | - | 22 3510 0760 | 97,15 | - | - | - | - | - | - | - | - |
| • 78,00 | 3.0709 | - | - | 22 2510 0780 | 114,75 | - | - | 22 3510 0780 | 108,00 | - | - | - | - | - | - | - | - |
| • 80,00 | 3.1496 | - | - | 22 2510 0800 | 114,75 | - | - | 22 3510 0800 | 108,00 | - | - | - | - | - | - | - | - |
| • 82,00 | 3.2283 | - | - | 22 2510 0820 | 114,75 | - | - | 22 3510 0820 | 108,00 | - | - | - | - | - | - | - | - |
| • 84,00 | 3.3071 | - | - | 22 2510 0840 | 114,75 | - | - | 22 3510 0840 | 108,00 | - | - | - | - | - | - | - | - |
| • 86,00 | 3.3858 | - | - | 22 2510 0860 | 114,75 | - | - | 22 3510 0860 | 108,00 | - | - | - | - | - | - | - | - |
| • 88,00 | 3.4646 | - | - | 22 2510 0880 | 114,75 | - | - | 22 3510 0880 | 108,00 | - | - | - | - | - | - | - | - |
| • 90,00 | 3.5433 | - | - | 22 2510 0900 | 134,70 | - | - | 22 3510 0900 | 127,85 | - | - | - | - | - | - | - | - |
| • 92,00 | 3.6220 | - | - | 22 2510 0920 | 134,70 | - | - | 22 3510 0920 | 127,85 | - | - | - | - | - | - | - | - |
| • 94,00 | 3.7008 | - | - | 22 2510 0940 | 134,70 | - | - | 22 3510 0940 | 127,85 | - | - | - | - | - | - | - | - |
| • 96,00 | 3.7795 | - | - | 22 2510 0960 | 134,70 | - | - | 22 3510 0960 | 127,85 | - | - | - | - | - | - | - | - |
| • 98,00 | 3.8583 | - | - | 22 2510 0980 | 134,70 | - | - | 22 3510 0980 | 127,85 | - | - | - | - | - | - | - | - |
| • 100,00 | 3.9370 | - | - | 22 2510 1000 | 134,70 | - | - | 22 3510 1000 | 127,85 | - | - | - | - | - | - | - | - |
| • 102,00 | 4.0157 | - | - | 22 2510 1020 | 153,50 | - | - | 22 3510 1020 | 146,65 | - | - | - | - | - | - | - | - |
| • 104,00 | 4.0945 | - | - | 22 2510 1040 | 153,50 | - | - | 22 3510 1040 | 146,65 | - | - | - | - | - | - | - | - |
| • 106,00 | 4.1732 | - | - | 22 2510 1060 | 153,50 | - | - | 22 3510 1060 | 146,65 | - | - | - | - | - | - | - | - |
| • 108,00 | 4.2520 | - | - | 22 2510 1080 | 153,50 | - | - | 22 3510 1080 | 146,65 | - | - | - | - | - | - | - | - |
| • 110,00 | 4.3307 | - | - | 22 2510 1100 | 153,50 | - | - | 22 3510 1100 | 146,65 | - | - | - | - | - | - | - | - |
| • 112,00 | 4.4094 | - | - | 22 2510 1120 | 153,50 | - | - | 22 3510 1120 | 146,65 | - | - | - | - | - | - | - | - |
| • 114,00 | 4.4882 | - | - | 22 2510 1140 | 153,50 | - | - | 22 3510 1140 | 146,65 | - | - | - | - | - | - | - | - |

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



MK 2,3,4,5 – Radiale Kühlung
mit Kühlmittelring
MT 2,3,4,5 – Radial coolant
with oil ring

Morsekegel
ISO 296 Typ BEK
Morse taper shank
ISO 296 type BEK



| Art. | € | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | mm Zoll / Inch | F | G | Art. | € |
|-----------------------------------|----------|----------------------|----------------------|-----------------------|-----------------------|---|------|-----------------|-------|
| • 22 1040 08890 0640 | 999,25 | | | | | | | • 22 9002 05715 | 58,25 |
| Ø 64,0-88,0 mm 2.5197-3.4646" | | | | | | | | | |
| Ø 64,0-76,0 mm 2.5197-2.9921" | | | | | | | | | |
| • 22 1040 08890 0780 | 999,25 | 889,0 mm 35.0000" | 933,4 mm 36.7480" | 1004,8 mm 39.5591" | 1147,7 mm 45.1850" | 5 | 1/2" | | |
| Ø 78,0-88,0 mm 3.0709-3.4646" | | | | | | | | | |
| • 22 1040 09390 0900 | 1.376,25 | | | | | | | | |
| Ø 90,0-114,0 mm 3.5433-4.4882" | | | | | | | | | |
| Ø 90,0-100,0 mm 3.5433-3.9370" | | | | | | | | | |
| • 22 1040 09390 1020 | 1.376,35 | 939,0 mm 36.9685" | 993,7 mm 39.1220" | 1065,2 mm 41.9370" | 1208,0 mm 47.5591" | 5 | 1/2" | | |
| Ø 102,0-114,0 mm 4.0157-4.4882" | | | | | | | | | |

Halter werden **ohne** Einsätze, inklusive 2x TORX Befestigungsschrauben und 1x TORX Schlüssel geliefert.
Holders are delivered **without** inserts including 2x TORX-screws and 1x TORX wrench.

Für Maschinen ohne axiale/radiale Kühlmittelzufuhr kann ein Kühlmittelring auf den Halter montiert werden. Details siehe Seite 356
For machines without radial/axial coolant supply a oil ring can be mounted on the holder. Details see page 356



Ersatz-Torxschrauben und Schlüssel mit Drehmomentangabe
Spare Torx-screws and wrench with torque specification

| Ø Diameter | | TORX | max. Drehmoment / Torque (N/cm) | Schlüssel / Wrench |
|------------|---------------|--------------|---------------------------------|--------------------|
| mm | Zoll / Inch | | € | |
| 9,5-11,0 | 0.3740-0.4331 | 22 9010 0095 | 3,50 | 22 9011 0084 |
| 11,5-12,5 | 0.4528-0.4921 | 22 9010 0115 | 3,50 | 22 9011 0175 |
| 13,0-17,5 | 0.5118-0.6890 | 22 9010 0130 | 3,50 | 22 9011 0305 |
| 18,0-24,0 | 0.7087-0.9449 | 22 9010 0180 | 3,50 | 22 9011 0690 |
| 25,0-35,0 | 0.9843-1.3780 | 22 9010 0250 | 3,60 | 22 9011 1370 |
| 36,0-65,0 | 1.4173-2.5591 | 22 9010 0360 | 3,65 | 22 9011 1750 |
| 64,0-114,0 | 2.5197-4.4882 | 22 9010 0640 | 3,70 | |

MK 2+3 mit axialer Kühlung
MT 2+3 with axial cooling



Schraube für MK 2 / Screw for MT 2 = RC 1/16"

22 1030 0231 802 € 0,30

Schraube für MK 3 / Screw for MT 3 = RC 1/8"

22 1030 0231 803 € 0,30

Bei Morsekonus 2+3 ist eine axiale Kühlung ohne Kühlmittelring möglich.
Hierzu muss das Gewinde des Kühlmittelringes (G) mit einer Schraube geschlossen werden.

With morse cone 2+3, axial cooling without coolant ring is possible.
For this, the thread of the coolant ring (G) must be closed with a screw.

Schnittdaten
Cutting data



Film
Movie

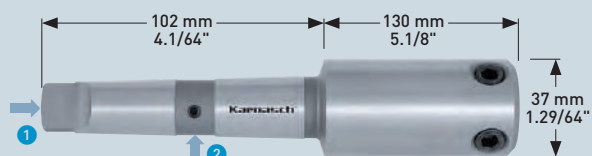


MORSEKONUS · MORSE TAPER
ISO 296 TYP BEK / TYPE BEK 3

21 0036

€ 51,85

20 1465



1
Kühlung axial
Cooling axial

2
Kühlung radial
Cooling radial



Weldon
19 mm
3/4"

EIGENSCHAFTEN · PROPERTIES

Morsekonus 3 Aufnahme mit obiger 1 und/oder seitlicher 2 Kühlmittelzufuhr.

Vorteile:

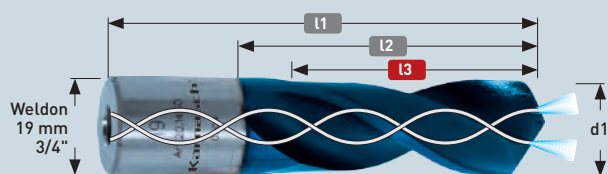
- Ein Morsekonus für alle Bohrer.
- Robust
- Preiswert

Morse taper 3 tool holder with top 1 and / or lateral 2 cooling supply.

Advantages:

- One morse taper for all drills.
- Robust
- Good value

20 1465



Weldon
19 mm
3/4"

| d1 Ø mm | d1 Ø Zoll/ Inch | Art. | Nutzlänge Max. drill depth L3 | | Spirallänge Spiral length L2 | | Gesamtlänge Overall length L1 | | € |
|------------|-----------------------|-------------|-------------------------------------|-----------|------------------------------------|-----------|-------------------------------------|-----------|--------|
| | | | mm | Zoll/Inch | mm | Zoll/Inch | mm | Zoll/Inch | |
| • 14 | 35/64 | 20 1465 014 | 50 | 1.31/32 | 67 | 2.41/64 | 90 | 3.35/64 | 80,85 |
| • 15 | 19/32 | 20 1465 015 | 50 | 1.31/32 | 67 | 2.41/64 | 90 | 3.35/64 | 80,85 |
| • 16 | 5/8 | 20 1465 016 | 50 | 1.31/32 | 67 | 2.41/64 | 90 | 3.35/64 | 83,85 |
| • 17 | 43/64 | 20 1465 017 | 55 | 2.11/64 | 67 | 2.41/64 | 90 | 3.35/64 | 83,85 |
| • 18 | 45/64 | 20 1465 018 | 55 | 2.11/64 | 67 | 2.41/64 | 90 | 3.35/64 | 83,85 |
| • 19 | 3/4 | 20 1465 019 | 55 | 2.11/64 | 67 | 2.41/64 | 90 | 3.35/64 | 83,85 |
| • 20 | 25/32 | 20 1465 020 | 55 | 2.11/64 | 67 | 2.41/64 | 90 | 3.35/64 | 90,25 |
| • 21 | 53/64 | 20 1465 021 | 55 | 2.11/64 | 67 | 2.41/64 | 90 | 3.35/64 | 90,25 |
| • 22 | 55/64 | 20 1465 022 | 55 | 2.11/64 | 67 | 2.41/64 | 90 | 3.35/64 | 97,35 |
| • 23 | 29/32 | 20 1465 023 | 55 | 2.11/64 | 67 | 2.41/64 | 90 | 3.35/64 | 98,15 |
| • 24 | 15/16 | 20 1465 024 | 55 | 2.11/64 | 67 | 2.41/64 | 90 | 3.35/64 | 109,30 |
| • 25 | 63/64 | 20 1465 025 | 55 | 2.11/64 | 67 | 2.41/64 | 90 | 3.35/64 | 109,30 |
| • 26 | 1.1/32 | 20 1465 026 | 55 | 2.11/64 | 67 | 2.41/64 | 90 | 3.35/64 | 123,80 |
| • 27 | 1.1/16 | 20 1465 027 | 55 | 2.11/64 | 67 | 2.41/64 | 90 | 3.35/64 | 123,80 |
| • 28 | 1.7/64 | 20 1465 028 | 55 | 2.11/64 | 67 | 2.41/64 | 90 | 3.35/64 | 143,50 |
| • 30 | 1.3/16 | 20 1465 030 | 55 | 2.11/64 | 67 | 2.41/64 | 90 | 3.35/64 | 159,35 |
| • 32 | 1.17/64 | 20 1465 032 | 55 | 2.11/64 | 67 | 2.41/64 | 90 | 3.35/64 | 172,05 |

EIGENSCHAFTEN · PROPERTIES

ASP-Pulverstahl Bohrer mit Innenkühlung + BLUE-TEC Beschichtung

Gefertigt aus pulvermetallurgischen Schnellarbeitsstahl für:

- Hohe Warmhärte
- Hohe Druckbelastbarkeit
- Hohe Verschleißfestigkeit

Mit BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

Zum Bohren in:

- Alle Sorten von Baustähle, Guss und Leichtmetallen.
- Edeltähle (V2A / V4A)
- Rost- und Säurebeständige Stähle
- Titan- und Titanlegierungen

Diese Bohrer sind bis zu 10-mal nachschleifbar und haben somit ein hervorragendes Preis-Leistungs-Verhältnis.

ASP-Powder steel twist drills with internal cooling supply + BLUE-TEC coating

Made of powder metallurgy high speed steel which results to:

- good thermal curing
- high pressure resistance
- high wear resistance

With BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/little cooling)

For drilling in:

- All kinds of structural steel, cast iron, non ferrous metals.
- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Titanium and titanium alloys

The drills can be resharpended up to 10 times and thus have an excellent cost - performance ratio.

Schnittdaten
Cutting data

Film
Movie



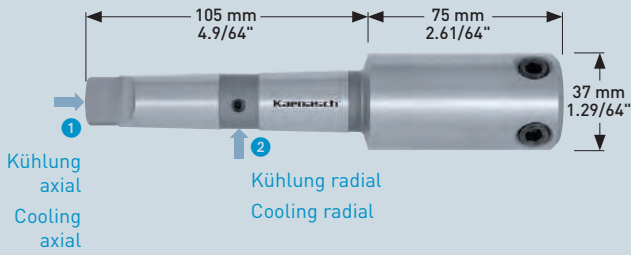
1296



MORSEKONUS · MORSE TAPER
ISO 296 TYP BEK / TYPE BEK

3

20 1400
€ 56,15



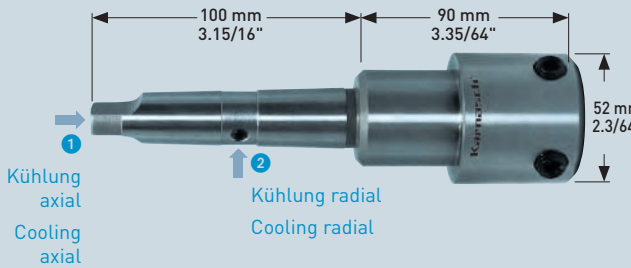
Wir empfehlen unsere Hartmetall-bestückten Kernbohrer HARD-LINE Ø 12-60 mm | 15/32-2.23/64" siehe Seite 366/368

We recommend our carbide-tipped annular cutters HARD-LINE Ø 12-60 mm | 15/32-2.23/64" see page 366/368

MORSEKONUS · MORSE TAPER
ISO 296 TYP BEK / TYPE BEK

3

20 1401
€ 59,15



Wir empfehlen unsere Hartmetall-bestückten Kernbohrer HARD-LINE Ø 61-150 mm | 2.13/32-5.29/32" siehe Seite 366/368

We recommend our carbide-tipped annular cutters HARD-LINE Ø 61-150 mm | 2.13/32-5.29/32" see page 366/368

Die Kombination Kernbohrer mit Säge-Bohranlagen ist nicht für die Serienproduktion gedacht, ist aber eine hervorragende Möglichkeit sehr preiswert große Bohrungen zu fertigen.

The combination saw-drilling machines with annular cutters is not intended for mass production, it represents an excellent way to produce very inexpensive large holes.



Schnittdaten
Cutting data



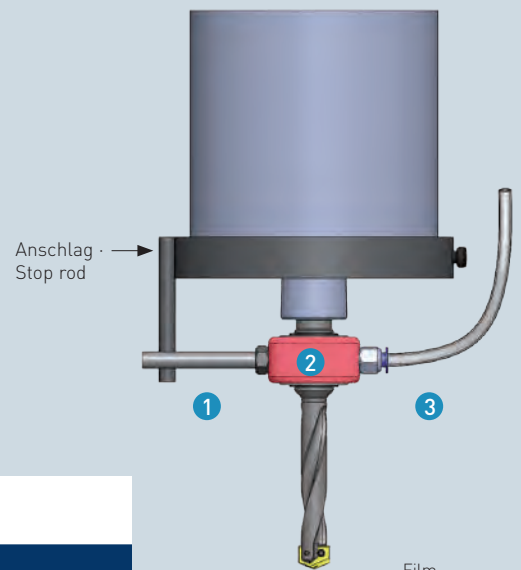
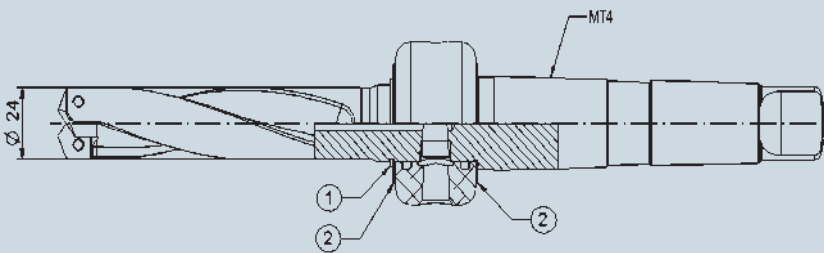
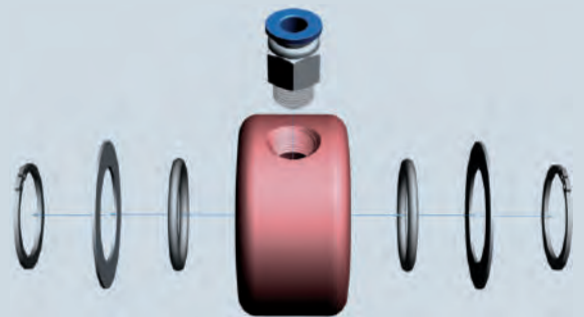
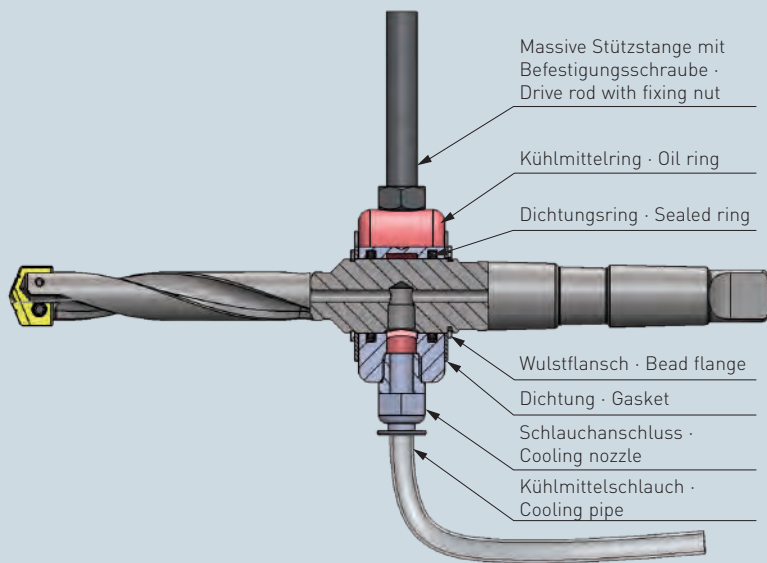
1295

Film
Movie



355

MONTAGE + ZUBEHÖR DES KÜHLMITTELRINGES • OIL RING ASSEMBLY AND ACCESSORIES



ACHTUNG: Bei 4 Stück Werkzeughalter gibt es einen Unterschied im Zusammenbau des Kühlmittelrings.
 ATTENTION: There here is a difference in the assembly of the coolant ring with 4 holders.

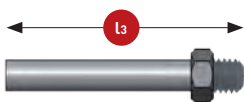
Anleitung Zusammenbau / Installation instructions

| Halter mit Artikelnummer / Corresponding holder article number | 1 Anzahl der Sicherungsringe 1 Stück / Number of retaining ring to be installed 1 piece | 2 Anzahl der Unterlegscheiben 2 Stück / Number of washer to be installed 2 pieces |
|---|---|---|
| 22 1030 01365 0250 | 1 | 2 |
| 22 1030 01873 0250 | 1 | 2 |
| 22 1030 02890 0250 | 1 | 2 |
| 22 1040 00857 0250 | 1 | 2 |

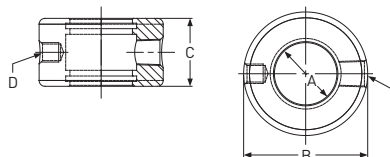
Film
Movie



1
Stützstange mit
Befestigungsschraube ·
Drive rod with fixing nut



2
Kühlmittelring · Oil ring



3
Kühlmittelschlauch ·
Cooling pipe

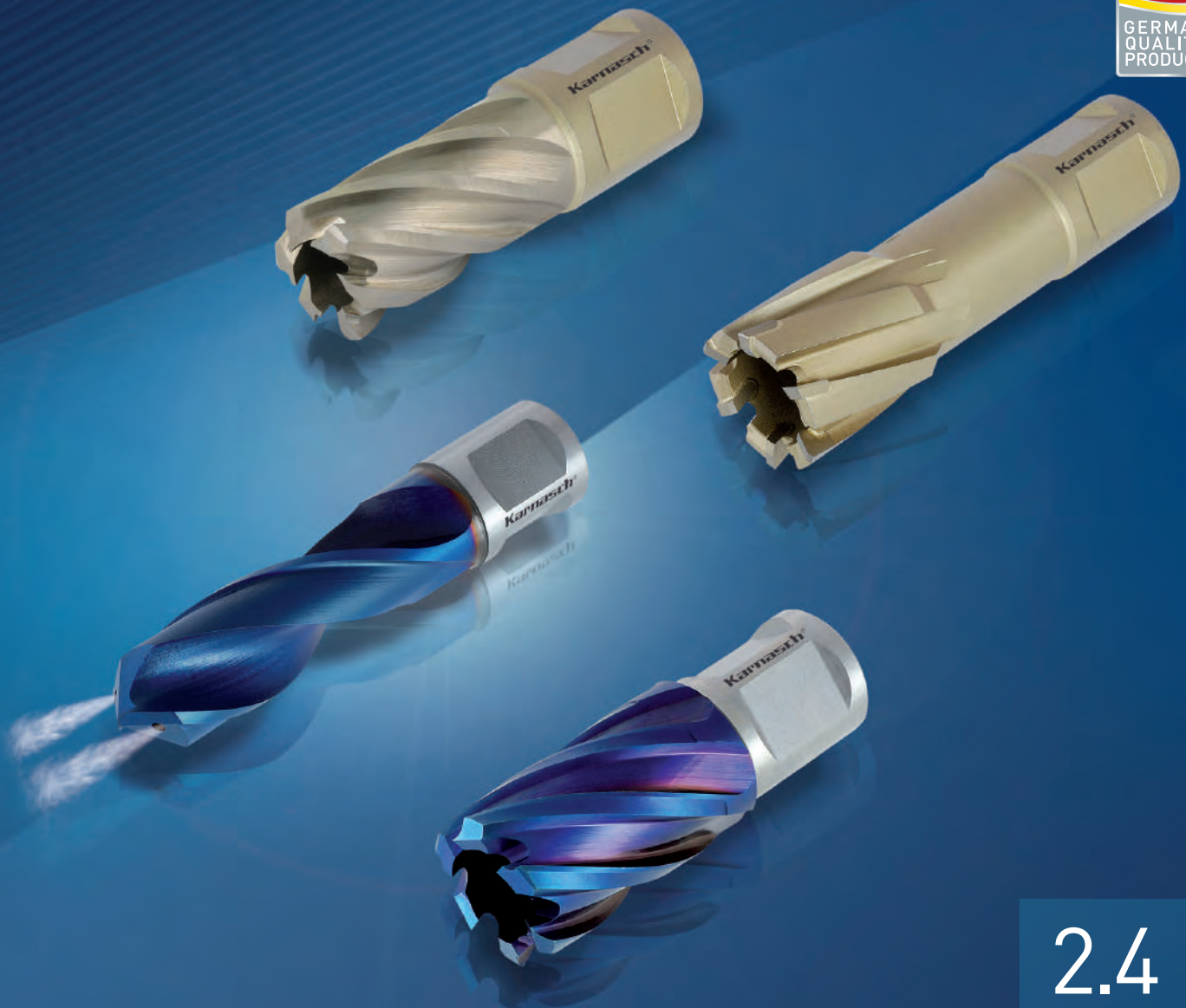


| Art. | € | l3 mm | Art. | € | Ø-Halter Ø-Holder | A Innen-Ø mm Inside-Ø mm | B Außen-Ø mm Outside-Ø mm | C Dicke mm Thickness mm | D Stützstangen Gewinde · Driving rod thread | E Schlauchanschluss Gewinde · Cooling nozzle thread | Art. | € |
|-----------------|------|----------|---------------|-------|----------------------|--------------------------------|---------------------------------|-------------------------------|--|---|--------------|------|
| | | | | | | | | | | | | |
| • 22 9001 08250 | 5,05 | 250 | 22 9002 01905 | 22,10 | 9,5-17,5 | 19,05 | 44,45 | 22,23 | M8 × 1,25 | 1/8" | • 22 9003 18 | 1,80 |
| | | | 22 9002 02540 | 24,85 | 18-29 | 25,40 | 53,97 | 28,57 | M8 × 1,25 | 1/8" | | |
| • 22 9001 10250 | 5,35 | 250 | 22 9002 03175 | 32,20 | 30-47 | 31,75 | 63,50 | 34,92 | M10 × 1,5 | 1/4" | • 22 9003 14 | 2,65 |
| | | | 22 9002 04445 | 42,30 | 48-65 | 44,45 | 76,20 | 34,92 | M10 × 1,5 | 1/4" | | |
| • 22 9001 12250 | 5,55 | 250 | 22 9002 05715 | 58,25 | 64-114 | 57,15 | 95,27 | 44,45 | M12 × 1,75 | 1/2" | • 22 9003 12 | 4,60 |



KERNBOHRER · SCHIENENBOHRER

ANNULAR CUTTERS · RAIL CUTTERS



2.4

KONTAKT | CONTACT

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INDUSTRIAL TOOLS DIVISION

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D-15848 Tauche/OT Görzdorf
mail@karnasch.tools

+49 (0) 33675 - 7265-0

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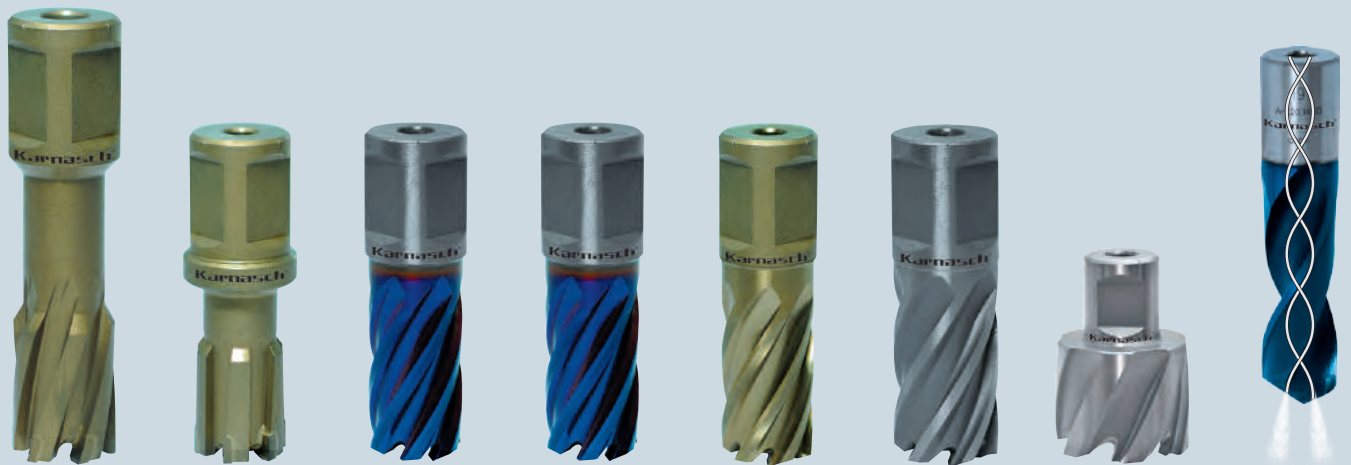
ONLINE



ÜBERSICHT • OVERVIEW

Kernbohrer + Spiralbohrer · Annular cutters + twist drills

362-433



| HARD-LINE / | | HARDOX-LINE / | | BLUE-DRILL LINE / PRO | | BLUE-DRILL LINE / | | GOLD-DRILL LINE / | | SILVER-DRILL LINE / | | MINI-LINE / | | DRILL-LINE / PRO | |
|-------------|---------|---------------|---------|-----------------------|---------|-------------------|---------|-------------------|---------|---------------------|---------|-------------|---------|------------------|---------|
| Weldon | 364-373 | Weldon | 382-387 | Weldon | 388-393 | Weldon | 394-403 | Weldon | 404-413 | Weldon | 420-425 | Weldon | 426-427 | Weldon | 428-431 |
| Nitto | 436-451 | | | | | Nitto | 452-467 | Nitto | 468-487 | | | | | | |
| Fein | 490-493 | | | | | Fein | 494-496 | Fein | 498-500 | | | | | | |

Schienenbohrer · Rail cutters

506-520



| RAIL-LINE / PRO | | RAIL-LINE / | | BLUE-DRILL LINE / PRO | | SILVER-DRILL LINE / RAIL | | DRILL-LINE / PRO | | DRILL-LINE / RAIL | |
|-----------------|---------|-------------|---------|-----------------------|---------|--------------------------|---------|------------------|---------|-------------------|-----|
| HM/T.C.T. | 502-505 | HM/T.C.T. | 506-509 | | 510-513 | | 514-517 | | 518-519 | | 520 |



Magnet-Kernbohrmaschine · Magnetic hole cutting machine

1083-1105



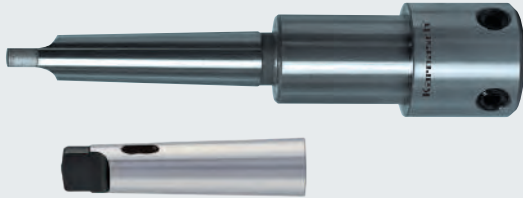
ÜBERSICHT • OVERVIEW

Zubehör • Sets • Displays • Ersatzteile / Accessories • Sets • Displays • Spare parts

521-532

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523

Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



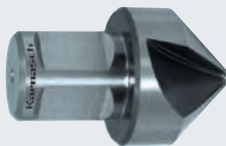
Kühlmittel-Druckflaschen 528

Coolant pressure bottles



Kegelsenker mit Weldonenschaft 524/525

Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529

Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622

Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



Sets • Displays 534-561

Sets • Displays



Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624

Tapping adapter Weldon + taps M 3 - M 30



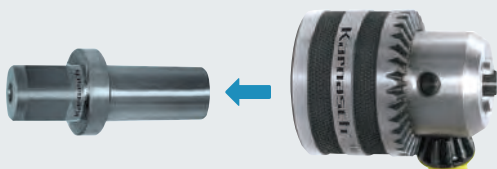
Vollhartmetall Gewindebohrer-Ausbohrer 628

Solid carbide drills to remove jammed taps



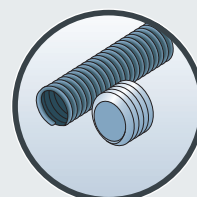
Adapter + passende Bohrfutter 528

Adapters + suitable drill chucks



Ersatzteile 530-532

Spare parts



Welcher Kernbohrer / Bohrer passt auf welche Kernbohrmaschinen Which annular cutter / Twist drill fits which annular cutter machine



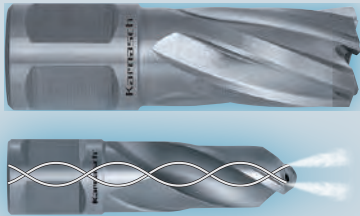
1



KERNBOHRER / BOHRER WELDONSCHAFT 19/32 MM
ANNULAR CUTTER / TWIST DRILL WELDON-SHANK 19/32 MM (3/4"+1.1/4")

362-431

WELDON



Passende Kernbohrmaschinen von:
Matching machines made by:

KARNASCH · ALFRA-ROTABEST + ALFRA
ROTAQUICK · BDS · BDS KEYLESS ·
BEKTOP · BUX · CEMBRE · DUBUIS ·
ERICO · EUROBOOR · EVOLUTION · HALL
(POWERBOR) · HOUGEN · JANCY ·
MAGBROACH · MAGTRON · MAGNETOR ·
METALLKRAFT · PROMAG · ROTABROACH
· RUKO+RUKO EASY LOCK · UNIVERSAL
...



2



3



4



KERNBOHRER MIT NITTO / UNIVERSALSCHAFT 19 MM
ANNULAR CUTTER WITH NITTO / UNIVERSAL SHANK 19 MM (3/4")

436-487

NITTO / UNIVERSAL



Passende Kernbohrmaschinen von Nitto:
Matching machines made by Nitto:

NITTO KOHKI "ONE TOUCH" TYPE:
WOJ 3200 · AO 5575 · WA 3500 · WA 5000 · QA 4000 · QA 6500

Passend auch für alle Maschinen mit Weldonschaft 19 mm (siehe oben).
Hierbei ist darauf zu achten, dass nur **eine** Spannfläche vorhanden ist.

Also matching all machines with Weldon shank 19 mm (3/4") (see above).
Observe that there is only **one** clamping face.

5



6



KERNBOHRER MIT FEIN QUICK-IN SCHAFT 18 MM / FEIN QUICK-IN MAX-SCHAFT 32 MM
ANNULAR CUTTER WITH FEIN QUICK-IN SHANK 18 MM / FEIN QUICK-IN MAX-SHANK 32 MM (1.1/4")

490-500

FEIN QUICK-IN



Passende Kernbohrmaschinen von Fein:
Matching machines made by Fein:

FEIN TYPE: KBM 32 Q · KBM 50 Q · KBM 50 U · KBM 50 AUTO · KBM 65 U · KBM 80 QUICK-IN MAX

7





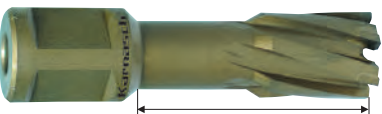
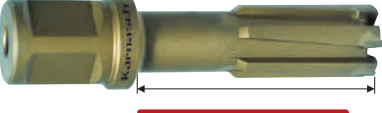





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















9

Index









Übersicht Kernbohrer Weldonschaft Overview annular cutters Weldon shank

| TYPE | Ø | Beschreibung · Specification | Anwendung · Application |
|--|--|---|--|
| HARD-LINE  | Ø 12-200 mm Ø 15/32-7.7/8" | Kernbohrer Hartmetall-bestückt Die leistungsstärksten Kernbohrer in unserem Sortiment. Exzellent für alle Stähle bis 1400 N Festigkeit sowie für alle Edelstähle. Annular cutters carbide-tipped The most powerful annular cutters in our range. Excellent for all steels up to a strength of 1400 N and for all stainless steels. |  Stahl Edelstahl Grauguss Alu Kupfer, Messing, Zinn Steel Stainless Grey cast iron Alu Copper, brass, tin |
| | Schnittiefen Drill depths 40, 55, 80, 110, 150 mm 1.1/2", 2", 3", 4", 5.29/32 | | |
| HARD-LINE ZOLL / INCH  | Ø 1/2-2.1/16" | | |
| | Schnittiefen Drill depths 40, 55, 80 mm 1.1/2", 2", 3" | | |
| HARDOX-LINE  | Ø 14-60 mm Ø 35/64-2.23/64" | Der beste Kernbohrer zum Bohren in: <ul style="list-style-type: none"> • Hardox 400, 450, 500 • Harte Stähle ab 30 HRC bis 50 HRC Speziell entwickeltes Hartmetall sowie optimierte Geometrie ergeben exzellente Ergebnisse beim Bohren von HARDOX / HARTE STÄHLE (unbedingt Schnittparameter beachten). The best annular cutter for drilling in: <ul style="list-style-type: none"> • Hardox 400, 450, 500 • Hard steels from 30 HRC up to 50 HRC Specially developed carbide as well as optimized geometry results in excellent performance for drilling in HARDOX / HARD STEEL (absolutely observe cutting parameters). |  Hardox 400, 450, 500 Harder Stahl ab 30 HRC bis 50 HRC Hardox 400, 450, 500 Hard steel from 30 HRC up to 50 HRC |
| | 25, 50 mm 1", 2" | Schnittiefen Drill depths | |
| BLUE-DRILL LINE / PRO  | Ø 12-36 mm Ø 15/32-1.27/64" | Kernbohrer aus Pulverstahl + DURABLU- Beschichtung. Für schwierigste Zerspanungsprobleme. Gut für alle Stähle bis 1400 N Festigkeit sowie für alle Edelstähle. Annular cutters made of powder steel + DURABLU-coating. For the most difficult chipping problems. Good for all steels up to a strength of 1400 N and for all stainless steels. |  Stahl Edelstahl Grauguss Alu Kupfer, Messing, Zinn Steel Stainless Grey cast iron Alu Copper, brass, tin |
| | 30, 55 mm 1", 2" | Schnittiefen Drill depths | |
| BLUE-DRILL LINE  | Ø 12-60 mm Ø 15/32-2.23/64" | Kernbohrer aus HSS-XE Spezialstahl + DURABLU- Beschichtung. Der am meisten verwendete beschichtete Kernbohrer für alle Stähle bis 1100 N Festigkeit sowie für alle Edelstähle. Annular cutters made of HSS-XE special steel + DURABLU-coating. The most-often used coated annular cutter for all steels up to a strength of 1100 N and for all stainless steels. |  Stahl Edelstahl Grauguss Alu Kupfer, Messing, Zinn Steel Stainless Grey cast iron Alu Copper, brass, tin |
| | 30, 55, 80, 110 mm 1", 2", 3", 4" | Schnittiefen Drill depths | |

Übersicht Kernbohrer Weldonschaft Overview annular cutters Weldon shank

| TYPE | Ø | Beschreibung · Specification | Anwendung · Application | |
|--------------------------|--------------------------------|--|---|---------|
| GOLD-DRILL LINE | Ø 12-60 mm Ø 15/32-2.23/64" | Kernbohrer aus HSS-XE Spezialstahl + GOLD-TECH-Behandlung. Der am meisten verwendete nicht beschichtete Kernbohrer für alle Stähle bis 900 N Festigkeit. Auch noch für Edelstahl geeignet. Annular cutters made of HSS-XE special steel + GOLD-TECH treatment. The most-often used uncoated annular cutter for all steels up to a strength of 900 N. Still suitable for stainless steels. |  Stahl Steel  Edelstahl Stainless  Alu Alu  Kupfer, Messing, Zinn Copper, brass, tin  Hardox 400 Hardox 400  Hardox 450 Hardox 450 | 404-419 |
| GOLD-DRILL LINE | Ø 7/16-2.1/16" ZOLL / INCH | | | |
| SILVER-DRILL LINE | Ø 12-60 mm Ø 15/32-2.23/64" | Kernbohrer aus HSS-XE Spezialstahl + 7 verschiedene Schneidgeometrien. Für alle Stähle bis 750 N Festigkeit. Annular cutters of HSS-XE special steel + 7 different cutting geometries. For all steels up to a strength of 750 N. |  Stahl Steel  Alu Alu  Kupfer, Messing, Zinn Copper, brass, tin  < 750 N  < 10% Si | 420-425 |
| MINI-LINE | Ø 8-25 mm Ø 5/16-63/64" | Kernbohrer / Lochsagen Kombination. Für alle Stähle bis 900 N Festigkeit. Annular cutters / hole saw combination. For all steels up to a strength of 900 N. |  Stahl Steel  Edelstahl Stainless  Alu Alu  Kupfer, Messing, Zinn Copper, brass, tin  < 900 N  < 10% Si | 426-427 |

Übersicht Spiralbohrer Weldonschaft · Overview twist drill Weldon shank

| TYPE | Ø | Beschreibung · Specification | Anwendung · Application | |
|-------------------|------------------------------|--|--|---------|
| DRILL-LINE | Ø 4-32 mm Ø 5/32-1.17/64" | Spiralbohrer aus Pulverstahl / HSS-XE Stahl / HSS-Kobalt Stahl. Mit oder ohne Innenkühlung für Stähle bis 1400 N Festigkeit sowie für alle Edelstähle. Twist drills made of powder steel / HSS-XE-steel / HSS-Cobalt steel. With or without inner cooling for steels up to a strength of 1400 N and for all stainless steels. |  Stahl Steel  Edelstahl Stainless  Grauguss Grey cast iron  Alu Alu  Kupfer, Messing, Zinn Copper, brass, tin  < 1400 N  > 900 N  > 10% Si | 428-433 |



OPTIMAL · OPTIMAL



GUT · GOOD



MÖGLICH · POSSIBLE

HARTMETALL-BESTÜCKTE KERNBOHRER CARBIDE-TIPPED ANNULAR CUTTERS



HARD-LINE

Der beste Kernbohrer ist grundsätzlich Hartmetall-bestückt.

Nur diese Bohrer bieten das optimale Preis-Leistungs-Verhältnis für nahezu alle Materialien. Neben der höchsten Standzeit in allen Stählen bieten nur Hartmetall-bestückte Kernbohrer:

- Bohren in Stähle bis 40 Rockwell (HRC)
- Bohren in alle Edelstähle
- Bohren in schwierigste Legierungen (Hardox/Inconel/Titan)
- Bohren hervorragend auch in weiche Werkstoffe wie Alu, Kupfer, Messing u.ä.

Mit Durchmessern von 12-150 mm in Schnitttiefen von 40 mm, 55 mm, 80 mm, 110 mm steht Ihnen weltweit das umfangreichste Lagerprogramm zur Verfügung.

The fact is: The best annular cutters are carbide tipped.

Only these drills offer the best value for money for almost all materials. Besides maximum cutting capacity in all kind of steels provide only carbide tipped annular cutters:

- Drilling in hardened steel up to 40 Rockwell (HRC)
- Drilling in all sorts of stainless steel
- Drilling in most difficult alloys (Hardox/Inconel/Titan)
- Drilling also excellent in all non-ferrous metals such as alu, copper, brass

Available in diameter 12-150 mm. Available in drill depths 40 mm, 55 mm, 80 mm and 110 mm. Simply the world's largest stock range of carbide tipped annular cutter.

EIGENSCHAFTEN · PROPERTIES



Karnasch Hartmetall-bestückte Kernbohrer (HARD-LINE) werden mit konischer Spirale gefertigt für: Sauberen Spanfluss und höchste Zerspanleistung auch bei schwierigen Materialien.

Karnasch carbide tipped annular cutters (HARD-LINE) are made with a conical helix for: clean chip flow and highest cutting ability even with difficult materials.



Karnasch Hartmetall-bestückte Kernbohrer (HARD-LINE) werden ausschließlich mit Sandvik Hartmetallzähnen bestückt. Wir meinen: Nur das beste Hartmetall ist gut genug für Karnasch Kernbohrer.

Karnasch carbide tipped annular cutters (HARD-LINE) are exclusively equipped with Sandvik carbide teeth. Our opinion is: Only the best carbide is good enough for Karnasch annular cutters.



Karnasch Hartmetall-bestückte Kernbohrer (HARD-LINE) sind in einer aufwendigen Vor-Mittel-Nachsneider-Geometrie gefertigt. Dies ergibt: ratterfreies, ruhiges und leichtes Zerspanen mit höchsten Standzeiten.

Karnasch carbide tipped annular cutters (HARD-LINE) are made in an elaborate pre-/intermediate-/after-cutting geometry. This results in: clatter-free, silent and easy cutting with highest lifetimes.

ANWENDUNG · APPLICATION

| | | | | | | | | |
|----------|-----------|----------|-----------------------|---------------------|----------------|----------|--|----------|
| | | | | | | | | |
| Stahl | Edelstahl | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Grauguss | Graphit | Hastelloy, Inconel, Nimonic, Exotische Materialien | Schienen |
| Steel | Stainless | Alu | Copper, brass, tin | Plastics GRP/CRP | Grey cast iron | Graphite | Hastelloy, Inconel, Nimonic, exotic materials | Rails |
| < 1400 N | > 900 N | > 10% Si | | | | | | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL · OPTIMAL

✓ GUT · GOOD

✓ MÖGLICH · POSSIBLE

HARTMETALL-BESTÜCKTE KERNBOHRER CARBIDE-TIPPED ANNULAR CUTTERS

HARD-LINE

| Schnitttiefe · Drill depths | Ø mm | Ø Zoll/Inch | Art. / Type | |
|---|--------|----------------|---|-----|
|  <p>Weldon 40 mm 1.1/2"</p> <p>BEST SELLER</p> | 12-120 | 15/32-4.23/32" | 20 1315 HARD-LINE / 40 | 366 |
|  <p>Weldon 55 mm 2"</p> <p>BEST SELLER</p> | 12-200 | 15/32-7.7/8" | 20 1316 HARD-LINE / 55 | 368 |
|  <p>Weldon 80 mm 3"</p> | 14-120 | 35/64-4.23/32" | 20 1650 HARD-LINE / 80 | 370 |
|  <p>Weldon 110 mm 4"</p> | 14-120 | 35/64-4.23/32" | 20 1660 HARD-LINE / 110 | 372 |
|  <p>Weldon 150 mm 5.29/32"</p> | 18-60 | 45/64-2.23/64" | 20 1665 HARD-LINE / 150 | 374 |
|  <p>Weldon 40 mm 1.1/2"</p> | - | 1/2-2.1/16" | 20 1930 HARD-LINE ZOLL / INCH / 40 | 376 |
|  <p>Weldon 55 mm 2"</p> | - | 1/2-2.1/16" | 20 1940 HARD-LINE ZOLL / INCH / 55 | 378 |
|  <p>Weldon 80 mm 3"</p> | - | 11/16-2.1/16" | 20 1970 HARD-LINE ZOLL / INCH / 80 | 380 |

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

| | | | |
|---|---------|--|---------|
| Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves | 521-523 | Kühlmittel-Druckflaschen Coolant pressure bottles | 528 |
| Kegelsenker mit Weldonschaft Countersinks with Weldon shank | 524/525 | Magnetstab zur Entfernung der Bohrspäne Magnetic stick for chip removal | 529 |
| Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm | 622 | Sets · Displays Sets · Displays | 534-561 |
| Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 Tapping adapter Weldon + taps M 3 - M 30 | 623-624 | | |
| Adapter + passende Bohrfutter Adapters + suitable drill chucks | 528 | Ersatzteile Spare parts | 530-532 |



20 1315

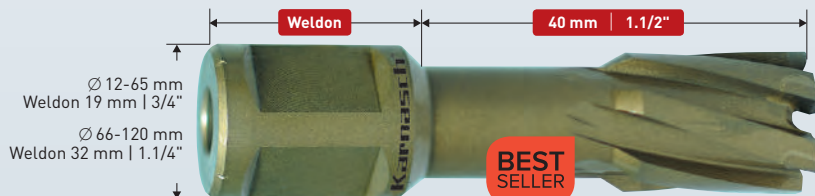
HARD-LINE 40

Hartmetall-bestückter Kernbohrer, Weldonschaft, Nutzlänge 40 mm
Carbide-tipped annular cutter, Weldon shank, drill depth 40 mm | 1.1/2"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|-------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



BEST SELLER

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|--------|
| 20 1315 012 | 12 | 15/32" | 23,90 | 20 1315 032 | 32 | 1.17/64" | 31,65 | 20 1315 052 | 52 | 2.3/64" | 55,20 | 20 1315 072 | 72 | 2.53/64" | 88,40 |
| 20 1315 013 | 13 | 33/64" | 23,90 | 20 1315 033 | 33 | 1.19/64" | 31,65 | 20 1315 053 | 53 | 2.3/32" | 56,85 | 20 1315 073 | 73 | 2.7/8" | 89,55 |
| 20 1315 014 | 14 | 35/64" | 24,70 | 20 1315 034 | 34 | 1.11/32" | 31,65 | 20 1315 054 | 54 | 2.1/8" | 58,75 | 20 1315 074 | 74 | 2.29/32" | 90,55 |
| 20 1315 015 | 15 | 19/32" | 24,70 | 20 1315 035 | 35 | 1.3/8" | 31,65 | 20 1315 055 | 55 | 2.11/64" | 60,00 | 20 1315 075 | 75 | 2.61/64" | 91,30 |
| 20 1315 016 | 16 | 5/8" | 24,70 | 20 1315 036 | 36 | 1.27/64" | 36,20 | 20 1315 056 | 56 | 2.13/64" | 62,15 | 20 1315 076 | 76 | 2.63/64" | 96,80 |
| 20 1315 017 | 17 | 43/64" | 24,70 | 20 1315 037 | 37 | 1.29/64" | 36,25 | 20 1315 057 | 57 | 2.1/4" | 63,65 | 20 1315 077 | 77 | 3.1/32" | 96,80 |
| 20 1315 018 | 18 | 45/64" | 24,70 | 20 1315 038 | 38 | 1.1/2" | 36,25 | 20 1315 058 | 58 | 2.9/32" | 64,80 | 20 1315 078 | 78 | 3.5/64" | 96,80 |
| 20 1315 019 | 19 | 3/4" | 24,70 | 20 1315 039 | 39 | 1.17/32" | 36,25 | 20 1315 059 | 59 | 2.21/64" | 65,95 | 20 1315 079 | 79 | 3.7/64" | 96,80 |
| 20 1315 020 | 20 | 25/32" | 24,70 | 20 1315 040 | 40 | 1.37/64" | 36,25 | 20 1315 060 | 60 | 2.23/64" | 67,10 | 20 1315 080 | 80 | 3.5/32" | 97,95 |
| 20 1315 021 | 21 | 53/64" | 25,40 | 20 1315 041 | 41 | 1.39/64" | 43,75 | 20 1315 061 | 61 | 2.13/32" | 69,10 | 20 1315 085 | 85 | 3.11/32" | 109,95 |
| 20 1315 022 | 22 | 55/64" | 25,40 | 20 1315 042 | 42 | 1.21/32" | 43,75 | 20 1315 062 | 62 | 2.7/16" | 71,55 | 20 1315 090 | 90 | 3.35/64" | 127,00 |
| 20 1315 023 | 23 | 29/32" | 25,40 | 20 1315 043 | 43 | 1.11/16" | 43,75 | 20 1315 063 | 63 | 2.31/64" | 74,20 | 20 1315 095 | 95 | 3.47/64" | 146,05 |
| 20 1315 024 | 24 | 15/16" | 25,40 | 20 1315 044 | 44 | 1.47/64" | 43,75 | 20 1315 064 | 64 | 2.33/64" | 76,65 | 20 1315 100 | 100 | 3.15/16" | 163,30 |
| 20 1315 025 | 25 | 63/64" | 25,40 | 20 1315 045 | 45 | 1.49/64" | 43,75 | 20 1315 065 | 65 | 2.9/16" | 79,15 | 20 1315 105 | 105 | 4.9/64" | 185,40 |
| 20 1315 026 | 26 | 1.1/32" | 26,80 | 20 1315 046 | 46 | 1.13/16" | 46,95 | 20 1315 066 | 66 | 2.19/32" | 78,90 | 20 1315 110 | 110 | 4.21/64" | 204,90 |
| 20 1315 027 | 27 | 1.1/16" | 26,80 | 20 1315 047 | 47 | 1.27/32" | 46,95 | 20 1315 067 | 67 | 2.41/64" | 80,75 | 20 1315 115 | 115 | 4.17/32" | 230,15 |
| 20 1315 028 | 28 | 1.7/64" | 26,80 | 20 1315 048 | 48 | 1.57/64" | 46,95 | 20 1315 068 | 68 | 2.43/64" | 82,35 | 20 1315 120 | 120 | 4.23/32" | 256,45 |
| 20 1315 029 | 29 | 1.9/64" | 26,80 | 20 1315 049 | 49 | 1.59/64" | 46,95 | 20 1315 069 | 69 | 2.23/32" | 83,60 | | | | |
| 20 1315 030 | 30 | 1.3/16" | 26,80 | 20 1315 050 | 50 | 1.31/32" | 49,70 | 20 1315 070 | 70 | 2.3/4" | 86,00 | | | | |
| 20 1315 031 | 31 | 1.7/32" | 31,65 | 20 1315 051 | 51 | 2.1/64" | 53,95 | 20 1315 071 | 71 | 2.51/64" | 88,40 | | | | |

Größere Ø sowie Zwischenabmessungen Art. 20 1316 siehe Seite 368, Art. 20 1130A Seite 575, Art. 20 1141A Seite 579 ·

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Larger Ø and in between Ø see Art. 20 1316 page 368, Art. 20 1130A page 575, Art. 20 1141A page 579 ·

Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1315

HARD-LINE 40

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE · EJECTOR PINS

Ø 12-17 mm **20 1149**
€ 7,90

6,34 x 90 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ø 18-65 mm **20 1151**
€ 8,50

7,98 x 90 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ø 66-120 mm **20 1273**
€ 14,65

7,98 x 105 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1315

HARD-LINE 40

SETS / DISPLAYS Seite / Page 534



Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1315 HARD-LINE40 – siehe Seite 534. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.

We offer a large selection of sets / displays – recommended content 20 1315 HARD-LINE40 – see page 534. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



1295

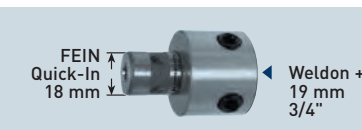


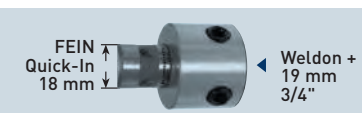
Zubehör für Hartmetall-bestückte Kernbohrer, Weldonschaft, Nutzlänge 40 mm
 Accessories for carbide-tipped annular cutter, Weldon shank, drill depth 40 mm | 1.1/2"

HARD-LINE 40

20 1315

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

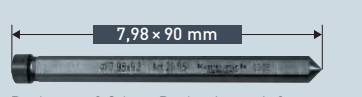
 **Ø 12-17 mm** **20 1263**
 FEIN Quick-In 18 mm Weldon + Nitto/Universal 19 mm 3/4"
 • € 17,50
 6,34 × 116 mm **20 1318**
 • € 8,30
 Packnorm 2 Stk. · Packaging unit 2 pcs.

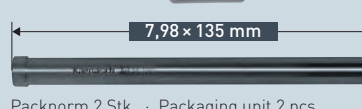
 **Ø 18-65 mm** **20 1161**
 FEIN Quick-In 18 mm Weldon + Nitto/Universal 19 mm 3/4"
 • € 17,45
 7,98 × 118 mm **20 1272**
 • € 13,95
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 12-17 mm** **20 1311**
 Nitto/Universal 19 mm 3/4" Weldon 19 mm 3/4"
 • € 16,30
 6,34 × 116 mm **20 1318**
 • € 8,30
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 18-65 mm** **20 1314**
 Nitto/Universal 19 mm 3/4" Weldon 19 mm 3/4"
 • € 16,30
 7,98 × 118 mm **20 1272**
 • € 13,95
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 12-17 mm** **21 0048**
 Weldon 32 mm 1.1/4" Weldon + Nitto/Universal 19 mm 3/4"
 • € 14,15
 6,34 × 90 mm **20 1149**
 • € 7,90
 Packnorm 2 Stk. · Packaging unit 2 pcs.

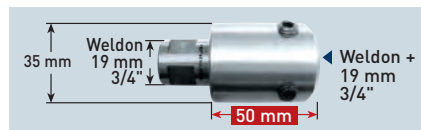
 **Ø 18-65 mm** **20 1151**
 Weldon 32 mm 1.1/4" Weldon + Nitto/Universal 19 mm 3/4"
 • € 8,50
 7,98 × 90 mm **20 1151**
 • € 8,50
 Packnorm 2 Stk. · Packaging unit 2 pcs.


 **Ø 66-120 mm** **20 1386**
 Weldon 19 mm 3/4" Weldon 32 mm 1.1/4"
 • € 17,50
 7,98 × 135 mm **20 1393**
 • € 13,70
 Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

Weiteres Zubehör siehe Übersichtsseite 365
 Further accessories see overview page 365

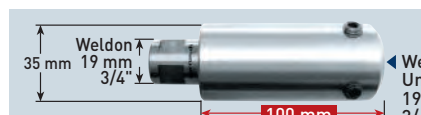
VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS

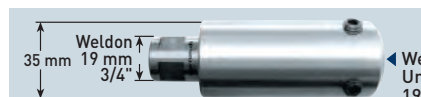
 **Ø 12-17 mm** **20 1387**
 Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"
 • € 18,95
 35 mm 50 mm
 7,98 × 6,34 × 5,30 × 140 mm **20 1390**
 • € 15,70
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 18-65 mm** **20 1387**
 Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"
 • € 18,95
 35 mm 50 mm
 7,98 × 135 mm **20 1393**
 • € 13,70
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 12-17 mm** **20 1402**
 Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"
 • € 20,95
 35 mm 75 mm
 7,98 × 6,34 × 5,30 × 165 mm **20 1405**
 • € 17,65
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 18-65 mm** **20 1402**
 Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"
 • € 20,95
 35 mm 75 mm
 7,98 × 167 mm **20 1408**
 • € 14,55
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 12-17 mm** **20 1417**
 Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"
 • € 24,95
 35 mm 100 mm
 7,98 × 6,34 × 5,30 × 190 mm **20 1420**
 • € 17,60
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 18-65 mm** **20 1417**
 Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"
 • € 24,95
 35 mm 100 mm
 7,98 × 190 mm **20 1423**
 • € 16,15
 Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 365
 Further accessories see overview page 365



20 1316

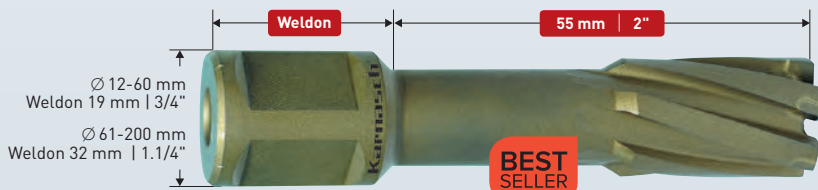
HARD-LINE 55

Hartmetall-bestückter Kernbohrer, Weldonschaft, Nutzlänge 55 mm
Carbide-tipped annular cutter, Weldon shank, drill depth 55 mm | 2"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



BEST SELLER

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|--------|-------------|------|-------------|--------|
| 20 1316 012 | 12 | 15/32" | 27,30 | 20 1316 035 | 35 | 1.3/8" | 35,15 | 20 1316 062 | 62 | 2.7/16" | 79,35 | 20 1316 100 | 100 | 3.15/16" | 188,10 |
| 20 1316 013 | 13 | 33/64" | 27,30 | 20 1316 036 | 36 | 1.27/64" | 40,10 | 20 1316 063 | 63 | 2.31/64" | 82,30 | 20 1316 103 | 103 | 4.1/16" | 203,75 |
| 20 1316 014 | 14 | 35/64" | 27,30 | 20 1316 037 | 37 | 1.29/64" | 40,15 | 20 1316 064 | 64 | 2.33/64" | 85,00 | 20 1316 104 | 104 | 4.3/32" | 211,40 |
| 20 1316 015 | 15 | 19/32" | 27,30 | 20 1316 038 | 38 | 1.1/32" | 40,15 | 20 1316 065 | 65 | 2.9/16" | 87,80 | 20 1316 105 | 105 | 4.9/64" | 218,75 |
| 20 1316 016 | 16 | 5/8" | 27,30 | 20 1316 039 | 39 | 1.17/32" | 40,15 | 20 1316 066 | 66 | 2.19/32" | 91,15 | 20 1316 106 | 106 | 4.11/64" | 226,50 |
| 20 1316 017 | 17 | 43/64" | 27,30 | 20 1316 040 | 40 | 1.37/64" | 40,15 | 20 1316 067 | 67 | 2.41/64" | 93,10 | 20 1316 108 | 108 | 4.1/4" | 235,40 |
| 20 1316 0175 | 17.5 | 11/16" | 27,30 | 20 1316 041 | 41 | 1.39/64" | 48,45 | 20 1316 068 | 68 | 2.43/64" | 95,00 | 20 1316 110 | 110 | 4.21/64" | 241,75 |
| 20 1316 018 | 18 | 45/64" | 27,30 | 20 1316 042 | 42 | 1.21/32" | 48,45 | 20 1316 069 | 69 | 2.23/32" | 96,50 | 20 1316 115 | 115 | 4.17/32" | 271,55 |
| 20 1316 019 | 19 | 3/4" | 27,30 | 20 1316 043 | 43 | 1.11/16" | 48,45 | 20 1316 070 | 70 | 2.3/4" | 99,35 | 20 1316 120 | 120 | 4.23/32" | 302,60 |
| 20 1316 020 | 20 | 25/32" | 27,30 | 20 1316 044 | 44 | 1.47/64" | 48,45 | 20 1316 071 | 71 | 2.51/64" | 100,45 | 20 1316 125 | 125 | 4.59/64" | 336,35 |
| 20 1316 021 | 21 | 53/64" | 28,15 | 20 1316 045 | 45 | 1.49/64" | 48,45 | 20 1316 072 | 72 | 2.53/64" | 101,60 | 20 1316 130 | 130 | 5.1/8" | 369,90 |
| 20 1316 0215 | 21.5 | 27/32" | 28,15 | 20 1316 046 | 46 | 1.13/16" | 52,10 | 20 1316 073 | 73 | 2.7/8" | 103,10 | 20 1316 135 | 135 | 5.5/16" | 403,70 |
| 20 1316 022 | 22 | 59/64" | 28,15 | 20 1316 047 | 47 | 1.27/32" | 52,10 | 20 1316 074 | 74 | 2.29/32" | 104,85 | 20 1316 140 | 140 | 5.33/64" | 439,80 |
| 20 1316 023 | 23 | 29/32" | 28,15 | 20 1316 048 | 48 | 1.57/64" | 52,10 | 20 1316 075 | 75 | 2.61/64" | 105,80 | 20 1316 145 | 145 | 5.45/64" | 474,70 |
| 20 1316 0235 | 23.5 | 59/64" | 28,15 | 20 1316 049 | 49 | 1.59/64" | 52,10 | 20 1316 076 | 76 | 2.63/64" | 107,45 | 20 1316 150 | 150 | 5.29/32" | 512,15 |
| 20 1316 024 | 24 | 15/16" | 28,15 | 20 1316 050 | 50 | 1.31/32" | 55,10 | 20 1316 077 | 77 | 3.1/32" | 108,80 | 20 1316 155 | 155 | 6.7/64" | 515,45 |
| 20 1316 025 | 25 | 63/64" | 28,15 | 20 1316 051 | 51 | 2.1/64" | 59,80 | 20 1316 078 | 78 | 3.5/64" | 110,30 | 20 1316 160 | 160 | 6.19/64" | 521,55 |
| 20 1316 0255 | 25.5 | 1" | 28,15 | 20 1316 052 | 52 | 2.3/64" | 61,20 | 20 1316 079 | 79 | 3.7/64" | 111,50 | 20 1316 165 | 165 | 6.1/2" | 528,90 |
| 20 1316 026 | 26 | 1.1/32" | 29,85 | 20 1316 053 | 53 | 2.3/32" | 63,05 | 20 1316 080 | 80 | 3.5/32" | 113,15 | 20 1316 170 | 170 | 6.11/16" | 535,80 |
| 20 1316 027 | 27 | 1.1/16" | 29,90 | 20 1316 054 | 54 | 2.1/8" | 65,15 | 20 1316 082 | 82 | 3.15/64" | 120,60 | 20 1316 175 | 175 | 6.57/64" | 568,75 |
| 20 1316 028 | 28 | 1.7/64" | 29,90 | 20 1316 055 | 55 | 2.11/64" | 66,55 | 20 1316 083 | 83 | 3.17/64" | 120,60 | 20 1316 180 | 180 | 7.3/32" | 564,40 |
| 20 1316 029 | 29 | 1.9/64" | 29,90 | 20 1316 056 | 56 | 2.13/64" | 68,90 | 20 1316 084 | 84 | 3.5/16" | 124,70 | 20 1316 185 | 185 | 7.9/32" | 580,05 |
| 20 1316 030 | 30 | 1.3/16" | 29,90 | 20 1316 057 | 57 | 2.1/4" | 70,55 | 20 1316 085 | 85 | 3.11/32" | 126,85 | 20 1316 190 | 190 | 7.31/64" | 595,80 |
| 20 1316 031 | 31 | 1.7/32" | 35,15 | 20 1316 058 | 58 | 2.9/32" | 71,85 | 20 1316 088 | 88 | 3.15/32" | 139,90 | 20 1316 195 | 195 | 7.43/64" | 611,45 |
| 20 1316 032 | 32 | 1.17/64" | 35,15 | 20 1316 059 | 59 | 2.21/64" | 73,15 | 20 1316 090 | 90 | 3.35/64" | 146,80 | 20 1316 200 | 200 | 7.7/8" | 627,00 |
| 20 1316 033 | 33 | 1.19/64" | 35,15 | 20 1316 060 | 60 | 2.23/64" | 74,40 | 20 1316 092 | 92 | 3.5/8" | 168,05 | | | | |
| 20 1316 034 | 34 | 1.11/32" | 35,15 | 20 1316 061 | 61 | 2.13/32" | 79,35 | 20 1316 095 | 95 | 3.47/64" | 168,05 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern. · Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1316

HARD-LINE 55

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS

Ø 12-17,5 mm **20 1271**
€ 7,65
6,34 × 102 mm
Packnorm 2 Stk. · Packaging unit 2 pcs.

Ø 18-60 mm **20 1273**
€ 14,65
7,98 × 105 mm
Packnorm 2 Stk. · Packaging unit 2 pcs.

Ø 61-200 mm **20 1272**
€ 13,95
7,98 × 118 mm
Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1316

HARD-LINE 55

SETS / DISPLAYS Seite / Page 535

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1316 HARD-LINE55 – siehe Seite 535. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.

We offer a large selection of sets / displays – recommended content 20 1316 HARD-LINE55 – see page 535. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie

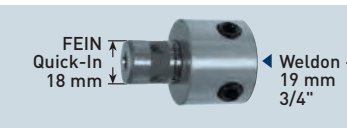


1295

Zubehör für Hartmetall-bestückte Kernbohrer, Weldonschaft, Nutzlänge 55 mm
 Accessories for carbide-tipped annular cutter, Weldon shank, drill depth 55 mm | 2"

HARD-LINE 55 20 1316


ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

 **Ø 12-17,5 mm** 20 1263
 FEIN Quick-In 18 mm Weldon + Nitto/Universal 19 mm 3/4"
 € 17,50
 6,34 x 130 mm 20 1160
 € 9,20
 Packnorm 2 Stk. · Packaging unit 2 pcs.

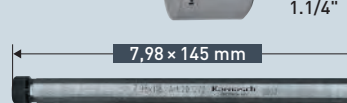
 **Ø 18-60 mm** 20 1161
 FEIN Quick-In 18 mm Weldon + Nitto/Universal 19 mm 3/4"
 € 17,45
 7,98 x 130 mm 20 1439
 € 13,05
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 12-17,5 mm** 20 1311
 Nitto/Universal 19 mm 3/4" Weldon 19 mm 3/4"
 € 16,30
 6,34 x 130 mm 20 1160
 € 9,20
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 18-60 mm** 20 1314
 Nitto/Universal 19 mm 3/4" Weldon 19 mm 3/4"
 € 16,30
 7,98 x 130 mm 20 1439
 € 13,05
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 12-17,5 mm** 21 0048
 Weldon 32 mm 1.1/4" Weldon + Nitto/Universal 19 mm 3/4"
 € 14,15
 6,34 x 102 mm 20 1271
 € 7,65
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 18-60 mm** 20 1273
 Weldon 32 mm 1.1/4" Weldon + Nitto/Universal 19 mm 3/4"
 € 14,65
 7,98 x 105 mm 20 1273
 € 14,65
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 61-150 mm** 20 1386
 Weldon 19 mm 3/4" Weldon 32 mm 1.1/4"
 € 17,50
 7,98 x 145 mm 20 1403
 € 12,95
 Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

Weiteres Zubehör siehe Übersichtsseite 365
 Further accessories see overview page 365

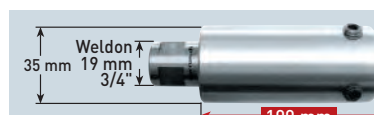
VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS

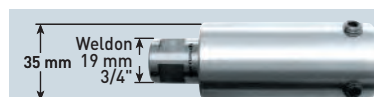
 **Ø 12-17,5 mm** 20 1387
 Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"
 € 18,95
 7,98 x 6,34 x 5,30 x 153 mm 20 1396
 € 16,45
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 18-60 mm** 20 1387
 Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"
 € 18,95
 7,98 x 160 mm 20 1399
 € 14,30
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 12-17,5 mm** 20 1402
 Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"
 € 20,95
 7,98 x 6,34 x 5,30 x 178 mm 20 1411
 € 17,05
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 18-60 mm** 20 1402
 Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"
 € 20,95
 7,98 x 180 mm 20 1414
 € 15,55
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 12-17,5 mm** 20 1417
 Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"
 € 24,95
 7,98 x 6,34 x 5,30 x 203 mm 20 1426
 € 18,35
 Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 18-60 mm** 20 1417
 Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"
 € 24,95
 7,98 x 205 mm 20 1429
 € 16,00
 Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 365
 Further accessories see overview page 365



20 1650

HARD-LINE 80

Hartmetall-bestückter Kernbohrer, Weldonschaft, Nutzlänge 80 mm
Carbide-tipped annular cutter, Weldon shank, drill depth 80 mm | 3"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|--------|-------------|------|-------------|--------|-------------|------|-------------|--------|
| 20 1650 014 | 14 | 35/64" | 52,00 | 20 1650 034 | 34 | 1.11/32" | 68,45 | 20 1650 054 | 54 | 2.1/8" | 118,45 | 20 1650 075 | 75 | 2.61/64" | 188,30 |
| 20 1650 015 | 15 | 19/32" | 52,00 | 20 1650 035 | 35 | 1.3/8" | 68,45 | 20 1650 055 | 55 | 2.11/64" | 121,10 | 20 1650 076 | 76 | 2.63/64" | 196,40 |
| 20 1650 016 | 16 | 5/8" | 52,00 | 20 1650 036 | 36 | 1.27/64" | 78,10 | 20 1650 056 | 56 | 2.13/64" | 129,85 | 20 1650 078 | 78 | 3.5/64" | 196,40 |
| 20 1650 017 | 17 | 43/64" | 52,00 | 20 1650 037 | 37 | 1.29/64" | 78,10 | 20 1650 057 | 57 | 2.1/4" | 129,85 | 20 1650 080 | 80 | 3.5/32" | 201,25 |
| 20 1650 018 | 18 | 45/64" | 52,00 | 20 1650 038 | 38 | 1.1/2" | 78,10 | 20 1650 058 | 58 | 2.9/32" | 129,85 | 20 1650 082 | 82 | 3.15/64" | 212,55 |
| 20 1650 019 | 19 | 3/4" | 52,00 | 20 1650 039 | 39 | 1.17/32" | 78,10 | 20 1650 059 | 59 | 2.21/64" | 132,30 | 20 1650 085 | 85 | 3.11/32" | 225,55 |
| 20 1650 020 | 20 | 25/32" | 52,00 | 20 1650 040 | 40 | 1.37/64" | 78,10 | 20 1650 060 | 60 | 2.23/64" | 135,50 | 20 1650 090 | 90 | 3.35/64" | 252,95 |
| 20 1650 021 | 21 | 53/64" | 52,00 | 20 1650 041 | 41 | 1.39/64" | 94,40 | 20 1650 061 | 61 | 2.13/32" | 146,30 | 20 1650 095 | 95 | 3.47/64" | 289,25 |
| 20 1650 022 | 22 | 55/64" | 52,00 | 20 1650 042 | 42 | 1.21/32" | 94,40 | 20 1650 062 | 62 | 2.7/16" | 146,30 | 20 1650 100 | 100 | 3.15/16" | 323,80 |
| 20 1650 023 | 23 | 29/32" | 52,00 | 20 1650 043 | 43 | 1.11/16" | 94,40 | 20 1650 063 | 63 | 2.31/64" | 146,30 | 20 1650 103 | 103 | 4.1/16" | 341,35 |
| 20 1650 024 | 24 | 15/16" | 52,00 | 20 1650 044 | 44 | 1.47/64" | 94,40 | 20 1650 064 | 64 | 2.33/64" | 146,30 | 20 1650 104 | 104 | 4.3/32" | 347,95 |
| 20 1650 025 | 25 | 63/64" | 52,00 | 20 1650 045 | 45 | 1.49/64" | 94,40 | 20 1650 065 | 65 | 2.9/16" | 146,30 | 20 1650 105 | 105 | 4.9/64" | 354,50 |
| 20 1650 026 | 26 | 1.1/32" | 56,70 | 20 1650 046 | 46 | 1.13/16" | 107,65 | 20 1650 066 | 66 | 2.19/32" | 169,10 | 20 1650 106 | 106 | 4.11/64" | 389,50 |
| 20 1650 027 | 27 | 1.1/16" | 56,70 | 20 1650 047 | 47 | 1.27/32" | 107,65 | 20 1650 067 | 67 | 2.41/64" | 169,10 | 20 1650 108 | 108 | 4.1/4" | 378,50 |
| 20 1650 028 | 28 | 1.7/64" | 56,70 | 20 1650 048 | 48 | 1.57/64" | 107,65 | 20 1650 068 | 68 | 2.43/64" | 169,10 | 20 1650 110 | 110 | 4.21/64" | 391,15 |
| 20 1650 029 | 29 | 1.9/64" | 56,70 | 20 1650 049 | 49 | 1.59/64" | 107,65 | 20 1650 069 | 69 | 2.23/32" | 169,10 | 20 1650 115 | 115 | 4.17/32" | 424,05 |
| 20 1650 030 | 30 | 1.3/16" | 56,70 | 20 1650 050 | 50 | 1.31/32" | 107,65 | 20 1650 070 | 70 | 2.3/4" | 169,10 | 20 1650 120 | 120 | 4.23/32" | 472,55 |
| 20 1650 031 | 31 | 1.7/32" | 68,45 | 20 1650 051 | 51 | 2.1/64" | 115,60 | 20 1650 072 | 72 | 2.53/64" | 188,30 | | | | |
| 20 1650 032 | 32 | 1.17/64" | 68,45 | 20 1650 052 | 52 | 2.3/64" | 115,60 | 20 1650 073 | 73 | 2.7/8" | 188,30 | | | | |
| 20 1650 033 | 33 | 1.19/64" | 68,45 | 20 1650 053 | 53 | 2.3/32" | 115,60 | 20 1650 074 | 74 | 2.29/32" | 188,30 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmesser. ·
Attention: The inch sizes do not correspond exactly to the mm diameters.

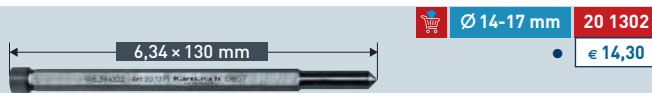
20 1650

HARD-LINE 80

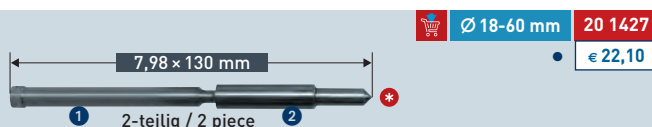
ZUBEHÖR · ACCESSORIES



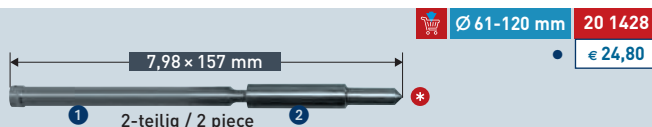
AUSWERFERSTIFTE 1 + 2-TEILIG
EJECTOR PINS 1 + 2-PIECE



Packnorm 2 Stk. · Packaging unit 2 pcs.



Packnorm 2 Stk. · Packaging unit 2 pcs.



Packnorm 2 Stk. · Packaging unit 2 pcs.

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG
APPLICATION EJECTOR PINS 2-PIECE



Anwendung:

Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:

Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

* Warum 2-teilige Auswerferstifte? In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn keine extra langen Aufnahmehalter verwendet werden (wie auf Seite 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

* Why use 2-part ejector pins? Usually, standard Morse taper holders have a cutting depth capacity of 50 mm. If no extra-long holders are used (e.g. as on page 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Einteilige Auswerferstifte siehe nächste Seite · One-piece ejector pins see next page

Schnittdaten
Cutting data

Film
Movie



1295




Zubehör für Hartmetall-bestückte Kernbohrer, Weldonschaft, Nutzlänge 80 mm
 Accessories for Carbide-tipped annular cutter, Weldon shank, drill depth 80 mm | 3"

HARD-LINE 80

20 1650

**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**

FEIN Quick-In 18 mm
 Weldon + Nitto/Universal 19 mm 3/4"



7,98 x 157 mm


1 2-teilig / 2 piece 2 *

20 1161 € 17,45

20 1436 € 25,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4"
 Weldon 19 mm 3/4"



7,98 x 157 mm

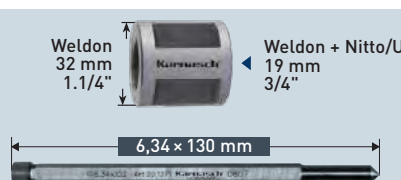
1 2-teilig / 2 piece 2 *

20 1314 € 16,30

20 1436 € 25,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 32 mm 1.1/4"
 Weldon + Nitto/Universal 19 mm 3/4"



6,34 x 130 mm

1-teilig / 1 piece

21 0048 € 14,15

20 1302 € 14,30

Packnorm 2 Stk. · Packaging unit 2 pcs.

7,98 x 130 mm

1 2-teilig / 2 piece 2 *

20 1427 € 22,10

Packnorm 2 Stk. · Packaging unit 2 pcs.

7,98 x 130 mm

1-teilig / 1 piece

20 1439 € 13,05

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 19 mm 3/4"
 Weldon 32 mm 1.1/4"



7,98 x 168 mm

1 2-teilig / 2 piece 2 *

20 1386 € 17,50

20 1486 € 27,80

Packnorm 2 Stk. · Packaging unit 2 pcs.

7,98 x 167 mm

1-teilig / 1 piece

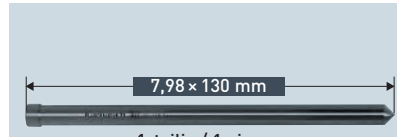
20 1408 € 14,55

Packnorm 2 Stk. · Packaging unit 2 pcs.

* Erklärung 1-teilige / 2-teilige Auswerferstifte beachten
 Please note explanation 1-part / 2-part pins

**AUSWERFERSTIFTE 1-TEILIG
 EJECTOR PINS 1-PIECE**

Ø 18-60 mm 20 1439 € 13,05

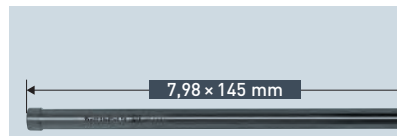


7,98 x 130 mm

1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ø 61-120 mm 20 1403 € 12,95



7,98 x 145 mm

1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522-523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522-523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

Weiteres Zubehör siehe Übersichtsseite 365
 Further accessories see overview page 365



20 1660

HARD-LINE / 110

Hartmetall-bestückter Kernbohrer, Weldonschaft, Nutzlänge 110 mm
Carbide-tipped annular cutter, Weldon shank, drill depth 110 mm | 4"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|--------|--------------|-------|-------------|--------|-------------|------|-------------|--------|
| 20 1660 014 | 14 | 35/64" | 66,20 | 20 1660 034 | 34 | 1.11/32" | 86,90 | 20 1660 054 | 54 | 2.1/8" | 158,20 | 20 1660 074 | 74 | 2.29/32" | 252,95 |
| 20 1660 015 | 15 | 19/32" | 66,20 | 20 1660 035 | 35 | 1.3/8" | 86,90 | 20 1660 055 | 55 | 2.11/64" | 158,20 | 20 1660 075 | 75 | 2.61/64" | 257,60 |
| 20 1660 016 | 16 | 5/8" | 66,20 | 20 1660 036 | 36 | 1.27/64" | 99,55 | 20 1660 055A | ☞ *55 | 2.11/64" | 83,65 | 20 1660 076 | 76 | 2.63/64" | 262,80 |
| 20 1660 017 | 17 | 43/64" | 66,20 | 20 1660 037 | 37 | 1.29/64" | 99,55 | 20 1660 056 | ☞ * | 2.13/64" | 173,25 | 20 1660 078 | 78 | 3.5/64" | 270,20 |
| 20 1660 018 | 18 | 45/64" | 66,20 | 20 1660 038 | 38 | 1.1/2" | 99,55 | 20 1660 057 | 57 | 2.1/4" | 173,25 | 20 1660 080 | 80 | 3.5/32" | 275,45 |
| 20 1660 019 | 19 | 3/4" | 66,20 | 20 1660 039 | 39 | 1.17/32" | 99,55 | 20 1660 058 | 58 | 2.9/32" | 173,25 | 20 1660 082 | 82 | 3.15/64" | 290,30 |
| 20 1660 020 | 20 | 25/32" | 66,20 | 20 1660 040 | 40 | 1.37/64" | 99,55 | 20 1660 059 | 59 | 2.21/64" | 173,25 | 20 1660 085 | 85 | 3.11/32" | 308,65 |
| 20 1660 021 | 21 | 53/64" | 66,20 | 20 1660 041 | 41 | 1.39/64" | 120,15 | 20 1660 060 | 60 | 2.23/64" | 173,25 | 20 1660 090 | 90 | 3.35/64" | 357,50 |
| 20 1660 022 | 22 | 55/64" | 66,20 | 20 1660 042 | 42 | 1.21/32" | 120,15 | 20 1660 061 | 61 | 2.13/32" | 205,50 | 20 1660 095 | 95 | 3.47/64" | 408,85 |
| 20 1660 023 | 23 | 29/32" | 66,20 | 20 1660 043 | 43 | 1.11/16" | 120,15 | 20 1660 062 | 62 | 2.7/16" | 205,50 | 20 1660 100 | 100 | 3.15/16" | 458,05 |
| 20 1660 024 | 24 | 15/16" | 66,20 | 20 1660 044 | 44 | 1.47/64" | 120,15 | 20 1660 063 | 63 | 2.31/64" | 205,50 | 20 1660 103 | 103 | 4.1/16" | 471,05 |
| 20 1660 025 | 25 | 63/64" | 66,20 | 20 1660 045 | 45 | 1.49/64" | 120,15 | 20 1660 064 | 64 | 2.33/64" | 205,50 | 20 1660 104 | 104 | 4.3/32" | 479,35 |
| 20 1660 026 | 26 | 1.1/32" | 72,15 | 20 1660 046 | 46 | 1.13/16" | 136,90 | 20 1660 065 | 65 | 2.9/16" | 205,50 | 20 1660 105 | 105 | 4.9/64" | 485,30 |
| 20 1660 027 | 27 | 1.1/16" | 72,15 | 20 1660 047 | 47 | 1.27/32" | 136,90 | 20 1660 066 | 66 | 2.19/32" | 228,25 | 20 1660 106 | 106 | 4.11/64" | 492,90 |
| 20 1660 028 | 28 | 1.7/64" | 72,15 | 20 1660 048 | 48 | 1.57/64" | 136,90 | 20 1660 067 | 67 | 2.41/64" | 228,25 | 20 1660 108 | 108 | 4.1/4" | 507,70 |
| 20 1660 029 | 29 | 1.9/64" | 72,15 | 20 1660 049 | 49 | 1.59/64" | 136,90 | 20 1660 068 | 68 | 2.43/64" | 228,25 | 20 1660 110 | 110 | 4.21/64" | 517,30 |
| 20 1660 030 | 30 | 1.3/16" | 72,15 | 20 1660 050 | 50 | 1.31/32" | 136,90 | 20 1660 069 | 69 | 2.23/32" | 228,25 | 20 1660 115 | 115 | 4.17/32" | 560,75 |
| 20 1660 031 | 31 | 1.7/32" | 86,90 | 20 1660 051 | 51 | 2.1/64" | 158,20 | 20 1660 070 | 70 | 2.3/4" | 241,70 | 20 1660 120 | 120 | 4.23/32" | 624,85 |
| 20 1660 032 | 32 | 1.17/64" | 86,90 | 20 1660 052 | 52 | 2.3/64" | 158,20 | 20 1660 072 | 72 | 2.53/64" | 247,50 | | | | |
| 20 1660 033 | 33 | 1.19/64" | 86,90 | 20 1660 053 | 53 | 2.3/32" | 158,20 | 20 1660 073 | 73 | 2.7/8" | 250,35 | | | | |

* Mit Weldon 32 mm Sonderpreis solange Vorrat reicht · With Weldon 32 mm special price as long as available

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern. · Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1660

HARD-LINE / 110

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE 1 + 2-TEILIG EJECTOR PINS 1 + 2-PIECE



1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.



2-teilig / 2 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.



2-teilig / 2 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG APPLICATION EJECTOR PINS 2-PIECE



Anwendung:

Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:

Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

* Warum 2-teilige Auswerferstifte? In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn keine extra langen Aufnahmehalter verwendet werden (wie auf Seite 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

* Why use 2-part ejector pins? Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If no extra-long holders are used (e.g. as on page 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Einteilige Auswerferstifte siehe nächste Seite · One-piece ejector pins see next page

Schnittdaten
Cutting data

Film
Movie



1295



Zubehör für Hartmetall-bestückte Kernbohrer, Weldonschaft, Nutzlänge 110 mm
 Accessories for Carbide-tipped annular cutter, Weldon shank, drill depth 110 mm | 4"

HARD-LINE 110 20 1660

**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**

FEIN Quick-In 18 mm | **Weldon + Nitto/Universal 19 mm 3/4"**

Ø 18-55 mm 20 1161
 • € 17,45

7,98 x 184 mm

1 2-teilig / 2 piece 2

20 1438
 • € 28,40

Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4" | **Weldon 19 mm 3/4"**

Ø 18-55 mm 20 1314
 • € 16,30

7,98 x 184 mm

1 2-teilig / 2 piece 2

20 1438
 • € 28,40

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 32 mm 1.1/4" | **Weldon + Nitto/Universal 19 mm 3/4"**

21 0048
 • € 14,15

6,34 x 160 mm

1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ø 14-17 mm 20 1304
 • € 15,75

7,98 x 160 mm

1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ø 18-55 mm 20 1399
 • € 14,30

7,98 x 157 mm

1 2-teilig / 2 piece 2

20 1428
 • € 24,80

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 19 mm 3/4" | **Weldon 32 mm 1.1/4"**

Ø 56-120 mm 20 1386
 • € 17,50

7,98 x 205 mm

1 2-teilig / 2 piece 2

20 1152
 • € 36,75

Packnorm 2 Stk. · Packaging unit 2 pcs.

7,98 x 205 mm

1-teilig / 1 piece

20 1429
 • € 16,00

Packnorm 2 Stk. · Packaging unit 2 pcs.

* Erklärung 1-teilige / 2-teilige Auswerferstifte beachten
 Please note explanation 1-part / 2-part pins

**AUSWERFERSTIFTE 1-TEILIG
 EJECTOR PINS 1-PIECE**

Ø 18-55 mm 20 1399
 • € 14,30

7,98 x 160 mm

1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ø 56-120 mm 20 1408
 • € 14,55

7,98 x 167 mm

1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522-523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522-523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

Weiteres Zubehör siehe Übersichtsseite 365
 Further accessories see overview page 365



20 1665

HARD-LINE / 150

Hartmetall-bestückter Kernbohrer, Weldonschaft, Nutzlänge 150 mm
Carbide-tipped annular cutter, Weldon shank, drill depth 150 mm | 5.29/32"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|------------------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



| Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € |
|-------------|------|---------|--------|-------------|------|----------|--------|-------------|------|----------|--------|-------------|------|----------|--------|
| 20 1665 018 | 18 | 45/64" | 108,50 | 20 1665 030 | 30 | 1.3/16" | 118,50 | 20 1665 042 | 42 | 1.21/32" | 191,05 | 20 1665 054 | 54 | 2.1/8" | 214,25 |
| 20 1665 019 | 19 | 3/4" | 108,50 | 20 1665 031 | 31 | 1.7/32" | 142,60 | 20 1665 043 | 43 | 1.11/16" | 191,05 | 20 1665 055 | 55 | 2.11/64" | 214,25 |
| 20 1665 020 | 20 | 25/32" | 108,50 | 20 1665 032 | 32 | 1.17/64" | 142,60 | 20 1665 044 | 44 | 1.47/64" | 191,05 | 20 1665 056 | 56 | 2.13/64" | 244,85 |
| 20 1665 021 | 21 | 53/64" | 108,50 | 20 1665 033 | 33 | 1.19/64" | 142,60 | 20 1665 045 | 45 | 1.49/64" | 191,05 | 20 1665 057 | 57 | 2.1/4" | 244,85 |
| 20 1665 022 | 22 | 55/64" | 108,50 | 20 1665 034 | 34 | 1.11/32" | 142,60 | 20 1665 046 | 46 | 1.13/16" | 217,40 | 20 1665 058 | 58 | 2.9/32" | 244,85 |
| 20 1665 023 | 23 | 29/32" | 108,50 | 20 1665 035 | 35 | 1.3/8" | 142,60 | 20 1665 047 | 47 | 1.27/32" | 217,40 | 20 1665 059 | 59 | 2.21/64" | 244,85 |
| 20 1665 024 | 24 | 15/16" | 108,50 | 20 1665 036 | 36 | 1.27/64" | 163,10 | 20 1665 048 | 48 | 1.57/64" | 191,05 | 20 1665 060 | 60 | 2.23/64" | 244,85 |
| 20 1665 025 | 25 | 63/64" | 108,50 | 20 1665 037 | 37 | 1.29/64" | 163,10 | 20 1665 049 | 49 | 1.59/64" | 191,05 | | | | |
| 20 1665 026 | 26 | 1.1/32" | 118,50 | 20 1665 038 | 38 | 1.1/2" | 163,10 | 20 1665 050 | 50 | 1.31/32" | 191,05 | | | | |
| 20 1665 027 | 27 | 1.1/16" | 118,50 | 20 1665 039 | 39 | 1.17/32" | 163,10 | 20 1665 051 | 51 | 2.1/64" | 214,25 | | | | |
| 20 1665 028 | 28 | 1.7/64" | 118,50 | 20 1665 040 | 40 | 1.37/64" | 163,10 | 20 1665 052 | 52 | 2.3/64" | 214,25 | | | | |
| 20 1665 029 | 29 | 1.9/64" | 118,50 | 20 1665 041 | 41 | 1.39/64" | 191,05 | 20 1665 053 | 53 | 2.3/32" | 214,25 | | | | |

20 1665

HARD-LINE / 150

ZUBEHÖR · ACCESSORIES

**AUSWERFERSTIFTE 1 + 2-TEILIG
EJECTOR PINS 1 + 2-PIECE**

7,98 x 205 mm **Ø 18-19 mm** **20 1429**
• € 16,00

1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

7,98 x 160 mm **20 1399**
• € 14,30

1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

7,98 x 205 mm **Ø 20-54 mm** **20 1152**
• € 36,75

2-teilig / 2 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

7,98 x 221,5 mm **Ø 55-60 mm** **20 1124**
• € 51,35

2-teilig / 2 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

**ANWENDUNG AUSWERFERSTIFTE 1-TEILIG Ø 18-19 mm
APPLICATION EJECTOR PINS 1-PIECE Ø 18-19 mm**

Verwenden Sie Auswerferstifte Art. 20 1429 und bohren Sie bis ca. 80 mm Tiefe

Mount pin Art. 20 1429 into the cutter and drill up to 80 mm cutting depth



Entfernen Sie den Kernbohrer aus der Maschine und wechseln Sie auf Auswerferstift Art. 20 1399 und bohren Sie bis zu 150 mm Tiefe weiter.

Take off the cutter and use pin Art. 20 1399 and continue drilling up to 150 mm cutting depth.

**ANWENDUNG AUSWERFERSTIFTE 2-TEILIG
APPLICATION EJECTOR PINS 2-PIECE**



Anwendung:

Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 80 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren bis zu 150 mm Schnitttiefe.

Application:

Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 80 mm cutting depth. Then remove piece 2 and continue drilling up to cutting depth 150 mm.

ACHTUNG: Die Anwendung dieser 1+2-teiligen Auswerferstifte funktioniert nur mit extra langen Aufnahmen mit Morsekegel siehe Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 Seite 522/523

ATTENTION: The use of these 1+2-part ejector pins works only with extra long morse taper holders see Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 page 522/523

Schnittdaten
Cutting data

Film
Movie



1295



Index

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20 1930

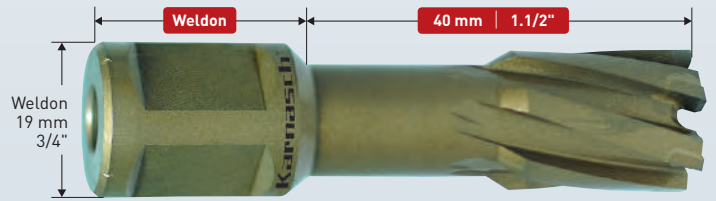
HARD-LINE
ZOLL / INCH **40**

Hartmetall-bestückter Kernbohrer, Weldonchaft, Nutzlänge 40 mm
Carbide-tipped annular cutter, Weldon shank, drill depth 40 mm | 1.1/2"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|------------|-------|-------------|-------|-----------|-------|-------------|-------|
| • 1/2" | 12,70 | 20 1930 010 | 26,90 | • 1" | 25,40 | 20 1930 050 | 29,30 | • 1.1/2" | 38,10 | 20 1930 090 | 41,85 | • 2" | 50,80 | 20 1930 130 | 62,20 |
| • 9/16" | 14,28 | 20 1930 015 | 28,50 | • 1.1/16" | 26,98 | 20 1930 055 | 30,95 | • 1.9/16" | 39,68 | 20 1930 095 | 41,85 | • 2.1/16" | 52,38 | 20 1930 135 | 63,70 |
| • 5/8" | 15,87 | 20 1930 020 | 28,50 | • 1.1/8" | 28,57 | 20 1930 060 | 30,95 | • 1.5/8" | 41,27 | 20 1930 100 | 50,50 | | | | |
| • 11/16" | 17,46 | 20 1930 025 | 28,50 | • 1.3/16" | 30,13 | 20 1930 065 | 30,95 | • 1.11/16" | 42,86 | 20 1930 105 | 50,50 | | | | |
| • 3/4" | 19,04 | 20 1930 030 | 28,50 | • 1.1/4" | 31,75 | 20 1930 070 | 36,55 | • 1.3/4" | 44,45 | 20 1930 110 | 50,50 | | | | |
| • 13/16" | 20,63 | 20 1930 035 | 29,30 | • 1.5/16" | 33,33 | 20 1930 075 | 36,55 | • 1.13/16" | 46,03 | 20 1930 115 | 54,15 | | | | |
| • 7/8" | 22,22 | 20 1930 040 | 29,30 | • 1.3/8" | 34,92 | 20 1930 080 | 36,55 | • 1.7/8" | 47,62 | 20 1930 120 | 54,15 | | | | |
| • 15/16" | 23,81 | 20 1930 045 | 29,30 | • 1.7/16" | 36,51 | 20 1930 085 | 41,80 | • 1.15/16" | 49,21 | 20 1930 125 | 54,15 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Attention: The inch sizes do not correspond exactly to the mm diameters.

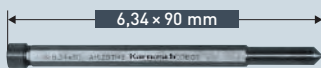
20 1930

HARD-LINE
ZOLL / INCH **40**

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE · EJECTOR PINS



Packnorm 2 Stk. · Packaging unit 2 pcs.

1/2"-11/16" 20 1149 € 7,90



Packnorm 2 Stk. · Packaging unit 2 pcs.

3/4"-2.1/16" 20 1151 € 8,50

20 1930

HARD-LINE
ZOLL / INCH **40**

SETS / DISPLAYS Seite / Page 536



Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1930 HARD-LINE40 – siehe Seite 536. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1930 HARD-LINE40 – see page 536. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data



1295

Film
Movie

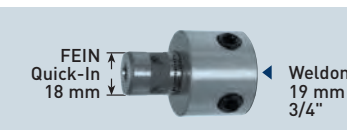


- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

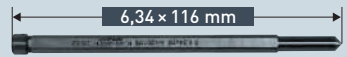
Zubehör für Hartmetall-bestückte Kernbohrer, Weldonschaft, Nutzlänge 40 mm
 Accessories for carbide-tipped annular cutter, Weldon shank, drill depth 40 mm | 1.1/2"

HARD-LINE 40 20 1930
 ZOLL / INCH

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS


 FEIN Quick-In 18 mm Weldon + Nitto/Universal 19 mm 3/4"

• **20 1263** € 17,50


 6,34 x 116 mm

• **20 1318** € 8,30

Packnorm 2 Stk. · Packaging unit 2 pcs.

 FEIN Quick-In 18 mm Weldon + Nitto/Universal 19 mm 3/4"

• **20 1161** € 17,45

 7,98 x 118 mm

• **20 1272** € 13,95

Packnorm 2 Stk. · Packaging unit 2 pcs.

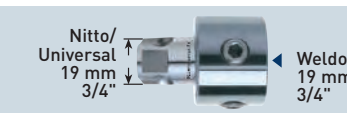
 Nitto/Universal 19 mm 3/4" Weldon 19 mm 3/4"

• **20 1311** € 16,30


 6,34 x 116 mm

• **20 1318** € 8,30

Packnorm 2 Stk. · Packaging unit 2 pcs.


 Nitto/Universal 19 mm 3/4" Weldon 19 mm 3/4"

• **20 1314** € 16,30

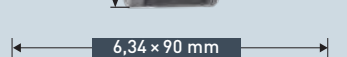
 7,98 x 118 mm

• **20 1272** € 13,95

Packnorm 2 Stk. · Packaging unit 2 pcs.

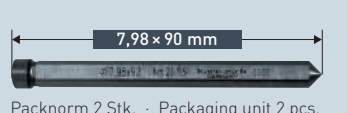
 Weldon 32 mm 1.1/4" Weldon + Nitto/Universal 19 mm 3/4"

• **21 0048** € 14,15


 6,34 x 90 mm

• **20 1149** € 7,90

Packnorm 2 Stk. · Packaging unit 2 pcs.

 Weldon 32 mm 1.1/4" Weldon + Nitto/Universal 19 mm 3/4"

• **20 1151** € 8,50

 7,98 x 90 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

Weiteres Zubehör siehe Übersichtsseite 365
 Further accessories see overview page 365

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS


 35 mm Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"

• **20 1387** € 18,95

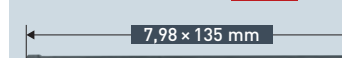
 7,98 x 6,34 x 5,30 x 140 mm

• **20 1390** € 15,70

Packnorm 2 Stk. · Packaging unit 2 pcs.

 35 mm Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"

• **20 1387** € 18,95

 7,98 x 135 mm

• **20 1393** € 13,70

Packnorm 2 Stk. · Packaging unit 2 pcs.

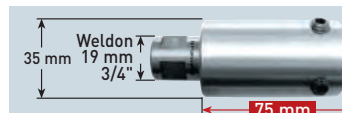
 35 mm Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"

• **20 1402** € 20,95

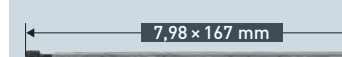
 7,98 x 6,34 x 5,30 x 165 mm

• **20 1405** € 17,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

 35 mm Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"

• **20 1402** € 20,95

 7,98 x 167 mm

• **20 1408** € 14,55

Packnorm 2 Stk. · Packaging unit 2 pcs.

 35 mm Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"

• **20 1417** € 24,95

 7,98 x 6,34 x 5,30 x 190 mm

• **20 1420** € 17,60

Packnorm 2 Stk. · Packaging unit 2 pcs.

 35 mm Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"

• **20 1417** € 24,95

 7,98 x 190 mm

• **20 1423** € 16,15

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 365
 Further accessories see overview page 365



20 1940

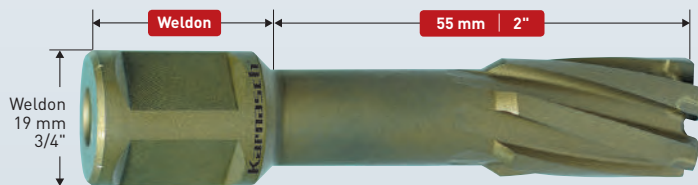
HARD-LINE
ZOLL / INCH **55**

Hartmetall-bestückter Kernbohrer, Weldonchaft, Nutzlänge 55 mm
Carbide-tipped annular cutter, Weldon shank, drill depth 55 mm | 2"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|------------|-------|-------------|-------|-----------|-------|-------------|-------|
| • 1/2" | 12,70 | 20 1940 010 | 31,50 | • 1" | 25,40 | 20 1940 050 | 32,50 | • 1.1/2" | 38,10 | 20 1940 090 | 46,30 | • 2" | 50,80 | 20 1940 130 | 69,00 |
| • 9/16" | 14,28 | 20 1940 015 | 31,50 | • 1.1/16" | 26,98 | 20 1940 055 | 34,45 | • 1.9/16" | 39,68 | 20 1940 095 | 46,30 | • 2.1/16" | 52,38 | 20 1940 135 | 70,60 |
| • 5/8" | 15,87 | 20 1940 020 | 31,50 | • 1.1/8" | 28,57 | 20 1940 060 | 34,45 | • 1.5/8" | 41,27 | 20 1940 100 | 55,90 | | | | |
| • 11/16" | 17,46 | 20 1940 025 | 31,50 | • 1.3/16" | 30,13 | 20 1940 065 | 34,45 | • 1.11/16" | 42,86 | 20 1940 105 | 55,90 | | | | |
| • 3/4" | 19,04 | 20 1940 030 | 31,50 | • 1.1/4" | 31,75 | 20 1940 070 | 40,55 | • 1.3/4" | 44,45 | 20 1940 110 | 55,90 | | | | |
| • 13/16" | 20,63 | 20 1940 035 | 32,50 | • 1.5/16" | 33,33 | 20 1940 075 | 40,55 | • 1.13/16" | 46,03 | 20 1940 115 | 60,10 | | | | |
| • 7/8" | 22,22 | 20 1940 040 | 32,50 | • 1.3/8" | 34,92 | 20 1940 080 | 40,55 | • 1.7/8" | 47,62 | 20 1940 120 | 60,10 | | | | |
| • 15/16" | 23,81 | 20 1940 045 | 32,50 | • 1.7/16" | 36,51 | 20 1940 085 | 46,25 | • 1.15/16" | 49,21 | 20 1940 125 | 60,10 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1940

HARD-LINE
ZOLL / INCH **55**

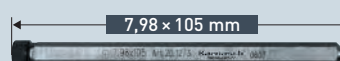
ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



1/2"-11/16" 20 1271
€ 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.



3/4"-2.1/16" 20 1273
€ 14,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1940

HARD-LINE
ZOLL / INCH **55**

SETS / DISPLAYS Seite / Page 537

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1940 HARD-LINE55 – siehe Seite 537. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1940 HARD-LINE55 – see page 537. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



1295

Zubehör für Hartmetall-bestückte Kernbohrer, Weldonschaft, Nutzlänge 55 mm
 Accessories for carbide-tipped annular cutter, Weldon shank, drill depth 55 mm | 2"

HARD-LINE 55 20 1940
 ZOLL / INCH

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

 FEIN Quick-In 18 mm
 Weldon + Nitto/Universal 19 mm 3/4"

1/2"-11/16" **20 1263**
 • € 17,50

 **6,34 x 130 mm**
20 1160
 • € 9,20

Packnorm 2 Stk. · Packaging unit 2 pcs.

 FEIN Quick-In 18 mm
 Weldon + Nitto/Universal 19 mm 3/4"

3/4"-2.1/16" **20 1161**
 • € 17,45

 **7,98 x 130 mm**
20 1439
 • € 13,05

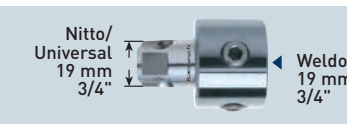
Packnorm 2 Stk. · Packaging unit 2 pcs.

 Nitto/Universal 19 mm 3/4"
 Weldon 19 mm 3/4"

1/2"-11/16" **20 1311**
 • € 16,30

 **6,34 x 130 mm**
20 1160
 • € 9,20


Packnorm 2 Stk. · Packaging unit 2 pcs.

 Nitto/Universal 19 mm 3/4"
 Weldon 19 mm 3/4"


3/4"-2.1/16" **20 1314**
 • € 16,30

 **7,98 x 130 mm**
20 1439
 • € 13,05

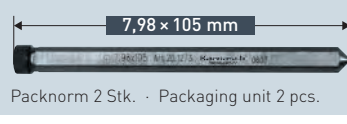
Packnorm 2 Stk. · Packaging unit 2 pcs.

 Weldon 32 mm 1.1/4"
 Weldon + Nitto/Universal 19 mm 3/4"


1/2"-11/16" **21 0048**
 • € 14,15

 **6,34 x 102 mm**
20 1271
 • € 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

 Weldon 32 mm 1.1/4"
 Weldon + Nitto/Universal 19 mm 3/4"

3/4"-2.1/16" **20 1273**
 • € 14,65

 **7,98 x 105 mm**
20 1273
 • € 14,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

Weiteres Zubehör siehe Übersichtsseite 365
 Further accessories see overview page 365

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS

 Weldon 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"

1/2"-11/16" **20 1387**
 • € 18,95

 **7,98 x 6,34 x 5,30 x 153 mm**
20 1396
 • € 16,45

Packnorm 2 Stk. · Packaging unit 2 pcs.

 Weldon 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"

3/4"-2.1/16" **20 1387**
 • € 18,95

 **7,98 x 160 mm**
20 1399
 • € 14,30

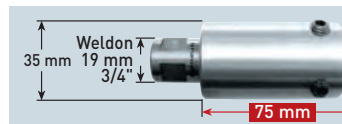
Packnorm 2 Stk. · Packaging unit 2 pcs.

 Weldon 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"


1/2"-11/16" **20 1402**
 • € 20,95

 **7,98 x 6,34 x 5,30 x 178 mm**
20 1411
 • € 17,05

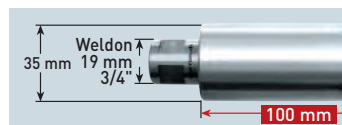
Packnorm 2 Stk. · Packaging unit 2 pcs.

 Weldon 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"

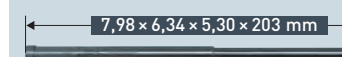
3/4"-2.1/16" **20 1402**
 • € 20,95

 **7,98 x 180 mm**
20 1414
 • € 15,55

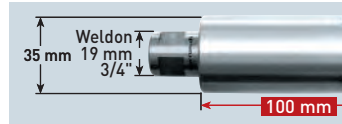
Packnorm 2 Stk. · Packaging unit 2 pcs.

 Weldon 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"


1/2"-11/16" **20 1417**
 • € 24,95

 **7,98 x 6,34 x 5,30 x 203 mm**
20 1426
 • € 18,35

Packnorm 2 Stk. · Packaging unit 2 pcs.

 Weldon 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"

3/4"-2.1/16" **20 1417**
 • € 24,95

 **7,98 x 205 mm**
20 1429
 • € 16,00

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 365
 Further accessories see overview page 365



20 1970

HARD-LINE
ZOLL / INCH **80**

Hartmetall-bestückter Kernbohrer, Weldonschaft, Nutzlänge 80 mm
Carbide-tipped annular cutter, Weldon shank, drill depth 80 mm | 3"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|------------|-------|-------------|-------|------------|-------|-------------|--------|
| • 11/16" | 17,46 | 20 1970 025 | 52,00 | • 1.1/16" | 26,98 | 20 1970 055 | 56,70 | • 1.7/16" | 36,51 | 20 1970 085 | 78,10 | • 1.13/16" | 46,03 | 20 1970 115 | 107,65 |
| • 3/4" | 19,04 | 20 1970 030 | 52,00 | • 1.1/8" | 28,57 | 20 1970 060 | 56,70 | • 1.1/2" | 38,10 | 20 1970 090 | 78,10 | • 1.7/8" | 47,62 | 20 1970 120 | 107,65 |
| • 13/16" | 20,63 | 20 1970 035 | 52,00 | • 1.3/16" | 30,13 | 20 1970 065 | 56,70 | • 1.9/16" | 39,68 | 20 1970 095 | 78,10 | • 1.15/16" | 49,21 | 20 1970 125 | 107,65 |
| • 7/8" | 22,22 | 20 1970 040 | 52,00 | • 1.1/4" | 31,75 | 20 1970 070 | 68,45 | • 1.5/8" | 41,27 | 20 1970 100 | 94,40 | • 2" | 50,80 | 20 1970 130 | 121,15 |
| • 15/16" | 23,81 | 20 1970 045 | 52,00 | • 1.5/16" | 33,33 | 20 1970 075 | 68,45 | • 1.11/16" | 42,86 | 20 1970 105 | 94,40 | • 2.1/16" | 52,38 | 20 1970 135 | 124,00 |
| • 1" | 25,40 | 20 1970 050 | 56,70 | • 1.3/8" | 34,92 | 20 1970 080 | 68,45 | • 1.3/4" | 44,45 | 20 1970 110 | 94,40 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1970

HARD-LINE
ZOLL / INCH **80**

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE 1-TEILIG · EJECTOR PINS 1-PIECE

20 1439
€ 13,05



1-teilig / 1 piece

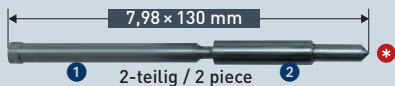
Packnorm 2 Stk. · Packaging unit 2 pcs.

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522–523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522–523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

AUSWERFERSTIFTE 2-TEILIG EJECTOR PINS 2-PIECE

20 1427
€ 22,10



2-teilig / 2 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG APPLICATION EJECTOR PINS 2-PIECE



Anwendung:

Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:

Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

• **Warum 2-teilige Auswerferstifte?** In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn **keine extra langen** Aufnahmehalter verwendet werden (wie auf Seite 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

• **Why use 2-part ejector pins?** Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If **no extra-long** holders are used (e.g. as on page 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Schnittdaten
Cutting data

Film
Movie




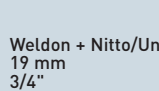
1295




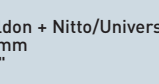
Zubehör für Hartmetall-bestückte Kernbohrer, Weldonschaft, Nutzlänge 80 mm
 Accessories for carbide-tipped annular cutter, Weldon shank, drill depth 80 mm | 3"


HARD-LINE 80 20 1970
 ZOLL / INCH


ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

FEIN Quick-In 18 mm  Weldon + Nitto/Universal 19 mm 3/4"  **20 1161**
 • € 17,45

7,98 x 157 mm  **20 1436**
 • € 25,65
 1 2-teilig / 2 piece 2
 Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 32 mm 1.1/4"  Weldon + Nitto/Universal 19 mm 3/4"  **21 0048**
 • € 14,15

7,98 x 130 mm  **20 1439**
 • € 13,05
 1-teilig / 1 piece
 Packnorm 2 Stk. · Packaging unit 2 pcs.

7,98 x 130 mm  **20 1427**
 • € 22,10
 1 2-teilig / 2 piece 2
 Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530


ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen  **521-523**
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves


Kühlmittel-Druckflaschen  **528**
 Coolant pressure bottles

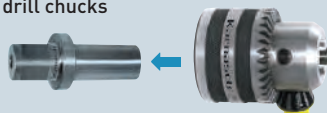
Kegelsenker mit Weldonschaft  **524/525**
 Countersinks with Weldon shank

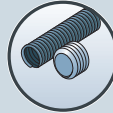
Magnetstab zur Entfernung der Bohrspäne  **529**
 Magnetic stick for chip removal

Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm  **622**
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm

Sets · Displays  **534-561**
 Sets · Displays

Gewindeadapter Weldon + Gewindebohrer M 3 - M 30  **623-624**
 Tapping adapter Weldon + taps M 3 - M 30

Adapter + passende Bohrfutter  **528**
 Adapters + suitable drill chucks

Ersatzteile  **530-532**
 Spare parts



HARDOX / HARTE STÄHLE KERNBOHRER HARDOX / HARD STEEL ANNULAR CUTTER



HARDOX-LINE

Der beste Kernbohrer zum Bohren in:

- Hardox 400, 450, 500
- Harte Stähle ab 30 HRC bis 50 HRC

Speziell entwickeltes Hartmetall sowie optimierte Geometrie ergeben exzellente Ergebnisse beim Bohren von HARDOX / HARTE STÄHLE (unbedingt Schnittparameter beachten).

The best annular cutter for drilling in:

- Hardox 400, 450, 500
- Hard steels from 30 HRC up to 50 HRC

Specially developed carbide as well as optimized geometry results in excellent performance for drilling in HARDOX / HARD STEEL (absolutely observe cutting parameters).

EIGENSCHAFTEN · PROPERTIES



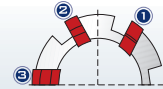
Karnasch HARDOX-LINE Kernbohrer werden mit konischer Spirale gefertigt für sauberen Spanfluss und höchste Zerspanleistung.

Karnasch HARDOX-LINE annular cutters are made with a conical helix for clean chip flow and highest cutting ability.



Karnasch HARDOX-LINE Kernbohrer kommen mit optimiertem Hartmetall zum Bohren in HARDOX und HARTE STÄHLE.

Karnasch HARDOX-LINE annular cutters come with optimized carbide tipped teeth material for excellent results drilling in HARDOX and HARD STEEL.



Karnasch HARDOX-LINE Kernbohrer sind in einer aufwendigen Vor-/Mittel-/Nachschneider-Geometrie gefertigt. Dies ergibt: ratterfreies, ruhiges und leichtes Zerspanen mit höchsten Standzeiten.

Karnasch HARDOX-LINE annular cutters are made in an elaborate pre-/intermediate-/after-cutting geometry. This results in: clatter-free, silent and easy cutting with highest lifetimes.

ANWENDUNG · APPLICATION



Hardox
400, 450, 500

Hardox
400, 450, 500



Harter Stahl
ab 30 HRC
bis 50 HRC

Hard steel
from 30 HRC
up to 50 HRC



ACHTUNG:

Maximal empfohlene Schnitttiefe bei Hardox:
Art. 20 1680 = 20 mm
Art. 20 1690 = 35 mm
Unbedingt Schnittparameter beachten,
siehe Seite 1298-1299

ATTENTION:

Maximum recommended cutting depth for
Hardox:
Art. 20 1680 = 20 mm
Art. 20 1690 = 35 mm
Be sure to observe cutting parameters,
see page 1298-1299



OPTIMAL · OPTIMAL



GUT · GOOD

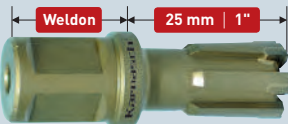
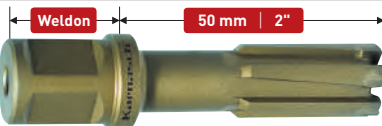


MÖGLICH · POSSIBLE

HARDOX / HARTE STÄHLE KERNBOHRER HARDOX / HARD STEEL ANNULAR CUTTER


HARDOX-LINE

Schnitttiefe · Drill depths

| | Ø mm | Ø Zoll/Inch | Art. / Type | |
|---|-------|----------------|-----------------------------------|-----|
|  <p>Weldon 25 mm 1"</p> | 14-40 | 35/64-1.37/64" | 20 1680 HARDOX-LINE /25 | 384 |
|  <p>Weldon 50 mm 2"</p> | 14-60 | 35/64-2.23/64" | 20 1690 HARDOX-LINE /50 | 386 |

Größere Ø und Schnitttiefen auf Anfrage · Larger Ø and drill depths on request

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen  521-523

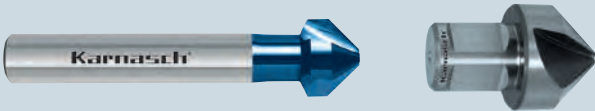
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves




Kegelsenker

 633


Countersinks



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm  622


Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



Gewindeadapter Weldon + Gewindebohrer M 3 - M 30  623-624


Tapping adapter Weldon + taps M 3 - M 30



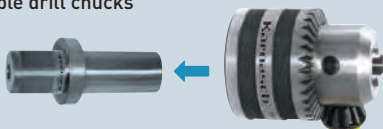
Vollhartmetall Gewindebohrer-Ausbohrer  628


Solid carbide drills to remove jammed taps



Adapter + passende Bohrfutter  528


Adapters + suitable drill chucks



Kühlmittel-Druckflaschen  528


Coolant pressure bottles



Magnetstab zur Entfernung der Bohrspäne  529


Magnetic stick for chip removal



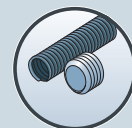
Sets · Displays  534-561

Sets · Displays



Ersatzteile  530-532

Spare parts



1



2



3



4



5



6



7



8



9



Index

20 1680

HARDOX-LINE 25

Hartmetall-bestückter Kernbohrer, Weldonschaft, Nutzlänge 25 mm
Carbide-tipped annular cutter, Weldon shank, drill depth 25 mm | 1"



ANWENDUNG · APPLICATION

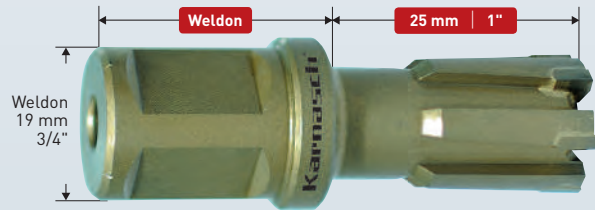


Hardox
400, 450, 500



Harter Stahl
ab 30 HRC bis
50 HRC

Hard steel
from 30 HRC up
to 50 HRC



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 20 1680 014 | 14 | 35/64" | 48,40 | 20 1680 022 | 22 | 55/64" | 48,40 | 20 1680 030 | 30 | 1.3/16" | 53,30 | 20 1680 038 | 38 | 1.1/2" | 63,70 |
| 20 1680 015 | 15 | 19/32" | 48,40 | 20 1680 023 | 23 | 29/32" | 48,40 | 20 1680 031 | 31 | 1.7/32" | 59,30 | 20 1680 039 | 39 | 1.17/32" | 63,70 |
| 20 1680 016 | 16 | 5/8" | 48,40 | 20 1680 024 | 24 | 15/16" | 48,40 | 20 1680 032 | 32 | 1.17/64" | 59,30 | 20 1680 040 | 40 | 1.37/64" | 63,70 |
| 20 1680 017 | 17 | 43/64" | 48,40 | 20 1680 025 | 25 | 63/64" | 48,40 | 20 1680 033 | 33 | 1.19/64" | 59,30 | | | | |
| 20 1680 018 | 18 | 45/64" | 48,40 | 20 1680 026 | 26 | 1.1/32" | 53,25 | 20 1680 034 | 34 | 1.11/32" | 59,30 | | | | |
| 20 1680 019 | 19 | 3/4" | 48,40 | 20 1680 027 | 27 | 1.1/16" | 53,30 | 20 1680 035 | 35 | 1.3/8" | 59,30 | | | | |
| 20 1680 020 | 20 | 25/32" | 48,40 | 20 1680 028 | 28 | 1.7/64" | 53,30 | 20 1680 036 | 36 | 1.27/64" | 63,70 | | | | |
| 20 1680 021 | 21 | 53/64" | 48,40 | 20 1680 029 | 29 | 1.9/64" | 53,30 | 20 1680 037 | 37 | 1.29/64" | 63,70 | | | | |

Größere Ø siehe Art. 20 1690 Seite 386 · Maximal empfohlene Schnitttiefe bei Hardox = 20 mm ·
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

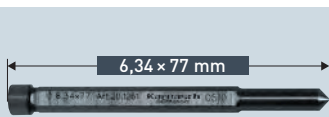
Larger Ø see Art. 20 1690 page 386 · Maximum recommended cutting depth for Hardox = 20 mm ·
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1680

HARDOX-LINE 25

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



Ø 12-40 mm 20 1261
€ 6,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

SETS / DISPLAYS

20 1344
€ 102,05

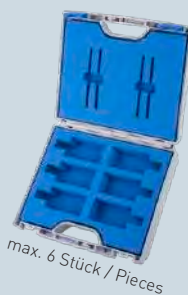
20 1138
€ 13,15

20 1132
€ 26,10

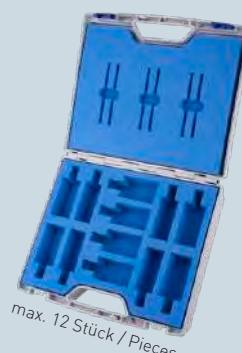
20 1139
€ 61,65



max. 44 Stück / Pieces



max. 6 Stück / Pieces



max. 12 Stück / Pieces



max. 50 Stück / Pieces

Sie möchten Ihren Inhalt selbst aussuchen?
Kein Problem. Kontaktieren Sie uns und wir stellen Ihr Wunsch-Set oder Wunsch-Display zusammen.

You would like to select your own contents?
No Problem. Contact us and we create your individual set or display.

Schnittdaten
Cutting data

Film
Movie



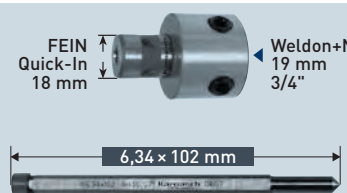
1298-1299

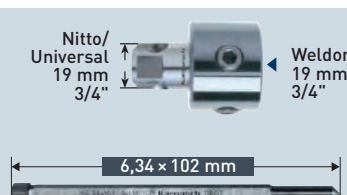
Zubehör für Hartmetall-bestückte Kernbohrer, Weldonschaft, Nutzlänge 25 mm
 Accessories for carbide-tipped annular cutter, Weldon shank, drill depth 25 mm | 1"


HARDOX-LINE 25

20 1680

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

FEIN Quick-In 18 mm
 Weldon+Nitto/Universal 19 mm 3/4"

 6,34 x 102 mm
 Packnorm 2 Stk. · Packaging unit 2 pcs.
 20 1263
 € 17,50

Nitto/Universal 19 mm 3/4"
 Weldon 19 mm 3/4"

 6,34 x 102 mm
 Packnorm 2 Stk. · Packaging unit 2 pcs.
 20 1311
 € 16,30

Weldon 32 mm 1.1/4"
 Weldon + Nitto/Universal 19 mm 3/4"

 6,34 x 77 mm
 Packnorm 2 Stk. · Packaging unit 2 pcs.
 21 0048
 € 14,15

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

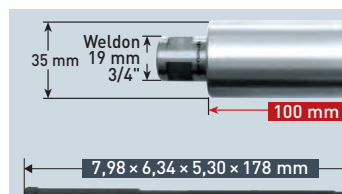
VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS

35 mm Weldon 19 mm 3/4"
 Weldon+Nitto/Universal 19 mm 3/4"

 50 mm
 7,98 x 6,34 x 5,30 x 127 mm
 Packnorm 2 Stk. · Packaging unit 2 pcs.
 20 1387
 € 18,95

35 mm Weldon 19 mm 3/4"
 Weldon+Nitto/Universal 19 mm 3/4"

 75 mm
 7,98 x 6,34 x 5,30 x 153 mm
 Packnorm 2 Stk. · Packaging unit 2 pcs.
 20 1402
 € 20,95

35 mm Weldon 19 mm 3/4"
 Weldon+Nitto/Universal 19 mm 3/4"

 100 mm
 7,98 x 6,34 x 5,30 x 178 mm
 Packnorm 2 Stk. · Packaging unit 2 pcs.
 20 1417
 € 24,95

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 491
 Further accessories see overview page 491



20 1690

HARDOX-LINE 50

Hartmetall-bestückter Kernbohrer, Weldonschaft, Nutzlänge 50 mm
Carbide-tipped annular cutter, Weldon shank, drill depth 50 mm | 2"



ANWENDUNG · APPLICATION

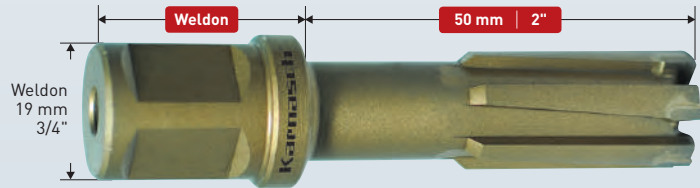


Hardox
400, 450, 500



Harter Stahl
ab 30 HRC bis
50 HRC

Hard steel
from 30 HRC up
to 50 HRC



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|--------|
| 20 1690 014 | • 14 | 35/64" | 55,70 | 20 1690 026 | • 26 | 1.1/32" | 61,20 | 20 1690 038 | • 38 | 1.1/2" | 73,30 | 20 1690 050 | • 50 | 1.31/32" | 86,55 |
| 20 1690 015 | • 15 | 19/32" | 55,70 | 20 1690 027 | • 27 | 1.1/16" | 61,30 | 20 1690 039 | • 39 | 1.17/32" | 73,30 | 20 1690 051 | • 51 | 2.1/64" | 101,35 |
| 20 1690 016 | • 16 | 5/8" | 55,70 | 20 1690 028 | • 28 | 1.7/64" | 61,30 | 20 1690 040 | • 40 | 1.37/64" | 73,30 | 20 1690 052 | • 52 | 2.3/64" | 101,35 |
| 20 1690 017 | • 17 | 43/64" | 55,70 | 20 1690 029 | • 29 | 1.9/64" | 61,30 | 20 1690 041 | • 41 | 1.39/64" | 80,55 | 20 1690 053 | • 53 | 2.3/32" | 101,35 |
| 20 1690 018 | • 18 | 45/64" | 55,70 | 20 1690 030 | • 30 | 1.3/16" | 61,30 | 20 1690 042 | • 42 | 1.21/32" | 80,55 | 20 1690 054 | • 54 | 2.1/8" | 101,35 |
| 20 1690 019 | • 19 | 3/4" | 55,70 | 20 1690 031 | • 31 | 1.7/32" | 68,20 | 20 1690 043 | • 43 | 1.11/16" | 80,55 | 20 1690 055 | • 55 | 2.11/64" | 101,35 |
| 20 1690 020 | • 20 | 25/32" | 55,70 | 20 1690 032 | • 32 | 1.17/64" | 68,20 | 20 1690 044 | • 44 | 1.47/64" | 80,55 | 20 1690 056 | • 56 | 2.13/64" | 115,70 |
| 20 1690 021 | • 21 | 53/64" | 55,70 | 20 1690 033 | • 33 | 1.19/64" | 68,20 | 20 1690 045 | • 45 | 1.49/64" | 80,55 | 20 1690 057 | • 57 | 2.1/4" | 115,70 |
| 20 1690 022 | • 22 | 55/64" | 55,70 | 20 1690 034 | • 34 | 1.11/32" | 68,20 | 20 1690 046 | • 46 | 1.13/16" | 86,55 | 20 1690 058 | • 58 | 2.9/32" | 115,70 |
| 20 1690 023 | • 23 | 29/32" | 55,70 | 20 1690 035 | • 35 | 1.3/8" | 68,20 | 20 1690 047 | • 47 | 1.27/32" | 86,55 | 20 1690 059 | • 59 | 2.21/64" | 115,70 |
| 20 1690 024 | • 24 | 15/16" | 55,70 | 20 1690 036 | • 36 | 1.27/64" | 73,30 | 20 1690 048 | • 48 | 1.57/64" | 86,55 | 20 1690 060 | • 60 | 2.23/64" | 115,70 |
| 20 1690 025 | • 25 | 63/64" | 55,70 | 20 1690 037 | • 37 | 1.29/64" | 73,30 | 20 1690 049 | • 49 | 1.59/64" | 86,55 | | | | |

Maximal empfohlene Schnitttiefe bei Hardox = 35 mm · **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Maximum recommended cutting depth for Hardox = 35 mm · **Attention:** The inch sizes do not correspond exactly to the mm diameters.

20 1690

HARDOX-LINE 50

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



Ø 14-60 mm 20 1271
• € 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

SETS / DISPLAYS

20 1344
• € 102,05

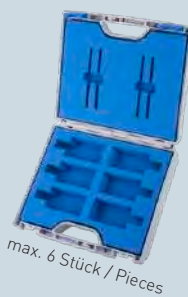
20 1138
• € 13,15

20 1132
• € 26,10

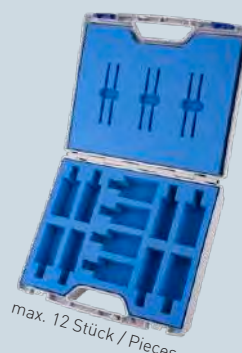
20 1139
• € 61,65



max. 44 Stück / Pieces



max. 6 Stück / Pieces



max. 12 Stück / Pieces



max. 50 Stück / Pieces

Sie möchten Ihren Inhalt selbst aussuchen?
Kein Problem. Kontaktieren Sie uns und wir stellen Ihr Wunsch-Set oder Wunsch-Display zusammen.

You would like to select your own contents?
No Problem. Contact us and we create your individual set or display.

Schnittdaten
Cutting data

Film
Movie



1298-1299

Zubehör für Hartmetall-bestückte Kernbohrer, Weldonschaft, Nutzlänge 50 mm
 Accessories for carbide-tipped annular cutter, Weldon shank, drill depth 50 mm | 2"


HARDOX-LINE 750

20 1690

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

FEIN Quick-In 18 mm
 Weldon+Nitto/Universal 19 mm 3/4"

 € 20 1263
 € 17,50

6,34 x 130 mm

 Packnorm 2 Stk. · Packaging unit 2 pcs.
 € 20 1160
 € 9,20

Nitto/Universal 19 mm 3/4"
 Weldon 19 mm 3/4"


 € 20 1311
 € 16,30

6,34 x 130 mm

 Packnorm 2 Stk. · Packaging unit 2 pcs.
 € 20 1160
 € 9,20

Weldon 32 mm 1.1/4"
 Weldon + Nitto/Universal 19 mm 3/4"

 € 21 0048
 € 14,15

6,34 x 102 mm

 Packnorm 2 Stk. · Packaging unit 2 pcs.
 € 20 1271
 € 7,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS

35 mm Weldon 19 mm 3/4"
 Weldon+Nitto/Universal 19 mm 3/4"

 € 20 1387
 € 18,95

7,98 x 6,34 x 5,30 x 153 mm

 Packnorm 2 Stk. · Packaging unit 2 pcs.
 € 20 1396
 € 16,45

35 mm Weldon 19 mm 3/4"
 Weldon+Nitto/Universal 19 mm 3/4"

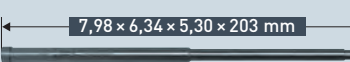
 € 20 1402
 € 20,95

7,98 x 6,34 x 5,30 x 178 mm

 Packnorm 2 Stk. · Packaging unit 2 pcs.
 € 20 1411
 € 17,05

35 mm Weldon 19 mm 3/4"
 Weldon+Nitto/Universal 19 mm 3/4"

 € 20 1417
 € 24,95

7,98 x 6,34 x 5,30 x 203 mm

 Packnorm 2 Stk. · Packaging unit 2 pcs.
 € 20 1426
 € 18,35

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 491
 Further accessories see overview page 491



PULVERSTAHL + DURABLU- BESCHICHTETE KERNBOHRER POWDER STEEL + DURABLU-COATED ANNULAR CUTTERS



BLUE-DRILL LINE PRO

Neben Hartmetall-bestückten Kernbohrern bieten beschichtete Pulverstahl-Kernbohrer ein hervorragendes Preis-Leistungs-Verhältnis.

Im harten Einsatz kann nur in den seltensten Fällen auf optimale Drehzahlen und Kühlung Rücksicht genommen werden. Die Karnasch DURABLU-Beschichtung macht den Kernbohrer somit entscheidend widerstandsfähiger. Letztendlich wird dadurch die Lebensdauer des Bohrers wesentlich erhöht.

BLUE-DRILL LINE PRO Kernbohrer sind der Problemlöser für schwierigste Zerspanungsprobleme. (Als beschichtete Standardkernbohrer empfehlen wir unsere BLUE-DRILL LINE Versionen siehe Seite 395)

Besides carbide tipped annular cutter provide coated powder steel cutters an excellent price-performance ratio.

Under hard field conditions only in the rarest cases optimum speed and cooling can be considered. The Karnasch DURABLU-coating makes the annular cutter decisively more resistant. This results finally to an extraordinary increase of lifetime.

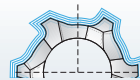
BLUE-DRILL LINE PRO annular cutters are the right choice for most difficult materials (As standard coated annular cutters do we recommend our BLUE-DRILL LINE range see page 395)

EIGENSCHAFTEN · PROPERTIES



Gefertigt aus ASP Pulverstahl zum Bohren auch schwierigster Materialien wie Eisenbahnschienen, Edelstähle, exotische Legierungen. Immer dort einsetzbar wo höchste Verschleißfestigkeit und Standzeit benötigt wird.

Made of ASP powder steel for drilling of difficult materials like railway tracks, stainless steels, exotic alloys. Applicable wherever a high wear resistance and lifetime are required.



Unsere hochwertigsten Kernbohrer erhalten die einzigartige und patentierte DURABLU-Beschichtung. Extreme Oberflächenhärte- und -glätte ergeben extreme Standzeiten auch unter nicht optimalen Arbeitsbedingungen wie „Über Kopf arbeiten“, Trockenbohrungen, u.s.w.

Our first-class annular cutters are equipped with the unique and patented DURABLU-coating. Extreme surface hardness and sleekness yield extreme lifetimes even under non-optimum conditions like "overhead work", dry drilling, etc.



Nur wenige Hersteller sind in der Lage in Stufen gehärtete Kernbohrer zu fertigen. Für uns ist dies „Standard“. Dadurch erreichen wir extrem harte Zahnschneiden (68 HRC) und dennoch einen flexiblen Kernbohrer.

Only few manufacturers are capable of producing step-hardened annular cutters. For Karnasch this is "standard". Only this makes us produce extremely hard tooth tips (68 HRC) and yet a flexible annular cutter.

ANWENDUNG · APPLICATION

| | | | | | | | | | | |
|----------|----------|-----------|----------|-----------------------|---------------------|----------------|--|----------|------------|------------|
| | | | | | | | | | | |
| Stahl | Stahl | Edelstahl | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Grauguss | Hastelloy, Inconel, Nimonic, Exotische Materialien | Schienen | Hardox 400 | Hardox 450 |
| Steel | Steel | Stainless | Alu | Copper, brass, tin | Plastics GRP/CRP | Grey cast iron | Hastelloy, Inconel, Nimonic, exotic materials | Rails | Hardox 400 | Hardox 450 |
| < 1100 N | < 1400 N | > 900 N | > 10% Si | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL · OPTIMAL

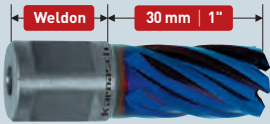
✓ GUT · GOOD

✓ MÖGLICH · POSSIBLE

PULVERSTAHL + DURABLU-ESCHICHTETE KERNBOHRER POWDER STEEL + DURABLU-COATED ANNULAR CUTTERS

BLUE-DRILL LINE PRO

Schnitttiefe · Drill depths



| Ø mm | Ø Zoll/Inch | Art. / Type | |
|-------|----------------|---|-----|
| 12-36 | 15/32-1.27/64" | 20 1284 BLUE-DRILL LINE 30 PRO | 390 |
| 12-36 | 15/32-1.27/64" | 20 1317 BLUE-DRILL LINE 55 PRO | 392 |

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

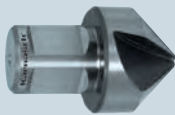
Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
Coolant pressure bottles



Kegelsenker mit Weldonschaft 524/525
Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



Sets · Displays 534-561
Sets · Displays



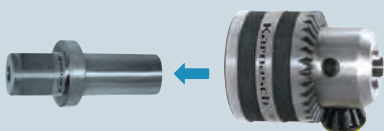
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
Tapping adaptor Weldon + taps M 3 - M 30



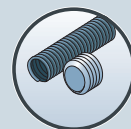
Vollhartmetall Gewindebohrer-Ausbohrer 628
Solid carbide drills to remove jammed taps



Adapter + passende Bohrfutter 528
Adapters + suitable drill chucks



Ersatzteile 530-532
Spare parts



20 1284

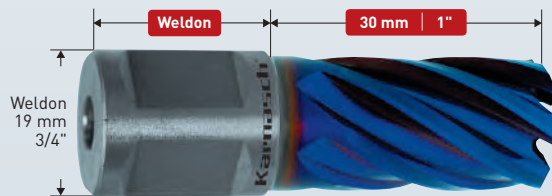
BLUE-DRILL LINE 30 PRO

Pulverstahl + DURABLU-beschichteter Kernbohrer, Weldonschaft, Nutzlänge 30 mm
Powder steel + DURABLU-coated annular cutter, Weldon shank, drill depth 30 mm | 1"



ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|-----------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials | Hardox 400, 450 |
| < 1400 N | > 900 N | | > 10% Si | | | | |



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|--------|-------------|------|-------------|--------|
| 20 1284 012 | 12 | 15/32" | 48,55 | 20 1284 020 | 20 | 25/32" | 55,55 | 20 1284 028 | 28 | 1.7/64" | 82,85 | 20 1284 036 | 36 | 1.27/64" | 111,25 |
| 20 1284 013 | 13 | 33/64" | 48,55 | 20 1284 021 | 21 | 53/64" | 55,90 | 20 1284 029 | 29 | 1.9/64" | 84,20 | | | | |
| 20 1284 014 | 14 | 35/64" | 48,55 | 20 1284 022 | 22 | 55/64" | 58,70 | 20 1284 030 | 30 | 1.3/16" | 86,25 | | | | |
| 20 1284 015 | 15 | 19/32" | 52,75 | 20 1284 023 | 23 | 29/32" | 61,75 | 20 1284 031 | 31 | 1.7/32" | 88,55 | | | | |
| 20 1284 016 | 16 | 5/8" | 52,75 | 20 1284 024 | 24 | 15/16" | 65,90 | 20 1284 032 | 32 | 1.17/64" | 92,25 | | | | |
| 20 1284 017 | 17 | 43/64" | 52,75 | 20 1284 025 | 25 | 63/64" | 65,90 | 20 1284 033 | 33 | 1.19/64" | 97,70 | | | | |
| 20 1284 018 | 18 | 45/64" | 52,75 | 20 1284 026 | 26 | 1.1/32" | 75,00 | 20 1284 034 | 34 | 1.11/32" | 97,70 | | | | |
| 20 1284 019 | 19 | 3/4" | 52,75 | 20 1284 027 | 27 | 1.1/16" | 75,10 | 20 1284 035 | 35 | 1.3/8" | 101,40 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1284

BLUE-DRILL LINE 30 PRO

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE · EJECTOR PINS



20 1261
€ 6,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1284

BLUE-DRILL LINE 30 PRO

SETS / DISPLAYS Seite / Page 538

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1284 BLUE-DRILL LINE30 PRO – siehe Seite 538. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.

We offer a large selection of sets / displays – recommended content 20 1284 BLUE-DRILL LINE30 PRO – see page 538. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



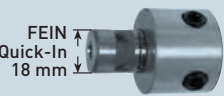
1296

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Zubehör für Pulverstahl + DURABLU- beschichteten Kernbohrer, Weldonschaft, Nutzlänge 30 mm
 Accessories for powder steel + DURABLU-coated annular cutter, Weldon shank, drill depth 30 mm | "

BLUE-DRILL LINE 30 PRO **20 1284**


ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

FEIN Quick-In 18 mm  **Weldon + Nitto/Universal 19 mm 3/4"**


20 1263
 € 17,50

6,34 x 102 mm 


Packnorm 2 Stk. · Packaging unit 2 pcs. **20 1271**
 € 7,65

Nitto/Universal 19 mm 3/4"  **Weldon 19 mm 3/4"**


20 1311
 € 16,30

6,34 x 102 mm 

Packnorm 2 Stk. · Packaging unit 2 pcs. **20 1271**
 € 7,65

Weldon 32 mm 1.1/4"  **Weldon + Nitto/Universal 19 mm 3/4"**

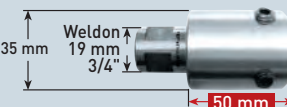
21 0048
 € 14,15

6,34 x 77 mm 


Packnorm 2 Stk. · Packaging unit 2 pcs. **20 1261**
 € 6,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

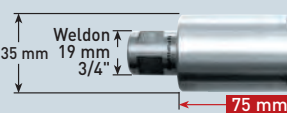
VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS

35 mm Weldon 19 mm 3/4"  **Weldon + Nitto/Universal 19 mm 3/4"**


20 1387
 € 18,95

7,98 x 6,34 x 5,30 x 127 mm 

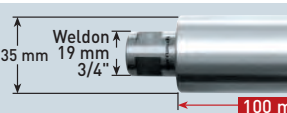
Packnorm 2 Stk. · Packaging unit 2 pcs. **20 1433**
 € 15,70

35 mm Weldon 19 mm 3/4"  **Weldon + Nitto/Universal 19 mm 3/4"**


20 1402
 € 20,95

7,98 x 6,34 x 5,30 x 153 mm 

Packnorm 2 Stk. · Packaging unit 2 pcs. **20 1396**
 € 16,45

35 mm Weldon 19 mm 3/4"  **Weldon + Nitto/Universal 19 mm 3/4"**

20 1417
 € 24,95

7,98 x 6,34 x 5,30 x 178 mm 

Packnorm 2 Stk. · Packaging unit 2 pcs. **20 1411**
 € 17,05

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530


ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen  **521-523**
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves


Kühlmittel-Druckflaschen  **528**
 Coolant pressure bottles

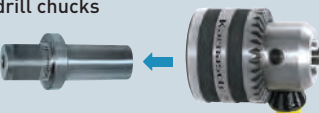
Kegelsenker mit Weldonschaft  **524/525**
 Countersinks with Weldon shank


Magnetstab zur Entfernung der Bohrspäne  **529**
 Magnetic stick for chip removal

Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm  **622**
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm

Sets · Displays  **534-561**
 Sets · Displays

Gewindeadapter Weldon + Gewindebohrer M 3 - M 30  **623-624**
 Tapping adapter Weldon + taps M 3 - M 30

Adapter + passende Bohrfutter  **528**
 Adapters + suitable drill chucks

Ersatzteile  **530-532**
 Spare parts



20 1317

BLUE-DRILL LINE 55 PRO

Pulverstahl + DURABLU-beschichteter Kernbohrer, Weldonschaft, Nutzlänge 55 mm
Powder steel + DURABLU-coated annular cutter, Weldon shank, drill depth 55 mm | 2"



ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|-----------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials | Hardox 400, 450 |
| < 1400 N | > 900 N | | > 10% Si | | | | |



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|--------|-------------|------|-------------|-------|
| 20 1317 012 | 12 | 15/32" | 61,55 | 20 1317 020 | 20 | 25/32" | 69,25 | 20 1317 028 | 28 | 1.7/64" | 54,00 | 20 1317 036 | 36 | 1.27/64" | 62,65 |
| 20 1317 013 | 13 | 33/64" | 61,55 | 20 1317 021 | 21 | 53/64" | 71,90 | 20 1317 029 | 29 | 1.9/64" | 54,80 | | | | |
| 20 1317 014 | 14 | 35/64" | 61,55 | 20 1317 022 | 22 | 55/64" | 73,25 | 20 1317 030 | 30 | 1.3/16" | 107,85 | | | | |
| 20 1317 015 | 15 | 19/32" | 65,10 | 20 1317 023 | 23 | 29/32" | 76,65 | 20 1317 031 | 31 | 1.7/32" | 54,00 | | | | |
| 20 1317 016 | 16 | 5/8" | 65,10 | 20 1317 024 | 24 | 15/16" | 82,85 | 20 1317 032 | 32 | 1.17/64" | 115,60 | | | | |
| 20 1317 017 | 17 | 43/64" | 65,10 | 20 1317 025 | 25 | 63/64" | 82,85 | 20 1317 033 | 33 | 1.19/64" | 122,80 | | | | |
| 20 1317 018 | 18 | 45/64" | 65,10 | 20 1317 026 | 26 | 1.1/32" | 89,50 | 20 1317 034 | 34 | 1.11/32" | 60,00 | | | | |
| 20 1317 019 | 19 | 3/4" | 65,10 | 20 1317 027 | 27 | 1.1/16" | 93,20 | 20 1317 035 | 35 | 1.3/8" | 62,60 | | | | |

% Sonderpreis / Sale Artikel.
Lieferbar solange Vorrat.
Special price / sale article.
While stocks last.

Ersatzartikel siehe Art. 20 1316 Seite 368 ·
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Replacement article see Art. 20 1316 page 368 ·
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1317

BLUE-DRILL LINE 55 PRO

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



20 1271
• € 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1317

BLUE-DRILL LINE 55 PRO

SETS / DISPLAYS Seite / Page 539

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1317 BLUE-DRILL LINE55 PRO – siehe Seite 539. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1317 BLUE-DRILL LINE55 PRO – see page 539. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



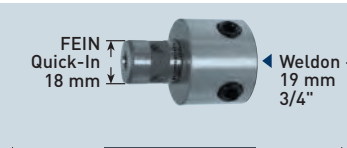
1296

Zubehör für Pulverstahl + DURABLU- beschichteten Kernbohrer, Weldonschaft, Nutzlänge 55 mm
 Accessories for powder steel + DURABLU-coated annular cutter, Weldon shank, drill depth 55 mm | 2"

BLUE-DRILL LINE 55 PRO **20 1317**

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

FEIN Quick-In 18 mm
 Weldon + Nitto/Universal 19 mm 3/4"

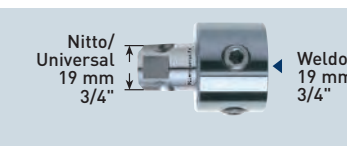


6,34 x 130 mm

20 1263
 € 17,50

Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4"
 Weldon 19 mm 3/4"




6,34 x 130 mm

20 1311
 € 16,30

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 32 mm 1.1/4"
 Weldon + Nitto/Universal 19 mm 3/4"



6,34 x 102 mm

21 0048
 € 14,15

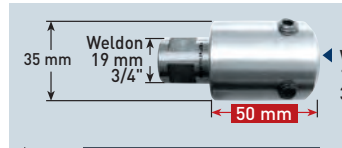
20 1271
 € 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS

Weldon 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"



35 mm

50 mm

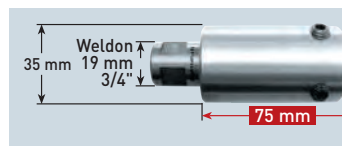
7,98 x 6,34 x 5,30 x 153 mm

20 1387
 € 18,95

20 1396
 € 16,45

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"



35 mm

75 mm

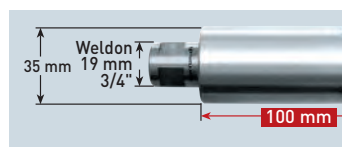
7,98 x 6,34 x 5,30 x 178 mm

20 1402
 € 20,95

20 1411
 € 17,05

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"



35 mm

100 mm

7,98 x 6,34 x 5,30 x 203 mm

20 1417
 € 24,95

20 1426
 € 18,35

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



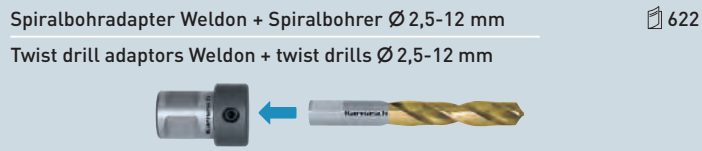
Kegelsenker mit Weldonschaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



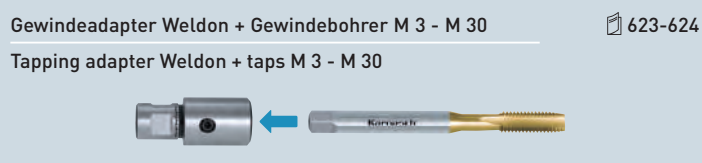
Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



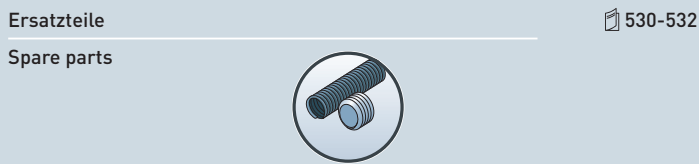
Sets · Displays 534-561
 Sets · Displays



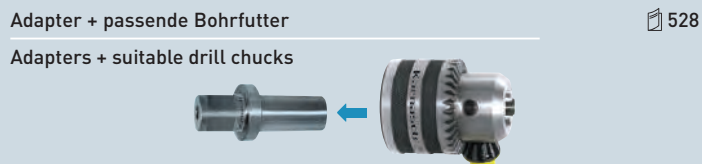
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30



Ersatzteile 530-532
 Spare parts



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks




HSS-XE + DURABLU-ESCHICHTETE KERNBOHRER

HSS-XE + DURABLU-COATED ANNULAR CUTTERS



BLUE-DRILL LINE

Neben Hartmetall-bestückten Kernbohrern bieten beschichtete HSS-XE Kernbohrer das optimale Preis-Leistungs-Verhältnis.

Im harten Einsatz kann nur in den seltensten Fällen auf optimale Drehzahlen und Kühlung Rücksicht genommen werden. Die Karnasch DURABLU-Beschichtung macht den Kernbohrer somit entscheidend widerstandsfähiger. Letztendlich wird dadurch die Lebensdauer des Bohrers wesentlich erhöht.

BLUE-DRILL LINE ist der am häufigsten verwendete Karnasch Kernbohrer. Der HSS-XE Bohrer mit dem besten Preis-Leistungs-Verhältnis für alle Stähle bis 1100 N Festigkeit, sowie Edelstahl.

Besides carbide tipped annular cutters provide coated HSS-XE cutters the optimal price-performance ratio.

Under hard field conditions only in the rarest cases optimum speed and cooling can be considered. The Karnasch DURABLU-coating makes the annular cutter decisively more resistant. This results finally to an extraordinary increase of lifetime.

BLUE-DRILL LINE annular cutters are the most commonly used Karnasch cutters. These HSS-XE cutters offers the best price-performance ratio for all steels up to a strength of 1100 N and stainless steels.

EIGENSCHAFTEN · PROPERTIES



Gefertigt aus hochlegiertem HSS-XE Spezialstahl. Für extreme Härte an den Zahnsitzen (bis 68 HRC). Somit hohe Verschleißfestigkeit und Standzeit.

Made of high-alloyed HSS-XE special steel. For extreme hardness at the tip of the tooth (up to 68 HRC). A high wear resistance and lifetime.



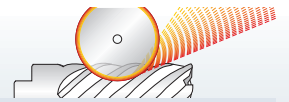
Unsere hochwertigsten Kernbohrer erhalten die einzigartige und patentierte DURABLU-Beschichtung. Extreme Oberflächenhärte- und -glätte ergeben extreme Standzeiten auch unter nicht optimalen Arbeitsbedingungen wie „Über Kopf arbeiten“, Trockenbohrungen, u.s.w.

Our first-class annular cutters are equipped with the unique and patented DURABLU-coating. Extreme surface hardness and sleekness yield extreme lifetimes even under non-optimum conditions like "overhead work", dry drilling, etc.



Nur wenige Hersteller sind in der Lage in Stufen gehärtete Kernbohrer zu fertigen. Für uns ist dies „Standard“. Dadurch erreichen wir extrem harte Zahnsitzen (68 HRC) und dennoch einen flexiblen Kernbohrer.

Only few manufacturers are capable of producing step-hardened annular cutters. For Karnasch this is "standard". Only this makes us produce extremely hard tooth tips (68 HRC) and yet a flexible annular cutter.



Aus dem vollen Material komplett geschliffen. Dieser Feinschliff erhöht die Zerspanleistung bei gleichzeitiger Reduzierung der Reibung. Für ein Mehr an Standzeit.

Completely made "FULLY GROUND". This refining rises the cutting ability with reducing friction at the same time. For an exceeded lifetime.

ANWENDUNG · APPLICATION

| | | | | | | | | | | | | |
|---------|----------|----------|-----------|-----------|----------|----------|-----------------------|---------------------|----------------|--|------------|------------|
| | | | | | | | | | | | | |
| Stahl | Stahl | Stahl | Edelstahl | Edelstahl | Alu | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Grauguss | Hastelloy, Inconel, Nimonic, Exotische Materialien | Hardox 400 | Hardox 450 |
| Steel | Steel | Steel | Stainless | Stainless | Alu | Alu | Copper, brass, tin | Plastics GRP/CRP | Grey cast iron | Hastelloy, Inconel, Nimonic, exotic materials | Hardox 400 | Hardox 450 |
| < 900 N | < 1100 N | < 1400 N | < 900 N | > 900 N | < 10% Si | > 10% Si | | | | | | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL · OPTIMAL

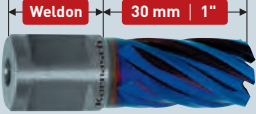

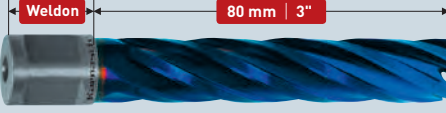
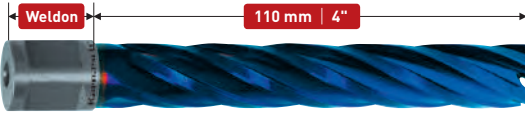
✓ GUT · GOOD

✓ MÖGLICH · POSSIBLE

HSS-XE + DURABLU-ESCHICHTETE KERNBOHRER HSS-XE + DURABLU-COATED ANNULAR CUTTERS

BLUE-DRILL LINE

Schnitttiefe · Drill depths

| | Ø mm | Ø Zoll/Inch | Art. / Type | |
|---|-------|----------------|---------------------------------------|-----|
|  <p>Weldon 30 mm 1"</p> <p>BEST SELLER</p> | 12-60 | 15/32-2.23/64" | 20 1312 BLUE-DRILL LINE/30 | 396 |
|  <p>Weldon 55 mm 2"</p> <p>BEST SELLER</p> | 12-60 | 15/32-2.23/64" | 20 1313 BLUE-DRILL LINE/55 | 398 |
|  <p>Weldon 80 mm 3"</p> | 18-50 | 45/64-1.31/32" | 20 1285 BLUE-DRILL LINE/80 | 400 |
|  <p>Weldon 110 mm 4"</p> | 18-50 | 45/64-1.31/32" | 20 1280 BLUE-DRILL LINE/110 | 402 |

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

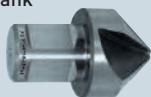
Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
Coolant pressure bottles



Kegelsenker mit Weldonschaft 524/525
Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



Sets · Displays 534-561
Sets · Displays



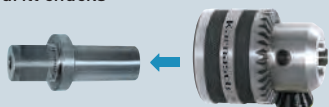
Gewintheadapter Weldon + Gewindebohrer M 3 - M 30 623-624
Tapping adapter Weldon + taps M 3 - M 30



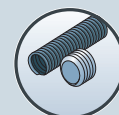
Vollhartmetall Gewindebohrer-Ausbohrer 628
Solid carbide drills to remove jammed taps



Adapter + passende Bohrfutter 528
Adapters + suitable drill chucks



Ersatzteile 530-532
Spare parts



20 1312

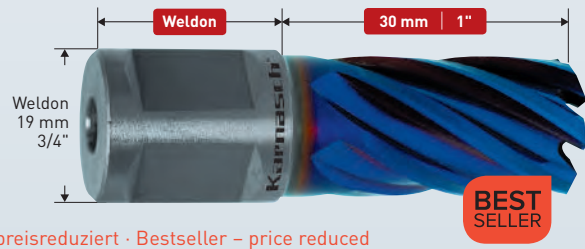
BLUE-DRILL LINE/30

HSS-XE + DURABLU- beschichteter Kernbohrer, Weldonschaft, Nutzlänge 30 mm
HSS-XE + DURABLU-coated annular cutter, Weldon shank, drill depth 30 mm | 1"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 1100 N | < 900 N | | > 10% Si | | | |



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 20 1312 012 | 12 | 15/32" | 18,50 | 20 1312 026 | 26 | 1.1/32" | 27,05 | 20 1312 040 | 40 | 1.37/64" | 51,50 | 20 1312 054 | 54 | 2.1/8" | 75,45 |
| 20 1312 013 | 13 | 33/64" | 18,50 | 20 1312 027 | 27 | 1.1/16" | 27,05 | 20 1312 041 | 41 | 1.39/64" | 51,50 | 20 1312 055 | 55 | 2.11/64" | 76,95 |
| 20 1312 014 | 14 | 35/64" | 18,85 | 20 1312 028 | 28 | 1.7/64" | 29,30 | 20 1312 042 | 42 | 1.21/32" | 54,40 | 20 1312 056 | 56 | 2.13/64" | 79,20 |
| 20 1312 015 | 15 | 19/32" | 18,85 | 20 1312 029 | 29 | 1.9/64" | 29,30 | 20 1312 043 | 43 | 1.11/16" | 54,40 | 20 1312 057 | 57 | 2.1/4" | 81,45 |
| 20 1312 016 | 16 | 5/8" | 19,85 | 20 1312 030 | 30 | 1.3/16" | 30,40 | 20 1312 044 | 44 | 1.47/64" | 58,25 | 20 1312 058 | 58 | 2.9/32" | 83,10 |
| 20 1312 017 | 17 | 43/64" | 19,85 | 20 1312 031 | 31 | 1.7/32" | 30,40 | 20 1312 045 | 45 | 1.49/64" | 58,25 | 20 1312 059 | 59 | 2.21/64" | 85,25 |
| 20 1312 018 | 18 | 45/64" | 20,50 | 20 1312 032 | 32 | 1.17/64" | 31,50 | 20 1312 046 | 46 | 1.13/16" | 61,50 | 20 1312 060 | 60 | 2.23/64" | 87,35 |
| 20 1312 019 | 19 | 3/4" | 20,50 | 20 1312 033 | 33 | 1.19/64" | 31,50 | 20 1312 047 | 47 | 1.27/32" | 61,50 | 20 1312 063 | *63 | 2.31/64" | 60,55 |
| 20 1312 020 | 20 | 25/32" | 21,60 | 20 1312 034 | 34 | 1.11/32" | 32,85 | 20 1312 048 | 48 | 1.57/64" | 64,05 | | | | |
| 20 1312 021 | 21 | 53/64" | 21,60 | 20 1312 035 | 35 | 1.3/8" | 32,85 | 20 1312 049 | 49 | 1.59/64" | 64,05 | | | | |
| 20 1312 022 | 22 | 55/64" | 24,55 | 20 1312 036 | 36 | 1.27/64" | 36,35 | 20 1312 050 | 50 | 1.31/32" | 67,40 | | | | |
| 20 1312 023 | 23 | 29/32" | 25,20 | 20 1312 037 | 37 | 1.29/64" | 46,00 | 20 1312 051 | 51 | 2.1/64" | 67,40 | | | | |
| 20 1312 024 | 24 | 15/16" | 25,90 | 20 1312 038 | 38 | 1.1/2" | 48,30 | 20 1312 052 | 52 | 2.3/64" | 71,85 | | | | |
| 20 1312 025 | 25 | 63/64" | 25,90 | 20 1312 039 | 39 | 1.17/32" | 48,30 | 20 1312 053 | 53 | 2.3/32" | 73,65 | | | | |

* Sonderpreis / Sale Artikel.
Lieferbar solange Vorrat.
Special price / sale article.
While stocks last.

* Mit Weldon 32 mm Sonderpreis solange Vorrat reicht · With Weldon 32 mm special price as long as available

Größere Ø siehe Art. 20 1315 Seite 366 sowie Art. 20 1316 Seite 368 ·

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Larger Ø see Art. 20 1315 page 366 and Art. 20 1316 page 368 ·

Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1312

BLUE-DRILL LINE/30

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



20 1261
€ 6,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1312

BLUE-DRILL LINE/30

SETS / DISPLAYS Seite / Page 540

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1312 BLUE-DRILL LINE30 – siehe Seite 540. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.

We offer a large selection of sets / displays – recommended content 20 1312 BLUE-DRILL LINE30 – see page 540. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



1296

Zubehör für HSS-XE + DURABLU- beschichteten Kernbohrer, Weldonschaft, Nutzlänge 30 mm
 Accessories for HSS-XE + DURABLU-coated annular cutter, Weldon shank, drill depth 30 mm | 1"

BLUE-DRILL LINE/30

20 1312

**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**

FEIN Quick-In 18 mm | **Weldon + Nitto/Universal 19 mm 3/4"**

20 1263 | **€ 17,50**

6,34 x 102 mm

20 1271 | **€ 7,65**

Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4" | **Weldon 19 mm 3/4"**

20 1311 | **€ 16,30**

6,34 x 102 mm

20 1271 | **€ 7,65**

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 32 mm 1.1/4" | **Weldon + Nitto/Universal 19 mm 3/4"**

21 0048 | **€ 14,15**

6,34 x 77 mm

20 1261 | **€ 6,65**

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

**VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
 EXTENSIONS + SUITABLE EJECTOR PINS**

35 mm Weldon 19 mm 3/4" | **Weldon + Nitto/Universal 19 mm 3/4"**

20 1387 | **€ 18,95**

50 mm

7,98 x 6,34 x 5,30 x 127 mm

20 1433 | **€ 15,70**

Packnorm 2 Stk. · Packaging unit 2 pcs.

35 mm Weldon 19 mm 3/4" | **Weldon + Nitto/Universal 19 mm 3/4"**

20 1402 | **€ 20,95**

75 mm

7,98 x 6,34 x 5,30 x 153 mm

20 1396 | **€ 16,45**

Packnorm 2 Stk. · Packaging unit 2 pcs.

35 mm Weldon 19 mm 3/4" | **Weldon + Nitto/Universal 19 mm 3/4"**

20 1417 | **€ 24,95**

100 mm

7,98 x 6,34 x 5,30 x 178 mm

20 1411 | **€ 17,05**

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen | 521-523
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen | 528
Coolant pressure bottles



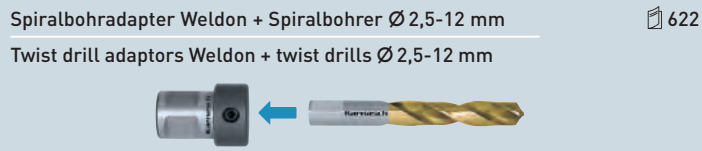
Kegelsenker mit Weldonschaft | 524/525
Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne | 529
Magnetic stick for chip removal



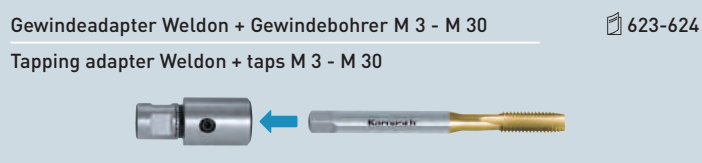
Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm | 622
Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



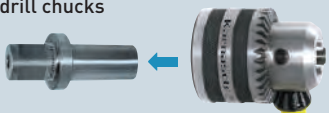
Sets · Displays | 534-561
Sets · Displays




Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 | 623-624
Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter | 528
Adapters + suitable drill chucks



Ersatzteile | 530-532
Spare parts




20 1313

BLUE-DRILL LINE/55

HSS-XE + DURABLUÉ-beschichteter Kernbohrer, Weldonschaft, Nutzlänge 55 mm
HSS-XE + DURABLUÉ-coated annular cutter, Weldon shank, drill depth 55 mm | 2"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 1100 N | < 900 N | | > 10% Si | | | |



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|--------|
| 20 1313 012 | 12 | 15/32" | 21,85 | 20 1313 026 | 26 | 1.1/32" | 31,95 | 20 1313 040 | 40 | 1.37/64" | 60,35 | 20 1313 054 | 54 | 2.1/8" | 92,00 |
| 20 1313 013 | 13 | 33/64" | 21,85 | 20 1313 027 | 27 | 1.1/16" | 31,95 | 20 1313 041 | 41 | 1.39/64" | 60,35 | 20 1313 055 | 55 | 2.11/64" | 94,10 |
| 20 1313 014 | 14 | 35/64" | 22,35 | 20 1313 028 | 28 | 1.7/64" | 34,20 | 20 1313 042 | 42 | 1.21/32" | 64,05 | 20 1313 056 | 56 | 2.13/64" | 96,50 |
| 20 1313 015 | 15 | 19/32" | 22,35 | 20 1313 029 | 29 | 1.9/64" | 34,20 | 20 1313 043 | 43 | 1.11/16" | 64,05 | 20 1313 057 | 57 | 2.1/4" | 98,50 |
| 20 1313 016 | 16 | 5/8" | 23,45 | 20 1313 030 | 30 | 1.3/16" | 35,60 | 20 1313 044 | 44 | 1.47/64" | 68,85 | 20 1313 058 | 58 | 2.9/32" | 100,80 |
| 20 1313 017 | 17 | 43/64" | 23,45 | 20 1313 031 | 31 | 1.7/32" | 35,60 | 20 1313 045 | 45 | 1.49/64" | 68,85 | 20 1313 059 | 59 | 2.21/64" | 102,75 |
| 20 1313 018 | 18 | 45/64" | 24,15 | 20 1313 032 | 32 | 1.17/64" | 37,65 | 20 1313 046 | 46 | 1.13/16" | 72,90 | 20 1313 060 | 60 | 2.23/64" | 105,20 |
| 20 1313 019 | 19 | 3/4" | 24,15 | 20 1313 033 | 33 | 1.19/64" | 37,65 | 20 1313 047 | 47 | 1.27/32" | 72,90 | | | | |
| 20 1313 020 | 20 | 25/32" | 25,30 | 20 1313 034 | 34 | 1.11/32" | 39,70 | 20 1313 048 | 48 | 1.57/64" | 76,10 | | | | |
| 20 1313 021 | 21 | 53/64" | 25,30 | 20 1313 035 | 35 | 1.3/8" | 39,70 | 20 1313 049 | 49 | 1.59/64" | 76,10 | | | | |
| 20 1313 022 | 22 | 55/64" | 28,00 | 20 1313 036 | 36 | 1.27/64" | 44,05 | 20 1313 050 | 50 | 1.31/32" | 83,95 | | | | |
| 20 1313 023 | 23 | 29/32" | 28,60 | 20 1313 037 | 37 | 1.29/64" | 54,05 | 20 1313 051 | 51 | 2.1/64" | 83,95 | | | | |
| 20 1313 024 | 24 | 15/16" | 29,90 | 20 1313 038 | 38 | 1.1/2" | 56,45 | 20 1313 052 | 52 | 2.3/64" | 87,25 | | | | |
| 20 1313 025 | 25 | 63/64" | 29,90 | 20 1313 039 | 39 | 1.17/32" | 56,45 | 20 1313 053 | 53 | 2.3/32" | 89,55 | | | | |

* Mit Weldon 32 mm Sonderpreis solange Vorrat reicht · With Weldon 32 mm special price as long as available

Größere Ø siehe Art. 20 1316 Seite 368 ·

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Larger Ø see Art. 20 1316 page 368 ·

Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1313

BLUE-DRILL LINE/55

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE · EJECTOR PINS



20 1271
€ 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1313

BLUE-DRILL LINE/55

SETS / DISPLAYS Seite / Page 541



Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1313 BLUE-DRILL LINE55 – siehe Seite 541. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.

We offer a large selection of sets / displays – recommended content 20 1313 BLUE-DRILL LINE55 – see page 541. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



1296

Zubehör für HSS-XE + DURABLU- beschichteten Kernbohrer, Weldonschaft, Nutzlänge 55 mm
 Accessories for HSS-XE + DURABLU-coated annular cutter, Weldon shank, drill depth 55 mm | 2"

BLUE-DRILL LINE 55

20 1313

**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**

FEIN Quick-In 18 mm | **Weldon + Nitto/Universal 19 mm 3/4"**

20 1263
 € 17,50

6,34 x 130 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4" | **Weldon 19 mm 3/4"**

20 1311
 € 16,30

6,34 x 130 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 32 mm 1.1/4" | **Weldon + Nitto/Universal 19 mm 3/4"**

21 0048
 € 14,15

6,34 x 102 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

**VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
 EXTENSIONS + SUITABLE EJECTOR PINS**

Weldon 19 mm 3/4" | **Weldon + Nitto/Universal 19 mm 3/4"**

20 1387
 € 18,95

75 mm

7,98 x 6,34 x 5,30 x 153 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 19 mm 3/4" | **Weldon + Nitto/Universal 19 mm 3/4"**

20 1402
 € 20,95

75 mm

7,98 x 6,34 x 5,30 x 178 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 19 mm 3/4" | **Weldon + Nitto/Universal 19 mm 3/4"**

20 1417
 € 24,95

100 mm


7,98 x 6,34 x 5,30 x 203 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen | 521-523
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen | 528
Coolant pressure bottles




Kegelsenker mit Weldonschaft | 524/525
Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne | 529
Magnetic stick for chip removal




Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm | 622
Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



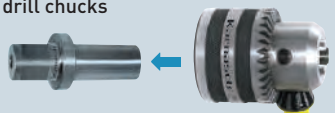
Sets · Displays | 534-561
Sets · Displays



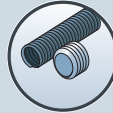
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 | 623-624
Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter | 528
Adapters + suitable drill chucks



Ersatzteile | 530-532
Spare parts




20 1285

BLUE-DRILL LINE / 80

HSS-XE + DURABLUÉ-beschichteter Kernbohrer, Weldonschaft, Nutzlänge 80 mm
HSS-XE + DURABLUÉ-coated annular cutter, Weldon shank, drill depth 80 mm | 3"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|------------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 1100 N | < 900 N | | > 10% Si | | | |



⚡ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|--------|
| 20 1285 018 | 18 | 45/64" | 45,50 | 20 1285 024 | 24 | 15/16" | 55,95 | 20 1285 030 | 30 | 1.3/16" | 64,80 | 20 1285 040 | 40 | 1.37/64" | 102,10 |
| 20 1285 019 | 19 | 3/4" | 45,50 | 20 1285 025 | 25 | 63/64" | 55,95 | 20 1285 032 | 32 | 1.17/64" | 68,70 | 20 1285 045 | 45 | 1.49/64" | 117,75 |
| 20 1285 020 | 20 | 25/32" | 47,05 | 20 1285 026 | 26 | 1.1/32" | 57,65 | 20 1285 033 | 33 | 1.19/64" | 68,70 | 20 1285 046 | 46 | 1.13/16" | 79,95 |
| 20 1285 021 | 21 | 53/64" | 47,05 | 20 1285 027 | 27 | 1.1/16" | 57,65 | 20 1285 035 | 35 | 1.3/8" | 71,60 | 20 1285 050 | 50 | 1.31/32" | 145,60 |
| 20 1285 022 | 22 | 55/64" | 52,55 | 20 1285 028 | 28 | 1.7/64" | 62,05 | 20 1285 036 | 36 | 1.27/64" | 79,95 | | | | |
| 20 1285 023 | 23 | 29/32" | 53,35 | 20 1285 029 | 29 | 1.9/64" | 62,05 | 20 1285 038 | 38 | 1.1/2" | 94,95 | | | | |

Weitere Ø siehe Art. 20 1650 Seite 370 ·

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Further Ø see Art. 20 1650 page 370 ·

Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1285

BLUE-DRILL LINE / 80

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE 1-TEILIG · EJECTOR PINS 1-PIECE



1-teilig / 1 piece

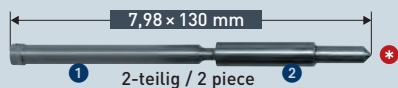
Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1439
€ 13,05

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522–523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522–523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

AUSWERFERSTIFTE 2-TEILIG · EJECTOR PINS 2-PIECE



2-teilig / 2 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1427
€ 22,10

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG · APPLICATION EJECTOR PINS 2-PIECE



Anwendung:

Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:

Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

⚡ **Warum 2-teilige Auswerferstifte?** In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn **keine extra langen** Aufnahmehalter verwendet werden (wie auf Seite 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

⚡ **Why use 2-part ejector pins?** Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If **no extra-long** holders are used (e.g. as on page 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Schnittdaten
Cutting data

Film
Movie



1296



Index

Zubehör für HSS-XE + DURABLU- beschichteten Kernbohrer, Weldonschaft, Nutzlänge 80 mm
 Accessories for HSS-XE + DURABLU-coated annular cutter, Weldon shank, drill depth 80 mm | 3"

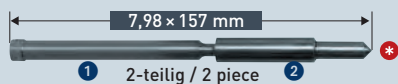
BLUE-DRILL LINE 80

20 1285

ADAPTER + PASSENDE AUSWERFERSTIFTE · ADAPTER + SUITABLE EJECTOR PINS

FEIN Quick-In 18 mm
 Weldon + Nitto/Universal 19 mm 3/4"

20 1161
 € 17,45



1 2-teilig / 2 piece
 Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4"
 Weldon 19 mm 3/4"

20 1314
 € 16,30



1 2-teilig / 2 piece
 Packnorm 2 Stk. · Packaging unit 2 pcs.

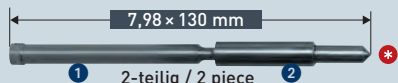
Weldon 32 mm 1.1/4"
 Weldon + Nitto/Universal 19 mm 3/4"

21 0048
 € 14,15



7,98 x 130 mm
 1-teilig / 1 piece
 Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1439
 € 13,05



7,98 x 130 mm
 1 2-teilig / 2 piece
 Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1427
 € 22,10

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



Kegelsenker mit Weldonschaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



Sets · Displays 534-561
 Sets · Displays



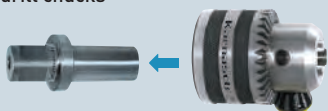
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30



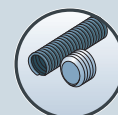
Vollhartmetall Gewindebohrer-Ausbohrer 628
 Solid carbide drills to remove jammed taps



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts



20 1280

BLUE-DRILL LINE / 110

HSS-XE + DURABLUe-beschichteter Kernbohrer, Weldonschaft, Nutzlänge 110 mm
HSS-XE + DURABLUe-coated annular cutter, Weldon shank, drill depth 110 mm | 4"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 1100 N | < 900 N | | > 10% Si | | | |



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|--------|-------------|------|-------------|--------|
| 20 1280 018 | 18 | 45/64" | 56,20 | 20 1280 024 | 24 | 15/16" | 67,70 | 20 1280 030 | 30 | 1.3/16" | 83,05 | 20 1280 040 | 40 | 1.37/64" | 135,55 |
| 20 1280 019 | 19 | 3/4" | 57,40 | 20 1280 025 | 25 | 63/64" | 69,05 | 20 1280 032 | 32 | 1.17/64" | 91,35 | 20 1280 045 | 45 | 1.49/64" | 155,90 |
| 20 1280 020 | 20 | 25/32" | 58,20 | 20 1280 026 | 26 | 1.1/32" | 75,00 | 20 1280 033 | 33 | 1.19/64" | 93,10 | 20 1280 050 | 50 | 1.31/32" | 186,55 |
| 20 1280 021 | 21 | 53/64" | 61,70 | 20 1280 027 | 27 | 1.1/16" | 76,35 | 20 1280 035 | 35 | 1.3/8" | 96,85 | | | | |
| 20 1280 022 | 22 | 55/64" | 62,85 | 20 1280 028 | 28 | 1.7/64" | 78,30 | 20 1280 036 | 36 | 1.27/64" | 106,85 | | | | |
| 20 1280 023 | 23 | 29/32" | 66,35 | 20 1280 029 | 29 | 1.9/64" | 80,30 | 20 1280 038 | 38 | 1.1/2" | 124,70 | | | | |

Weitere Ø siehe Art. 20 1660 Seite 372 -
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmesser.
Further Ø see Art. 20 1660 page 372 -
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1280

BLUE-DRILL LINE / 110

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE 1-TEILIG · EJECTOR PINS 1-PIECE

7,98 x 160 mm
1-teilig / 1 piece

Art. 20 1399
€ 14,30

Packnorm 2 Stk. · Packaging unit 2 pcs.

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522-523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522-523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

AUSWERFERSTIFTE 2-TEILIG · EJECTOR PINS 2-PIECE

7,98 x 157 mm
2-teilig / 2 piece

Art. 20 1428
€ 24,80

Packnorm 2 Stk. · Packaging unit 2 pcs.

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG · APPLICATION EJECTOR PINS 2-PIECE



Anwendung:

Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:

Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

* **Warum 2-teilige Auswerferstifte?** In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn **keine extra langen** Aufnahmehalter verwendet werden (wie auf Seite 522-523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

* **Why use 2-part ejector pins?** Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If **no extra-long** holders are used (e.g. as on page 522-523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Schnittdaten
Cutting data

Film
Movie



1296



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Zubehör für HSS-XE + DURABLUe-beschichteten Kernbohrer, Weldonschaft, Nutzlänge 110 mm
 Accessories for HSS-XE + DURABLUe-coated annular cutter, Weldon shank, drill depth 110 mm | 4"

BLUE-DRILL LINE 110

20 1280

ADAPTER + PASSENDE AUSWERFERSTIFTE · ADAPTER + SUITABLE EJECTOR PINS

FEIN Quick-In 18 mm
 Weldon + Nitto/Universal 19 mm 3/4"

20 1161
 € 17,45



Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4"
 Weldon 19 mm 3/4"

20 1314
 € 16,30



Packnorm 2 Stk. · Packaging unit 2 pcs.

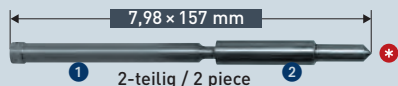
Weldon 32 mm 1.1/4"
 Weldon + Nitto/Universal 19 mm 3/4"

21 0048
 € 14,15



Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1399
 € 14,30



Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1428
 € 24,80

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



Kegelsenker mit Weldonschaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



Sets · Displays 534-561
 Sets · Displays



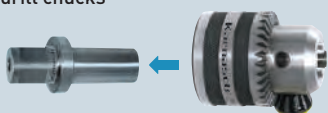
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30



Vollhartmetall Gewindebohrer-Ausbohrer 628
 Solid carbide drills to remove jammed taps



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts



HSS-XE KERNBOHRER HSS-XE ANNULAR CUTTERS



GOLD-DRILL LINE

Karnasch GOLD-DRILL LINE Kernbohrer sind die am meisten verwendeten nicht beschichteten HSS-XE Kernbohrer.

Durch spezial GOLD-TECH Oberflächenbehandlung + Vollschliff + HSS-XE Spezialstahl hervorragend zum Bohren in Stähle bis 900 N und sogar geeignet für Edelstähle.

Karnasch GOLD-DRILL LINE annular cutters are the most commonly used non-coated HSS-XE annular cutter.

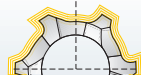
By special surface treatment GOLD-TECH + FULLY GROUND + special steel HSS-XE ideal for drilling in steel up to a strength of 900 N and even suitable for stainless steels.

EIGENSCHAFTEN · PROPERTIES



Gefertigt aus hochlegiertem HSS-XE Spezialstahl. Für extreme Härte an den Zahnspitzen (bis 68 HRC). Somit hohe Verschleißfestigkeit und Standzeit.

Made of high-alloyed HSS-XE special steel. For extreme hardness at the tip of the tooth (up to 68 HRC). A high wear resistance and lifetime.



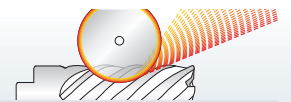
Gold-Tech Oberflächenbehandlung. Die Spezialbehandlung für höhere Standzeiten

Gold-Tech surface treatment. The special treatment for higher lifetimes.



Nur wenige Hersteller sind in der Lage in Stufen gehärtete Kernbohrer zu fertigen. Für uns ist dies „Standard“. Dadurch erreichen wir extrem harte Zahnspitzen (68 HRC) und dennoch einen flexiblen Kernbohrer.











Only few manufacturers are capable of producing step-hardened annular cutters. For Karnasch this is "standard". Only this makes us produce extremely hard tooth tips (68 HRC) and yet a flexible annular cutter.



Aus dem vollen Material komplett geschliffen. Dieser Feinschliff erhöht die Zerspanleistung bei gleichzeitiger Reduzierung der Reibung. Für ein Mehr an Standzeit.

Completely made "FULLY GROUND". This refining rises the cutting ability with reducing friction at the same time. For an exceeded lifetime.

ANWENDUNG · APPLICATION

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |  |
| Stahl | Stahl | Stahl | Edelstahl | Alu | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Steel | Steel | Stainless | Alu | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 750 N | < 900 N | < 1100 N | < 900 N | < 10% Si | > 10% Si | | | | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL · OPTIMAL

✓ GUT · GOOD










✓ MÖGLICH · POSSIBLE

HSS-XE KERNBOHRER HSS-XE ANNULAR CUTTERS

GOLD-DRILL LINE

| Schnitttiefe · Drill depths | Ø mm | Ø Zoll/Inch | Art. / Type | |
|---|-------|----------------|--|-----|
|  <p>Weldon 30 mm 1"</p> <p>BEST SELLER</p> | 12-60 | 15/32-2.23/64" | 20 1260U GOLD-DRILL LINE / 30 | 406 |
|  <p>Weldon 55 mm 2"</p> <p>BEST SELLER</p> | 12-60 | 15/32-2.23/64" | 20 1270U GOLD-DRILL LINE / 55 | 408 |
|  <p>Weldon 80 mm 3"</p> | 18-50 | 45/64-1.31/32" | 20 1285U GOLD-DRILL LINE / 80 | 410 |
|  <p>Weldon 110 mm 4"</p> | 18-50 | 45/64-1.31/32" | 20 1280U GOLD-DRILL LINE / 110 | 412 |
|  <p>Weldon 30 mm 1"</p> | - | 7/16-2.1/16" | 20 1910 GOLD-DRILL LINE ZOLL / INCH / 30 | 414 |
|  <p>Weldon 55 mm 2"</p> | - | 7/16-2.1/16" | 20 1920 GOLD-DRILL LINE ZOLL / INCH / 55 | 416 |
|  <p>Weldon 80 mm 3"</p> | - | 11/16-2.1/16" | 20 1925 GOLD-DRILL LINE ZOLL / INCH / 80 | 418 |

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

| | |
|--|---|
| Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen  521-523 | Kühlmittel-Druckflaschen  528 |
| Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves | Coolant pressure bottles |
| Kegelsenker mit Weldonschaft  524/525 | Magnetstab zur Entfernung der Bohrspäne  529 |
| Countersinks with Weldon shank | Magnetic stick for chip removal |
| Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm  622 | Sets · Displays  534-561 |
| Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm | Sets · Displays |
| Gewindeadapter Weldon + Gewindebohrer M 3 - M 30  623-624 | |
| Tapping adapter Weldon + taps M 3 - M 30 | |
| Adapter + passende Bohrfutter  528 | Ersatzteile  530-532 |
| Adapters + suitable drill chucks | Spare parts |



20 1260U

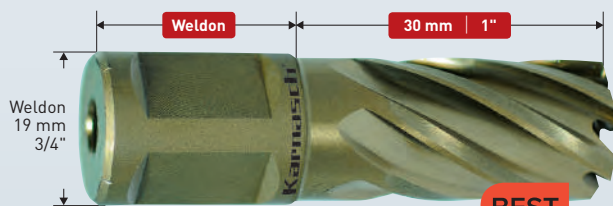
GOLD-DRILL LINE / 30

HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 30 mm
HSS-XE annular cutter, Weldon shank, drill depth 30 mm | 1"



ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|---------------|------|-------------|-------|---------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|-------|
| 20 1260u 012 | 12 | 15/32" | 12,60 | 20 1260u 022 | 22 | 55/64" | 18,65 | 20 1260u 035 | 35 | 1.3/8" | 26,30 | 20 1260u 049 | 49 | 1.59/64" | 49,00 |
| 20 1260u 013 | 13 | 33/64" | 12,60 | 20 1260u 023 | 23 | 29/32" | 18,65 | 20 1260u 036 | 36 | 1.27/64" | 29,80 | 20 1260u 050 | 50 | 1.31/32" | 52,35 |
| 20 1260u 0135 | 13,5 | 17/32" | 12,85 | 20 1260u 024 | 24 | 15/16" | 19,35 | 20 1260u 037 | 37 | 1.29/64" | 30,95 | 20 1260u 051 | 51 | 2.1/64" | 52,35 |
| 20 1260u 014 | 14 | 35/64" | 12,95 | 20 1260u 025 | 25 | 63/64" | 19,35 | 20 1260u 038 | 38 | 1.1/2" | 33,25 | 20 1260u 052 | 52 | 2.3/64" | 56,85 |
| 20 1260u 015 | 15 | 19/32" | 12,95 | 20 1260u 026 | 26 | 1.1/32" | 20,50 | 20 1260u 039 | 39 | 1.17/32" | 33,25 | 20 1260u 053 | 53 | 2.3/32" | 58,60 |
| 20 1260u 0155 | 15,5 | 39/64" | 13,70 | 20 1260u 0265 | 26,5 | 1.3/64" | 20,50 | 20 1260u 040 | 40 | 1.37/64" | 36,45 | 20 1260u 054 | 54 | 2.1/8" | 60,40 |
| 20 1260u 016 | 16 | 5/8" | 13,95 | 20 1260u 027 | 27 | 1.1/16" | 20,50 | 20 1260u 041 | 41 | 1.39/64" | 36,45 | 20 1260u 055 | 55 | 2.11/64" | 61,90 |
| 20 1260u 017 | 17 | 43/64" | 13,95 | 20 1260u 028 | 28 | 1.7/64" | 22,75 | 20 1260u 042 | 42 | 1.21/32" | 39,35 | 20 1260u 056 | 56 | 2.13/64" | 64,15 |
| 20 1260u 0175 | 17,5 | 11/16" | 14,30 | 20 1260u 029 | 29 | 1.9/64" | 22,75 | 20 1260u 043 | 43 | 1.11/16" | 39,35 | 20 1260u 057 | 57 | 2.1/4" | 66,40 |
| 20 1260u 018 | 18 | 45/64" | 14,60 | 20 1260u 030 | 30 | 1.3/16" | 23,85 | 20 1260u 044 | 44 | 1.47/64" | 43,20 | 20 1260u 058 | 58 | 2.9/32" | 68,05 |
| 20 1260u 019 | 19 | 3/4" | 14,60 | 20 1260u 031 | 31 | 1.7/32" | 23,85 | 20 1260u 045 | 45 | 1.49/64" | 43,20 | 20 1260u 059 | 59 | 2.21/64" | 70,20 |
| 20 1260u 0195 | 19,5 | 49/64" | 15,00 | 20 1260u 032 | 32 | 1.17/64" | 24,95 | 20 1260u 046 | 46 | 1.13/16" | 46,45 | 20 1260u 060 | 60 | 2.23/64" | 72,30 |
| 20 1260u 020 | 20 | 25/32" | 15,70 | 20 1260u 033 | 33 | 1.19/64" | 24,95 | 20 1260u 047 | 47 | 1.27/32" | 46,45 | | | | |
| 20 1260u 021 | 21 | 53/64" | 15,70 | 20 1260u 034 | 34 | 1.11/32" | 26,30 | 20 1260u 048 | 48 | 1.57/64" | 49,00 | | | | |

Größere Ø siehe Art. 20 1315 Seite 366 sowie Art. 20 1316 Seite 368 – Kleinere Ø siehe Art. 20 1230 Seite 426 ·

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern

Larger Ø see Art. 20 1315 page 366 and Art. 20 1316 page 368 – Smaller Ø see Art. 20 1230 page 426 ·

Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1260U

GOLD-DRILL LINE / 30

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



20 1261
€ 6,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1260U

GOLD-DRILL LINE / 30

SETS / DISPLAYS Seite / Page 542

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1260U GOLD-DRILL LINE30 – siehe Seite 542. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.

We offer a large selection of sets / displays – recommended content 20 1260U GOLD-DRILL LINE30 – see page 542. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



1296

Zubehör für HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 30 mm
Accessories for HSS-XE annular cutter, Weldon shank, drill depth 30 mm | 1"

GOLD-DRILL LINE 30

20 1260U

**ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS**

FEIN Quick-In 18 mm
Weldon + Nitto/Universal 19 mm 3/4"



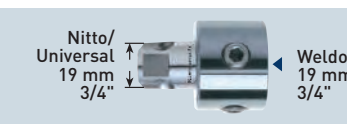
6,34 x 102 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1263
€ 17,50

20 1271
€ 7,65

Nitto/Universal 19 mm 3/4"



Weldon 19 mm 3/4"


6,34 x 102 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1311
€ 16,30

20 1271
€ 7,65

Weldon 32 mm 1.1/4"



Weldon + Nitto/Universal 19 mm 3/4"

6,34 x 77 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

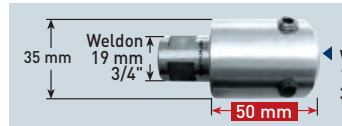
21 0048
€ 14,15

20 1261
€ 6,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
Spare allen screws for all adapters see page 530

**VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS**

Weldon 19 mm 3/4"



Weldon + Nitto/Universal 19 mm 3/4"

35 mm

50 mm

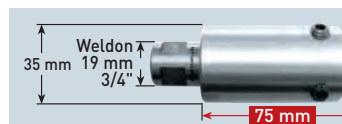
7,98 x 6,34 x 5,30 x 127 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1387
€ 18,95

20 1433
€ 15,70

Weldon 19 mm 3/4"



Weldon + Nitto/Universal 19 mm 3/4"

35 mm

75 mm

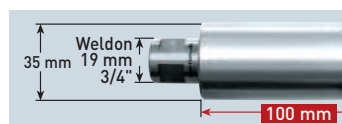
7,98 x 6,34 x 5,30 x 153 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1402
€ 20,95

20 1396
€ 16,45

Weldon 19 mm 3/4"



Weldon + Nitto/Universal 19 mm 3/4"

35 mm

100 mm

7,98 x 6,34 x 5,30 x 178 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

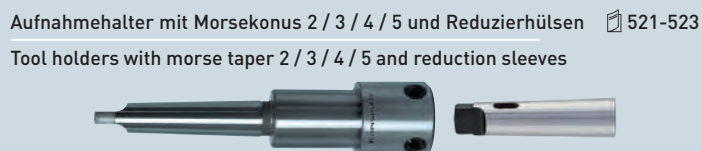
20 1417
€ 24,95

20 1411
€ 17,05

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
Spare allen screws for all extensions see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
Coolant pressure bottles



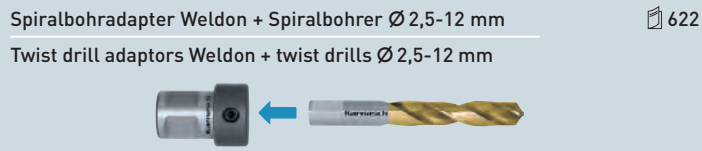
Kegelsenker mit Weldonschaft 524/525
Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
Magnetic stick for chip removal



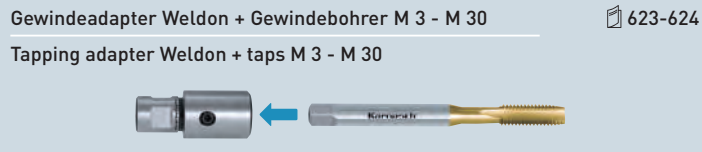
Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



Sets · Displays 534-561
Sets · Displays



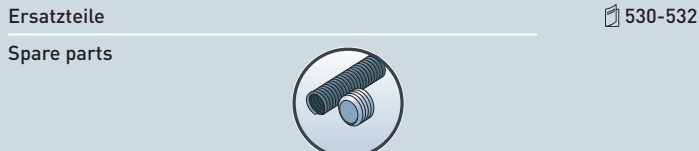
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
Adapters + suitable drill chucks



Ersatzteile 530-532
Spare parts




20 1270U

GOLD-DRILL LINE / 55

HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 55 mm
HSS-XE annular cutter, Weldon shank, drill depth 55 mm | 2"



ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € |
|---------------|------|--------|-------|---------------|------|----------|-------|--------------|------|----------|-------|--------------|------|----------|-------|
| 20 1270u 012 | 12 | 15/32" | 15,95 | 20 1270u 022 | 22 | 55/64" | 22,05 | 20 1270u 035 | 35 | 1.3/8" | 33,15 | 20 1270u 049 | 49 | 1.59/64" | 61,05 |
| 20 1270u 013 | 13 | 33/64" | 15,95 | 20 1270u 023 | 23 | 29/32" | 22,05 | 20 1270u 036 | 36 | 1.27/64" | 37,50 | 20 1270u 050 | 50 | 1.31/32" | 68,90 |
| 20 1270u 0135 | 13,5 | 17/32" | 16,20 | 20 1270u 024 | 24 | 15/16" | 23,35 | 20 1270u 037 | 37 | 1.29/64" | 39,00 | 20 1270u 051 | 51 | 2.1/64" | 68,90 |
| 20 1270u 014 | 14 | 35/64" | 16,45 | 20 1270u 025 | 25 | 63/64" | 23,35 | 20 1270u 038 | 38 | 1.1/2" | 41,40 | 20 1270u 052 | 52 | 2.3/64" | 72,20 |
| 20 1270u 015 | 15 | 19/32" | 16,45 | 20 1270u 026 | 26 | 1.1/32" | 25,40 | 20 1270u 039 | 39 | 1.17/32" | 41,40 | 20 1270u 053 | 53 | 2.3/32" | 74,50 |
| 20 1270u 0155 | 15,5 | 39/64" | 17,30 | 20 1270u 0265 | 26,5 | 1.3/64" | 25,40 | 20 1270u 040 | 40 | 1.37/64" | 45,30 | 20 1270u 054 | 54 | 2.1/8" | 76,95 |
| 20 1270u 016 | 16 | 5/8" | 17,55 | 20 1270u 027 | 27 | 1.1/16" | 25,40 | 20 1270u 041 | 41 | 1.39/64" | 45,30 | 20 1270u 055 | 55 | 2.11/64" | 79,05 |
| 20 1270u 017 | 17 | 43/64" | 17,55 | 20 1270u 028 | 28 | 1.7/64" | 27,65 | 20 1270u 042 | 42 | 1.21/32" | 49,00 | 20 1270u 056 | 56 | 2.13/64" | 81,45 |
| 20 1270u 0175 | 17,5 | 11/16" | 17,90 | 20 1270u 029 | 29 | 1.9/64" | 27,65 | 20 1270u 043 | 43 | 1.11/16" | 49,00 | 20 1270u 057 | 57 | 2.1/4" | 83,45 |
| 20 1270u 018 | 18 | 45/64" | 18,25 | 20 1270u 030 | 30 | 1.3/16" | 29,05 | 20 1270u 044 | 44 | 1.47/64" | 53,80 | 20 1270u 058 | 58 | 2.9/32" | 85,75 |
| 20 1270u 019 | 19 | 3/4" | 18,25 | 20 1270u 031 | 31 | 1.7/32" | 29,05 | 20 1270u 045 | 45 | 1.49/64" | 53,80 | 20 1270u 059 | 59 | 2.21/64" | 87,70 |
| 20 1270u 0195 | 19,5 | 49/64" | 18,65 | 20 1270u 032 | 32 | 1.17/64" | 31,10 | 20 1270u 046 | 46 | 1.13/16" | 57,85 | 20 1270u 060 | 60 | 2.23/64" | 90,15 |
| 20 1270u 020 | 20 | 25/32" | 19,40 | 20 1270u 033 | 33 | 1.19/64" | 31,10 | 20 1270u 047 | 47 | 1.27/32" | 57,85 | | | | |
| 20 1270u 021 | 21 | 53/64" | 19,40 | 20 1270u 034 | 34 | 1.11/32" | 33,15 | 20 1270u 048 | 48 | 1.57/64" | 61,05 | | | | |

Größere Ø siehe Art. 20 1316 Seite 368 ·
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Larger Ø see Art. 20 1316 page 368 ·
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1270U

GOLD-DRILL LINE / 55

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



20 1271
€ 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1270U

GOLD-DRILL LINE / 55

SETS / DISPLAYS Seite / Page 543

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1270U GOLD-DRILL LINE55 – siehe Seite 543. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.

We offer a large selection of sets / displays – recommended content 20 1270U GOLD-DRILL LINE55 – see page 543. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



1296

Zubehör für HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 55 mm
 Accessories for HSS-XE annular cutter, Weldon shank, drill depth 55 mm | 2"

GOLD-DRILL LINE 55

20 1270U

**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**

FEIN Quick-In 18 mm
 Weldon + Nitto/Universal 19 mm 3/4"

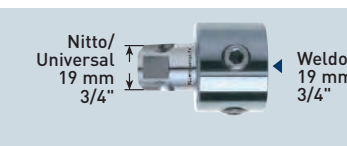


6,34 x 130 mm

20 1263
 € 17,50

Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4"
 Weldon 19 mm 3/4"




6,34 x 130 mm

20 1311
 € 16,30

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 32 mm 1.1/4"
 Weldon + Nitto/Universal 19 mm 3/4"



6,34 x 102 mm

21 0048
 € 14,15

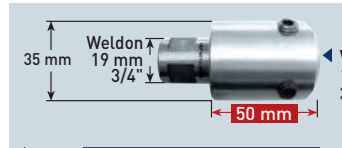
20 1271
 € 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

**VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
 EXTENSIONS + SUITABLE EJECTOR PINS**

Weldon 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"



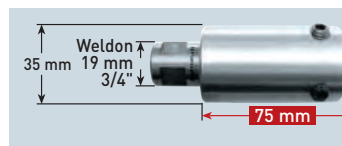
35 mm
 50 mm
 7,98 x 6,34 x 5,30 x 153 mm

20 1387
 € 18,95

20 1396
 € 16,45

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"



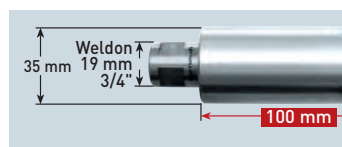
35 mm
 75 mm
 7,98 x 6,34 x 5,30 x 178 mm

20 1402
 € 20,95

20 1411
 € 17,05

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"



35 mm
 100 mm
 7,98 x 6,34 x 5,30 x 203 mm

20 1417
 € 24,95

20 1426
 € 18,35

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



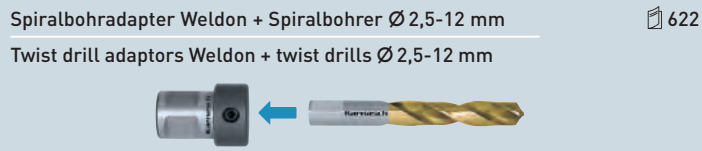
Kegelsenker mit Weldonschaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



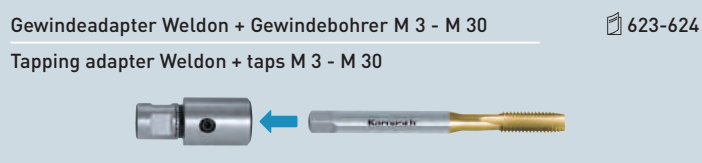
Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



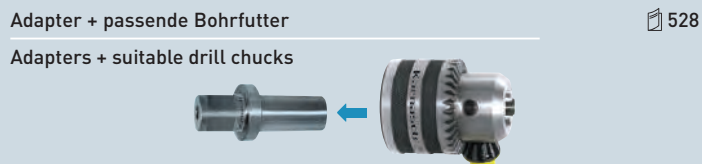
Sets · Displays 534-561
 Sets · Displays



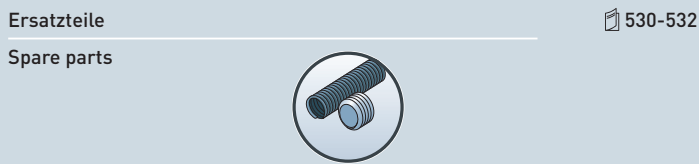
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts




20 1285U

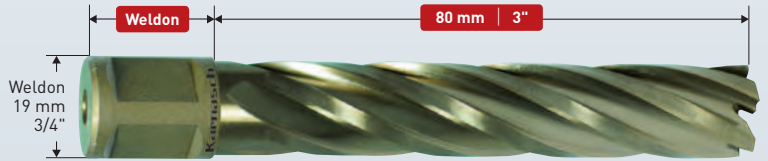
GOLD-DRILL LINE / 80

HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 80 mm
HSS-XE annular cutter, Weldon shank, drill depth 80 mm | 3"



ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|--------|
| 20 1285u 018 | 18 | 45/64" | 38,10 | 20 1285u 024 | 24 | 15/16" | 47,75 | 20 1285u 030 | 30 | 1.3/16" | 56,60 | 20 1285u 038 | 38 | 1.1/2" | 76,15 |
| 20 1285u 019 | 19 | 3/4" | 38,10 | 20 1285u 025 | 25 | 63/64" | 47,75 | 20 1285u 032 | 32 | 1.17/64" | 60,55 | 20 1285u 040 | 40 | 1.37/64" | 83,30 |
| 20 1285u 020 | 20 | 25/32" | 39,70 | 20 1285u 026 | 26 | 1.1/32" | 49,45 | 20 1285u 033 | 33 | 1.19/64" | 60,55 | 20 1285u 045 | 45 | 1.49/64" | 98,95 |
| 20 1285u 021 | 21 | 53/64" | 39,70 | 20 1285u 027 | 27 | 1.1/16" | 49,45 | 20 1285u 034 | 34 | 1.11/32" | 70,40 | 20 1285u 046 | 46 | 1.13/16" | 50,90 |
| 20 1285u 022 | 22 | 55/64" | 45,15 | 20 1285u 028 | 28 | 1.7/64" | 53,85 | 20 1285u 035 | 35 | 1.3/8" | 63,40 | 20 1285u 050 | 50 | 1.31/32" | 126,80 |
| 20 1285u 023 | 23 | 29/32" | 45,15 | 20 1285u 029 | 29 | 1.9/64" | 53,85 | 20 1285u 036 | 36 | 1.27/64" | 71,75 | | | | |

Weitere Ø siehe Art. 20 1650 Seite 370 sowie Art. 20 1660 Seite 372.
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Further Ø see Art. 20 1650 page 370 and Art. 20 1660 page 372.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1285U

GOLD-DRILL LINE / 80

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE 1-TEILIG · EJECTOR PINS 1-PIECE



1-teilig / 1 piece

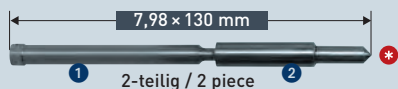
Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1439
€ 13,05

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522–523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522–523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

AUSWERFERSTIFTE 2-TEILIG EJECTOR PINS 2-PIECE



2-teilig / 2 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1427
€ 22,10

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG APPLICATION EJECTOR PINS 2-PIECE



Anwendung:

Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:

Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

* **Warum 2-teilige Auswerferstifte?** In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn **keine extra langen** Aufnahmehalter verwendet werden (wie auf Seite 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

* **Why use 2-part ejector pins?** Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If **no extra-long** holders are used (e.g. as on page 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Schnittdaten
Cutting data

Film
Movie



1296



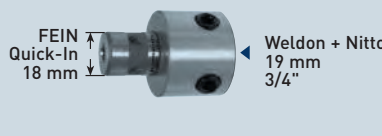
Zubehör für HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 80 mm
 Accessories for HSS-XE annular cutter, Weldon shank, drill depth 80 mm | 3"

GOLD-DRILL LINE 55

20 1285U

ADAPTER + PASSENDE AUSWERFERSTIFTE · ADAPTER + SUITABLE EJECTOR PINS

FEIN Quick-In 18 mm
 Weldon + Nitto/Universal 19 mm 3/4"



7,98 x 157 mm


1 2-teilig / 2 piece 2 *

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1161 € 17,45

20 1436 € 25,65

Nitto/Universal 19 mm 3/4"
 Weldon 19 mm 3/4"



7,98 x 157 mm


1 2-teilig / 2 piece 2 *

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1314 € 16,30

20 1436 € 25,65

Weldon 32 mm 1.1/4"
 Weldon + Nitto/Universal 19 mm 3/4"



7,98 x 130 mm

1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

21 0048 € 14,15

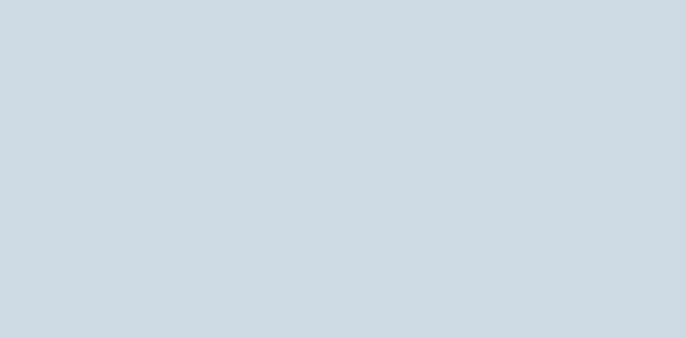
20 1439 € 13,05

7,98 x 130 mm

1 2-teilig / 2 piece 2 *

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1427 € 22,10



Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves




Kühlmittel-Druckflaschen 528
 Coolant pressure bottles




Kegelsenker mit Weldonschaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal




Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm




Sets · Displays 534-561
 Sets · Displays



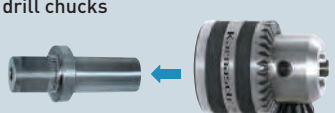
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30




Vollhartmetall Gewindebohrer-Ausbohrer 628
 Solid carbide drills to remove jammed taps



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts




20 1280U

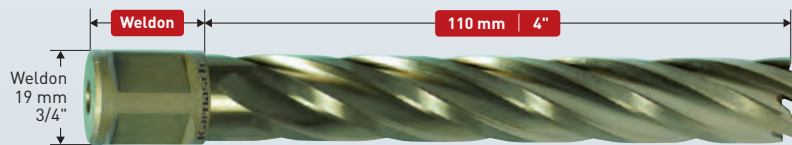
GOLD-DRILL LINE 110

HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 110 mm
HSS-XE annular cutter, Weldon shank, drill depth 110 mm | 4"



ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|--------|--------------|------|-------------|--------|
| 20 1280u 018 | 18 | 45/64" | 48,45 | 20 1280u 024 | 24 | 15/16" | 57,65 | 20 1280u 030 | 30 | 1.3/16" | 73,00 | 20 1280u 040 | 40 | 1.37/64" | 114,85 |
| 20 1280u 019 | 19 | 3/4" | 49,65 | 20 1280u 025 | 25 | 63/64" | 59,00 | 20 1280u 032 | 32 | 1.17/64" | 81,30 | 20 1280u 045 | 45 | 1.49/64" | 135,25 |
| 20 1280u 020 | 20 | 25/32" | 50,45 | 20 1280u 026 | 26 | 1.1/32" | 64,95 | 20 1280u 033 | 33 | 1.19/64" | 83,05 | 20 1280u 050 | 50 | 1.31/32" | 165,90 |
| 20 1280u 021 | 21 | 53/64" | 53,95 | 20 1280u 027 | 27 | 1.1/16" | 66,30 | 20 1280u 035 | 35 | 1.3/8" | 86,80 | | | | |
| 20 1280u 022 | 22 | 55/64" | 55,15 | 20 1280u 028 | 28 | 1.7/64" | 68,25 | 20 1280u 036 | 36 | 1.27/64" | 96,80 | | | | |
| 20 1280u 023 | 23 | 29/32" | 56,30 | 20 1280u 029 | 29 | 1.9/64" | 70,25 | 20 1280u 038 | 38 | 1.1/2" | 104,05 | | | | |

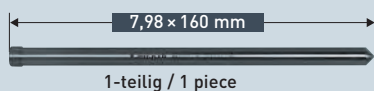
Weitere Ø siehe Art. 20 1660 Seite 372 -
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmesser.
Further Ø see Art. 20 1660 page 372 -
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1280U

GOLD-DRILL LINE 110

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE 1-TEILIG · EJECTOR PINS 1-PIECE



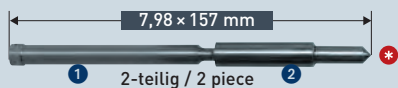
20 1399
€ 14,30

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522-523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522-523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

Packnorm 2 Stk. · Packaging unit 2 pcs.

AUSWERFERSTIFTE 2-TEILIG
EJECTOR PINS 2-PIECE



20 1428
€ 24,80

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG
APPLICATION EJECTOR PINS 2-PIECE



Anwendung:

Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:

Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

Packnorm 2 Stk. · Packaging unit 2 pcs.

* **Warum 2-teilige Auswerferstifte?** In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn **keine extra langen** Aufnahmehalter verwendet werden (wie auf Seite 522-523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

* **Why use 2-part ejector pins?** Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If **no extra-long** holders are used (e.g. as on page 522-523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Schnittdaten
Cutting data

Film
Movie



1296



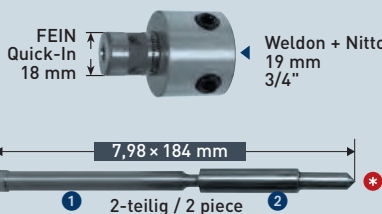
Zubehör für HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 110 mm
 Accessories for HSS-XE annular cutter, Weldon shank, drill depth 110 mm | 4"

GOLD-DRILL LINE 110

20 1280U

ADAPTER + PASSENDE AUSWERFERSTIFTE · ADAPTER + SUITABLE EJECTOR PINS

FEIN Quick-In 18 mm
 Weldon + Nitto/Universal 19 mm 3/4"



7,98 x 184 mm

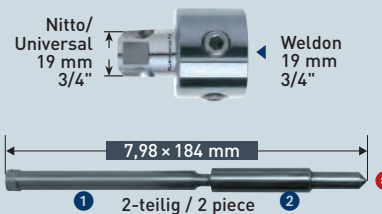
1 2-teilig / 2 piece 2 *

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1161
 € 17,45

20 1438
 € 28,40

Nitto/Universal 19 mm 3/4"
 Weldon 19 mm 3/4"



7,98 x 184 mm

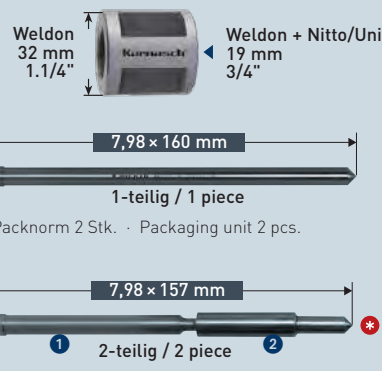
1 2-teilig / 2 piece 2 *

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1314
 € 16,30

20 1438
 € 28,40

Weldon 32 mm 1.1/4"
 Weldon + Nitto/Universal 19 mm 3/4"



7,98 x 160 mm

1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

21 0048
 € 14,15

20 1399
 € 14,30

7,98 x 157 mm

1 2-teilig / 2 piece 2 *

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1428
 € 24,80

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



521-523

Kühlmittel-Druckflaschen
 Coolant pressure bottles




528

Kegelsenker mit Weldonschaft
 Countersinks with Weldon shank




524/525

Magnetstab zur Entfernung der Bohrspäne
 Magnetic stick for chip removal



529

Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm




622

Sets · Displays
 Sets · Displays




534-561

Gewindeadapter Weldon + Gewindebohrer M 3 - M 30
 Tapping adapter Weldon + taps M 3 - M 30



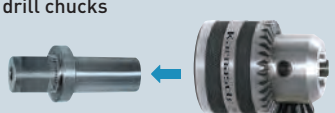
623-624

Vollhartmetall Gewindebohrer-Ausbohrer
 Solid carbide drills to remove jammed taps




628

Adapter + passende Bohrfutter
 Adapters + suitable drill chucks



528

Ersatzteile
 Spare parts



530-532



20 1910

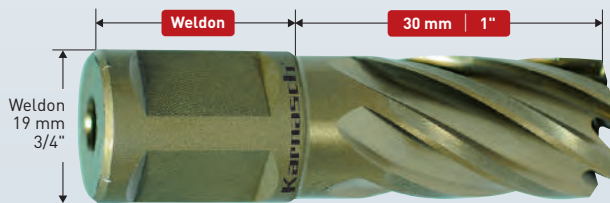
GOLD-DRILL LINE
ZOLL / INCH 30

HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 30 mm
HSS-XE annular cutter, Weldon shank, drill depth 30 mm | 1"



ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|------------|-------|-------------|-------|------------|-------|-------------|-------|
| • 7/16" | 11,10 | 20 1910 005 | 16,75 | • 15/16" | 23,81 | 20 1910 045 | 24,90 | • 1.7/16" | 36,51 | 20 1910 085 | 38,75 | • 1.15/16" | 49,21 | 20 1910 125 | 61,30 |
| • 1/2" | 12,70 | 20 1910 010 | 16,75 | • 1" | 25,40 | 20 1910 050 | 24,90 | • 1.1/2" | 38,10 | 20 1910 090 | 41,55 | • 2" | 50,80 | 20 1910 130 | 65,45 |
| • 9/16" | 14,28 | 20 1910 015 | 17,05 | • 1.1/16" | 26,98 | 20 1910 055 | 26,40 | • 1.9/16" | 39,68 | 20 1910 095 | 45,60 | • 2.1/16" | 52,38 | 20 1910 135 | 69,70 |
| • 5/8" | 15,87 | 20 1910 020 | 18,35 | • 1.1/8" | 28,57 | 20 1910 060 | 28,45 | • 1.5/8" | 41,27 | 20 1910 100 | 45,60 | | | | |
| • 11/16" | 17,46 | 20 1910 025 | 18,35 | • 1.3/16" | 30,13 | 20 1910 065 | 29,85 | • 1.11/16" | 42,86 | 20 1910 105 | 49,20 | | | | |
| • 3/4" | 19,04 | 20 1910 030 | 19,25 | • 1.1/4" | 31,75 | 20 1910 070 | 31,15 | • 1.3/4" | 44,45 | 20 1910 110 | 54,00 | | | | |
| • 13/16" | 20,63 | 20 1910 035 | 20,25 | • 1.5/16" | 33,33 | 20 1910 075 | 31,15 | • 1.13/16" | 46,03 | 20 1910 115 | 58,05 | | | | |
| • 7/8" | 22,22 | 20 1910 040 | 24,05 | • 1.3/8" | 34,92 | 20 1910 080 | 32,85 | • 1.7/8" | 47,62 | 20 1910 120 | 61,30 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1910

GOLD-DRILL LINE
ZOLL / INCH 30

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE · EJECTOR PINS



• Ø 7/16" 20 1482
• € 6,95

Packnorm 2 Stk. · Packaging unit 2 pcs.



• Ø 1/2" - 2.1/16" 20 1261
• € 6,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1910

GOLD-DRILL LINE
ZOLL / INCH 30

SETS / DISPLAYS Seite / Page 544



Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1910 GOLD-DRILL LINE30 – siehe Seite 544. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1910 GOLD-DRILL LINE30 – see page 544. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



1296



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

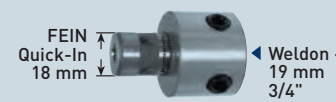
Zubehör für HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 30 mm
Accessories for HSS-XE annular cutter, Weldon shank, drill depth 30 mm | 1"

GOLD-DRILL LINE 30
ZOLL / INCH

20 1910

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

FEIN Quick-In 18 mm
Weldon + Nitto/Universal 19 mm 3/4"



6,34 x 102 mm


20 1263
€ 17,50

20 1271
€ 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 32 mm 1.1/4"

Weldon + Nitto/Universal 19 mm 3/4"



4,74 x 77 mm

Ø 7/16"

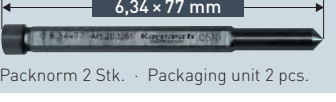
20 0048
€ 14,15

20 1482
€ 6,95

Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4"

Weldon 19 mm 3/4"



6,34 x 77 mm


Ø 1/2" - 2.1/16"

20 1261
€ 6,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4"

Weldon 19 mm 3/4"



6,34 x 102 mm

20 1311
€ 16,30

20 1271
€ 7,65

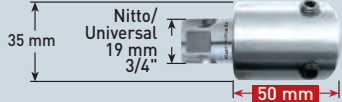
Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS

Nitto/Universal 19 mm 3/4"

Weldon + Nitto/Universal 19 mm 3/4"



35 mm

50 mm

7,98 x 6,34 x 5,30 x 127 mm

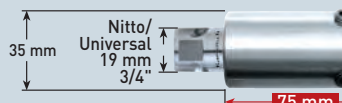
20 1406
€ 22,10

20 1433
€ 15,70

Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4"

Weldon + Nitto/Universal 19 mm 3/4"



35 mm

75 mm

7,98 x 6,34 x 5,30 x 153 mm

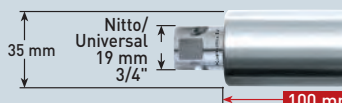
20 1407
€ 24,40

20 1396
€ 16,45

Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4"

Weldon + Nitto/Universal 19 mm 3/4"



35 mm

100 mm

7,98 x 6,34 x 5,30 x 178 mm

20 1409
€ 29,05


20 1411
€ 17,05

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
Spare allen screws for all extensions see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves




521-523

Kühlmittel-Druckflaschen
Coolant pressure bottles




528

Kegelsenker mit Weldonschaft
Countersinks with Weldon shank



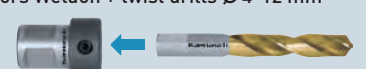
524/525

Magnetstab zur Entfernung der Bohrspäne
Magnetic stick for chip removal



529

Spiralbohradapter Weldon + Spiralbohrer Ø 4-12 mm
Twist drill adaptors Weldon + twist drills Ø 4-12 mm



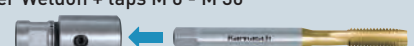
622

Sets · Displays
Sets · Displays



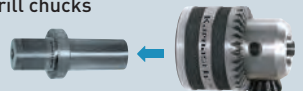
534-561

Gewindeadapter Weldon + Gewindebohrer M 6 - M 30
Tapping adapter Weldon + taps M 6 - M 30




623-624

Adapter + passende Bohrfutter
Adapters + suitable drill chucks



528

Ersatzteile
Spare parts



530-532



20 1920

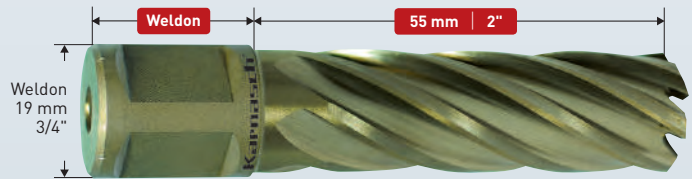
GOLD-DRILL LINE 55
ZOLL / INCH

HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 55 mm
HSS-XE annular cutter, Weldon shank, drill depth 55 mm | 2"



ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|------------|-------|-------------|-------|------------|-------|-------------|-------|
| • 7/16" | 11,10 | 20 1920 005 | 21,00 | • 15/16" | 23,81 | 20 1920 045 | 30,10 | • 1.7/16" | 36,51 | 20 1920 085 | 48,80 | • 1.15/16" | 49,21 | 20 1920 125 | 76,35 |
| • 1/2" | 12,70 | 20 1920 010 | 21,00 | • 1" | 25,40 | 20 1920 050 | 30,10 | • 1.1/2" | 38,10 | 20 1920 090 | 51,80 | • 2" | 50,80 | 20 1920 130 | 86,15 |
| • 9/16" | 14,28 | 20 1920 015 | 21,70 | • 1.1/16" | 26,98 | 20 1920 055 | 31,75 | • 1.9/16" | 39,68 | 20 1920 095 | 56,65 | • 2.1/16" | 52,38 | 20 1920 135 | 88,55 |
| • 5/8" | 15,87 | 20 1920 020 | 23,10 | • 1.1/8" | 28,57 | 20 1920 060 | 34,55 | • 1.5/8" | 41,27 | 20 1920 100 | 56,65 | | | | |
| • 11/16" | 17,46 | 20 1920 025 | 23,10 | • 1.3/16" | 30,13 | 20 1920 065 | 36,30 | • 1.11/16" | 42,86 | 20 1920 105 | 61,20 | | | | |
| • 3/4" | 19,04 | 20 1920 030 | 24,05 | • 1.1/4" | 31,75 | 20 1920 070 | 38,85 | • 1.3/4" | 44,45 | 20 1920 110 | 67,25 | | | | |
| • 13/16" | 20,63 | 20 1920 035 | 25,00 | • 1.5/16" | 33,33 | 20 1920 075 | 38,85 | • 1.13/16" | 46,03 | 20 1920 115 | 72,30 | | | | |
| • 7/8" | 22,22 | 20 1920 040 | 28,45 | • 1.3/8" | 34,92 | 20 1920 080 | 41,45 | • 1.7/8" | 47,62 | 20 1920 120 | 76,35 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmesser.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1920

GOLD-DRILL LINE 55
ZOLL / INCH

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE · EJECTOR PINS

4,74 × 102 mm
 • **Ø 7/16"** **20 1485**
 • € 8,00
 Packnorm 2 Stk. · Packaging unit 2 pcs.

6,34 × 102 mm
 • **Ø 1/2" - 2.1/16"** **20 1271**
 • € 7,65
 Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1920

GOLD-DRILL LINE 55
ZOLL / INCH

SETS / DISPLAYS Seite / Page 545



Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1920 GOLD-DRILL LINE55 – siehe Seite 545. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
 We offer a large selection of sets / displays – recommended content 20 1920 GOLD-DRILL LINE55 – see page 545. Other content possible by individually equipped sets / displays.



Schnittdaten Cutting data | Film Movie

 1296


Zubehör für HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 55 mm
Accessories for HSS-XE annular cutter, Weldon shank, drill depth 55 mm | 2"

GOLD-DRILL LINE 55
ZOLL / INCH

20 1920

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

FEIN Quick-In 18 mm
Weldon + Nitto/Universal 19 mm 3/4"



6,34 x 130 mm


20 1263
€ 17,50

20 1160
€ 9,20

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 32 mm 1.1/4"

Weldon + Nitto/Universal 19 mm 3/4"



4,74 x 102 mm

21 0048
€ 14,15

Ø 7/16" 20 1485
€ 8,00

Packnorm 2 Stk. · Packaging unit 2 pcs.

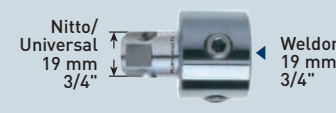
6,34 x 102 mm

Ø 1/2" - 2.1/16" 20 1271
€ 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4"

Weldon 19 mm 3/4"



6,34 x 130 mm

20 1311
€ 16,30

20 1160
€ 9,20

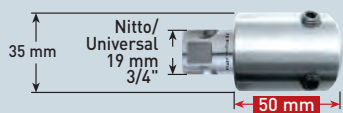
Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS

35 mm Nitto/Universal 19 mm 3/4"

Weldon + Nitto/Universal 19 mm 3/4"



50 mm

7,98 x 6,34 x 5,30 x 153 mm

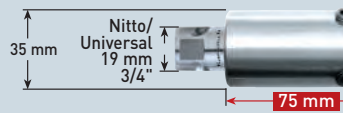
20 1406
€ 22,10

20 1396
€ 16,45

Packnorm 2 Stk. · Packaging unit 2 pcs.

35 mm Nitto/Universal 19 mm 3/4"

Weldon + Nitto/Universal 19 mm 3/4"



75 mm

7,98 x 6,34 x 5,30 x 178 mm

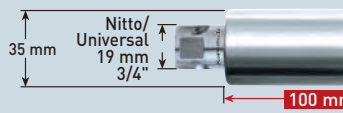
20 1407
€ 24,40

20 1411
€ 17,05

Packnorm 2 Stk. · Packaging unit 2 pcs.

35 mm Nitto/Universal 19 mm 3/4"

Weldon + Nitto/Universal 19 mm 3/4"



100 mm

7,98 x 6,34 x 5,30 x 203 mm

20 1409
€ 29,05

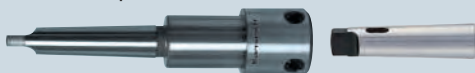
20 1426
€ 18,35

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
Spare allen screws for all extensions see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kegelsenker mit Weldonschaft 524/525
Countersinks with Weldon shank



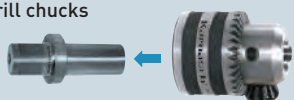
Spiralbohradapter Weldon + Spiralbohrer Ø 4-12 mm 622
Twist drill adaptors Weldon + twist drills Ø 4-12 mm



Gewindeadapter Weldon + Gewindebohrer M 6 - M 30 623-624
Tapping adapter Weldon + taps M 6 - M 30



Adapter + passende Bohrfutter 528
Adapters + suitable drill chucks



Kühlmittel-Druckflaschen 528
Coolant pressure bottles



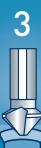
Magnetstab zur Entfernung der Bohrspäne 529
Magnetic stick for chip removal



Sets · Displays 534-561
Sets · Displays



Ersatzteile 530-532
Spare parts



20 1925

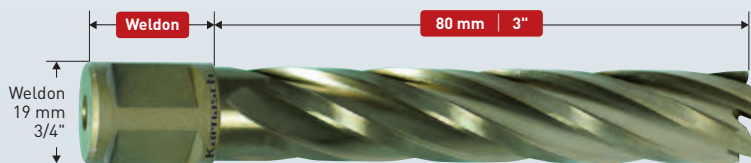
GOLD-DRILL LINE
ZOLL / INCH 80

HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 80 mm
HSS-XE annular cutter, Weldon shank, drill depth 80 mm | 3"



ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|------------|-------|-------------|-------|------------|-------|-------------|--------|
| • 11/16" | 17,46 | 20 1925 025 | 38,15 | • 1.1/16" | 26,98 | 20 1925 055 | 49,45 | • 1.7/16" | 36,51 | 20 1925 085 | 71,75 | • 1.13/16" | 46,03 | 20 1925 115 | 105,55 |
| • 3/4" | 19,04 | 20 1925 030 | 38,15 | • 1.1/8" | 28,57 | 20 1925 060 | 53,85 | • 1.1/2" | 38,10 | 20 1925 090 | 76,15 | • 1.7/8" | 47,62 | 20 1925 120 | 112,85 |
| • 13/16" | 20,63 | 20 1925 035 | 39,70 | • 1.3/16" | 30,13 | 20 1925 065 | 56,55 | • 1.9/16" | 39,68 | 20 1925 095 | 83,30 | • 1.15/16" | 49,21 | 20 1925 125 | 118,85 |
| • 7/8" | 22,22 | 20 1925 040 | 45,15 | • 1.1/4" | 31,75 | 20 1925 070 | 60,55 | • 1.5/8" | 41,27 | 20 1925 100 | 83,30 | • 2" | 50,80 | 20 1925 130 | 126,80 |
| • 15/16" | 23,81 | 20 1925 045 | 47,75 | • 1.5/16" | 33,33 | 20 1925 075 | 60,55 | • 1.11/16" | 42,86 | 20 1925 105 | 89,60 | • 2.1/16" | 52,38 | 20 1925 135 | 129,25 |
| • 1" | 25,40 | 20 1925 050 | 49,45 | • 1.3/8" | 34,92 | 20 1925 080 | 63,40 | • 1.3/4" | 44,45 | 20 1925 110 | 98,95 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmesser.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1925

GOLD-DRILL LINE
ZOLL / INCH 80

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE 1-TEILIG · EJECTOR PINS 1-PIECE

20 1439
€ 13,05



1-teilig / 1 piece

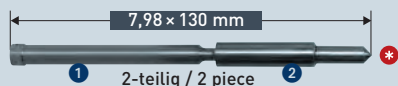
Packnorm 2 Stk. · Packaging unit 2 pcs.

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522–523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522–523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

AUSWERFERSTIFTE 2-TEILIG EJECTOR PINS 2-PIECE

20 1427
€ 22,10



2-teilig / 2 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG APPLICATION EJECTOR PINS 2-PIECE



Anwendung:

Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:

Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

* **Warum 2-teilige Auswerferstifte?** In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn **keine extra langen** Aufnahmehalter verwendet werden (wie auf Seite 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

* **Why use 2-part ejector pins?** Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If **no extra-long** holders are used (e.g. as on page 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Schnittdaten
Cutting data

Film
Movie



1296



Zubehör für HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 80 mm
 Accessories for HSS-XE annular cutter, Weldon shank, drill depth 80 mm | 3"

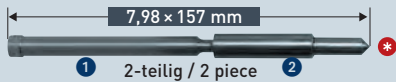
GOLD-DRILL LINE 80
ZOLL / INCH

20 1925

ADAPTER + PASSENDE AUSWERFERSTIFTE · ADAPTER + SUITABLE EJECTOR PINS

FEIN Quick-In 18 mm
 Weldon + Nitto/Universal 19 mm 3/4"

20 1161
 € 17,45



7,98 x 157 mm
 1 2-teilig / 2 piece 2 *

Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4"
 Weldon 19 mm 3/4"

20 1314
 € 16,30

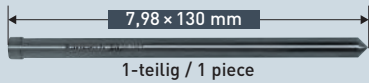


7,98 x 157 mm
 1 2-teilig / 2 piece 2 *

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 32 mm 1.1/4"
 Weldon + Nitto/Universal 19 mm 3/4"

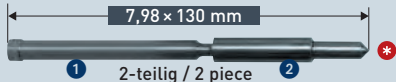
21 0048
 € 14,15



7,98 x 130 mm
 1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1439
 € 13,05



7,98 x 130 mm
 1 2-teilig / 2 piece 2 *

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1427
 € 22,10

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

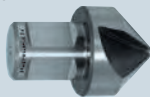
Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



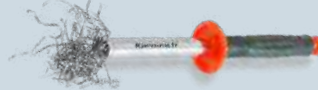
Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



Kegelsenker mit Weldonschaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



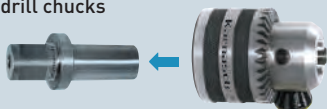
Sets · Displays 534-561
 Sets · Displays



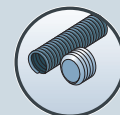
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30



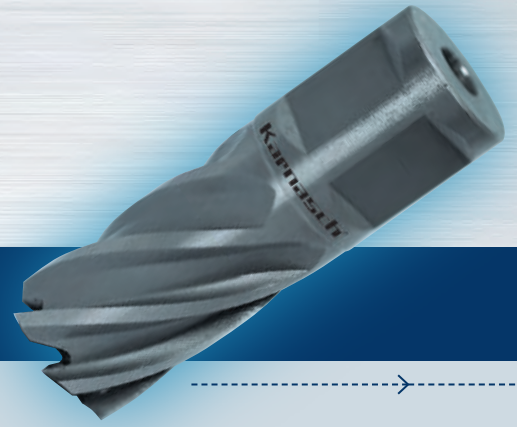
Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts



HSS-XE KERNBOHRER HSS-XE ANNULAR CUTTERS



SILVER-DRILL LINE

Karnasch SILVER-DRILL LINE Kernbohrer ist ein hervorragender Universalbohrer.

HSS-XE Spezialstahl + Stufenhärtung + bis zu 7 verschiedene Schneidgeometrien geeignet zum Bohren aller Baustähle bis 750 N.

Karnasch SILVER-DRILL LINE annular cutter is an excellent UNIVERSAL DRILL.

HSS-XE special steel + Step hardened + up to 7 different cutting geometries suitable for drilling of all mild steels up to a strength of 750 N.

EIGENSCHAFTEN · PROPERTIES



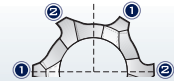
Gefertigt aus hochlegiertem HSS-XE Spezialstahl. Für extreme Härte an den Zahnspitzen (bis 68 HRC). Somit hohe Verschleißfestigkeit und Standzeit.

Made of high-alloyed HSS-XE special steel. For extreme hardness at the tip of the tooth (up to 68 HRC). A high wear resistance and lifetime.



Nur wenige Hersteller sind in der Lage in Stufen gehärtete Kernbohrer zu fertigen. Für uns ist dies „Standard“. Dadurch erreichen wir extrem harte Zahnspitzen (68 HRC) und dennoch einen flexiblen Kernbohrer.

Only few manufacturers are capable of producing step-hardened annular cutters. For Karnasch this is "standard". Only this makes us produce extremely hard tooth tips (68 HRC) and yet a flexible annular cutter.



Sieben verschiedene Schneidgeometrien optimiert je nach Durchmesser und Schnitttiefe des Kernbohrers, ergeben höchste Zerspanleistung.

Seven different cutting geometries optimally adapted to the different diameter and drill depths leads to high performance cutting results.

ANWENDUNG · APPLICATION

| | | | | |
|---------|---------|----------|-----------------------------|------------------------|
| | | | | |
| Stahl | Stahl | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Steel | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 750 N | < 900 N | < 10% Si | | |
| ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL · OPTIMAL

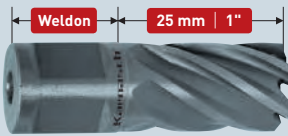
✓ GUT · GOOD

✓ MÖGLICH · POSSIBLE

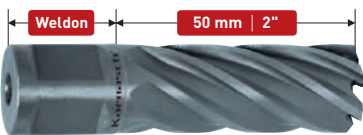
HSS-XE KERNBOHRER HSS-XE ANNULAR CUTTERS

SILVER-DRILL LINE

Schnitttiefe · Drill depths




**BEST
SELLER**




**BEST
SELLER**

| Ø mm | Ø Zoll/Inch | Art. / Type | |
|-------|--------------------|--|-----|
| 12-60 | 15/32- 2.23/64" | 20 1255 SILVER-DRILL LINE/25 | 422 |
| 12-60 | 15/32- 2.23/64" | 20 1265 SILVER-DRILL LINE/50 | 424 |

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

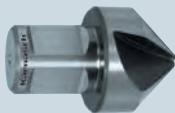
Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen  521-523
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves




Kühlmittel-Druckflaschen  528
Coolant pressure bottles




Kegelsenker mit Weldonschaft  524/525
Countersinks with Weldon shank




Magnetstab zur Entfernung der Bohrspäne  529
Magnetic stick for chip removal




Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm  622
Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm




Sets · Displays  534-561
Sets · Displays



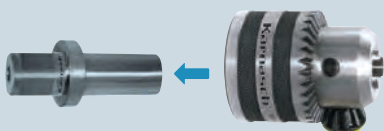
Gewintheadapter Weldon + Gewindebohrer M 3 - M 30  623-624
Tapping adapter Weldon + taps M 3 - M 30



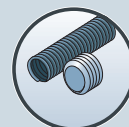
Vollhartmetall Gewindebohrer-Ausbohrer  628
Solid carbide drills to remove jammed taps



Adapter + passende Bohrfutter  528
Adapters + suitable drill chucks



Ersatzteile  530-532
Spare parts



20 1255

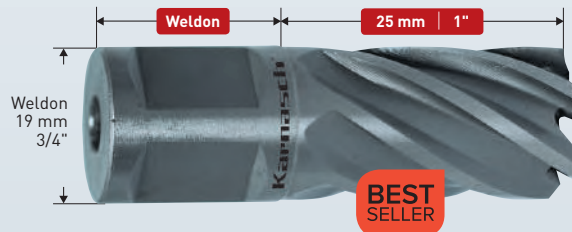
SILVER-DRILL LINE / 25

HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 25 mm
HSS-XE annular cutter, Weldon shank, drill depth 25 mm | 1"



ANWENDUNG · APPLICATION

| | | | |
|----------------|------------|---|---|
| | | | |
| Stahl Steel | Alu Alu | Kupfer, Messing, Zinn Copper, brass, tin | Kunststoffe GFK/CFK Plastics GRP/CRP |
| < 750 N | < 10% Si | | |



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 20 1255 012 | 12 | 15/32" | 10,00 | 20 1255 026 | 26 | 1.1/32" | 18,15 | 20 1255 040 | 40 | 1.37/64" | 32,00 | 20 1255 054 | 54 | 2.1/8" | 53,10 |
| 20 1255 013 | 13 | 33/64" | 10,00 | 20 1255 027 | 27 | 1.1/16" | 18,15 | 20 1255 041 | 41 | 1.39/64" | 32,00 | 20 1255 055 | 55 | 2.11/64" | 54,35 |
| 20 1255 014 | 14 | 35/64" | 10,55 | 20 1255 028 | 28 | 1.7/64" | 19,35 | 20 1255 042 | 42 | 1.21/32" | 34,55 | 20 1255 056 | 56 | 2.13/64" | 56,30 |
| 20 1255 015 | 15 | 19/32" | 10,55 | 20 1255 029 | 29 | 1.9/64" | 19,35 | 20 1255 043 | 43 | 1.11/16" | 34,55 | 20 1255 057 | 57 | 2.1/4" | 58,30 |
| 20 1255 016 | 16 | 5/8" | 11,30 | 20 1255 030 | 30 | 1.3/16" | 20,70 | 20 1255 044 | 44 | 1.47/64" | 37,95 | 20 1255 058 | 58 | 2.9/32" | 59,75 |
| 20 1255 017 | 17 | 43/64" | 11,30 | 20 1255 031 | 31 | 1.7/32" | 20,70 | 20 1255 045 | 45 | 1.49/64" | 37,95 | 20 1255 059 | 59 | 2.21/64" | 61,65 |
| 20 1255 018 | 18 | 45/64" | 12,00 | 20 1255 032 | 32 | 1.17/64" | 21,70 | 20 1255 046 | 46 | 1.13/16" | 40,80 | 20 1255 060 | 60 | 2.23/64" | 63,50 |
| 20 1255 019 | 19 | 3/4" | 12,00 | 20 1255 033 | 33 | 1.19/64" | 21,70 | 20 1255 047 | 47 | 1.27/32" | 40,80 | | | | |
| 20 1255 020 | 20 | 25/32" | 13,05 | 20 1255 034 | 34 | 1.11/32" | 23,05 | 20 1255 048 | 48 | 1.57/64" | 43,05 | | | | |
| 20 1255 021 | 21 | 53/64" | 13,05 | 20 1255 035 | 35 | 1.3/8" | 23,05 | 20 1255 049 | 49 | 1.59/64" | 43,05 | | | | |
| 20 1255 022 | 22 | 55/64" | 15,70 | 20 1255 036 | 36 | 1.27/64" | 27,20 | 20 1255 050 | 50 | 1.31/32" | 46,00 | | | | |
| 20 1255 023 | 23 | 29/32" | 15,70 | 20 1255 037 | 37 | 1.29/64" | 27,20 | 20 1255 051 | 51 | 2.1/64" | 46,00 | | | | |
| 20 1255 024 | 24 | 15/16" | 16,45 | 20 1255 038 | 38 | 1.1/2" | 29,20 | 20 1255 052 | 52 | 2.3/64" | 49,90 | | | | |
| 20 1255 025 | 25 | 63/64" | 16,45 | 20 1255 039 | 39 | 1.17/32" | 29,20 | 20 1255 053 | 53 | 2.3/32" | 51,50 | | | | |

Größere Ø siehe Art. 20 1315 Seite 366 sowie Art. 20 1316 Seite 368 -
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmesser.
Larger Ø see Art. 20 1315 page 366 and Art. 20 1316 page 368 -
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1255

SILVER-DRILL LINE / 25

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE · EJECTOR PINS



20 1221
€ 4,75

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1255

SILVER-DRILL LINE / 25

SETS / DISPLAYS Seite / Page 546



Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1255 SILVER-DRILL LINE 25 – siehe Seite 546. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1255 SILVER-DRILL LINE 25 – see page 546. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



1296

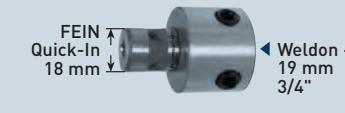
Zubehör für HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 25 mm
Accessories for HSS-XE annular cutter, Weldon shank, drill depth 25 mm | 1"

SILVER-DRILL LINE 25

20 1255

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

FEIN Quick-In 18 mm
Weldon + Nitto/Universal 19 mm 3/4"



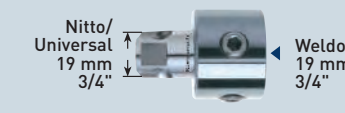
6,34 x 102 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1263
€ 17,50

20 1271
€ 7,65

Nitto/Universal 19 mm 3/4"
Weldon 19 mm 3/4"




6,34 x 102 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1311
€ 16,30

20 1271
€ 7,65

Weldon 32 mm 1.1/4"
Weldon + Nitto/Universal 19 mm 3/4"



6,34 x 77 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

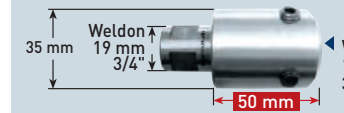
21 0048
€ 14,15

20 1221
€ 4,75

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS

Weldon 19 mm 3/4"
Weldon + Nitto/Universal 19 mm 3/4"



35 mm
50 mm

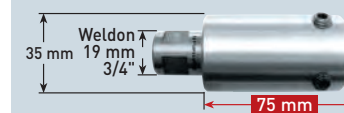
7,98 x 6,34 x 5,30 x 127 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1387
€ 18,95

20 1433
€ 15,70

Weldon 19 mm 3/4"
Weldon + Nitto/Universal 19 mm 3/4"



35 mm
75 mm

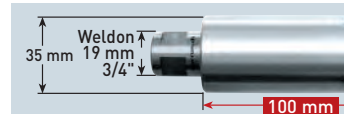
7,98 x 6,34 x 5,30 x 153 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1402
€ 20,95

20 1396
€ 16,45

Weldon 19 mm 3/4"
Weldon + Nitto/Universal 19 mm 3/4"



35 mm
100 mm

7,98 x 6,34 x 5,30 x 178 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1417
€ 24,95

20 1411
€ 17,05

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
Spare allen screws for all extensions see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
Coolant pressure bottles



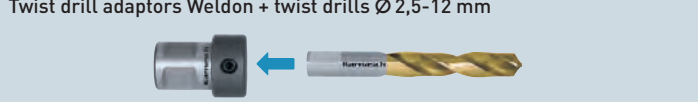
Kegelsenker mit Weldonschaft 524/525
Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
Magnetic stick for chip removal



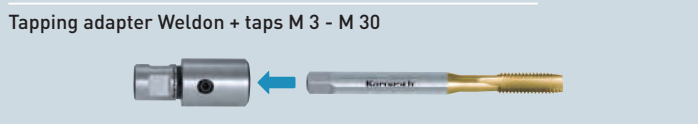
Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



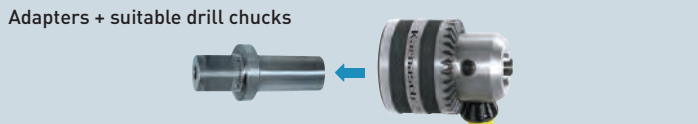
Sets · Displays 534-561
Sets · Displays



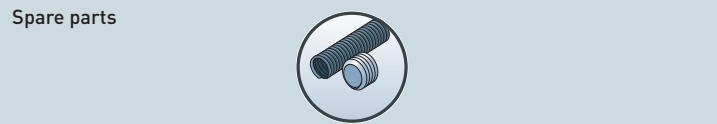
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
Adapters + suitable drill chucks



Ersatzteile 530-532
Spare parts




Index

20 1265

SILVER-DRILL LINE / 50

HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 50 mm
HSS-XE annular cutter, Weldon shank, drill depth 50 mm | 2"



ANWENDUNG · APPLICATION

| | | | |
|----------------|------------|---|---|
| | | | |
| Stahl Steel | Alu Alu | Kupfer, Messing, Zinn Copper, brass, tin | Kunststoffe GFK/CFK Plastics GRP/CRP |
| < 750 N | < 10% Si | | |



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 20 1265 012 | 12 | 15/32" | 13,15 | 20 1265 026 | 26 | 1.1/32" | 21,80 | 20 1265 040 | 40 | 1.37/64" | 40,20 | 20 1265 054 | 54 | 2.1/8" | 68,35 |
| 20 1265 013 | 13 | 33/64" | 13,15 | 20 1265 027 | 27 | 1.1/16" | 21,80 | 20 1265 041 | 41 | 1.39/64" | 40,20 | 20 1265 055 | 55 | 2.11/8" | 70,20 |
| 20 1265 014 | 14 | 35/64" | 13,85 | 20 1265 028 | 28 | 1.7/64" | 23,50 | 20 1265 042 | 42 | 1.21/32" | 43,50 | 20 1265 056 | 56 | 2.13/64" | 72,35 |
| 20 1265 015 | 15 | 19/32" | 13,85 | 20 1265 029 | 29 | 1.9/64" | 23,50 | 20 1265 043 | 43 | 1.11/16" | 43,50 | 20 1265 057 | 57 | 2.1/4" | 74,05 |
| 20 1265 016 | 16 | 5/8" | 14,55 | 20 1265 030 | 30 | 1.3/16" | 25,60 | 20 1265 044 | 44 | 1.47/64" | 47,80 | 20 1265 058 | 58 | 2.9/32" | 76,10 |
| 20 1265 017 | 17 | 43/64" | 14,55 | 20 1265 031 | 31 | 1.7/32" | 25,60 | 20 1265 045 | 45 | 1.49/64" | 47,80 | 20 1265 059 | 59 | 2.21/64" | 77,85 |
| 20 1265 018 | 18 | 45/64" | 15,45 | 20 1265 032 | 32 | 1.17/64" | 27,40 | 20 1265 046 | 46 | 1.13/16" | 51,35 | 20 1265 060 | 60 | 2.23/64" | 80,05 |
| 20 1265 019 | 19 | 3/4" | 15,45 | 20 1265 033 | 33 | 1.19/64" | 27,40 | 20 1265 047 | 47 | 1.27/32" | 51,35 | | | | |
| 20 1265 020 | 20 | 25/32" | 16,80 | 20 1265 034 | 34 | 1.11/32" | 29,40 | 20 1265 048 | 48 | 1.57/64" | 54,20 | | | | |
| 20 1265 021 | 21 | 53/64" | 16,80 | 20 1265 035 | 35 | 1.3/8" | 29,40 | 20 1265 049 | 49 | 1.59/64" | 54,20 | | | | |
| 20 1265 022 | 22 | 55/64" | 18,40 | 20 1265 036 | 36 | 1.27/64" | 34,65 | 20 1265 050 | 50 | 1.31/32" | 61,20 | | | | |
| 20 1265 023 | 23 | 29/32" | 18,40 | 20 1265 037 | 37 | 1.29/64" | 34,65 | 20 1265 051 | 51 | 2.1/64" | 61,20 | | | | |
| 20 1265 024 | 24 | 15/16" | 20,35 | 20 1265 038 | 38 | 1.1/2" | 36,75 | 20 1265 052 | 52 | 2.3/64" | 64,10 | | | | |
| 20 1265 025 | 25 | 63/64" | 20,35 | 20 1265 039 | 39 | 1.17/32" | 36,75 | 20 1265 053 | 53 | 2.3/32" | 66,15 | | | | |

Größere Ø siehe Art. 20 1316 Seite 368 ·
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Larger Ø see Art. 20 1316 page 368 ·
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1265

SILVER-DRILL LINE / 50

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE · EJECTOR PINS



20 1226
• € 5,35

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1265

SILVER-DRILL LINE / 50

SETS / DISPLAYS Seite / Page 547

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1265 SILVER-DRILL LINE 50 – siehe Seite 547. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1265 SILVER-DRILL LINE 50 – see page 547. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



1296



Zubehör für HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 50 mm
 Accessories for HSS-XE annular cutter, Weldon shank, drill depth 50 mm | 2"

SILVER-DRILL LINE 50

20 1265

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

FEIN Quick-In 18 mm
 Weldon + Nitto/Universal 19 mm 3/4"




6,34 x 130 mm

20 1263 € 17,50

Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4" Weldon 19 mm 3/4"




6,34 x 130 mm

20 1311 € 16,30

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 32 mm 1.1/4" Weldon + Nitto/Universal 19 mm 3/4"



6,34 x 102 mm

21 0048 € 14,15


20 1226 € 5,35

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS

Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"



35 mm 50 mm


7,98 x 6,34 x 5,30 x 153 mm

20 1387 € 18,95

20 1396 € 16,45

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"



35 mm 75 mm


7,98 x 6,34 x 5,30 x 178 mm

20 1402 € 20,95

20 1411 € 17,05

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 19 mm 3/4" Weldon + Nitto/Universal 19 mm 3/4"



35 mm 100 mm

7,98 x 6,34 x 5,30 x 203 mm

20 1417 € 24,95

20 1426 € 18,35

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



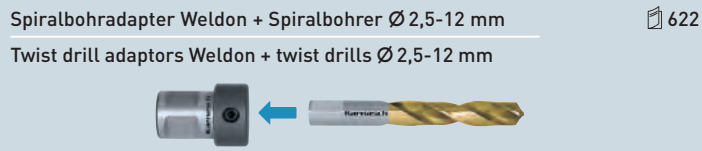
Kegelsenker mit Weldonschaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



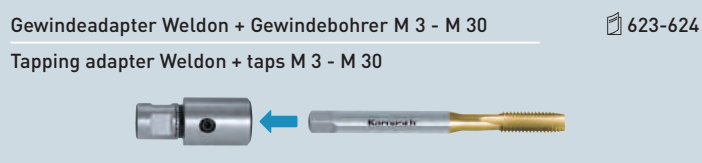
Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



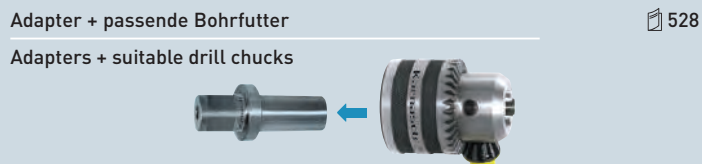
Sets · Displays 534-561
 Sets · Displays



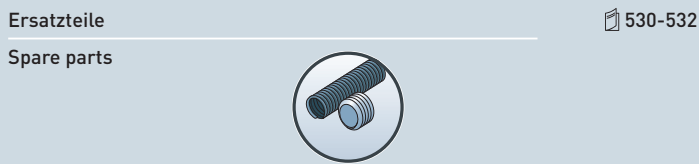
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts




20 1230

MINI-LINE / 8

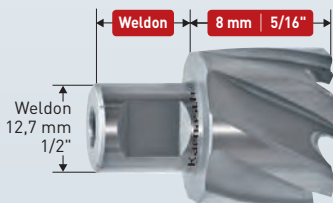
Kernbohrer / Lochsägen Kombination, Weldonschaft, Nutzlänge 8 mm

Annular cutter / hole saw combination, Weldon shank, drill depth 8 mm | 5/16"



ANWENDUNG · APPLICATION

| | | | | |
|----------------|------------------------|------------|---|---|
| | | | | |
| Stahl Steel | Edelstahl Stainless | Alu Alu | Kupfer, Messing, Zinn Copper, brass, tin | Kunststoffe GFK/CFK Plastics GRP/CRP |
| < 900 N | > 900 N | < 10% Si | | |



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|----------------|------|-------------|------|----------------|-------|-------------|------|----------------|-------|
| 20 1230 008 | 8 | 5/16" | 9,60 | 20 1230 014 | 14 | 35/64" | 10,05 | 20 1230 022 | 22 | 55/64" | 15,35 |
| 20 1230 010 | 10 | 25/64" | 9,60 | 20 1230 016 | 16 | 5/8" | 11,60 | 20 1230 024 | 24 | 15/16" | 16,45 |
| 20 1230 012 | 12 | 15/32" | 9,60 | 20 1230 018 | 18 | 45/64" | 13,10 | 20 1230 025 | 25 | 63/64" | 17,00 |
| 20 1230 013 | 13 | 33/64" | 9,90 | 20 1230 020 | 20 | 25/32" | 14,00 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Attention: The inch sizes do not correspond exactly to the mm diameters.

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl Kernbohrer / Lochsägen Kombination in Leichtlauf Ausführung für handgeführte Maschinen, Kernbohrmaschinen, Stationäre Maschinen.

Das ideale Bohrwerkzeug für:

- Elektriker
- Sanitär- und Heizungsbauer
- Blechbearbeitung
- Wartungsinstallationen
- Automobil-Blecharbeiten und vieles mehr...

Durch dünne Schnittbreite von nur 2,8 mm:

- Sehr wenig Schnittdruck für lange Lebensdauer bei Arbeiten mit Akku-Bohrmaschinen.
- Schnelles und leichtgängiges Bohren aller Durchmesser
- Exzellente Führung und Kontrolle während des Bohrvorgangs.

Schnitttiefen:

Bis zu 8 mm möglich bei Stahl/Edelstahl. Bis zu 8 mm möglich bei NE-Metallen (Alu), Kunststoffen, Sandwich-Material.

Anwendungshinweis:

Verwenden Sie bei allen Metallen gutes Schneidöl (siehe ab Seite 1143)

HSS-XE steel annular cutter / hole saw combination for handeld machines, core drilling machines, stationary machines.

The ideal drilling tool for:

- Electrical
- Piping
- Conduit work
- Sheet metal fabrication
- Maintenance installation
- HVAC & PHCC
- Automotive aftermarket and many other industries.

Because of thin cutting width of only 2,8 mm:

- Very little cutting pressure for long battery life if using cordless drilling machines.
- Fast and smooth running drilling of all diameters.
- Excellent guidance and control during drilling.

Drill depths:

Up to 8 mm possible in steel/stainless steel. Up to 8 mm possible in non ferrous metal (Alu), plastics, sandwich material.

Application note:

Use only good cutting oil. For metal (see from page 1143)

Schnittdaten
Cutting data

Film
Movie



1296



Zubehör Kernbohrer / Lochsägen Kombination, Weldonschaft, Nutzlänge 8 mm
Accessories for annular cutter / hole saw combination, Weldon shank, drill depth 8 mm | 5/16"

MINI-LINE / 8

20 1230



HANDMASCHINEN
HANDHELD MACHINES

STATIONÄRE MASCHINEN
STATIONARY MACHINES



MAGNET-KERNBOHRMASCHINEN
MAGNETIC HOLE CUTTING MACHINES

SCHAFT + PASSENDER AUSWERFERSTIFT
SHANK + SUITABLE EJECTOR PIN



20 1235
€ 36,85



20 1232
€ 6,50

SETS · SETS



20 1251
€ 200,80

Inhalt · Content

11 Stk./Pcs. → Ø 8, 10, 12, 13, 14, 16, 18, 20, 22, 24, 25 mm +

- Schaft · Shank 20 1235
- Auswerferstift · Ejector pin 20 1232
- Adapter · Adapter 20 1234
- Auswerferstift · Ejector pin 20 1233
- Körner · Punch 20 1238
- Inbusschlüssel · Allen key 20 1239

Anderer Inhalt möglich!

Other content possible!

Leeres Set 20 1377
Empty set € 13,25

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

WELDON 19 mm (3/4")

Passend für Maschinen · Suitable for machines

Karnasch · Alfra-Rotabest + Alfra Rotaquick · BDS + BDS Keyless · Bektop · Bux · Cembre · Dubuis · Erico · Euroboor · Evolution · Hall (Powerbor) · Hougen · Jancy · Magbroach · Magtron · Magnetor · Metallkraft · Promag · Ruko · Rotabroach · Ruko + Ruko Easylock · Universal ...

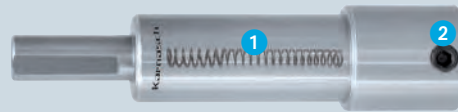


20 1234
€ 13,25



20 1233
€ 6,80

ERSATZTEILE · SPARE PARTS



1 Auswurfeder · Ejector spring



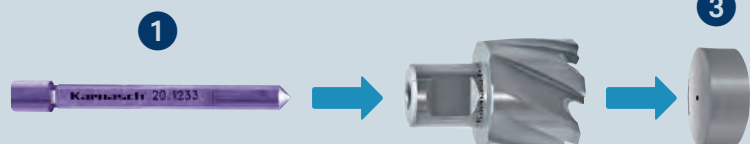
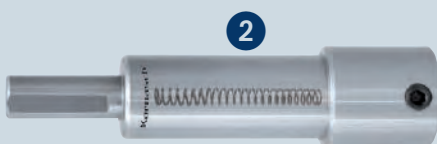
12x55 mm 20 1237
€ 1,65

2 Schraube · Screw



Ø 3 mm / M6x6 20 1330
€ 0,10

FUNKTIONSWEISE · OPERATING MODE



- a. Das Werkstück ankören. Es ist wichtig mit dem Körner einen starken Körnerpunkt zu setzen (speziell bei Handmaschinen).
- b. Setzen Sie den Auswerferstift 1 genau in die Mitte des starken Körnerpunktes an. Zu Beginn des Bohrprozesses wenig Druck (Vorschub) verwenden, bis der Bohrer zirka 0,5 mm Schnitttiefe erreicht hat. Der Bohrer hat sich nun selbst zentriert. Der Vorschub kann erhöht werden.
- c. Eine Auswurfeder im Schaft 2 erzeugt Druck auf den Auswerferstift 1.
- d. Der Auswerferstift wirft den Kern 3 nach dem Durchbohren aus.

- a. Center punch the work piece. It is important to set a strong center mark (especially if using handheld machines).
- b. Place the ejector pin 1 exactly in the middle of the strong center mark. Use little pressure (feed-rate) until you reach approximately 0,5 mm cutting depth. The drill is self-centered now. You can increase feed rate.
- c. An ejection spring 2 which is installed in the shank puts pressure on the ejector pin 1.
- d. The ejector pin ejects the core 3 after drilling process.



PULVERSTAHL + DURABLUE-BESCHICHTETE SPIRALBOHRER POWDER STEEL + DURABLUE-COATED TWIST DRILLS



DRILL-LINE PRO

Im harten Einsatz kann nur in den seltensten Fällen auf optimale Drehzahlen und Kühlung Rücksicht genommen werden. Die Karnasch DURABLUE-Beschichtung macht den Kernbohrer somit entscheidend widerstandsfähiger. Letztendlich wird dadurch die Lebensdauer des Bohrers wesentlich erhöht.

DRILL-LINE PRO Spiralbohrer sind der Problemlöser für schwierigste Zerspanungsprobleme. Für weniger schwierige Zerspanung siehe Art. 20 1710 Seite 432, Art. 20 1840 Seite 433

Under hard field conditions only in the rarest cases optimum speed and cooling can be considered. The Karnasch DURABLUE-coating makes the annular cutter decisively more resistant. This results finally to an extraordinary increase of lifetime.

DRILL-LINE PRO twist drill are the right choice for most difficult materials. For less difficult materials see Art. 20 1710 page 432, Art. 20 1840 page 433

EIGENSCHAFTEN · PROPERTIES



Gefertigt aus ASP Pulverstahl zum Bohren auch schwierigster Materialien wie Eisenbahnschienen, Edelstähle, exotische Legierungen. Immer dort einsetzbar wo höchste Verschleißfestigkeit und Standzeit benötigt wird.

Made of ASP powder steel for drilling of difficult materials like railway tracks, stainless steels, exotic alloys. Applicable wherever a high wear resistance and lifetime are required.

Karnasch Spiralbohrer werden mit einer Hochleistungsgeometrie gefertigt für: Sofortiges Selbstzentrieren, leichteres Zerspanen, höchste Standzeiten.

Karnasch twist drills are produced in a heavy-duty geometry for immediate self-centering, easy cutting, highest lifetimes.

Unsere hochwertigsten Spiralbohrer erhalten die einzigartige und patentierte DURABLUE-Beschichtung. Extreme Oberflächenhärte- und -glätte ergeben extreme Standzeiten auch unter nicht optimalen Arbeitsbedingungen wie „Über Kopf arbeiten“, Trockenbohrungen, u.s.w.

Our first-class twist drills are equipped with the unique and patented DURABLUE-coating. Extreme surface hardness and sleekness yield extreme lifetimes even under non-optimum conditions like "overhead work", dry drilling, etc.

ANWENDUNG · APPLICATION

| | | | | | | | | | | |
|----------|----------|-----------|----------|-----------------------|---------------------|----------------|----------|--|----------|------------|
| | | | | | | | | | | |
| Stahl | Stahl | Edelstahl | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Grauguss | Graphit | Hastelloy, Inconel, Nimonic, Exotische Materialien | Schienen | Hardox 400 |
| Steel | Steel | Stainless | Alu | Copper, brass, tin | Plastics GRP/CRP | Grey cast iron | Graphite | Hastelloy, Inconel, Nimonic, exotic materials | Rails | Hardox 400 |
| < 1100 N | < 1400 N | > 900 N | > 10% Si | | | | | | | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL · OPTIMAL

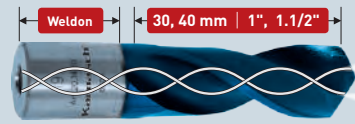
✓ GUT · GOOD

✓ MÖGLICH · POSSIBLE

PULVERSTAHL + DURABLUE-BESCHICHTETE SPIRALBOHRER POWDER STEEL + DURABLUE-COATED TWIST DRILLS

DRILL-LINE PRO

Schnitttiefe · Drill depths



Ø mm

Ø Zoll/Inch

Art. / Type



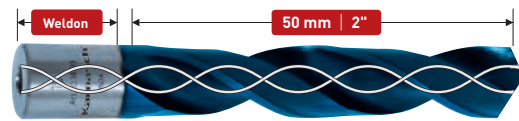
6-27,5

15/64-
1.5/64"

20 1430

DRILL-LINE 30/40 PRO

430



14-32

35/64-
1.17/64"

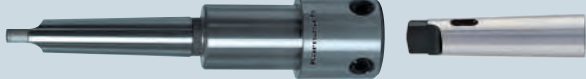
20 1465

DRILL-LINE 50 PRO

431

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

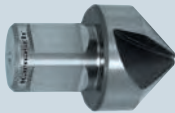
Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
Coolant pressure bottles



Kegelsenker mit Weldonschaft 524/525
Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



Sets · Displays 534-561
Sets · Displays



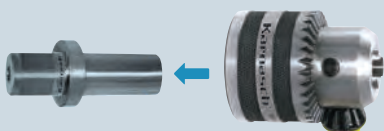
Gewintheadapter Weldon + Gewindebohrer M 3 - M 30 623-624
Tapping adapter Weldon + taps M 3 - M 30



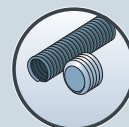
Vollhartmetall Gewindebohrer-Ausbohrer 628
Solid carbide drills to remove jammed taps



Adapter + passende Bohrfutter 528
Adapters + suitable drill chucks



Ersatzteile 530-532
Spare parts



1



2



3



4



5



6



7



8



9



Index

20 1430

DRILL-LINE 30 PRO



Pulverstahl + DURABLUE-beschichteter Spiralbohrer, Nutzlänge 30 mm, Weldonschaft oder Fein Quick-In Schaft
 Powder steel + DURABLUE-coated twist drill, drill depth 30 mm | 1", Weldon shank or Fein Quick-In shank

ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien | Hardox 400 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials | Hardox 400 |
| < 1400 N | > 900 N | | > 10% Si | | | | |



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|--------------|------|-------------|-------|
| 20 1430 006 | 6 | 15/64" | 23,70 | 20 1430 013 | 13 | 33/64" | 44,35 |
| 20 1430 008 | 8 | 5/16" | 23,70 | 20 1430 0135 | 13,5 | 17/32" | 51,95 |
| 20 1430 0098 | 9,8 | 25/64" | 28,85 | 20 1430 014 | 14 | 35/64" | 52,75 |
| 20 1430 010 | 10 | 25/64" | 28,85 | 20 1430 015 | 15 | 19/32" | 54,90 |
| 20 1430 011 | 11 | 7/16" | 32,40 | 20 1430 016 | 16 | 5/8" | 62,50 |
| 20 1430 012 | 12 | 15/32" | 36,05 | | | | |

Für Ø 6 - 16 mm benötigen Sie Adapter (siehe Zubehör).
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
 For Ø 6 - 16 mm you need adapter (see accessories).
Attention: The inch sizes do not correspond exactly to the mm diameters.

ZUBEHÖR · ACCESSORY

Adapter mit Bolzen zum Öffnen der Kühlmittelzufuhr
 Adapter with pin for opening the coolant supply

WELDON 19 mm (3/4")

| | | | |
|--|------------|---------|---------|
| | Ø 6-12 mm | 20 1431 | € 11,60 |
| | Ø 13-16 mm | 20 1434 | € 11,60 |

FEIN QUICK-IN

| | | | |
|--|------------|---------|---------|
| | Ø 6-12 mm | 20 1421 | € 11,60 |
| | Ø 13-16 mm | 20 1422 | € 11,60 |

20 1430

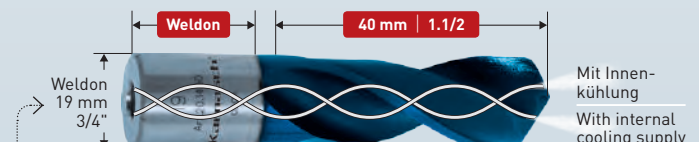
DRILL-LINE 40 PRO



Pulverstahl + DURABLUE-beschichteter Spiralbohrer mit Innenkühlung, Nutzlänge 40 mm, Weldonschaft
 Powder steel + DURABLUE-coated twist drill with internal cooling supply, drill depth 40 mm | 1.1/2", Weldon shank

ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien | Hardox 400 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials | Hardox 400 |
| < 1400 N | > 900 N | | > 10% Si | | | | |



Ø 17-27,5 mm wird ohne Bolzen zum Öffnen der Kühlmittelzufuhr geliefert (wenn benötigt siehe Zubehör).
 Ø 17-27,5 mm will be delivered without pin for opening the cooling supply (see accessories if required).

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|--------------|------|-------------|-------|
| 20 1430 017 | 17 | 43/64" | 63,55 | 20 1430 023 | 23 | 29/32" | 80,70 |
| 20 1430 018 | 18 | 45/64" | 64,50 | 20 1430 024 | 24 | 15/16" | 82,80 |
| 20 1430 019 | 19 | 3/4" | 68,30 | 20 1430 0275 | 27,5 | 1.5/64" | 88,30 |
| 20 1430 020 | 20 | 25/32" | 70,85 | | | | |
| 20 1430 021 | 21 | 53/64" | 72,70 | | | | |
| 20 1430 022 | 22 | 55/64" | 74,70 | | | | |

Weitere Abmessungen sowie Schnitttiefe 50 mm siehe nächste Seite Art. 20 1465.
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
 More dimensions and cutting depth 50 mm see next page art. 20 1465.
Attention: The inch sizes do not correspond exactly to the mm diameters.

ZUBEHÖR · ACCESSORY

Der Bolzen ist nur notwendig, wenn Aufnahmehalter mit Innenkühlung verwendet werden (Siehe Seite 521-523).
 The pin is only necessary if you use tool holders with internal cooling supply (see page 521-523).

Bolzen zum Öffnen der Kühlmittelzufuhr
Pin for opening the cooling supply

| | | | |
|--|--------------|---------|--------|
| | Ø 17-27,5 mm | 20 1435 | € 4,25 |
|--|--------------|---------|--------|

Schnittdaten
Cutting data

Film
Movie

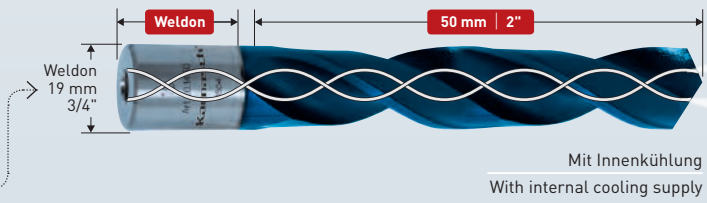
1301

Pulverstahl + DURABLUE-beschichteter Spiralbohrer mit Innenkühlung, Nutzlänge 50 mm, Weldonschaft
 Powder steel + DURABLUE-coated twist drill with internal cooling supply, drill depth 50 mm | 2", Weldon shank

DRILL-LINE 750 PRO **20 1465**

ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien | Hardox 400 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials | Hardox 400 |
| < 1400 N | > 900 N | | > 10% Si | | | | |



Wird ohne Bolzen zum Öffnen der Kühlmittelzufuhr geliefert (wenn benötigt siehe Zubehör).
 Will be delivered without pin for opening the cooling supply (see accessories if required).

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|--------|-------------|------|-------------|--------|
| 20 1465 014 | • 14 | 35/64" | 80,85 | 20 1465 020 | • 20 | 25/32" | 90,25 | 20 1465 026 | • 26 | 1.1/32" | 123,80 |
| 20 1465 015 | • 15 | 19/32" | 80,85 | 20 1465 021 | • 21 | 53/64" | 90,25 | 20 1465 027 | • 27 | 1.1/16" | 123,80 |
| 20 1465 016 | • 16 | 5/8" | 83,85 | 20 1465 022 | • 22 | 55/64" | 97,35 | 20 1465 028 | • 28 | 1.7/64" | 143,50 |
| 20 1465 017 | • 17 | 43/64" | 83,85 | 20 1465 023 | • 23 | 29/32" | 98,15 | 20 1465 030 | • 30 | 1.3/16" | 159,35 |
| 20 1465 018 | • 18 | 45/64" | 83,85 | 20 1465 024 | • 24 | 15/16" | 109,30 | 20 1465 032 | • 32 | 1.17/64" | 172,05 |
| 20 1465 019 | • 19 | 3/4" | 83,85 | 20 1465 025 | • 25 | 63/64" | 109,30 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmesser.
Attention: The inch sizes do not correspond exactly to the mm diameters.

ZUBEHÖR · ACCESSORY

Der Bolzen ist nur notwendig, wenn Aufnahmehalter mit Innenkühlung verwendet werden (Siehe Seite 521-523).
 The pin is only necessary if you use tool holders with internal cooling supply (see page 521-523).

Bolzen zum Öffnen der Kühlmittelzufuhr
 Pin for opening the cooling supply

Ø 14-32 mm **20 1435**
 • € 4,25

EIGENSCHAFTEN · PROPERTIES

Für Art. 20 1430 Seite 430 sowie für Art. 20 1465 · For Art. 20 1430 page 430 and for Art. 20 1465



Gefertigt aus ASP Pulverstahl zum Bohren auch schwierigster Materialien wie Eisenbahnschienen, Edelstähle, exotische Legierungen. Immer dort einsetzbar wo höchste Verschleißfestigkeit und Standzeit benötigt wird.

Made of ASP powder steel for drilling of difficult materials like railway tracks, stainless steels, exotic alloys. Applicable wherever a high wear resistance and lifetime are required.

Karnasch Spiralbohrer werden mit einer Hochleistungsgeometrie gefertigt für: Sofortiges Selbstzentrieren, leichteres Zerspanen, höchste Standzeiten.

Karnasch twist drills are produced in a heavy-duty geometry for immediate self-centering, easy cutting, highest lifetimes.

Unsere hochwertigsten Spiralbohrer erhalten die einzigartige und patentierte DURABLUE-Beschichtung. Extreme Oberflächenhärte- und -glätte ergeben extreme Standzeiten auch unter nicht optimalen Arbeitsbedingungen wie „Über Kopf arbeiten“, Trockenbohrungen, u.s.w.

Our first-class twist drills are equipped with the unique and patented DURABLUE-coating. Extreme surface hardness and sleekness yield extreme lifetimes even under non-optimum conditions like "overhead work", dry drilling, etc.

Schnittdaten
Cutting data



1301

Film
Movie



431



Index

20 1710

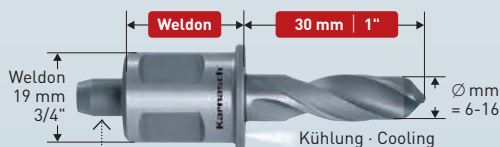
DRILL-LINE 30



HSS-XE Spiralbohrer, Nutzlänge 30 mm, Weldonschaft
HSS-XE twist drill, drill depth 30 mm | 1", Weldon shank

ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 900 N | < 900 N | | < 10% Si | | |



Ø 6-16 mm wird mit Bolzen zum Öffnen der Kühlmittelzufuhr geliefert.
Ø 6-16 mm will be delivered with pin for opening the cooling supply.

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|--------------|------|-------------|-------|
| 20 1710 006 | 6 | 15/64" | 14,90 | 20 1710 012 | 12 | 15/32" | 17,40 |
| 20 1710 008 | 8 | 5/16" | 14,90 | 20 1710 013 | 13 | 33/64" | 21,45 |
| 20 1710 0095 | 9,5 | 25/64" | 13,60 | 20 1710 0135 | 13,5 | 17/32" | 19,55 |
| 20 1710 0098 | 9,8 | 25/64" | 13,60 | 20 1710 014 | 14 | 35/64" | 21,45 |
| 20 1710 010 | 10 | 25/64" | 14,90 | 20 1710 015 | 15 | 19/32" | 25,60 |
| 20 1710 011 | 11 | 7/16" | 17,40 | 20 1710 016 | 16 | 5/8" | 25,60 |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Attention: The inch sizes do not correspond exactly to the mm diameters.

ZUBEHÖR · ACCESSORY

Der Bolzen ist nur notwendig, wenn Aufnahmehalter mit Innenkühlung verwendet werden (Siehe Seite 521-523).
The pin is only necessary if you use tool holders with internal cooling supply (see page 521-523).

Bolzen zum Öffnen der Kühlmittelzufuhr
Pin for opening the cooling supply



20 1435
€ 4,25

EIGENSCHAFTEN · PROPERTIES



Gefertigt aus hochlegiertem HSS-XE Spezialstahl. Für extreme Härte an den Zahnsitzen (bis 68 HRC). Somit hohe Verschleißfestigkeit und Standzeit.

Karnasch Spiralbohrer werden mit einer Hochleistungsgeometrie gefertigt für: Sofortiges Selbstzentrieren, leichteres Zerspanen, höchste Standzeiten.

Made of high-alloyed HSS-XE special steel. For extreme hardness at the tip of the tooth (up to 68 HRC). Thus guaranteeing a high wear resistance and lifetime.

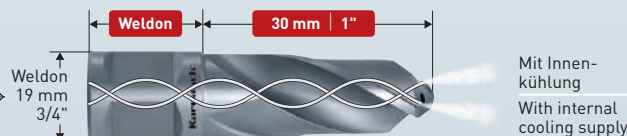
Karnasch twist drills are produced in a heavy-duty geometry for immediate self-centering, easy cutting, highest lifetimes.

HSS-XE Spiralbohrer mit Innenkühlung, Nutzlänge 30 mm, Weldonschaft

HSS-XE Spiralbohrer twist drill with internal cooling supply, drill depth 30 mm | 1", Weldon shank

ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 900 N | < 900 N | | < 10% Si | | |



Ø 17-27,5 mm wird ohne Bolzen zum Öffnen der Kühlmittelzufuhr geliefert (wenn benötigt siehe Zubehör).
Ø 17-27,5 mm will be delivered without pin for opening the cooling supply (see accessories if required).

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|--------------|------|-------------|-------|
| 20 1710 017 | 17 | 43/64" | 17,25 | 20 1710 023 | 23 | 29/32" | 21,40 |
| 20 1710 018 | 18 | 45/64" | 17,25 | 20 1710 024 | 24 | 15/16" | 21,40 |
| 20 1710 019 | 19 | 3/4" | 18,15 | 20 1710 0275 | 27,5 | 1.5/64" | 23,90 |
| 20 1710 020 | 20 | 25/32" | 18,15 | | | | |
| 20 1710 021 | 21 | 53/64" | 19,85 | | | | |
| 20 1710 022 | 22 | 55/64" | 19,85 | | | | |

Ersatzartikel siehe Art. 20 1430 Seite 430 / Replacement article see Art. 20 1430 page 430

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Attention: The inch sizes do not correspond exactly to the mm diameters.

Schnittdaten
Cutting data

Film
Movie



1296



20 1830



20 1840

DRILL-LINE GOLD 750

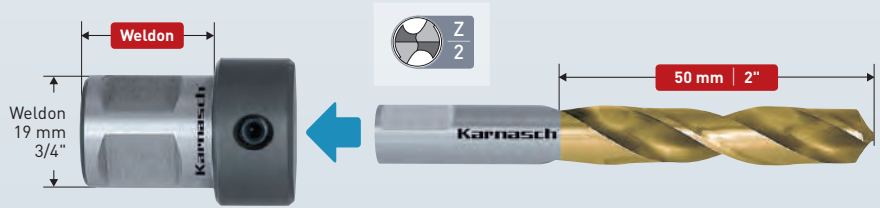


Adapter Weldonschaft
Adapter Weldon shank

HSS-CO Cobalt + TiN beschichteter Spiralbohrer, Nutzlänge 50 mm
HSS-CO Cobalt + TiN coated twist drill, drill depth 50 mm | 2"

ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 1400 N | > 900 N | | > 10% Si | | |



| Adapter - Adapter | Schaft - Shank | Spiralbohrer - Twist drill | Bohrer - Drill | Für Gewinde - For thread Size |
|-----------------------|----------------|----------------------------|-----------------------|--------------------------------|
| 20 1830 002 € 7,45 | 2,5 mm | | Ø 2,5 mm Ø 3/32" | 20 1840 002 € 7,55 M 3 |
| 20 1830 004 € 7,45 | 3 mm | | Ø 3,4 mm Ø 9/64" | 20 1840 004 € 7,55 M 4 |
| 20 1830 010 € 7,30 | 4 mm | | Ø 4,3 mm Ø 11/64" | 20 1840 006 € 7,55 M 5 |
| | | | Ø 4 mm Ø 5/32" | 20 1840 010 € 6,85 - |
| 20 1830 020 € 7,30 | 5 mm | | Ø 5 mm Ø 13/64" | 20 1840 020 € 7,65 M 6 |
| 20 1830 030 € 7,30 | 6 mm | | Ø 6 mm Ø 15/64" | 20 1840 030 € 8,95 - |
| | | | Ø 6,8 mm Ø 17/64" | 20 1840 035 € 9,90 M 8 |
| 20 1830 040 € 7,30 | 7 mm | | Ø 7 mm Ø 9/32" | 20 1840 040 € 10,15 - |
| 20 1830 050 € 7,30 | 8 mm | | Ø 8 mm Ø 5/16" | 20 1840 050 € 11,95 - |
| | | | Ø 8,5 mm Ø 21/64" | 20 1840 055 € 13,25 M 10 |
| 20 1830 060 € 7,30 | 9 mm | | Ø 9 mm Ø 23/64" | 20 1840 060 € 13,45 - |
| 20 1830 070 € 7,30 | 10 mm | | Ø 10 mm Ø 25/64" | 20 1840 070 € 14,70 - |
| | | | Ø 10,3 mm Ø 13/32" | 20 1840 075 € 16,25 M 12 |
| 20 1830 080 € 7,30 | 11 mm | | Ø 11 mm Ø 7/16" | 20 1840 080 € 16,15 - |
| 20 1830 090 € 7,30 | 12 mm | | Ø 12 mm Ø 15/32" | 20 1840 090 € 17,80 M 14 |

Gewindebohrer Siehe Art. 20 1820 Seite 623 · **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Taps see Art. 20 1820 page 623 · **Attention:** The inch sizes do not correspond exactly to the mm diameters.



EIGENSCHAFTEN · PROPERTIES

Cobaltstahl + TiN-Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

Cobalt steel + TiN-coating for a further substantial increase in service life also when machining dry (no/little cooling)

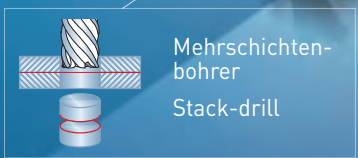
Schnelle, preiswerte und präzise Bohrungen mit Karnasch Hochleistungs-spiralbohrer + Spiralbohradapter Weldon

Fast, inexpensive and accurate holes with Karnasch high-performance twist drills + twist drill adaptor Weldon



KERNBOHRER MIT NITTO / UNIVERSALSCHAFT

ANNULAR CUTTERS WITH NITTO / UNIVERSAL SHANK



Passende Kernbohrmaschinen von Nitto:
Matching machines made by Nitto:

NITTO KOHKI "ONE TOUCH" TYPE:
WOJ 3200 · AO 5575 · WA 3500 · WA 5000 · QA 4000 · QA 6500

Passend auch für alle Maschinen mit Weldonschaft 19 mm (siehe Seite 360).
Hierbei ist darauf zu achten, dass nur **eine** Spannfläche vorhanden ist.


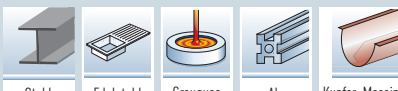


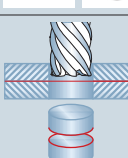
Also matching all machines with Weldon shank 19 mm (3/4") (see page 360).
Observe that there is only **one** clamping face.

NITTO / UNIVERSALSCHAFT

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Übersicht Kernbohrer Nitto / Universalschaft

Overview annular cutters Nitto / Universal shank

| TYPE | Ø | Anwendung · Application | Beschreibung · Specification | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------|------------------------------|--|--|-----------------------|-----------|----------|-----------------------|-----------------------|-----------|-----------|--------------------|----------|--------------------|----------|---------|---------|----------|---|------------|------------|------------|------------|---|---|---------|
| HARD-LINE | Ø 12-65 mm Ø 1/2-2.1/16" | <p>Kernbohrer Hartmetall-bestückt Die leistungsstärksten Kernbohrer in unserem Sortiment. Exzellente für alle Stähle bis 1400 N Festigkeit sowie für alle Edelstähle.</p> <p>Annular cutters carbide-tipped The most powerful annular cutters in our range. Excellent for all steels up to a strength of 1400 N and for all stainless steels.</p> |  <table border="1"> <tr> <td>Stahl</td> <td>Edelstahl</td> <td>Grauguss</td> <td>Alu</td> <td>Kupfer, Messing, Zinn</td> </tr> <tr> <td>Steel</td> <td>Stainless</td> <td>Grey cast iron</td> <td>Alu</td> <td>Copper, brass, tin</td> </tr> <tr> <td>< 1400 N</td> <td>> 900 N</td> <td>✓</td> <td>> 10% Si</td> <td>✓</td> </tr> </table> | Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | < 1400 N | > 900 N | ✓ | > 10% Si | ✓ | 436-451 | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | | | | | | | | | | | | | | | | | | | | | |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | | | | | | | | | | | | | | | | | | | | | |
| < 1400 N | > 900 N | ✓ | > 10% Si | ✓ | | | | | | | | | | | | | | | | | | | | | |
| BLUE-DRILL LINE | Ø 12-60 mm Ø 7/16-2.1/16" | <p>Kernbohrer aus HSS-XE Spezialstahl + DURABLU- Beschichtung. Der am meisten verwendete beschichtete Kernbohrer für alle Stähle bis 1100 N Festigkeit sowie für alle Edelstähle.</p> <p>Annular cutters made of HSS-XE special steel + DURABLU-coating. The most-often used coated annular cutter for all steels up to a strength of 1100 N and for all stainless steels.</p> |  <table border="1"> <tr> <td>Stahl</td> <td>Edelstahl</td> <td>Grauguss</td> <td>Alu</td> <td>Kupfer, Messing, Zinn</td> </tr> <tr> <td>Steel</td> <td>Stainless</td> <td>Grey cast iron</td> <td>Alu</td> <td>Copper, brass, tin</td> </tr> <tr> <td>< 1400 N</td> <td>> 900 N</td> <td>✓</td> <td>> 10% Si</td> <td>✓</td> </tr> </table>  <table border="1"> <tr> <td>Hardox 400</td> <td>Hardox 450</td> </tr> <tr> <td>Hardox 400</td> <td>Hardox 450</td> </tr> <tr> <td>✓</td> <td>✓</td> </tr> </table> | Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | < 1400 N | > 900 N | ✓ | > 10% Si | ✓ | Hardox 400 | Hardox 450 | Hardox 400 | Hardox 450 | ✓ | ✓ | 452-467 |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | | | | | | | | | | | | | | | | | | | | | |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | | | | | | | | | | | | | | | | | | | | | |
| < 1400 N | > 900 N | ✓ | > 10% Si | ✓ | | | | | | | | | | | | | | | | | | | | | |
| Hardox 400 | Hardox 450 | | | | | | | | | | | | | | | | | | | | | | | | |
| Hardox 400 | Hardox 450 | | | | | | | | | | | | | | | | | | | | | | | | |
| ✓ | ✓ | | | | | | | | | | | | | | | | | | | | | | | | |
| GOLD-DRILL LINE | Ø 12-60 mm Ø 7/16-2.1/16" | <p>Kernbohrer aus HSS-XE Spezialstahl + GOLD-TECH-Behandlung. Der am meisten verwendete nicht beschichtete Kernbohrer für alle Stähle bis 900 N Festigkeit. Auch noch für Edelstahl geeignet.</p> <p>Annular cutters made of HSS-XE special steel + GOLD-TECH treatment. The most-often used uncoated annular cutter for all steels up to a strength of 900 N. Still suitable for stainless steels.</p> |  <table border="1"> <tr> <td>Stahl</td> <td>Edelstahl</td> <td>Alu</td> <td>Kupfer, Messing, Zinn</td> </tr> <tr> <td>Steel</td> <td>Stainless</td> <td>Alu</td> <td>Copper, brass, tin</td> </tr> <tr> <td>< 1400 N</td> <td>> 900 N</td> <td>> 10% Si</td> <td>✓</td> </tr> </table> | Stahl | Edelstahl | Alu | Kupfer, Messing, Zinn | Steel | Stainless | Alu | Copper, brass, tin | < 1400 N | > 900 N | > 10% Si | ✓ | 468-483 | | | | | | | | | |
| Stahl | Edelstahl | Alu | Kupfer, Messing, Zinn | | | | | | | | | | | | | | | | | | | | | | |
| Steel | Stainless | Alu | Copper, brass, tin | | | | | | | | | | | | | | | | | | | | | | |
| < 1400 N | > 900 N | > 10% Si | ✓ | | | | | | | | | | | | | | | | | | | | | | |
| GOLD-DRILL LINE SANDWICH | Ø 14-32 mm Ø 9/16-1.1/16" | <p>Kernbohrer aus HSS-XE Spezialstahl + GOLD-TECH-Behandlung. Der am meisten verwendete nicht beschichtete Kernbohrer für alle Stähle bis 900 N Festigkeit. Auch noch für Edelstahl geeignet.</p> <p>Annular cutters made of HSS-XE special steel + GOLD-TECH treatment. The most-often used uncoated annular cutter for all steels up to a strength of 900 N. Still suitable for stainless steels.</p> |  <p>Mehrschichtenbohrer. Spezialgeometrie zum Bohren übereinanderliegender Metallplatten bis 1100 N (Sandwich)</p> <p>Multi layer drill. For stack drilling (sandwich) in steel until 1100 N</p> | 484-487 | | | | | | | | | | | | | | | | | | | | | |



HARTMETALL-BESTÜCKTE KERNBOHRER CARBIDE-TIPPED ANNULAR CUTTERS



HARD-LINE

Der beste Kernbohrer ist grundsätzlich Hartmetall-bestückt.

Nur diese Bohrer bieten das optimale Preis-Leistungs-Verhältnis für nahezu alle Materialien. Neben der höchsten Standzeit in allen Stählen bieten nur Hartmetall-bestückte Kernbohrer:

- Bohren in Stähle bis 40 Rockwell (HRC)
- Bohren in alle Edelstähle
- Bohren in schwierigste Legierungen (Hardox/Inconel/Titan)
- Bohren hervorragend auch in weiche Werkstoffe wie Alu, Kupfer, Messing u.ä.

Mit Durchmessern von 12-150 mm in Schnitttiefen von 40, 55, 80, 110 mm steht Ihnen weltweit das umfangreichste Lagerprogramm zur Verfügung.

The fact is: The best annular cutters are carbide tipped.

Only these drills offer the best value for money for almost all materials. Besides maximum cutting capacity in all kind of steels provide only carbide tipped annular cutters:

- Drilling in hardened steel up to 40 Rockwell (HRC)
- Drilling in all sorts of stainless steel
- Drilling in most difficult alloys (Hardox/Inconel/Titan)
- Drilling also excellent in all non-ferrous metals such as alu, copper, brass

Available in diameter 12-150 mm. Available in drill depths 40 mm, 55 mm, 80 mm and 110 mm. Simply the world's largest stock range of carbide tipped annular cutter.

EIGENSCHAFTEN · PROPERTIES



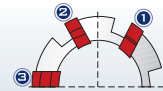
Karnasch Hartmetall-bestückte Kernbohrer (HARD-LINE) werden mit konischer Spirale gefertigt für: Sauberen Spanfluss und höchste Zerspanleistung auch bei schwierigen Materialien.

Karnasch carbide tipped annular cutters (HARD-LINE) are made with a conical helix for: clean chip flow and highest cutting ability even with difficult materials.



Karnasch Hartmetall-bestückte Kernbohrer (HARD-LINE) werden ausschließlich mit Sandvik Hartmetallzähnen bestückt. Wir meinen: Nur das beste Hartmetall ist gut genug für Karnasch Kernbohrer.

Karnasch carbide tipped annular cutters (HARD-LINE) are exclusively equipped with Sandvik carbide teeth. Our opinion is: Only the best carbide is good enough for Karnasch annular cutters.



Karnasch Hartmetall-bestückte Kernbohrer (HARD-LINE) sind in einer aufwendigen Vor-Mittel-Nachsneider-Geometrie gefertigt. Dies ergibt: ratterfreies, ruhiges und leichtes Zerspanen mit höchsten Standzeiten.

Karnasch carbide tipped annular cutters (HARD-LINE) are made in an elaborate pre-/intermediate-/after-cutting geometry. This results in: clatter-free, silent and easy cutting with highest lifetimes.

ANWENDUNG · APPLICATION

| | | | | | | | | |
|----------|-----------|----------|-----------------------|---------------------|----------------|----------|--|----------|
| | | | | | | | | |
| Stahl | Edelstahl | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Grauguss | Graphit | Hastelloy, Inconel, Nimonic, Exotische Materialien | Schienen |
| Steel | Stainless | Alu | Copper, brass, tin | Plastics GRP/CRP | Grey cast iron | Graphite | Hastelloy, Inconel, Nimonic, exotic materials | Rails |
| < 1400 N | > 900 N | > 10% Si | | | | | | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL · OPTIMAL

✓ GUT · GOOD

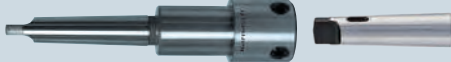
✓ MÖGLICH · POSSIBLE

HARTMETALL-BESTÜCKTE KERNBOHRER CARBIDE-TIPPED ANNULAR CUTTERS

| Schnitttiefe · Drill depths | Ø mm | Ø Zoll / Inch | Art. / Type | |
|--------------------------------------|-------|----------------|---|-----|
| Nitto / Universal 40 mm 1.1/2" | 12-65 | 15/32-2.9/16" | 20 1315N HARD-LINE / 40 | 438 |
| Nitto / Universal 55 mm 2" | 12-60 | 15/32-2.23/64" | 20 1316N HARD-LINE / 55 | 440 |
| Nitto / Universal 80 mm 3" | 14-50 | 35/64-1.31/32" | 20 1650N HARD-LINE / 80 | 442 |
| Nitto / Universal 110 mm 4" | 14-50 | 35/64-1.31/32" | 20 1660N HARD-LINE / 110 | 444 |
| Nitto / Universal 40 mm 1.1/2" | - | 1/2-2.1/16" | 20 1630 HARD-LINE ZOLL / INCH 40 | 446 |
| Nitto / Universal 55 mm 2" | - | 1/2-2.1/16" | 20 1640 HARD-LINE ZOLL / INCH 55 | 448 |
| Nitto / Universal 80 mm 3" | - | 11/16-2.1/16" | 20 1670 HARD-LINE ZOLL / INCH 80 | 450 |

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



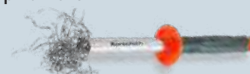
Kühlmittel-Druckflaschen 528
Coolant pressure bottles



Kegelsenker mit Weldonschaft 524/525
Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



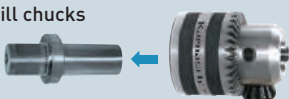
Sets · Displays 534-561
Sets · Displays



Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
Adapters + suitable drill chucks



Ersatzteile 530-532
Spare parts



1



2



3



4



5



6



7



8



9



20 1315N

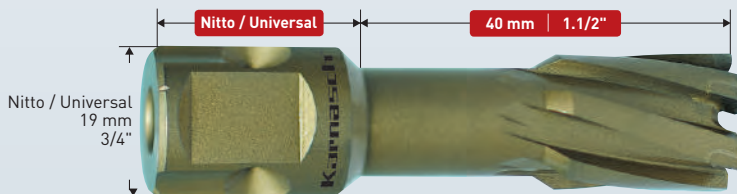
HARD-LINE 40

Hartmetall-bestückter Kernbohrer, Nitto/Universalschaft, Nutzlänge 40 mm
Carbide-tipped annular cutter, Nitto/Universal shank, drill depth 40 mm | 1.1/2"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|-------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics | Hastelloy, Inconel, exotic materials |
| | | | > 10% Si | | | |
| < 1400 N | > 900 N | | | | | |



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|-------|
| 20 1315N 012 | 12 | 15/32" | 27,60 | 20 1315N 026 | 26 | 1.1/32" | 30,90 | 20 1315N 040 | 40 | 1.37/64" | 41,85 | 20 1315N 054 | 54 | 2.1/8" | 67,75 |
| 20 1315N 013 | 13 | 33/64" | 27,60 | 20 1315N 027 | 27 | 1.1/16" | 30,95 | 20 1315N 041 | 41 | 1.39/64" | 50,50 | 20 1315N 055 | 55 | 2.11/64" | 69,25 |
| 20 1315N 014 | 14 | 35/64" | 28,50 | 20 1315N 028 | 28 | 1.7/64" | 30,95 | 20 1315N 042 | 42 | 1.21/32" | 50,50 | 20 1315N 056 | 56 | 2.13/64" | 71,70 |
| 20 1315N 015 | 15 | 19/32" | 28,50 | 20 1315N 029 | 29 | 1.9/64" | 30,95 | 20 1315N 043 | 43 | 1.11/16" | 50,50 | 20 1315N 057 | 57 | 2.1/4" | 73,40 |
| 20 1315N 016 | 16 | 5/8" | 28,50 | 20 1315N 030 | 30 | 1.3/16" | 30,95 | 20 1315N 044 | 44 | 1.47/64" | 50,50 | 20 1315N 058 | 58 | 2.9/32" | 74,75 |
| 20 1315N 017 | 17 | 43/64" | 28,50 | 20 1315N 031 | 31 | 1.7/32" | 36,55 | 20 1315N 045 | 45 | 1.49/64" | 50,50 | 20 1315N 059 | 59 | 2.21/64" | 76,10 |
| 20 1315N 018 | 18 | 45/64" | 28,50 | 20 1315N 032 | 32 | 1.17/64" | 36,55 | 20 1315N 046 | 46 | 1.13/16" | 54,15 | 20 1315N 060 | 60 | 2.23/64" | 77,40 |
| 20 1315N 019 | 19 | 3/4" | 28,50 | 20 1315N 033 | 33 | 1.19/64" | 36,55 | 20 1315N 047 | 47 | 1.27/32" | 54,15 | 20 1315N 061 | 61 | 2.13/32" | 79,75 |
| 20 1315N 020 | 20 | 25/32" | 28,50 | 20 1315N 034 | 34 | 1.11/32" | 36,55 | 20 1315N 048 | 48 | 1.57/64" | 54,15 | 20 1315N 062 | 62 | 2.7/16" | 82,55 |
| 20 1315N 021 | 21 | 53/64" | 29,30 | 20 1315N 035 | 35 | 1.3/8" | 36,55 | 20 1315N 049 | 49 | 1.59/64" | 54,15 | 20 1315N 063 | 63 | 2.31/64" | 85,60 |
| 20 1315N 022 | 22 | 55/64" | 29,30 | 20 1315N 036 | 36 | 1.27/64" | 41,80 | 20 1315N 050 | 50 | 1.31/32" | 57,35 | 20 1315N 064 | 64 | 2.33/64" | 88,45 |
| 20 1315N 023 | 23 | 29/32" | 29,30 | 20 1315N 037 | 37 | 1.29/64" | 41,85 | 20 1315N 051 | 51 | 2.1/64" | 62,20 | 20 1315N 065 | 65 | 2.9/16" | 91,30 |
| 20 1315N 024 | 24 | 15/16" | 29,30 | 20 1315N 038 | 38 | 1.1/2" | 41,85 | 20 1315N 052 | 52 | 2.3/64" | 63,70 | | | | |
| 20 1315N 025 | 25 | 63/64" | 29,30 | 20 1315N 039 | 39 | 1.17/32" | 41,85 | 20 1315N 053 | 53 | 2.3/32" | 65,60 | | | | |

Größere Ø bis 100 mm siehe Art. 20 1130A + Adapter Seite 575 / 577 ·
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Larger Ø up to 100 mm see Art. 20 1130A + adapter page 575 / 577 ·
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1315N

HARD-LINE 40

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS

Ø 12-17 mm **20 1149**
€ 7,90
6,34 x 90 mm
Packnorm 2 Stk. · Packaging unit 2 pcs.

Ø 18-65 mm **20 1151**
€ 8,50
7,98 x 90 mm
Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1315N

HARD-LINE 40

SETS / DISPLAYS Seite / Page 548

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1315N HARD-LINE40 – siehe Seite 548. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1315N HARD-LINE40 – see page 548. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie

i

▶

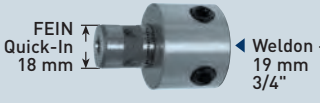
1295


Zubehör für Hartmetall-bestückte Kernbohrer, Nitto/Universalschaft, Nutzlänge 40 mm
 Accessories for carbide-tipped annular cutter, Nitto/Universal shank, drill depth 40 mm | 1.1/2"

HARD-LINE 40

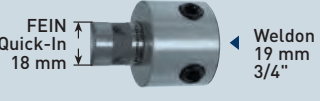
20 1315N

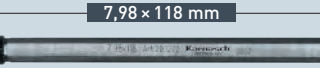
ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

 **Ø 12-17 mm** **20 1263**
 FEIN Quick-In 18 mm
 Weldon + Nitto/Universal 19 mm 3/4"
 € 17,50

 **20 1318**
 € 8,30

Packnorm 2 Stk. - Packaging unit 2 pcs.

 **Ø 18-60 mm** **20 1161**
 FEIN Quick-In 18 mm
 Weldon + Nitto/Universal 19 mm 3/4"
 € 17,45

 **20 1272**
 € 13,95

Packnorm 2 Stk. - Packaging unit 2 pcs.

 **Ø 12-17 mm** **21 0048**
 Weldon 32 mm 1.1/4"
 Weldon + Nitto/Universal 19 mm 3/4"
 € 14,15

 **20 1149**
 € 7,90

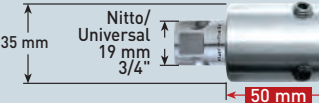
 **Ø 18-65 mm** **20 1151**
 € 8,50

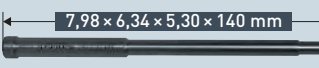
Packnorm 2 Stk. - Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

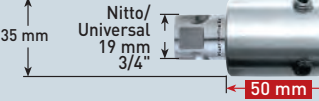
Weiteres Zubehör siehe Übersichtsseite 437
 Further accessories see overview page 437

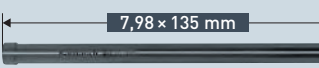
VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS

 **Ø 12-17 mm** **20 1406**
 Nitto/Universal 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"
 € 22,10

 **20 1390**
 € 15,70

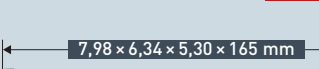
Packnorm 2 Stk. - Packaging unit 2 pcs.

 **Ø 18-65 mm** **20 1406**
 Nitto/Universal 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"
 € 22,10

 **20 1393**
 € 13,70

Packnorm 2 Stk. - Packaging unit 2 pcs.

 **Ø 12-17 mm** **20 1407**
 Nitto/Universal 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"
 € 24,40


 **20 1405**
 € 17,65

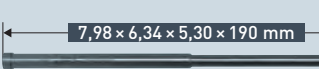
Packnorm 2 Stk. - Packaging unit 2 pcs.

 **Ø 18-65 mm** **20 1407**
 Nitto/Universal 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"
 € 24,40

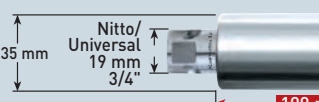
 **20 1408**
 € 14,55

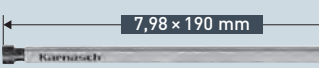
Packnorm 2 Stk. - Packaging unit 2 pcs.

 **Ø 12-17 mm** **20 1409**
 Nitto/Universal 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"
 € 29,05

 **20 1420**
 € 17,60

Packnorm 2 Stk. - Packaging unit 2 pcs.

 **Ø 18-65 mm** **20 1409**
 Nitto/Universal 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"
 € 29,05

 **20 1423**
 € 16,15

Packnorm 2 Stk. - Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 437
 Further accessories see overview page 437



20 1316N

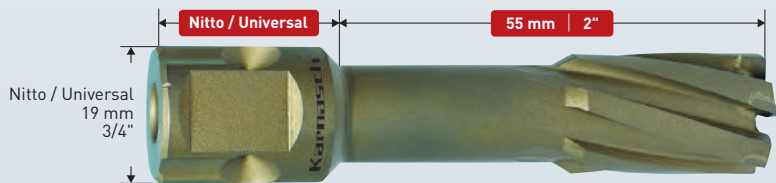
HARD-LINE 55

Hartmetall-bestückter Kernbohrer, Nitto/Universalschaft, Nutzlänge 55 mm
Carbide-tipped annular cutter, Nitto/Universal shank, drill depth 55 mm | 2"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



| Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € |
|---------------|------|--------|-------|---------------|------|----------|-------|--------------|------|----------|-------|--------------|------|----------|-------|
| 20 1316N 012 | 12 | 15/32" | 31,50 | 20 1316N 023 | 23 | 29/32" | 32,50 | 20 1316N 034 | 34 | 1.11/32" | 40,55 | 20 1316N 048 | 48 | 1.57/64" | 60,10 |
| 20 1316N 013 | 13 | 33/64" | 31,50 | 20 1316N 0235 | 23,5 | 59/64" | 32,50 | 20 1316N 035 | 35 | 1.3/8" | 40,55 | 20 1316N 049 | 49 | 1.59/64" | 60,10 |
| 20 1316N 014 | 14 | 35/64" | 31,50 | 20 1316N 024 | 24 | 15/16" | 32,50 | 20 1316N 036 | 36 | 1.27/64" | 46,25 | 20 1316N 050 | 50 | 1.31/32" | 63,60 |
| 20 1316N 015 | 15 | 19/32" | 31,50 | 20 1316N 0245 | 24,5 | 31/32" | 32,50 | 20 1316N 037 | 37 | 1.29/64" | 46,30 | 20 1316N 051 | 51 | 2.1/64" | 69,00 |
| 20 1316N 016 | 16 | 5/8" | 31,50 | 20 1316N 025 | 25 | 63/64" | 32,50 | 20 1316N 038 | 38 | 1.1/2" | 46,30 | 20 1316N 052 | 52 | 2.3/64" | 70,60 |
| 20 1316N 017 | 17 | 43/64" | 31,50 | 20 1316N 026 | 26 | 1.1/32" | 34,45 | 20 1316N 039 | 39 | 1.17/32" | 46,30 | 20 1316N 053 | 53 | 2.3/32" | 72,75 |
| 20 1316N 0175 | 17,5 | 11/16" | 31,50 | 20 1316N 0265 | 26,5 | 1.3/64" | 34,45 | 20 1316N 040 | 40 | 1.37/64" | 46,30 | 20 1316N 054 | 54 | 2.1/8" | 75,20 |
| 20 1316N 018 | 18 | 45/64" | 31,50 | 20 1316N 027 | 27 | 1.1/16" | 34,45 | 20 1316N 041 | 41 | 1.39/64" | 55,90 | 20 1316N 055 | 55 | 2.11/64" | 76,80 |
| 20 1316N 019 | 19 | 3/4" | 31,50 | 20 1316N 028 | 28 | 1.7/64" | 34,45 | 20 1316N 042 | 42 | 1.21/32" | 55,90 | 20 1316N 056 | 56 | 2.13/64" | 79,50 |
| 20 1316N 020 | 20 | 25/32" | 31,50 | 20 1316N 029 | 29 | 1.9/64" | 34,45 | 20 1316N 043 | 43 | 1.11/16" | 55,90 | 20 1316N 057 | 57 | 2.1/4" | 81,40 |
| 20 1316N 021 | 21 | 53/64" | 32,50 | 20 1316N 030 | 30 | 1.3/16" | 34,45 | 20 1316N 044 | 44 | 1.47/64" | 55,90 | 20 1316N 058 | 58 | 2.9/32" | 82,90 |
| 20 1316N 0215 | 21,5 | 27/32" | 32,50 | 20 1316N 031 | 31 | 1.7/32" | 40,55 | 20 1316N 045 | 45 | 1.49/64" | 55,90 | 20 1316N 059 | 59 | 2.21/64" | 84,40 |
| 20 1316N 022 | 22 | 55/64" | 32,50 | 20 1316N 032 | 32 | 1.17/64" | 40,55 | 20 1316N 046 | 46 | 1.13/16" | 60,10 | 20 1316N 060 | 60 | 2.23/64" | 85,85 |
| 20 1316N 0225 | 22,5 | 57/64" | 32,50 | 20 1316N 033 | 33 | 1.19/64" | 40,55 | 20 1316N 047 | 47 | 1.27/32" | 60,10 | | | | |

Größere Ø bis 100 mm siehe Art. 20 1141A + Adapter Seite 579 / 581 ·
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Larger Ø up to 100 mm see Art. 20 1141A + adapter page 579 / 581 ·
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1316N

HARD-LINE 55

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS

Ø 12-17,5 mm **20 1271**
€ 7,65
Packnorm 2 Stk. · Packaging unit 2 pcs.

Ø 18-60 mm **20 1273**
€ 14,65
Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1316N

HARD-LINE 55

SETS / DISPLAYS Seite / Page 549

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1316N HARD-LINE55 – siehe Seite 549. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1316N HARD-LINE55 – see page 549. Other content possible by individually equipped sets / displays.



Schnittdaten Cutting data | Film Movie

1295

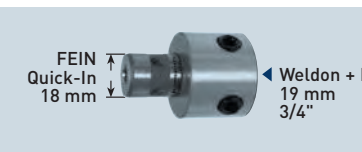
- 1
- 2
- 3
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- 6
- 7
- 8
- 9


Zubehör für Hartmetall-bestückte Kernbohrer, Nitto/Universalschaft, Nutzlänge 55 mm
 Accessories for carbide-tipped annular cutter, Nitto/Universal shank, drill depth 55 mm | 2"

HARD-LINE 55

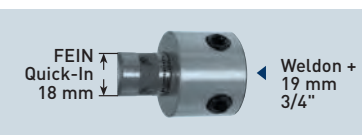
20 1316N

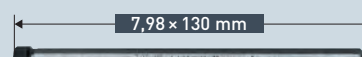
**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**

 **Ø 12-17,5 mm** **20 1263**
 • € 17,50
 FEIN Quick-In 18 mm
 Weldon + Nitto/Universal 19 mm 3/4"

 **20 1160**
 • € 9,20
 6,34 × 130 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 18-60 mm** **20 1161**
 • € 17,45
 FEIN Quick-In 18 mm
 Weldon + Nitto/Universal 19 mm 3/4"

 **20 1439**
 • € 13,05
 7,98 × 130 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 12-17,5 mm** **21 0048**
 • € 14,15
 Weldon 32 mm 1.1/4"
 Weldon + Nitto/Universal 19 mm 3/4"

 **Ø 12-17,5 mm** **20 1271**
 • € 7,65
 6,34 × 102 mm

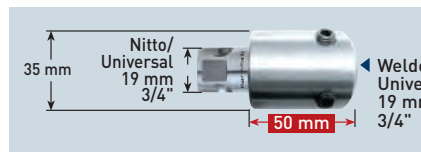
 **Ø 18-60 mm** **20 1273**
 • € 14,65
 7,98 × 105 mm


Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

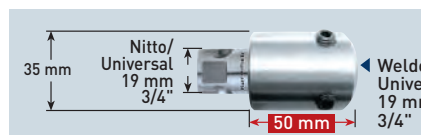
Weiteres Zubehör siehe Übersichtsseite 437
 Further accessories see overview page 437


**VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
 EXTENSIONS + SUITABLE EJECTOR PINS**

 **Ø 12-17,5 mm** **20 1406**
 • € 22,10
 Nitto/Universal 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"
 35 mm
 50 mm

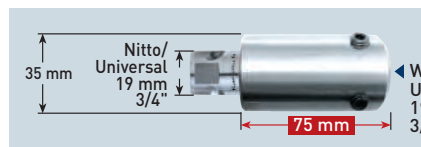
 **20 1396**
 • € 16,45
 7,98 × 6,34 × 5,30 × 153 mm


Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 18-65 mm** **20 1406**
 • € 22,10
 Nitto/Universal 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"
 35 mm
 50 mm

 **20 1399**
 • € 14,30
 7,98 × 160 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 12-17,5 mm** **20 1407**
 • € 24,40
 Nitto/Universal 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"
 35 mm
 75 mm

 **20 1411**
 • € 17,05
 7,98 × 6,34 × 5,30 × 178 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 18-65 mm** **20 1407**
 • € 24,40
 Nitto/Universal 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"
 35 mm
 75 mm

 **20 1414**
 • € 15,55
 7,98 × 180 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 12-17,5 mm** **20 1409**
 • € 29,05
 Nitto/Universal 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"
 35 mm
 100 mm

 **20 1426**
 • € 18,35
 7,98 × 6,34 × 5,30 × 203 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

 **Ø 18-65 mm** **20 1409**
 • € 29,05
 Nitto/Universal 19 mm 3/4"
 Weldon + Nitto/Universal 19 mm 3/4"
 35 mm
 100 mm

 **20 1429**
 • € 16,00
 7,98 × 205 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 437
 Further accessories see overview page 437



20 1650N

HARD-LINE 80

Hartmetall-bestückter Kernbohrer, Nitto/Universalschaft, Nutzlänge 80 mm
Carbide-tipped annular cutter, Nitto/Universal shank, drill depth 80 mm | 3"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|--------|
| 20 1650N 014 | 14 | 35/64" | 52,00 | 20 1650N 024 | 24 | 15/16" | 52,00 | 20 1650N 034 | 34 | 1.11/32" | 68,45 | 20 1650N 044 | 44 | 1.47/64" | 94,40 |
| 20 1650N 015 | 15 | 19/32" | 52,00 | 20 1650N 025 | 25 | 63/64" | 52,00 | 20 1650N 035 | 35 | 1.3/8" | 68,45 | 20 1650N 045 | 45 | 1.49/64" | 94,40 |
| 20 1650N 016 | 16 | 5/8" | 52,00 | 20 1650N 026 | 26 | 1.1/32" | 56,70 | 20 1650N 036 | 36 | 1.27/64" | 78,10 | 20 1650N 046 | 46 | 1.13/16" | 107,65 |
| 20 1650N 017 | 17 | 43/64" | 52,00 | 20 1650N 027 | 27 | 1.1/16" | 56,70 | 20 1650N 037 | 37 | 1.29/64" | 78,10 | 20 1650N 047 | 47 | 1.27/32" | 107,65 |
| 20 1650N 018 | 18 | 45/64" | 52,00 | 20 1650N 028 | 28 | 1.7/64" | 56,70 | 20 1650N 038 | 38 | 1.1/2" | 78,10 | 20 1650N 048 | 48 | 1.57/64" | 107,65 |
| 20 1650N 019 | 19 | 3/4" | 52,00 | 20 1650N 029 | 29 | 1.9/64" | 56,70 | 20 1650N 039 | 39 | 1.17/32" | 78,10 | 20 1650N 049 | 49 | 1.59/64" | 107,65 |
| 20 1650N 020 | 20 | 25/32" | 52,00 | 20 1650N 030 | 30 | 1.3/16" | 56,70 | 20 1650N 040 | 40 | 1.37/64" | 78,10 | 20 1650N 050 | 50 | 1.31/32" | 107,65 |
| 20 1650N 021 | 21 | 53/64" | 52,00 | 20 1650N 031 | 31 | 1.7/32" | 68,45 | 20 1650N 041 | 41 | 1.39/64" | 94,40 | | | | |
| 20 1650N 022 | 22 | 55/64" | 52,00 | 20 1650N 032 | 32 | 1.17/64" | 68,45 | 20 1650N 042 | 42 | 1.21/32" | 94,40 | | | | |
| 20 1650N 023 | 23 | 29/32" | 52,00 | 20 1650N 033 | 33 | 1.19/64" | 68,45 | 20 1650N 043 | 43 | 1.11/16" | 94,40 | | | | |

Größere Ø bis 60 mm mit Adapter siehe Art. 20 1650 Seite 370 ·
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Larger Ø up to 60 mm with adapter see Art. 20 1650 page 370 ·
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1650N

HARD-LINE 80

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS

Ø 14-17 mm **20 1302**
€ 14,30

1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ø 18-50 mm **20 1439**
€ 13,05

1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522–523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522–523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

AUSWERFERSTIFTE 2-TEILIG EJECTOR PINS 2-PIECE

Ø 18-50 mm **20 1427**
€ 22,10

2-teilig / 2 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG APPLICATION EJECTOR PINS 2-PIECE



Anwendung:
Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:
Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

* **Warum 2-teilige Auswerferstifte?** In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn **keine extra langen** Aufnahmehalter verwendet werden (wie auf Seite 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

* **Why use 2-part ejector pins?** Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If **no extra-long** holders are used (e.g. as on page 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Schnittdaten
Cutting data

Film
Movie



1295



Zubehör für Hartmetall-bestückte Kernbohrer, Nitto/Universalschaft, Nutzlänge 80 mm
 Accessories for carbide-tipped annular cutter, Nitto/Universal shank, drill depth 80 mm | 3"

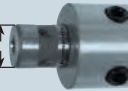
HARD-LINE 80


20 1650N

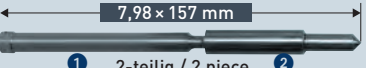
ADAPTER + PASSENDE AUSWERFERSTIFTE · ADAPTER + SUITABLE EJECTOR PINS

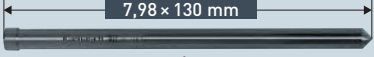
Weldon 32 mm 1.1/4" | Weldon + Nitto/Universal 19 mm 3/4"

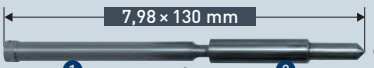
 21 0048
 € 14,15

FEIN Quick-In 18 mm | Weldon + Nitto/Universal 19 mm 3/4"

 Ø 18-50 mm 20 1161
 € 17,45

6,34 × 130 mm | Ø 14-17 mm 20 1302

 1-teilig / 1 piece
 Packnorm 2 Stk. · Packaging unit 2 pcs.
 € 14,30

7,98 × 157 mm | 2-teilig / 2 piece

 20 1436
 € 25,65
 Packnorm 2 Stk. · Packaging unit 2 pcs.

7,98 × 130 mm | Ø 18-50 mm 20 1439

 1-teilig / 1 piece
 Packnorm 2 Stk. · Packaging unit 2 pcs.
 € 13,05

7,98 × 130 mm | Ø 18-50 mm 20 1427

 2-teilig / 2 piece
 Packnorm 2 Stk. · Packaging unit 2 pcs.
 € 22,10


Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530


ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



Kegelsenker mit Weldonchaft 524/525
 Countersinks with Weldon shank

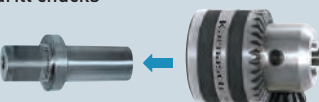

Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm


Sets · Displays 534-561
 Sets · Displays


Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30


Vollhartmetall Gewindebohrer-Ausbohrer 628
 Solid carbide drills to remove jammed taps


Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks


Ersatzteile 530-532
 Spare parts




20 1660N

HARD-LINE / 110

Hartmetall-bestückter Kernbohrer, Nitto/Universalschaft, Nutzlänge 110 mm
Carbide-tipped annular cutter, Nitto/Universal shank, drill depth 110 mm | 4"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|--------|--------------|------|-------------|--------|
| 20 1660N 014 | 14 | 35/64" | 66,20 | 20 1660N 024 | 24 | 15/16" | 66,20 | 20 1660N 034 | 34 | 1.11/32" | 86,90 | 20 1660N 044 | 44 | 1.47/64" | 120,15 |
| 20 1660N 015 | 15 | 19/32" | 66,20 | 20 1660N 025 | 25 | 63/64" | 66,20 | 20 1660N 035 | 35 | 1.3/8" | 86,90 | 20 1660N 045 | 45 | 1.49/64" | 120,15 |
| 20 1660N 016 | 16 | 5/8" | 66,20 | 20 1660N 026 | 26 | 1.1/32" | 72,15 | 20 1660N 036 | 36 | 1.27/64" | 99,55 | 20 1660N 046 | 46 | 1.13/16" | 136,90 |
| 20 1660N 017 | 17 | 43/64" | 66,20 | 20 1660N 027 | 27 | 1.1/16" | 72,15 | 20 1660N 037 | 37 | 1.29/64" | 99,55 | 20 1660N 047 | 47 | 1.27/32" | 136,90 |
| 20 1660N 018 | 18 | 45/64" | 66,20 | 20 1660N 028 | 28 | 1.7/64" | 72,15 | 20 1660N 038 | 38 | 1.1/2" | 99,55 | 20 1660N 048 | 48 | 1.57/64" | 136,90 |
| 20 1660N 019 | 19 | 3/4" | 66,20 | 20 1660N 029 | 29 | 1.9/64" | 72,15 | 20 1660N 039 | 39 | 1.17/32" | 99,55 | 20 1660N 049 | 49 | 1.59/64" | 136,90 |
| 20 1660N 020 | 20 | 25/32" | 66,20 | 20 1660N 030 | 30 | 1.3/16" | 72,15 | 20 1660N 040 | 40 | 1.37/64" | 99,55 | 20 1660N 050 | 50 | 1.31/32" | 163,90 |
| 20 1660N 021 | 21 | 53/64" | 66,20 | 20 1660N 031 | 31 | 1.7/32" | 86,90 | 20 1660N 041 | 41 | 1.39/64" | 120,15 | | | | |
| 20 1660N 022 | 22 | 55/64" | 66,20 | 20 1660N 032 | 32 | 1.17/64" | 86,90 | 20 1660N 042 | 42 | 1.21/32" | 120,15 | | | | |
| 20 1660N 023 | 23 | 29/32" | 66,20 | 20 1660N 033 | 33 | 1.19/64" | 86,90 | 20 1660N 043 | 43 | 1.11/16" | 120,15 | | | | |

Größere Ø bis 55 mm mit Adapter möglich. Siehe Art. 20 1660 Seite 372.
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmesser.
Larger Ø up to 55 mm with adapter possible. See Art. 20 1660 page 372.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1660N

HARD-LINE / 110

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE · EJECTOR PINS

Ø 14-17 mm 20 1304 € 15,75

6,34 x 160 mm

1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ø 18-50 mm 20 1399 € 14,30

7,98 x 160 mm

1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522-523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522-523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

**AUSWERFERSTIFTE 2-TEILIG
EJECTOR PINS 2-PIECE**

Ø 18-50 mm 20 1428 € 24,80

7,98 x 157 mm

1 2

2-teilig / 2 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

**ANWENDUNG AUSWERFERSTIFTE 2-TEILIG
APPLICATION EJECTOR PINS 2-PIECE**



Anwendung:
Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:
Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

* **Warum 2-teilige Auswerferstifte?** In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn **keine extra langen** Aufnahmehalter verwendet werden (wie auf Seite 522-523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

* **Why use 2-part ejector pins?** Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If **no extra-long** holders are used (e.g. as on page 522-523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Schnittdaten
Cutting data

Film
Movie



1295



Zubehör für Hartmetall-bestückte Kernbohrer, Nitto/Universalschaft, Nutzlänge 110 mm
 Accessories for carbide-tipped annular cutter, Nitto/Universal shank, drill depth 110 mm | 4"

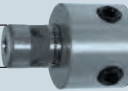
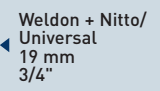
HARD-LINE 110

20 1660N


ADAPTER + PASSENDE AUSWERFERSTIFTE · ADAPTER + SUITABLE EJECTOR PINS

Weldon 32 mm 1.1/4"  Weldon + Nitto/Universal 19 mm 3/4" 

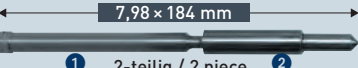
21 0048
 • € 14,15

FEIN Quick-In 18 mm  Weldon + Nitto/Universal 19 mm 3/4" 

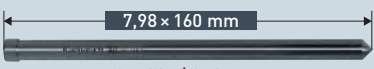
Ø 18-50 mm 20 1161
 • € 17,45

 **6,34 × 160 mm**
 1-teilig / 1 piece
 Packnorm 2 Stk. · Packaging unit 2 pcs.

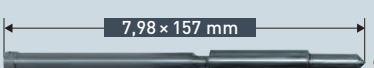
Ø 14-17 mm 20 1304
 • € 15,75

 **7,98 × 184 mm**
 2-teilig / 2 piece
 Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1438
 • € 28,40

 **7,98 × 160 mm**
 1-teilig / 1 piece
 Packnorm 2 Stk. · Packaging unit 2 pcs.


Ø 18-50 mm 20 1399
 • € 14,30

 **7,98 × 157 mm**
 2-teilig / 2 piece
 Packnorm 2 Stk. · Packaging unit 2 pcs.


Ø 18-50 mm 20 1428
 • € 24,80

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen  521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves




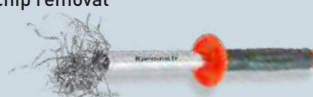
Kühlmittel-Druckflaschen  528
 Coolant pressure bottles




Kegelsenker mit Weldonchaft  524/525
 Countersinks with Weldon shank




Magnetstab zur Entfernung der Bohrspäne  529
 Magnetic stick for chip removal




Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm  622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm




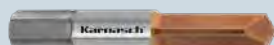
Sets · Displays  534-561
 Sets · Displays



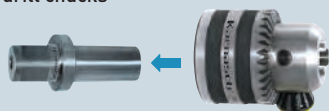
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30  623-624
 Tapping adapter Weldon + taps M 3 - M 30



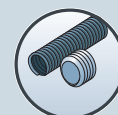
Vollhartmetall Gewindebohrer-Ausbohrer  628
 Solid carbide drills to remove jammed taps



Adapter + passende Bohrfutter  528
 Adapters + suitable drill chucks



Ersatzteile  530-532
 Spare parts



20 1630

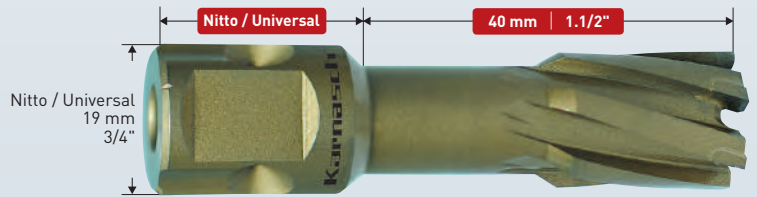
HARD-LINE
ZOLL / INCH **40**

Hartmetall-bestückter Kernbohrer, Nitto/Universalschaft, Nutzlänge 40 mm
Carbide-tipped annular cutter, Nitto/Universal shank, drill depth 40 mm | 1.1/2"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|------------|-------|-------------|-------|-----------|-------|-------------|-------|
| • 1/2" | 12,70 | 20 1630 010 | 26,90 | • 1" | 25,40 | 20 1630 050 | 29,30 | • 1.1/2" | 38,10 | 20 1630 090 | 41,85 | • 2" | 50,80 | 20 1630 130 | 62,20 |
| • 9/16" | 14,28 | 20 1630 015 | 28,50 | • 1.1/16" | 26,98 | 20 1630 055 | 30,95 | • 1.9/16" | 39,68 | 20 1630 095 | 41,85 | • 2.1/16" | 52,38 | 20 1630 135 | 63,70 |
| • 5/8" | 15,87 | 20 1630 020 | 28,50 | • 1.1/8" | 28,57 | 20 1630 060 | 30,95 | • 1.5/8" | 41,27 | 20 1630 100 | 50,50 | | | | |
| • 11/16" | 17,46 | 20 1630 025 | 28,50 | • 1.3/16" | 30,13 | 20 1630 065 | 30,95 | • 1.11/16" | 42,86 | 20 1630 105 | 50,50 | | | | |
| • 3/4" | 19,04 | 20 1630 030 | 28,50 | • 1.1/4" | 31,75 | 20 1630 070 | 36,55 | • 1.3/4" | 44,45 | 20 1630 110 | 50,50 | | | | |
| • 13/16" | 20,63 | 20 1630 035 | 29,30 | • 1.5/16" | 33,33 | 20 1630 075 | 36,55 | • 1.13/16" | 46,03 | 20 1630 115 | 54,15 | | | | |
| • 7/8" | 22,22 | 20 1630 040 | 29,30 | • 1.3/8" | 34,92 | 20 1630 080 | 36,55 | • 1.7/8" | 47,62 | 20 1630 120 | 54,15 | | | | |
| • 15/16" | 23,81 | 20 1630 045 | 29,30 | • 1.7/16" | 36,51 | 20 1630 085 | 41,80 | • 1.15/16" | 49,21 | 20 1630 125 | 54,15 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmesser.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1630

HARD-LINE
ZOLL / INCH **40**

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE · EJECTOR PINS



20 1149
• € 7,90

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1630

HARD-LINE
ZOLL / INCH **40**

SETS / DISPLAYS Seite / Page 550



Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1630 HARD-LINE40 – siehe Seite 550. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1630 HARD-LINE40 – see page 550. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



1295



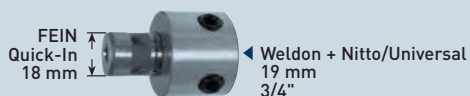
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Zubehör für Hartmetall-bestückte Kernbohrer, Nitto/Universalschaft, Nutzlänge 40 mm
 Accessories for carbide-tipped annular cutter, Nitto/Universal shank, drill depth 40 mm | 1.1/2"

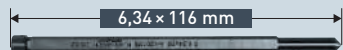
HARD-LINE 40
 ZOLL/INCH

20 1630

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS



20 1263
 € 17,50



20 1318
 € 8,30

Packnorm 2 Stk. · Packaging unit 2 pcs.



21 0048
 € 14,15



20 1149
 € 7,90

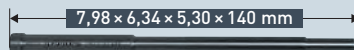
Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS



20 1406
 € 22,10

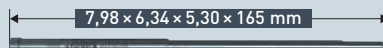


20 1390
 € 15,70

Packnorm 2 Stk. · Packaging unit 2 pcs.



20 1407
 € 24,40

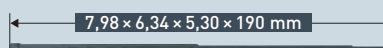


20 1405
 € 17,65

Packnorm 2 Stk. · Packaging unit 2 pcs.



20 1409
 € 29,05



20 1420
 € 17,60

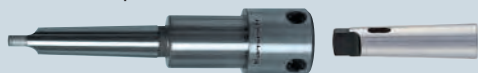
Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves

521-523



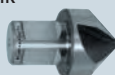
Kühlmittel-Druckflaschen
 Coolant pressure bottles

528



Kegelsenker mit Weldonschaft
 Countersinks with Weldon shank

524/525



Magnetstab zur Entfernung der Bohrspäne
 Magnetic stick for chip removal

529



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm

622



Sets · Displays
 Sets · Displays

534-561



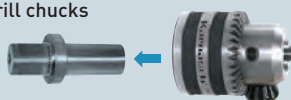
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30
 Tapping adapter Weldon + taps M 3 - M 30

623-624



Adapter + passende Bohrfutter
 Adapters + suitable drill chucks

528



Ersatzteile
 Spare parts

530-532



20 1640

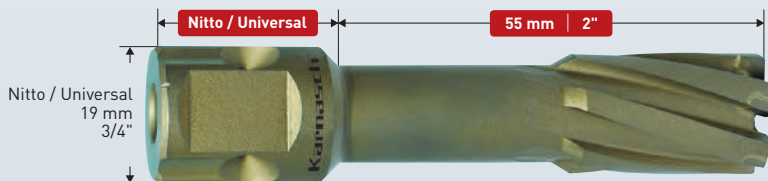
HARD-LINE
ZOLL / INCH **55**

Hartmetall-bestückter Kernbohrer, Nitto/Universalschaft, Nutzlänge 55 mm
Carbide-tipped annular cutter, Nitto/Universal shank, drill depth 55 mm | 2"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|------------|-------|-------------|-------|-----------|-------|-------------|-------|
| • 1/2" | 12,70 | 20 1640 010 | 31,50 | • 1" | 25,40 | 20 1640 050 | 32,50 | • 1.1/2" | 38,10 | 20 1640 090 | 46,30 | • 2" | 50,80 | 20 1640 130 | 69,00 |
| • 9/16" | 14,28 | 20 1640 015 | 31,50 | • 1.1/16" | 26,98 | 20 1640 055 | 34,45 | • 1.9/16" | 39,68 | 20 1640 095 | 46,30 | • 2.1/16" | 52,38 | 20 1640 135 | 70,60 |
| • 5/8" | 15,87 | 20 1640 020 | 31,50 | • 1.1/8" | 28,57 | 20 1640 060 | 34,45 | • 1.5/8" | 41,27 | 20 1640 100 | 55,90 | | | | |
| • 11/16" | 17,46 | 20 1640 025 | 31,50 | • 1.3/16" | 30,13 | 20 1640 065 | 34,45 | • 1.11/16" | 42,86 | 20 1640 105 | 55,90 | | | | |
| • 3/4" | 19,04 | 20 1640 030 | 31,50 | • 1.1/4" | 31,75 | 20 1640 070 | 40,55 | • 1.3/4" | 44,45 | 20 1640 110 | 55,90 | | | | |
| • 13/16" | 20,63 | 20 1640 035 | 32,50 | • 1.5/16" | 33,33 | 20 1640 075 | 40,55 | • 1.13/16" | 46,03 | 20 1640 115 | 60,10 | | | | |
| • 7/8" | 22,22 | 20 1640 040 | 32,50 | • 1.3/8" | 34,92 | 20 1640 080 | 40,55 | • 1.7/8" | 47,62 | 20 1640 120 | 60,10 | | | | |
| • 15/16" | 23,81 | 20 1640 045 | 32,50 | • 1.7/16" | 36,51 | 20 1640 085 | 46,25 | • 1.15/16" | 49,21 | 20 1640 125 | 60,10 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmesser.
Attention: The inch sizes do not correspond exactly to the mm diameters.

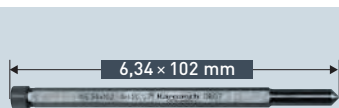
20 1640

HARD-LINE
ZOLL / INCH **55**

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE · EJECTOR PINS



20 1271
• € 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1640

HARD-LINE
ZOLL / INCH **55**

SETS / DISPLAYS Seite / Page 551



Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1640 HARD-LINE55 – siehe Seite 551. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1640 HARD-LINE55 – see page 551. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



1295



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Zubehör für Hartmetall-bestückte Kernbohrer, Nitto/Universalschaft, Nutzlänge 55 mm
Accessories for carbide-tipped annular cutter, Nitto/Universal shank, drill depth 55 mm | 2"

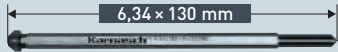
HARD-LINE 55
ZOLL / INCH

20 1640

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS



20 1263
€ 17,50



Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1160
€ 9,20



21 0048
€ 14,15

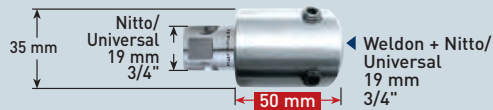


Packnorm 2 Stk. · Packaging unit 2 pcs.

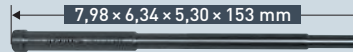
20 1271
€ 7,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS



20 1406
€ 22,10

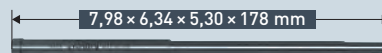


Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1396
€ 16,45

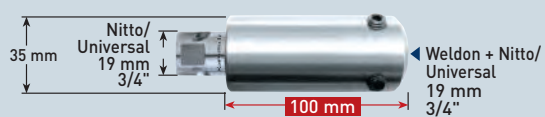


20 1407
€ 24,40

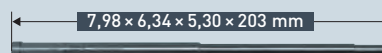


Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1411
€ 17,05



20 1409
€ 29,05



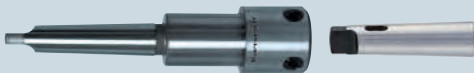
Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1426
€ 18,35

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
Spare allen screws for all extensions see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
Coolant pressure bottles



Kegelsenker mit Weldonschaft 524/525
Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



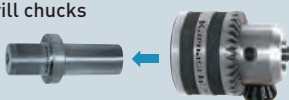
Sets · Displays 534-561
Sets · Displays



Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
Adapters + suitable drill chucks



Ersatzteile 530-532
Spare parts



20 1670

HARD-LINE
ZOLL / INCH **80**

Hartmetall-bestückter Kernbohrer, Nitto/Universalschaft, Nutzlänge 80 mm
Carbide-tipped annular cutter, Nitto/Universal shank, drill depth 80 mm | 3"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|------------|-------|-------------|-------|------------|-------|-------------|--------|
| • 11/16" | 17,46 | 20 1670 025 | 52,00 | • 1.1/16" | 26,98 | 20 1670 055 | 56,70 | • 1.7/16" | 36,51 | 20 1670 085 | 78,10 | • 1.13/16" | 46,03 | 20 1670 115 | 107,65 |
| • 3/4" | 19,04 | 20 1670 030 | 52,00 | • 1.1/8" | 28,57 | 20 1670 060 | 56,70 | • 1.1/2" | 38,10 | 20 1670 090 | 78,10 | • 1.7/8" | 47,62 | 20 1670 120 | 107,65 |
| • 13/16" | 20,63 | 20 1670 035 | 52,00 | • 1.3/16" | 30,13 | 20 1670 065 | 56,70 | • 1.9/16" | 39,68 | 20 1670 095 | 78,10 | • 1.15/16" | 49,21 | 20 1670 125 | 107,65 |
| • 7/8" | 22,22 | 20 1670 040 | 52,00 | • 1.1/4" | 31,75 | 20 1670 070 | 68,45 | • 1.5/8" | 41,27 | 20 1670 100 | 94,40 | • 2" | 50,80 | 20 1670 130 | 121,15 |
| • 15/16" | 23,81 | 20 1670 045 | 52,00 | • 1.5/16" | 33,33 | 20 1670 075 | 68,45 | • 1.11/16" | 42,86 | 20 1670 105 | 94,40 | • 2.1/16" | 52,38 | 20 1670 135 | 124,00 |
| • 1" | 25,40 | 20 1670 050 | 56,70 | • 1.3/8" | 34,92 | 20 1670 080 | 68,45 | • 1.3/4" | 44,45 | 20 1670 110 | 94,40 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1670

HARD-LINE
ZOLL / INCH **80**

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE 1-TEILIG · EJECTOR PINS 1-PIECE

20 1439
€ 13,05



1-teilig / 1 piece

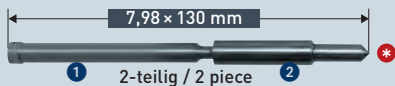
Packnorm 2 Stk. · Packaging unit 2 pcs.

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522–523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522–523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

AUSWERFERSTIFTE 2-TEILIG EJECTOR PINS 2-PIECE

20 1427
€ 22,10



2-teilig / 2 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG APPLICATION EJECTOR PINS 2-PIECE



Anwendung:

Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:

Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

• **Warum 2-teilige Auswerferstifte?** In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn **keine extra langen** Aufnahmehalter verwendet werden (wie auf Seite 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

• **Why use 2-part ejector pins?** Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If **no extra-long** holders are used (e.g. as on page 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Schnittdaten
Cutting data

Film
Movie



1295

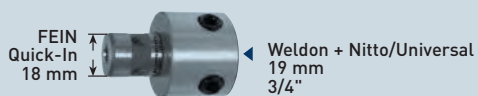


Zubehör für Hartmetall-bestückte Kernbohrer, Nitto/Universalschaft, Nutzlänge 80 mm
 Accessories for carbide-tipped annular cutter, Nitto/Universal shank, drill depth 80 mm | 3"

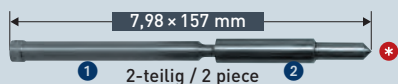
HARD-LINE / 80
 ZOLL / INCH

20 1670

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS



20 1161
 € 17,45

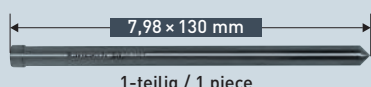


20 1436
 € 25,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

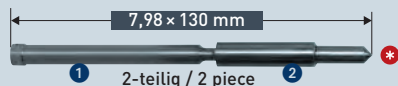


21 0048
 € 14,15



20 1439
 € 13,05

Packnorm 2 Stk. · Packaging unit 2 pcs.



20 1427
 € 22,10

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

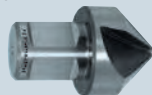
Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



Kegelsenker mit Weldonchaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



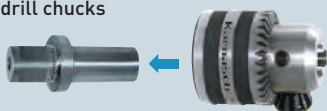
Sets · Displays 534-561
 Sets · Displays



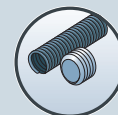
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts



HSS-XE + DURABLUE BESCHICHTETE KERNBOHRER

HSS-XE + DURABLUE-COATED ANNULAR CUTTERS



BLUE-DRILL LINE

Neben Hartmetall-bestückten Kernbohrern bieten beschichtete HSS-XE Kernbohrer das optimale Preis-Leistungs-Verhältnis.

Im harten Einsatz kann nur in den seltensten Fällen auf optimale Drehzahlen und Kühlung Rücksicht genommen werden. Die Karnasch DURABLUE-Beschichtung macht den Kernbohrer somit entscheidend widerstandsfähiger. Letztendlich wird dadurch die Lebensdauer des Bohrers wesentlich erhöht.

BLUE-DRILL LINE ist der am häufigsten verwendete Karnasch Kernbohrer. Der HSS-XE Bohrer mit dem besten Preis-Leistungs-Verhältnis für alle Stähle bis 1100 N Festigkeit sowie Edelstähle.

Besides carbide tipped annular cutters provide coated HSS-XE cutters the optimal price-performance ratio.

Under hard field conditions only in the rarest cases optimum speed and cooling can be considered. The Karnasch DURABLUE-coating makes the annular cutter decisively more resistant. This results finally to an extraordinary increase of lifetime.

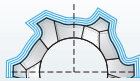
BLUE-DRILL LINE annular cutters are the most commonly used Karnasch cutters. These HSS-XE cutters offers the best price-performance ratio for all steels up to a strength of 1100 N and stainless steel.

EIGENSCHAFTEN · PROPERTIES



Gefertigt aus hochlegiertem HSS-XE Spezialstahl. Für extreme Härte an den Zahnsitzen (bis 68 HRC). Somit hohe Verschleißfestigkeit und Standzeit.

Made of high-alloyed HSS-XE special steel. For extreme hardness at the tip of the tooth (up to 68 HRC). A high wear resistance and lifetime.



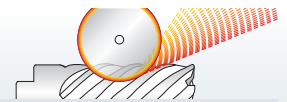
Unsere hochwertigsten Kernbohrer erhalten die einzigartige und patentierte DURABLUE-Beschichtung. Extreme Oberflächenhärte- und -glätte ergeben extreme Standzeiten auch unter nicht optimalen Arbeitsbedingungen wie „Über Kopf arbeiten“, Trockenbohrungen, u.s.w.

Our first-class annular cutters are equipped with the unique and patented DURABLUE-coating. Extreme surface hardness and sleekness yield extreme lifetimes even under non-optimum conditions like "overhead work", dry drilling, etc.



Nur wenige Hersteller sind in der Lage in Stufen gehärtete Kernbohrer zu fertigen. Für uns ist dies „Standard“. Dadurch erreichen wir extrem harte Zahnsitzen (68 HRC) und dennoch einen flexiblen Kernbohrer.

Only few manufacturers are capable of producing step-hardened annular cutters. For us this is "standard". Only this makes us produce extremely hard tooth tips (68 HRC) and yet a flexible annular cutter.



Aus dem vollen Material komplett geschliffen. Dieser Feinschliff erhöht die Zerspanleistung bei gleichzeitiger Reduzierung der Reibung. Für ein Mehr an Standzeit.

Completely made "FULLY GROUND". This refining rises the cutting ability with reducing friction at the same time. For an exceeded lifetime.

ANWENDUNG · APPLICATION

| | | | | | | | | | | | | |
|---------|----------|----------|-----------|-----------|----------|----------|-----------------------|---------------------|----------------|--|------------|------------|
| | | | | | | | | | | | | |
| Stahl | Stahl | Stahl | Edelstahl | Edelstahl | Alu | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Grauguss | Hastelloy, Inconel, Nimonic, Exotische Materialien | Hardox 400 | Hardox 450 |
| Steel | Steel | Steel | Stainless | Stainless | Alu | Alu | Copper, brass, tin | Plastics GRP/CRP | Grey cast iron | Hastelloy, Inconel, Nimonic, exotic materials | Hardox 400 | Hardox 450 |
| < 900 N | < 1100 N | < 1400 N | < 900 N | > 900 N | < 10% Si | > 10% Si | | | | | | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL · OPTIMAL

✓ GUT · GOOD

✓ MÖGLICH · POSSIBLE

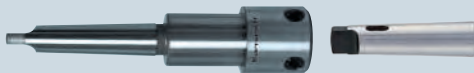
HSS-XE + DURABLUK BESCHICHTETE KERNBOHRER

HSS-XE + DURABLUK-COATED ANNULAR CUTTERS

| Schnitttiefe · Drill depths | Ø mm | Ø Zoll / Inch | Art. / Type | |
|--|-------|----------------|--|-----|
|  | 12-60 | 15/32-2.23/64" | 20 1312N BLUE-DRILL LINE / 30 | 454 |
|  | 12-60 | 15/32-2.23/64" | 20 1313N BLUE-DRILL LINE / 55 | 456 |
|  | 18-50 | 45/64-1.31/32" | 20 1185N BLUE-DRILL LINE / 80 | 458 |
|  | 18-50 | 45/64-1.31/32" | 20 1180N BLUE-DRILL LINE / 110 | 460 |
|  | - | 7/16-1.7/8" | 20 1611 BLUE-DRILL LINE ZOLL / INCH / 30 | 462 |
|  | - | 7/16-1.7/8" | 20 1621 BLUE-DRILL LINE ZOLL / INCH / 55 | 464 |
|  | - | 11/16-2.1/16" | 20 1125 BLUE-DRILL LINE ZOLL / INCH / 80 | 466 |

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



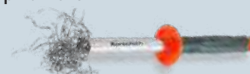
Kühlmittel-Druckflaschen 528
Coolant pressure bottles



Kegelsenker mit Weldonchaft 524/525
Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



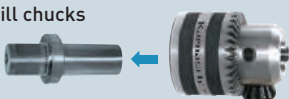
Sets · Displays 534-561
Sets · Displays



Gewintheadapter Weldon + Gewindebohrer M 3 - M 30 623-624
Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
Adapters + suitable drill chucks



Ersatzteile 530-532
Spare parts



1



2



3



4



5



6



7



8



9



20 1312N

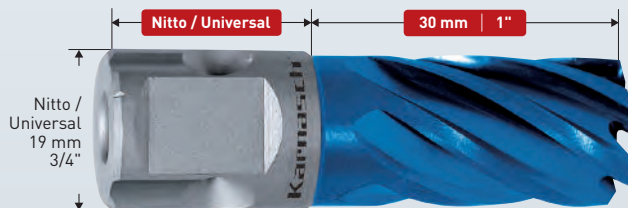
BLUE-DRILL LINE/30

HSS-XE + DURABLUe-beschichteter Kernbohrer, Nitto/Universalschaft, Nutzlänge 30 mm
HSS-XE + DURABLUe-coated annular cutter, Nitto/Universal shank, drill depth 30 mm | 1"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 1100 N | < 900 N | | > 10% Si | | | |



☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|-------|
| 20 1312N 012 | 12 | 15/32" | 23,10 | 20 1312N 026 | 26 | 1.1/32" | 33,80 | 20 1312N 040 | 40 | 1.37/64" | 64,35 | 20 1312N 054 | 54 | 2.1/8" | 46,55 |
| 20 1312N 013 | 13 | 33/64" | 23,10 | 20 1312N 027 | 27 | 1.1/16" | 33,80 | 20 1312N 041 | 41 | 1.39/64" | 31,95 | 20 1312N 055 | 55 | 2.11/64" | 47,45 |
| 20 1312N 014 | 14 | 35/64" | 23,60 | 20 1312N 028 | 28 | 1.7/64" | 36,65 | 20 1312N 042 | 42 | 1.21/32" | 33,70 | 20 1312N 056 | 56 | 2.13/64" | 48,80 |
| 20 1312N 015 | 15 | 19/32" | 23,60 | 20 1312N 029 | 29 | 1.9/64" | 36,65 | 20 1312N 043 | 43 | 1.11/16" | 33,70 | 20 1312N 057 | 57 | 2.1/4" | 50,20 |
| 20 1312N 016 | 16 | 5/8" | 24,80 | 20 1312N 030 | 30 | 1.3/16" | 38,00 | 20 1312N 044 | 44 | 1.47/64" | 36,05 | 20 1312N 058 | 58 | 2.9/32" | 51,20 |
| 20 1312N 017 | 17 | 43/64" | 24,80 | 20 1312N 031 | 31 | 1.7/32" | 38,00 | 20 1312N 045 | 45 | 1.49/64" | 72,80 | 20 1312N 059 | 59 | 2.21/64" | 52,50 |
| 20 1312N 018 | 18 | 45/64" | 25,65 | 20 1312N 032 | 32 | 1.17/64" | 39,35 | 20 1312N 046 | 46 | 1.13/16" | 38,00 | 20 1312N 060 | 60 | 2.23/64" | 53,80 |
| 20 1312N 019 | 19 | 3/4" | 25,65 | 20 1312N 033 | 33 | 1.19/64" | 39,35 | 20 1312N 047 | 47 | 1.27/32" | 38,00 | | | | |
| 20 1312N 020 | 20 | 25/32" | 27,00 | 20 1312N 034 | 34 | 1.11/32" | 41,05 | 20 1312N 048 | 48 | 1.57/64" | 39,60 | | | | |
| 20 1312N 021 | 21 | 53/64" | 27,00 | 20 1312N 035 | 35 | 1.3/8" | 41,05 | 20 1312N 049 | 49 | 1.59/64" | 39,60 | | | | |
| 20 1312N 022 | 22 | 55/64" | 30,65 | 20 1312N 036 | 36 | 1.27/64" | 45,40 | 20 1312N 050 | 50 | 1.31/32" | 84,25 | | | | |
| 20 1312N 023 | 23 | 29/32" | 31,45 | 20 1312N 037 | 37 | 1.29/64" | 57,50 | 20 1312N 051 | 51 | 2.1/64" | 41,65 | | | | |
| 20 1312N 024 | 24 | 15/16" | 32,35 | 20 1312N 038 | 38 | 1.1/2" | 60,35 | 20 1312N 052 | 52 | 2.3/64" | 44,35 | | | | |
| 20 1312N 025 | 25 | 63/64" | 32,35 | 20 1312N 039 | 39 | 1.17/32" | 60,35 | 20 1312N 053 | 53 | 2.3/32" | 45,45 | | | | |

Ersatzartikel siehe Art. 20 1260N Seite 470, Art. 20 1315N Seite 438
Replacement article see Art. 20 1260N page 470, Art. 20 1315N page 438

Größere Ø siehe Art. 20 1315 Seite 366 sowie Art. 20 1316 Seite 368 – Größere Ø bis 100 mm siehe Art. 20 1130A + Adapter Seite 575/577
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Larger Ø see Art. 20 1315 page 366 and Art. 20 1316 page 368 – Larger Ø up to 100 mm see Art. 20 1130A + adapter page 575/577
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1312N

BLUE-DRILL LINE/30

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



20 1261
€ 6,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1312N

BLUE-DRILL LINE/30

SETS / DISPLAYS Seite / Page 552

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1312N BLUE-DRILL LINE30 – siehe Seite 552. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1312N BLUE-DRILL LINE30 – see page 552. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



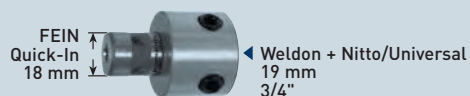
1296

Zubehör für HSS-XE + DURABLU- beschichteten Kernbohrer, Nitto/Universalschaft, Nutzlänge 30 mm
 Accessories for HSS-XE + DURABLU-coated annular cutter, Nitto/Universal shank, drill depth 30 mm | 1"

BLUE-DRILL LINE/30

20 1312N

**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**



20 1263
 € 17,50



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1271
 € 7,65



21 0048
 € 14,15

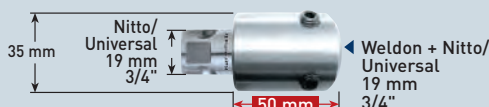


Packnorm 2 Stk. - Packaging unit 2 pcs.

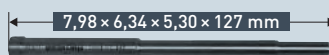
20 1261
 € 6,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

**VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
 EXTENSIONS + SUITABLE EJECTOR PINS**



20 1406
 € 22,10

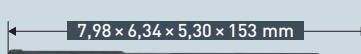


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1433
 € 15,70



20 1407
 € 24,40

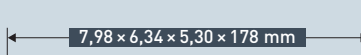


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1396
 € 16,45



20 1409
 € 29,05



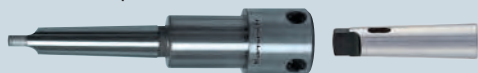
Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1411
 € 17,05

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

ZUBEHÖR • SETS • DISPLAYS • ERSATZTEILE / ACCESSORIES • SETS • DISPLAYS • SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



Kegelsenker mit Weldonschaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



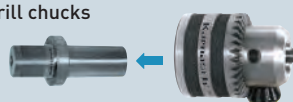
Sets • Displays 534-561
 Sets • Displays



Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts



20 1313N

BLUE-DRILL LINE/55

HSS-XE + DURABLUe-beschichteter Kernbohrer, Nitto/Universalschaft, Nutzlänge 55 mm
HSS-XE + DURABLUe-coated annular cutter, Nitto/Universal shank, drill depth 55 mm | 2"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 1100 N | < 900 N | | > 10% Si | | | |



☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|--------|--------------|------|-------------|-------|
| 20 1313N 012 | 12 | 15/32" | 27,30 | 20 1313N 026 | 26 | 1.1/32" | 39,90 | 20 1313N 040 | 40 | 1.37/64" | 75,40 | 20 1313N 054 | 54 | 2.1/8" | 56,60 |
| 20 1313N 013 | 13 | 33/64" | 27,30 | 20 1313N 027 | 27 | 1.1/16" | 39,90 | 20 1313N 041 | 41 | 1.39/64" | 37,30 | 20 1313N 055 | 55 | 2.11/64" | 57,90 |
| 20 1313N 014 | 14 | 35/64" | 27,95 | 20 1313N 028 | 28 | 1.7/64" | 42,75 | 20 1313N 042 | 42 | 1.21/32" | 39,55 | 20 1313N 056 | 56 | 2.13/64" | 59,35 |
| 20 1313N 015 | 15 | 19/32" | 27,95 | 20 1313N 029 | 29 | 1.9/64" | 42,75 | 20 1313N 043 | 43 | 1.11/16" | 39,55 | 20 1313N 057 | 57 | 2.1/4" | 60,55 |
| 20 1313N 016 | 16 | 5/8" | 29,30 | 20 1313N 030 | 30 | 1.3/16" | 44,50 | 20 1313N 044 | 44 | 1.47/64" | 42,50 | 20 1313N 058 | 58 | 2.9/32" | 61,95 |
| 20 1313N 017 | 17 | 43/64" | 29,30 | 20 1313N 031 | 31 | 1.7/32" | 44,50 | 20 1313N 045 | 45 | 1.49/64" | 86,05 | 20 1313N 059 | 59 | 2.21/64" | 63,45 |
| 20 1313N 018 | 18 | 45/64" | 30,20 | 20 1313N 032 | 32 | 1.17/64" | 47,05 | 20 1313N 046 | 46 | 1.13/16" | 45,00 | 20 1313N 060 | 60 | 2.23/64" | 64,65 |
| 20 1313N 019 | 19 | 3/4" | 30,20 | 20 1313N 033 | 33 | 1.19/64" | 47,05 | 20 1313N 047 | 47 | 1.27/32" | 45,00 | | | | |
| 20 1313N 020 | 20 | 25/32" | 31,65 | 20 1313N 034 | 34 | 1.11/32" | 49,60 | 20 1313N 048 | 48 | 1.57/64" | 46,95 | | | | |
| 20 1313N 021 | 21 | 53/64" | 31,65 | 20 1313N 035 | 35 | 1.3/8" | 49,60 | 20 1313N 049 | 49 | 1.59/64" | 46,95 | | | | |
| 20 1313N 022 | 22 | 55/64" | 34,95 | 20 1313N 036 | 36 | 1.27/64" | 55,10 | 20 1313N 050 | 50 | 1.31/32" | 104,95 | | | | |
| 20 1313N 023 | 23 | 29/32" | 35,75 | 20 1313N 037 | 37 | 1.29/64" | 67,55 | 20 1313N 051 | 51 | 2.1/64" | 51,70 | | | | |
| 20 1313N 024 | 24 | 15/16" | 37,35 | 20 1313N 038 | 38 | 1.1/2" | 70,55 | 20 1313N 052 | 52 | 2.3/64" | 53,70 | | | | |
| 20 1313N 025 | 25 | 63/64" | 37,35 | 20 1313N 039 | 39 | 1.17/32" | 70,55 | 20 1313N 053 | 53 | 2.3/32" | 55,15 | | | | |

Größere Ø siehe Art. 20 1316 Seite 368 – Größere Ø bis 100 mm siehe Art. 20 1141A + Adapter Seite 579 / 581 ·
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Larger Ø see Art. 20 1316 page 368 – Larger Ø up to 100 mm see Art. 20 1141A + adapter page 579 / 581 ·
Attention: The inch sizes do not correspond exactly to the mm diameters.

Ersatzartikel siehe Art. 20 1270N Seite 472, Art. 20 1316N Seite 440
Replacement article see Art. 20 1270N page 472, Art. 20 1316N page 440

20 1313N

BLUE-DRILL LINE/55

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE · EJECTOR PINS



20 1271
€ 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1313N

BLUE-DRILL LINE/55

SETS / DISPLAYS Seite / Page 553



Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1313N BLUE-DRILL LINE55 – siehe Seite 553. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1313N BLUE-DRILL LINE55 – see page 553. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



1296



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Zubehör für HSS-XE + DURABLU- beschichteten Kernbohrer, Nitto/Universalschaft, Nutzlänge 55 mm
 Accessories for HSS-XE + DURABLU-coated annular cutter, Nitto/Universal shank, drill depth 55 mm | 2"

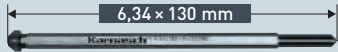
BLUE-DRILL LINE 55

20 1313N

**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**



20 1263
 € 17,50



20 1160
 € 9,20

Packnorm 2 Stk. · Packaging unit 2 pcs.



21 0048
 € 14,15

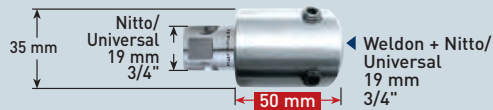


20 1271
 € 7,65

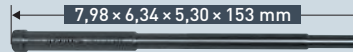
Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

**VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
 EXTENSIONS + SUITABLE EJECTOR PINS**



20 1406
 € 22,10

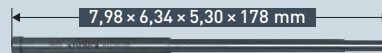


20 1396
 € 16,45

Packnorm 2 Stk. · Packaging unit 2 pcs.

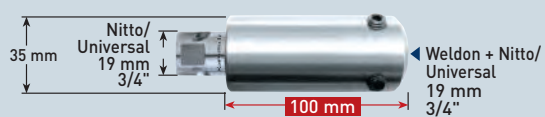


20 1407
 € 24,40

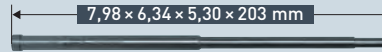


20 1411
 € 17,05

Packnorm 2 Stk. · Packaging unit 2 pcs.



20 1409
 € 29,05



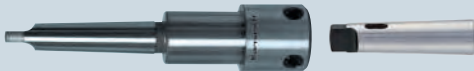
20 1426
 € 18,35

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmelhalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



Kegelsenker mit Weldonschaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



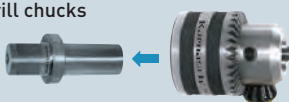
Sets · Displays 534-561
 Sets · Displays



Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts



20 1185N

BLUE-DRILL LINE / 80

HSS-XE + DURABLUÉ-beschichteter Kernbohrer, Nitto/Universalschaft, Nutzlänge 80 mm
HSS-XE + DURABLUÉ-coated annular cutter, Nitto/Universal shank, drill depth 80 mm | 3"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 1100 N | < 900 N | | > 10% Si | | | |



☒ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € |
|--------------|------|--------|-------|--------------|------|---------|-------|--------------|------|----------|-------|--------------|------|----------|-------|
| 20 1185N 018 | 18 | 45/64" | 22,25 | 20 1185N 024 | 24 | 15/16" | 27,40 | 20 1185N 030 | 30 | 1.3/16" | 31,70 | 20 1185N 040 | 40 | 1.37/64" | 50,05 |
| 20 1185N 019 | 19 | 3/4" | 22,25 | 20 1185N 025 | 25 | 63/64" | 27,40 | 20 1185N 032 | 32 | 1.17/64" | 33,65 | 20 1185N 045 | 45 | 1.49/64" | 57,65 |
| 20 1185N 020 | 20 | 25/32" | 23,05 | 20 1185N 026 | 26 | 1.1/32" | 28,20 | 20 1185N 033 | 33 | 1.19/64" | 33,65 | 20 1185N 050 | 50 | 1.31/32" | 71,25 |
| 20 1185N 021 | 21 | 53/64" | 23,05 | 20 1185N 027 | 27 | 1.1/16" | 28,20 | 20 1185N 035 | 35 | 1.3/8" | 35,00 | | | | |
| 20 1185N 022 | 22 | 55/64" | 25,70 | 20 1185N 028 | 28 | 1.7/64" | 30,40 | 20 1185N 036 | 36 | 1.27/64" | 39,10 | | | | |
| 20 1185N 023 | 23 | 29/32" | 26,15 | 20 1185N 029 | 29 | 1.9/64" | 30,40 | 20 1185N 038 | 38 | 1.1/2" | 46,55 | | | | |

Größere Ø siehe Art. 20 1650 Seite 370 sowie Art. 20 1660 Seite 372 – Ersatzartikel siehe Art. 20 1285N Seite 474, Art. 20 1650N Seite 442.
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmesser.

Larger Ø see Art. 20 1650 page 370 and Art. 20 1660 page 372 – Replacement article see Art. 20 1285N page 474, Art. 20 1650N page 442.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1185N

BLUE-DRILL LINE / 80

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE 1-TEILIG · EJECTOR PINS 1-PIECE



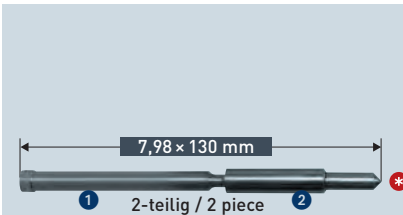
☒ 20 1439
• € 13,05

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522–523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522–523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

Packnorm 2 Stk. · Packaging unit 2 pcs.

AUSWERFERSTIFTE 2-TEILIG · EJECTOR PINS 2-PIECE



☒ 20 1427
• € 22,10

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG · APPLICATION EJECTOR PINS 2-PIECE



Anwendung:

Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:

Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

Packnorm 2 Stk. · Packaging unit 2 pcs.

☒ **Warum 2-teilige Auswerferstifte?** In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn **keine extra langen** Aufnahmehalter verwendet werden (wie auf Seite 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

☒ **Why use 2-part ejector pins?** Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If **no extra-long** holders are used (e.g. as on page 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Schnittdaten
Cutting data

Film
Movie



1296



Zubehör für HSS-XE + DURABLUE-beschichteten Kernbohrer, Nitto/Universalschaft, Nutzlänge 80 mm
 Accessories for HSS-XE + DURABLUE-coated annular cutter, Nitto/Universal shank, drill depth 80 mm | 3"

BLUE-DRILL LINE / 80

20 1185N

**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**



20 1161
 € 17,45

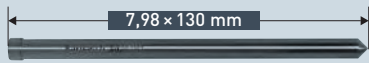


20 1436
 € 25,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

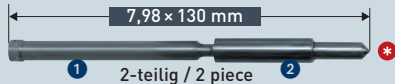


21 0048
 € 14,15



20 1439
 € 13,05

Packnorm 2 Stk. · Packaging unit 2 pcs.



20 1427
 € 22,10

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

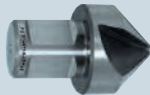
Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



Kegelsenker mit Weldonchaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



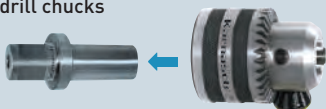
Sets · Displays 534-561
 Sets · Displays



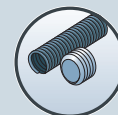
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts



20 1180N

BLUE-DRILL LINE / 110

HSS-XE + DURABLUe-beschichteter Kernbohrer, Nitto/Universalschaft, Nutzlänge 110 mm
HSS-XE + DURABLUe-coated annular cutter, Nitto/Universal shank, drill depth 110 mm | 4"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 1100 N | < 900 N | | > 10% Si | | | |



☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € |
|--------------|------|--------|-------|--------------|------|---------|-------|--------------|------|----------|-------|--------------|------|----------|-------|
| 20 1180N 018 | 18 | 45/64" | 21,28 | 20 1180N 024 | 24 | 15/16" | 25,66 | 20 1180N 030 | 30 | 1.3/16" | 31,46 | 20 1180N 040 | 40 | 1.37/64" | 51,36 |
| 20 1180N 019 | 19 | 3/4" | 21,74 | 20 1180N 025 | 25 | 63/64" | 26,16 | 20 1180N 032 | 32 | 1.17/64" | 34,58 | 20 1180N 045 | 45 | 1.49/64" | 59,06 |
| 20 1180N 020 | 20 | 25/32" | 22,04 | 20 1180N 026 | 26 | 1.1/32" | 28,42 | 20 1180N 033 | 33 | 1.19/64" | 35,24 | 20 1180N 050 | 50 | 1.31/32" | 70,62 |
| 20 1180N 021 | 21 | 53/64" | 23,36 | 20 1180N 027 | 27 | 1.1/16" | 28,92 | 20 1180N 035 | 35 | 1.3/8" | 36,66 | | | | |
| 20 1180N 022 | 22 | 55/64" | 23,80 | 20 1180N 028 | 28 | 1.7/64" | 29,66 | 20 1180N 036 | 36 | 1.27/64" | 40,42 | | | | |
| 20 1180N 023 | 23 | 29/32" | 25,14 | 20 1180N 029 | 29 | 1.9/64" | 30,40 | 20 1180N 038 | 38 | 1.1/2" | 47,28 | | | | |

Ersatzartikel siehe Art. 20 1280N Seite 476, Art. 20 1660N Seite 444 · **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Replacement article see Art. 20 1280N page 476, Art. 20 1660N page 444 · **Attention:** The inch sizes do not correspond exactly to the mm diameters.

20 1180N

BLUE-DRILL LINE / 110

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE 1-TEILIG · EJECTOR PINS 1-PIECE

20 1399
€ 14,30



1-teilig / 1 piece

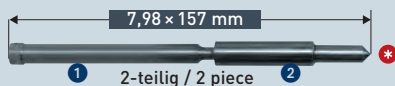
Packnorm 2 Stk. · Packaging unit 2 pcs.

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522–523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522–523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

AUSWERFERSTIFTE 2-TEILIG · EJECTOR PINS 2-PIECE

20 1428
€ 24,80



2-teilig / 2 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG · APPLICATION EJECTOR PINS 2-PIECE



Anwendung:

Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:

Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

☞ **Warum 2-teilige Auswerferstifte?** In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn **keine extra langen** Aufnahmehalter verwendet werden (wie auf Seite 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

☞ **Why use 2-part ejector pins?** Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If **no extra-long** holders are used (e.g. as on page 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Schnittdaten

Cutting data

Film

Movie



1296



Zubehör für HSS-XE + DURABLU- beschichteten Kernbohrer, Nitto/Universalschaft, Nutzlänge 110 mm
 Accessories for HSS-XE + DURABLU-coated annular cutter, Nitto/Universal shank, drill depth 110 mm | 4"

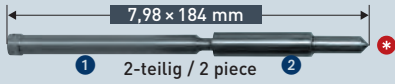
BLUE-DRILL LINE 110

20 1180N

**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**



20 1161
 € 17,45

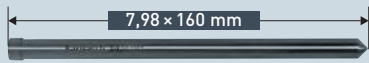


20 1438
 € 28,40

Packnorm 2 Stk. · Packaging unit 2 pcs.

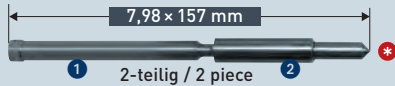


21 0048
 € 14,15



20 1399
 € 14,30

Packnorm 2 Stk. · Packaging unit 2 pcs.



20 1428
 € 24,80

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

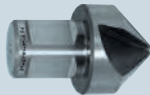
Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



Kegelsenker mit Weldonchaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



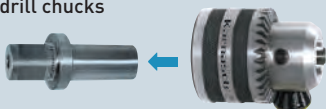
Sets · Displays 534-561
 Sets · Displays



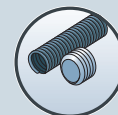
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts



20 1611

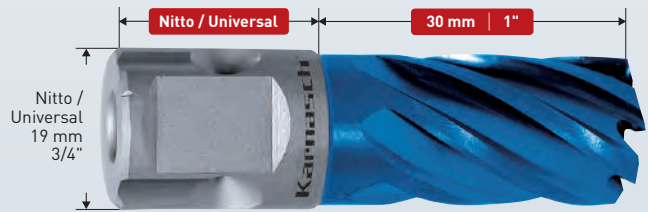
BLUE-DRILL LINE
ZOLL / INCH 30

HSS-XE + DURABLUЕ-beschichteter Kernbohrer, Nitto/Universalschaft, Nutzlänge 30 mm
HSS-XE + DURABLUЕ-coated annular cutter, Nitto/Universal shank, drill depth 30 mm | 1"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 1100 N | < 900 N | | > 10% Si | | | |



☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|-----------|-------|-------------|-------|-----------|-------|--------------|-------|
| 7/16" | 11,10 | 20 1611 005 | 11,45 | 1.1/16" | 26,98 | 20 1611 055 | 17,00 | 1.11/16" | 42,86 | 20 1611 105 | 33,40 | 9/16" | 14,28 | 20 1611w 015 | 13,50 |
| 1/2" | 12,70 | 20 1611 010 | 11,85 | 1.1/8" | 28,57 | 20 1611 060 | 18,00 | 1.3/4" | 44,45 | 20 1611 110 | 35,75 | 5/8" | 15,87 | 20 1611w 020 | 13,85 |
| 9/16" | 14,28 | 20 1611 015 | 12,05 | 1.3/16" | 30,13 | 20 1611 065 | 18,65 | 1.13/16" | 46,03 | 20 1611 115 | 37,75 | 11/16" | 17,46 | 20 1611w 025 | 13,85 |
| 5/8" | 15,87 | 20 1611 020 | 12,65 | 1.1/4" | 31,75 | 20 1611 070 | 19,30 | 1.7/8" | 47,62 | 20 1611 120 | 39,30 | 3/4" | 19,04 | 20 1611w 030 | 14,35 |
| 11/16" | 17,46 | 20 1611 025 | 12,65 | 1.5/16" | 33,33 | 20 1611 075 | 19,30 | 1.15/16" | 49,21 | 20 1611 125 | 39,30 | 13/16" | 20,63 | 20 1611w 035 | 14,90 |
| 3/4" | 19,04 | 20 1611 030 | 13,10 | 1.3/8" | 34,92 | 20 1611 080 | 20,15 | 2" | 50,80 | 20 1611 130 | 41,35 | 1.1/2" | 38,10 | 20 1611w 090 | 31,55 |
| 13/16" | 20,63 | 20 1611 035 | 13,60 | 1.7/16" | 36,51 | 20 1611 085 | 28,35 | 2.1/16" | 52,38 | 20 1611 135 | 43,40 | 2" | 50,80 | 20 1611w 130 | 44,30 |
| 7/8" | 22,22 | 20 1611 040 | 15,40 | 1.1/2" | 38,10 | 20 1611 090 | 29,70 | | | | | | | | |
| 15/16" | 23,81 | 20 1611 045 | 16,25 | 1.9/16" | 39,68 | 20 1611 095 | 31,65 | | | | | | | | |
| 1" | 25,40 | 20 1611 050 | 16,25 | 1.5/8" | 41,27 | 20 1611 100 | 31,65 | | | | | | | | |

Ersatzartikel siehe Art. 20 1610 Seite 478, Art. 20 1630 Seite 446 -
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Replacement article see Art. 20 1610 page 478, Art. 20 1630 page 446 -
Attention: The inch sizes do not correspond exactly to the mm diameters.



* In Weldonschaft Sonderpreise solange Vorrat reicht
* Special prices as long as supplies are available in Weldon shank

20 1611

BLUE-DRILL LINE
ZOLL / INCH 30

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



Packnorm 2 Stk. · Packaging unit 2 pcs.

☞ Ø 7/16" 20 1482
• € 6,95



Packnorm 2 Stk. · Packaging unit 2 pcs.

☞ Ø 1/2" - 2.1/16" 20 1261
• € 6,65

Schnittdaten
Cutting data

Film
Movie



1296



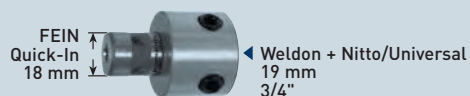
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Zubehör für HSS-XE + DURABLU- beschichteten Kernbohrer, Nitto/Universalschaft, Nutzlänge 30 mm
 Accessories for HSS-XE + DURABLU-coated annular cutter, Nitto/Universal shank, drill depth 30 mm | 1"

BLUE-DRILL LINE 30
ZOLL / INCH

20 1611

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS



20 1263
 € 17,50



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1271
 € 7,65



21 0048
 € 14,15



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1482
 € 6,95

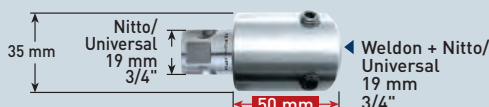


Packnorm 2 Stk. - Packaging unit 2 pcs.

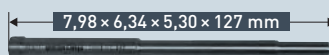
20 1261
 € 6,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS



20 1406
 € 22,10

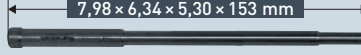


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1433
 € 15,70



20 1407
 € 24,40

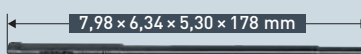


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1396
 € 16,45



20 1409
 € 29,05



Packnorm 2 Stk. - Packaging unit 2 pcs.

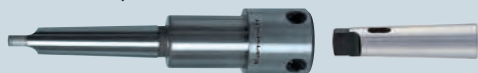
20 1411
 € 17,05

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

ZUBEHÖR • SETS • DISPLAYS • ERSATZTEILE / ACCESSORIES • SETS • DISPLAYS • SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves

521-523



Kühlmittel-Druckflaschen
 Coolant pressure bottles

528



Kegelsenker mit Weldonschaft
 Countersinks with Weldon shank

524/525



Magnetstab zur Entfernung der Bohrspäne
 Magnetic stick for chip removal

529



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm

622



Sets • Displays
 Sets • Displays

534-561



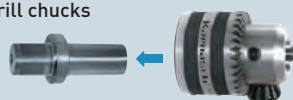
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30
 Tapping adapter Weldon + taps M 3 - M 30

623-624



Adapter + passende Bohrfutter
 Adapters + suitable drill chucks

528



Ersatzteile
 Spare parts

530-532



20 1621

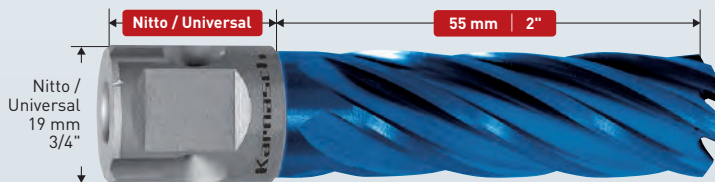
BLUE-DRILL LINE
ZOLL / INCH 55

HSS-XE + DURABLUe-beschichteter Kernbohrer, Nitto/Universalschaft, Nutzlänge 55 mm
HSS-XE + DURABLUe-coated annular cutter, Nitto/Universal shank, drill depth 55 mm | 2"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 1100 N | < 900 N | | > 10% Si | | | |



☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|------------|-------|-------------|-------|-----------|-------|--------------|-------|
| % 7/16" | 11,10 | 20 1621 005 | 13,55 | % 1.1/16" | 26,98 | 20 1621 055 | 19,60 | % 1.11/16" | 42,86 | 20 1621 105 | 39,30 | % 1" | 25,40 | 20 1621w 050 | 20,80 |
| % 1/2" | 12,70 | 20 1621 010 | 13,95 | % 1.1/8" | 28,57 | 20 1621 060 | 20,95 | % 1.3/4" | 44,45 | 20 1621 110 | 42,20 | % 1.7/8" | 47,62 | 20 1621w 120 | 50,10 |
| % 9/16" | 14,28 | 20 1621 015 | 14,25 | % 1.3/16" | 30,13 | 20 1621 065 | 21,80 | % 1.13/16" | 46,03 | 20 1621 115 | 44,65 | | | | |
| % 5/8" | 15,87 | 20 1621 020 | 14,95 | % 1.1/4" | 31,75 | 20 1621 070 | 23,05 | % 1.7/8" | 47,62 | 20 1621 120 | 46,65 | | | | |
| % 11/16" | 17,46 | 20 1621 025 | 14,95 | % 1.5/16" | 33,33 | 20 1621 075 | 23,05 | % 1.15/16" | 49,21 | 20 1621 125 | 46,65 | | | | |
| % 3/4" | 19,04 | 20 1621 030 | 15,40 | % 1.3/8" | 34,92 | 20 1621 080 | 24,35 | % 2" | 50,80 | 20 1621 130 | 51,45 | | | | |
| % 13/16" | 20,63 | 20 1621 035 | 15,90 | % 1.7/16" | 36,51 | 20 1621 085 | 33,20 | % 2.1/16" | 52,38 | 20 1621 135 | 52,60 | | | | |
| % 7/8" | 22,22 | 20 1621 040 | 17,60 | % 1.1/2" | 38,10 | 20 1621 090 | 34,70 | | | | | | | | |
| % 15/16" | 23,81 | 20 1621 045 | 18,80 | % 1.9/16" | 39,68 | 20 1621 095 | 37,05 | | | | | | | | |
| % 1" | 25,40 | 20 1621 050 | 18,80 | % 1.5/8" | 41,27 | 20 1621 100 | 37,05 | | | | | | | | |

Ersatzartikel siehe Art. 20 1620 Seite 480, Art. 20 1640 Seite 448 -
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Replacement article see Art. 20 1620 page 480, Art. 20 1640 page 448 -
Attention: The inch sizes do not correspond exactly to the mm diameters.



* In Weldonschaft Sonderpreise solange Vorrat reicht
* Special prices as long as supplies are available in Weldon shank

20 1621

BLUE-DRILL LINE
ZOLL / INCH 55

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



Packnorm 2 Stk. · Packaging unit 2 pcs.

☞ Ø 7/16" 20 1485
€ 8,00



Packnorm 2 Stk. · Packaging unit 2 pcs.

☞ Ø 1/2" - 2.1/16" 20 1271
€ 7,65

Schnittdaten
Cutting data

Film
Movie



1296

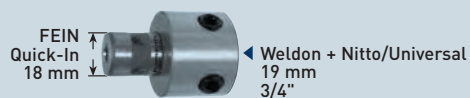


Zubehör für HSS-XE + DURABLU- beschichteten Kernbohrer, Nitto/Universalschaft, Nutzlänge 55 mm
 Accessories for HSS-XE + DURABLU-coated annular cutter, Nitto/Universal shank, drill depth 55 mm | 2"

BLUE-DRILL LINE 55
ZOLL / INCH

20 1621

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS



20 1263
 € 17,50



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1160
 € 9,20



21 0048
 € 14,15



Packnorm 2 Stk. - Packaging unit 2 pcs.

Ø 7/16" 20 1485
 € 8,00



Packnorm 2 Stk. - Packaging unit 2 pcs.

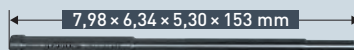
Ø 1/2" - 2.1/16" 20 1271
 € 7,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS



20 1406
 € 22,10



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1396
 € 16,45



20 1407
 € 24,40



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1411
 € 17,05



20 1409
 € 29,05



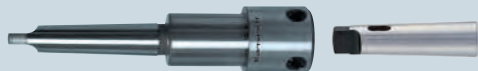
Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1426
 € 18,35

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

ZUBEHÖR • SETS • DISPLAYS • ERSATZTEILE / ACCESSORIES • SETS • DISPLAYS • SPARE PARTS

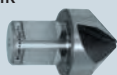
Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves 521-523



Kühlmittel-Druckflaschen
 Coolant pressure bottles 528



Kegelsenker mit Weldonschaft
 Countersinks with Weldon shank 524/525



Magnetstab zur Entfernung der Bohrspäne
 Magnetic stick for chip removal 529



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm 622



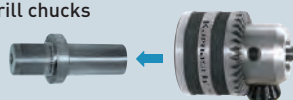
Sets • Displays
 Sets • Displays 534-561



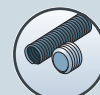
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30
 Tapping adapter Weldon + taps M 3 - M 30 623-624



Adapter + passende Bohrfutter
 Adapters + suitable drill chucks 528



Ersatzteile
 Spare parts 530-532



20 1125

BLUE-DRILL LINE
ZOLL / INCH **80**

HSS-XE + DURABLU- beschichteter Kernbohrer, Nitto/Universalschaft, Nutzlänge 80 mm
HSS-XE + DURABLU-coated annular cutter, Nitto/Universal shank, drill depth 80 mm | 3"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 1100 N | < 900 N | | > 10% Si | | | |



☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|-----------|-------|-------------|-------|-----------|-------|-------------|-------|
| 11/16" | 17,46 | 20 1125 025 | 22,30 | 1.1/16" | 26,98 | 20 1125 055 | 28,20 | 1.7/16" | 36,51 | 20 1125 085 | 44,40 | 1.13/16" | 46,03 | 20 1125 115 | 60,90 |
| 3/4" | 19,04 | 20 1125 030 | 22,30 | 1.1/8" | 28,57 | 20 1125 060 | 30,40 | 1.1/2" | 38,10 | 20 1125 090 | 46,55 | 1.7/8" | 47,62 | 20 1125 120 | 64,45 |
| 13/16" | 20,63 | 20 1125 035 | 23,05 | 1.3/16" | 30,13 | 20 1125 065 | 31,70 | 1.9/16" | 39,68 | 20 1125 095 | 50,05 | 1.15/16" | 49,21 | 20 1125 125 | 67,35 |
| 7/8" | 22,22 | 20 1125 040 | 25,70 | 1.1/4" | 31,75 | 20 1125 070 | 33,65 | 1.5/8" | 41,27 | 20 1125 100 | 50,05 | 2" | 50,80 | 20 1125 130 | 71,25 |
| 15/16" | 23,81 | 20 1125 045 | 27,40 | 1.5/16" | 33,33 | 20 1125 075 | 33,65 | 1.11/16" | 42,86 | 20 1125 105 | 53,10 | 2.1/16" | 52,38 | 20 1125 135 | 72,45 |
| 1" | 25,40 | 20 1125 050 | 28,20 | 1.3/8" | 34,92 | 20 1125 080 | 35,05 | 1.3/4" | 44,45 | 20 1125 110 | 57,65 | | | | |

Ersatzartikel siehe Art. 20 1670 Seite 450, Art. 20 1285N Seite 474 ·

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Replacement article see Art. 20 1670 page 450, Art. 20 1285N page 474 ·

Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1125

BLUE-DRILL LINE
ZOLL / INCH **80**

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE 1-TEILIG · EJECTOR PINS 1-PIECE

☞ **20 1439**
€ 13,05



1-teilig / 1 piece

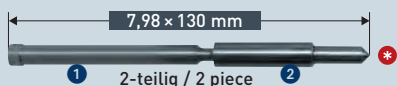
Packnorm 2 Stk. · Packaging unit 2 pcs.

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522–523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522–523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

AUSWERFERSTIFTE 2-TEILIG EJECTOR PINS 2-PIECE

☞ **20 1427**
€ 22,10



2-teilig / 2 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG APPLICATION EJECTOR PINS 2-PIECE



Anwendung:

Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:

Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

☞ **Warum 2-teilige Auswerferstifte?** In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn **keine extra langen** Aufnahmehalter verwendet werden (wie auf Seite 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

☞ **Why use 2-part ejector pins?** Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If **no extra-long** holders are used (e.g. as on page 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Schnittdaten
Cutting data

Film
Movie



1296

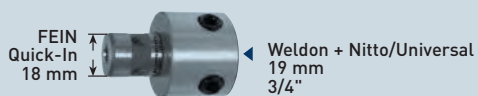


Zubehör für HSS-XE + DURABLUe-beschichteten Kernbohrer, Nitto/Universalschaft, Nutzlänge 80 mm
 Accessories for HSS-XE + DURABLUe-coated annular cutter, Nitto/Universal shank, drill depth 80 mm | 3"

BLUE-DRILL LINE 80
 ZOLL / INCH

20 1125

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS



20 1161
 € 17,45



20 1436
 € 25,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

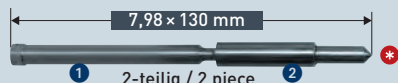


21 0048
 € 14,15



20 1439
 € 13,05

Packnorm 2 Stk. · Packaging unit 2 pcs.



20 1427
 € 22,10

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



Kegelsenker mit Weldonchaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



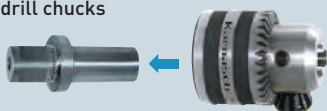
Sets · Displays 534-561
 Sets · Displays



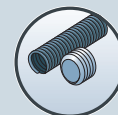
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts



HSS-XE KERNBOHRER

HSS-XE ANNULAR CUTTERS



GOLD-DRILL LINE

Karnasch GOLD-DRILL LINE Kernbohrer sind die am meisten verwendeten nicht beschichteten HSS-XE Kernbohrer.

Durch spezial GOLD-TECH Oberflächenbehandlung + Vollschliff + HSS-XE Spezialstahl hervorragend zum Bohren in Stähle bis 900 N und sogar geeignet für Edelstähle.

Karnasch GOLD-DRILL LINE annular cutters are the most commonly used non-coated HSS-XE annular cutter.

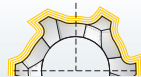
By special surface treatment GOLD-TECH + FULLY GROUND + special steel HSS-XE ideal for drilling in steel up to a strength of 900 N and even suitable for stainless steels.

EIGENSCHAFTEN · PROPERTIES



Gefertigt aus hochlegiertem HSS-XE Spezialstahl. Für extreme Härte an den Zahnschneiden (bis 68 HRC). Somit hohe Verschleißfestigkeit und Standzeit.

Made of high-alloyed HSS-XE special steel. For extreme hardness at the tip of the tooth (up to 68 HRC). A high wear resistance and lifetime.



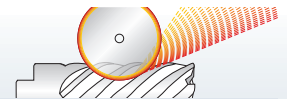
Gold-Tech Oberflächenbehandlung. Die Spezialbehandlung für höhere Standzeiten

Gold-Tech surface treatment. The special treatment for higher lifetimes.



Nur wenige Hersteller sind in der Lage in Stufen gehärtete Kernbohrer zu fertigen. Für uns ist dies „Standard“. Dadurch erreichen wir extrem harte Zahnschneiden (68 HRC) und dennoch einen flexiblen Kernbohrer.

Only few manufacturers are capable of producing step-hardened annular cutters. For Karnasch this is "standard". Only this makes us produce extremely hard tooth tips (68 HRC) and yet a flexible annular cutter.



Aus dem vollen Material komplett geschliffen. Dieser Feinschliff erhöht die Zerspanleistung bei gleichzeitiger Reduzierung der Reibung. Für ein Mehr an Standzeit.

Completely made "FULLY GROUND". This refining rises the cutting ability with reducing friction at the same time. For an exceeded lifetime.

ANWENDUNG · APPLICATION

| | | | | | | | | | |
|---------|---------|----------|-----------|----------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | | | |
| Stahl | Stahl | Stahl | Edelstahl | Alu | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Steel | Steel | Stainless | Alu | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 750 N | < 900 N | < 1100 N | < 900 N | < 10% Si | > 10% Si | | | | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

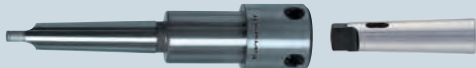
HSS-XE KERNBOHRER

HSS-XE ANNULAR CUTTERS

| Schnitttiefe · Drill depths | Ø mm | Ø Zoll / Inch | Art. / Type | |
|---|---|----------------|---|-----|
|  Nitto / Universal 30 mm 1" | 12-60 | 15/32-2.23/64" | 20 1260N GOLD-DRILL LINE / 30 | 470 |
|  Nitto / Universal 55 mm 2" | 12-60 | 15/32-2.23/64" | 20 1270N GOLD-DRILL LINE / 55 | 472 |
|  Nitto / Universal 80 mm 3" | 18-50 | 45/64-1.31/32" | 20 1285N GOLD-DRILL LINE / 80 | 474 |
|  Nitto / Universal 110 mm 4" | 18-50 | 45/64-1.31/32" | 20 1280N GOLD-DRILL LINE / 110 | 476 |
|  Nitto / Universal 30 mm 1" | - | 7/16-2.1/16" | 20 1610 GOLD-DRILL LINE ZOLL / INCH / 30 | 478 |
|  Nitto / Universal 55 mm 2" | - | 7/16-2.1/16" | 20 1620 GOLD-DRILL LINE ZOLL / INCH / 55 | 480 |
|  Nitto / Universal 80 mm 3" | - | 11/16-2.1/16" | 20 1625 GOLD-DRILL LINE ZOLL / INCH / 80 | 482 |
|  Nitto / Universal 30 mm 1" | 14-32 | 9/16-1.1/16" | 20 1240 GOLD-DRILL LINE SANDWICH / 30 | 484 |
| Mehrschichtenbohrer. Spezialgeometrie zum Bohren übereinanderliegender Metallplatten bis 1100 N (Sandwich) |  | | 20 1241 GOLD-DRILL LINE SANDWICH ZOLL / INCH / 30 | |
|  Nitto / Universal 55 mm 2" | 14-32 | 9/16-1.1/16" | 20 1242 GOLD-DRILL LINE SANDWICH / 55 | 486 |
| Multi layer drill. For stack drilling (sandwich) in steel until 1100 N | | | 20 1243 GOLD-DRILL LINE SANDWICH ZOLL / INCH / 55 | |

ZUBEHÖR · ERSATZTEILE / ACCESSORIES · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



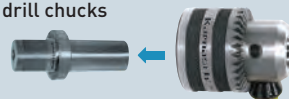
Gewintheadapter Weldon + Gewindebohrer M 3 - M 30 623-624
Tapping adapter Weldon + taps M 3 - M 30



Kegelsenker mit Weldonschaft 524/525
Countersinks with Weldon shank



Adapter + passende Bohrfutter 528
Adapters + suitable drill chucks



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



Ersatzteile 530-532
Spare parts



1



2



3



4



5



6



7



8



9



Index

20 1260N

GOLD-DRILL LINE / 30

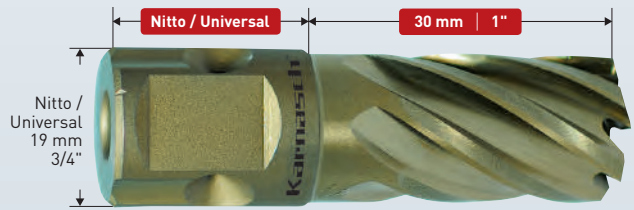
HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 30 mm

HSS-XE annular cutter, Nitto/Universal shank, drill depth 30 mm | 1"



ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



☒ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|---------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|-------|
| 20 1260N 012 | 12 | 15/32" | 16,75 | 20 1260N 024 | 24 | 15/16" | 24,90 | 20 1260N 038 | 38 | 1.1/2" | 41,55 | 20 1260N 052 | 52 | 2.3/64" | 34,65 |
| 20 1260N 013 | 13 | 33/64" | 16,75 | 20 1260N 025 | 25 | 63/64" | 24,90 | 20 1260N 039 | 39 | 1.17/32" | 41,55 | 20 1260N 053 | 53 | 2.3/32" | 35,75 |
| 20 1260N 0135 | 13,5 | 17/32" | 9,20 | 20 1260N 026 | 26 | 1.1/32" | 26,40 | 20 1260N 040 | 40 | 1.37/64" | 45,55 | 20 1260N 054 | 54 | 2.1/8" | 36,85 |
| 20 1260N 014 | 14 | 35/64" | 17,05 | 20 1260N 027 | 27 | 1.1/16" | 26,40 | 20 1260N 041 | 41 | 1.39/64" | 45,55 | 20 1260N 055 | 55 | 2.11/64" | 77,35 |
| 20 1260N 015 | 15 | 19/32" | 17,05 | 20 1260N 028 | 28 | 1.7/64" | 28,45 | 20 1260N 042 | 42 | 1.21/32" | 49,20 | 20 1260N 056 | 56 | 2.13/64" | 39,10 |
| 20 1260N 016 | 16 | 5/8" | 18,35 | 20 1260N 029 | 29 | 1.9/64" | 28,45 | 20 1260N 043 | 43 | 1.11/16" | 49,20 | 20 1260N 057 | 57 | 2.1/4" | 40,45 |
| 20 1260N 017 | 17 | 43/64" | 18,35 | 20 1260N 030 | 30 | 1.3/16" | 29,80 | 20 1260N 044 | 44 | 1.47/64" | 54,00 | 20 1260N 058 | 58 | 2.9/32" | 41,50 |
| 20 1260N 018 | 18 | 45/64" | 19,20 | 20 1260N 031 | 31 | 1.7/32" | 29,80 | 20 1260N 045 | 45 | 1.49/64" | 54,00 | 20 1260N 059 | 59 | 2.21/64" | 42,80 |
| 20 1260N 019 | 19 | 3/4" | 19,20 | 20 1260N 032 | 32 | 1.17/64" | 31,15 | 20 1260N 046 | 46 | 1.13/16" | 58,05 | 20 1260N 060 | 60 | 2.23/64" | 90,40 |
| 20 1260N 0195 | 19,5 | 49/64" | 9,15 | 20 1260N 033 | 33 | 1.19/64" | 31,15 | 20 1260N 047 | 47 | 1.27/32" | 58,05 | | | | |
| 20 1260N 020 | 20 | 25/32" | 20,20 | 20 1260N 034 | 34 | 1.11/32" | 32,85 | 20 1260N 048 | 48 | 1.57/64" | 61,25 | | | | |
| 20 1260N 021 | 21 | 53/64" | 20,20 | 20 1260N 035 | 35 | 1.3/8" | 32,85 | 20 1260N 049 | 49 | 1.59/64" | 61,25 | | | | |
| 20 1260N 022 | 22 | 55/64" | 24,00 | 20 1260N 036 | 36 | 1.27/64" | 37,25 | 20 1260N 050 | 50 | 1.31/32" | 65,45 | | | | |
| 20 1260N 023 | 23 | 29/32" | 24,00 | 20 1260N 037 | 37 | 1.29/64" | 38,70 | 20 1260N 051 | 51 | 2.1/64" | 31,90 | | | | |

Größere Ø bis 100 mm siehe Art. 20 1130A + Adapter Seite 575 / 577 ·

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Larger Ø up to 100 mm see Art. 20 1130A + adapter page 575 / 577 ·

Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1260N

GOLD-DRILL LINE / 30

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



20 1261
€ 6,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1260N

GOLD-DRILL LINE / 30

SETS / DISPLAYS Seite / Page 554

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1260N GOLD-DRILL LINE30 – siehe Seite 554. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.

We offer a large selection of sets / displays – recommended content 20 1260N GOLD-DRILL LINE30 – see page 554. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



1296

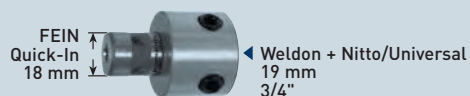
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Zubehör für HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 30 mm
 Accessories for HSS-XE annular cutter, Nitto/Universal shank, drill depth 30 mm | 1"

GOLD-DRILL LINE / 30

20 1260N

**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**



20 1263
 € 17,50



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1271
 € 7,65



21 0048
 € 14,15

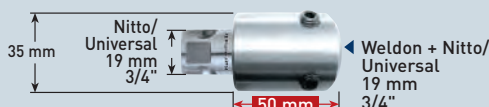


Packnorm 2 Stk. - Packaging unit 2 pcs.

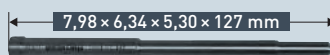
20 1261
 € 6,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

**VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
 EXTENSIONS + SUITABLE EJECTOR PINS**



20 1406
 € 22,10

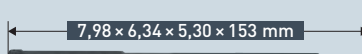


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1433
 € 15,70



20 1407
 € 24,40

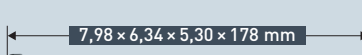


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1396
 € 16,45



20 1409
 € 29,05



Packnorm 2 Stk. - Packaging unit 2 pcs.

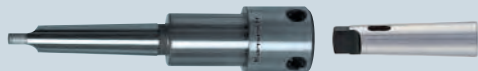
20 1411
 € 17,05

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

ZUBEHÖR • SETS • DISPLAYS • ERSATZTEILE / ACCESSORIES • SETS • DISPLAYS • SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves

521-523



Kühlmittel-Druckflaschen
 Coolant pressure bottles

528



Kegelsenker mit Weldonschaft
 Countersinks with Weldon shank

524/525



Magnetstab zur Entfernung der Bohrspäne
 Magnetic stick for chip removal

529



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm

622



Sets • Displays
 Sets • Displays

534-561



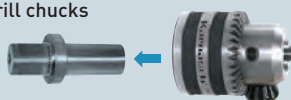
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30
 Tapping adapter Weldon + taps M 3 - M 30

623-624



Adapter + passende Bohrfutter
 Adapters + suitable drill chucks

528



Ersatzteile
 Spare parts

530-532



20 1270N

GOLD-DRILL LINE / 55

HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 55 mm
HSS-XE annular cutter, Nitto/Universal shank, drill depth 55 mm | 2"



ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € |
|---------------|------|--------|-------|--------------|------|----------|-------|--------------|------|----------|-------|--------------|------|----------|--------|
| 20 1270N 012 | 12 | 15/32" | 21,00 | 20 1270N 023 | 23 | 29/32" | 28,45 | 20 1270N 037 | 37 | 1.29/64" | 48,75 | 20 1270N 051 | 51 | 2.1/64" | 86,15 |
| 20 1270N 013 | 13 | 33/64" | 21,00 | 20 1270N 024 | 24 | 15/16" | 30,10 | 20 1270N 038 | 38 | 1.1/2" | 51,75 | 20 1270N 052 | 52 | 2.3/64" | 90,25 |
| 20 1270N 0135 | 13,5 | 17/32" | 9,90 | 20 1270N 025 | 25 | 63/64" | 30,10 | 20 1270N 039 | 39 | 1.17/32" | 51,75 | 20 1270N 053 | 53 | 2.3/32" | 93,15 |
| 20 1270N 014 | 14 | 35/64" | 21,65 | 20 1270N 026 | 26 | 1.1/32" | 31,70 | 20 1270N 040 | 40 | 1.37/64" | 56,60 | 20 1270N 054 | 54 | 2.1/8" | 96,20 |
| 20 1270N 015 | 15 | 19/32" | 21,65 | 20 1270N 027 | 27 | 1.1/16" | 31,75 | 20 1270N 041 | 41 | 1.39/64" | 56,60 | 20 1270N 055 | 55 | 2.11/64" | 98,85 |
| 20 1270N 0155 | 15,5 | 39/64" | 10,55 | 20 1270N 028 | 28 | 1.7/64" | 34,55 | 20 1270N 042 | 42 | 1.21/32" | 61,20 | 20 1270N 056 | 56 | 2.13/64" | 101,85 |
| 20 1270N 016 | 16 | 5/8" | 23,10 | 20 1270N 029 | 29 | 1.9/64" | 34,55 | 20 1270N 043 | 43 | 1.11/16" | 61,20 | 20 1270N 057 | 57 | 2.1/4" | 104,30 |
| 20 1270N 017 | 17 | 43/64" | 23,10 | 20 1270N 030 | 30 | 1.3/16" | 36,30 | 20 1270N 044 | 44 | 1.47/64" | 67,25 | 20 1270N 058 | 58 | 2.9/32" | 107,15 |
| 20 1270N 0175 | 17,5 | 11/16" | 10,95 | 20 1270N 031 | 31 | 1.7/32" | 36,30 | 20 1270N 045 | 45 | 1.49/64" | 67,25 | 20 1270N 059 | 59 | 2.21/64" | 109,60 |
| 20 1270N 018 | 18 | 45/64" | 24,00 | 20 1270N 032 | 32 | 1.17/64" | 38,85 | 20 1270N 046 | 46 | 1.13/16" | 72,30 | 20 1270N 060 | 60 | 2.23/64" | 112,70 |
| 20 1270N 019 | 19 | 3/4" | 24,00 | 20 1270N 033 | 33 | 1.19/64" | 38,85 | 20 1270N 047 | 47 | 1.27/32" | 72,30 | | | | |
| 20 1270N 020 | 20 | 25/32" | 25,00 | 20 1270N 034 | 34 | 1.11/32" | 41,45 | 20 1270N 048 | 48 | 1.57/64" | 76,30 | | | | |
| 20 1270N 021 | 21 | 53/64" | 25,00 | 20 1270N 035 | 35 | 1.3/8" | 41,45 | 20 1270N 049 | 49 | 1.59/64" | 76,30 | | | | |
| 20 1270N 022 | 22 | 55/64" | 28,45 | 20 1270N 036 | 36 | 1.27/64" | 46,90 | 20 1270N 050 | 50 | 1.31/32" | 86,15 | | | | |

Größere Ø bis 100 mm siehe Art. 20 1141A + Adapter Seite 579 / 581 ·
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Larger Ø up to 100 mm see Art. 20 1141A + adapter page 579 / 581 ·
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1270N

GOLD-DRILL LINE / 55

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



20 1271
€ 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1270N

GOLD-DRILL LINE / 55

SETS / DISPLAYS Seite / Page 555

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1270N GOLD-DRILL LINE55 – siehe Seite 555. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1270N GOLD-DRILL LINE55 – see page 555. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



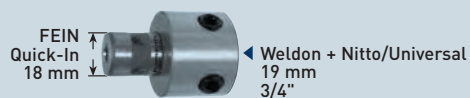
1296

Zubehör für HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 55 mm
Accessories for HSS-XE annular cutter, Nitto/Universal shank, drill depth 55 mm | 2"

GOLD-DRILL LINE 55

20 1270N

**ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS**



20 1263
€ 17,50



20 1160
€ 9,20

Packnorm 2 Stk. · Packaging unit 2 pcs.



21 0048
€ 14,15



20 1271
€ 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
Spare allen screws for all adapters see page 530

**VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS**



20 1406
€ 22,10

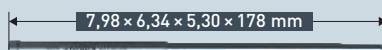


20 1396
€ 16,45

Packnorm 2 Stk. · Packaging unit 2 pcs.

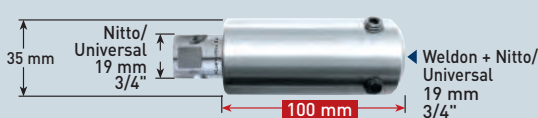


20 1407
€ 24,40



20 1411
€ 17,05

Packnorm 2 Stk. · Packaging unit 2 pcs.



20 1409
€ 29,05



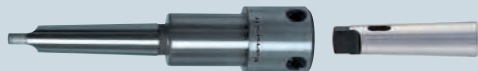
20 1426
€ 18,35

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
Spare allen screws for all extensions see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
Coolant pressure bottles



Kegelsenker mit Weldonschaft 524/525
Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



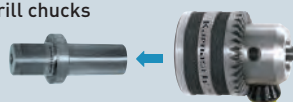
Sets · Displays 534-561
Sets · Displays



Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
Adapters + suitable drill chucks



Ersatzteile 530-532
Spare parts



20 1285N

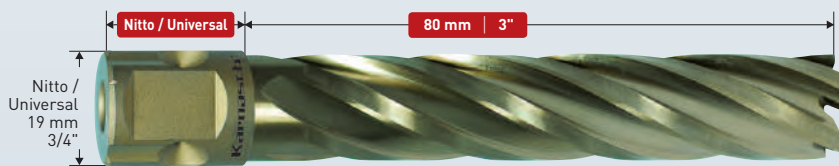
GOLD-DRILL LINE / 80

HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 80 mm
HSS-XE annular cutter, Nitto/Universal shank, drill depth 80 mm | 3"



ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|--------|
| 20 1285N 018 | 18 | 45/64" | 38,10 | 20 1285N 024 | 24 | 15/16" | 47,75 | 20 1285N 030 | 30 | 1.3/16" | 56,60 | 20 1285N 040 | 40 | 1.37/64" | 83,30 |
| 20 1285N 019 | 19 | 3/4" | 38,10 | 20 1285N 025 | 25 | 63/64" | 47,75 | 20 1285N 032 | 32 | 1.17/64" | 60,55 | 20 1285N 045 | 45 | 1.49/64" | 48,25 |
| 20 1285N 020 | 20 | 25/32" | 39,70 | 20 1285N 026 | 26 | 1.1/32" | 49,45 | 20 1285N 033 | 33 | 1.19/64" | 29,55 | 20 1285N 050 | 50 | 1.31/32" | 126,80 |
| 20 1285N 021 | 21 | 53/64" | 39,70 | 20 1285N 027 | 27 | 1.1/16" | 49,45 | 20 1285N 035 | 35 | 1.3/8" | 63,40 | | | | |
| 20 1285N 022 | 22 | 55/64" | 45,15 | 20 1285N 028 | 28 | 1.7/64" | 53,85 | 20 1285N 036 | 36 | 1.27/64" | 35,00 | | | | |
| 20 1285N 023 | 23 | 29/32" | 22,00 | 20 1285N 029 | 29 | 1.9/64" | 53,85 | 20 1285N 038 | 38 | 1.1/2" | 37,15 | | | | |

Kleinere Ø ab 14 mm siehe Art. 20 1650N Seite 444 ·
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Smaller Ø from 14 mm see Art. 20 1650N page 444 ·
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1285N

GOLD-DRILL LINE / 80

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE 1-TEILIG · EJECTOR PINS 1-PIECE



20 1439
€ 13,05

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522–523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522–523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

Packnorm 2 Stk. · Packaging unit 2 pcs.

AUSWERFERSTIFTE 2-TEILIG
EJECTOR PINS 2-PIECE



20 1427
€ 22,10

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG
APPLICATION EJECTOR PINS 2-PIECE



Anwendung:
Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:
Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

Packnorm 2 Stk. · Packaging unit 2 pcs.

- ☛ Warum 2-teilige Auswerferstifte? In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn keine extra langen Aufnahmehalter verwendet werden (wie auf Seite 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.
- ☛ Why use 2-part ejector pins? Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If no extra-long holders are used (e.g. as on page 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Schnittdaten
Cutting data

Film
Movie



1296

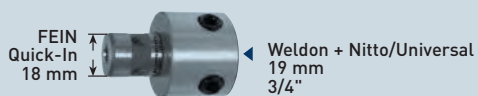


Zubehör für HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 80 mm
 Accessories for HSS-XE annular cutter, Nitto/Universal shank, drill depth 80 mm | 3"

GOLD-DRILL LINE 80

20 1285N

**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**



20 1161
 € 17,45



20 1436
 € 25,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

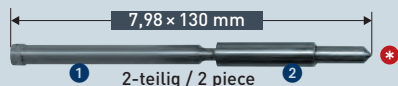


21 0048
 € 14,15



20 1439
 € 13,05

Packnorm 2 Stk. · Packaging unit 2 pcs.



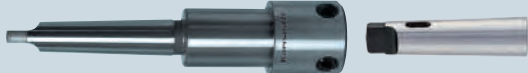
20 1427
 € 22,10

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



Kegelsenker mit Weldonchaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



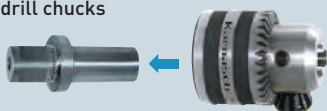
Sets · Displays 534-561
 Sets · Displays



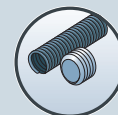
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts



20 1280N

GOLD-DRILL LINE / 110

HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 110 mm
HSS-XE annular cutter, Nitto/Universal shank, drill depth 110 mm | 4"



ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|--------|--------------|------|-------------|--------|
| 20 1280N 018 | 18 | 45/64" | 48,45 | 20 1280N 024 | 24 | 15/16" | 57,65 | 20 1280N 030 | 30 | 1.3/16" | 73,00 | 20 1280N 040 | 40 | 1.37/64" | 114,85 |
| 20 1280N 019 | 19 | 3/4" | 49,65 | 20 1280N 025 | 25 | 63/64" | 59,00 | 20 1280N 032 | 32 | 1.17/64" | 81,30 | 20 1280N 045 | 45 | 1.49/64" | 135,25 |
| 20 1280N 020 | 20 | 25/32" | 50,45 | 20 1280N 026 | 26 | 1.1/32" | 64,95 | 20 1280N 033 | 33 | 1.19/64" | 83,05 | 20 1280N 050 | 50 | 1.31/32" | 165,85 |
| 20 1280N 021 | 21 | 53/64" | 53,95 | 20 1280N 027 | 27 | 1.1/16" | 66,30 | 20 1280N 035 | 35 | 1.3/8" | 86,80 | | | | |
| 20 1280N 022 | 22 | 55/64" | 55,15 | 20 1280N 028 | 28 | 1.7/64" | 68,25 | 20 1280N 036 | 36 | 1.27/64" | 96,80 | | | | |
| 20 1280N 023 | 23 | 29/32" | 56,30 | 20 1280N 029 | 29 | 1.9/64" | 70,25 | 20 1280N 038 | 38 | 1.1/2" | 104,05 | | | | |

Kleinere Ø ab 14 mm siehe Art. 20 1660N Seite 444 · **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmesser.
Smaller Ø from 14 mm see Art. 20 1660N page 444 · **Attention:** The inch sizes do not correspond exactly to the mm diameters.

20 1280N

GOLD-DRILL LINE / 110

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE 1-TEILIG · EJECTOR PINS 1-PIECE

20 1399
• € 14,30

1-teilig / 1 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522-523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522-523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

AUSWERFERSTIFTE 2-TEILIG
EJECTOR PINS 2-PIECE

20 1428
• € 24,80

2-teilig / 2 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG
APPLICATION EJECTOR PINS 2-PIECE



Anwendung:
Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:
Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

• **Warum 2-teilige Auswerferstifte?** In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn **keine extra langen** Aufnahmehalter verwendet werden (wie auf Seite 522-523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

• **Why use 2-part ejector pins?** Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If **no extra-long** holders are used (e.g. as on page 522-523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Schnittdaten
Cutting data

Film
Movie



1296



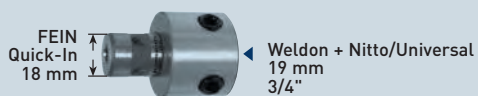
Index

Zubehör für HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 110 mm
 Accessories for HSS-XE annular cutter, Nitto/Universal shank, drill depth 110 mm | 4"

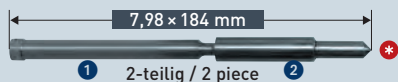
GOLD-DRILL LINE 110

20 1280N

**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**



20 1161
 € 17,45



20 1438
 € 28,40

Packnorm 2 Stk. · Packaging unit 2 pcs.

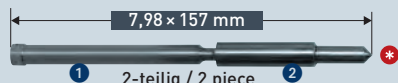


21 0048
 € 14,15



20 1399
 € 14,30

Packnorm 2 Stk. · Packaging unit 2 pcs.



20 1428
 € 24,80

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



Kegelsenker mit Weldonchaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



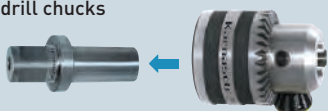
Sets · Displays 534-561
 Sets · Displays



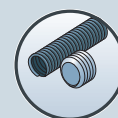
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts



20 1610

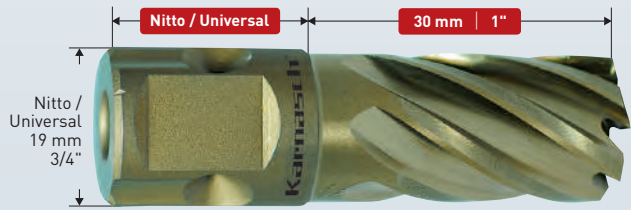
GOLD-DRILL LINE
ZOLL / INCH 30

HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 30 mm
HSS-XE annular cutter, Nitto/Universal shank, drill depth 30 mm | 1"



ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|------------|-------|-------------|-------|------------|-------|-------------|-------|
| • 7/16" | 11,10 | 20 1610 005 | 16,75 | • 15/16" | 23,81 | 20 1610 045 | 24,90 | • 1.7/16" | 36,51 | 20 1610 085 | 38,75 | • 1.15/16" | 49,21 | 20 1610 125 | 61,30 |
| • 1/2" | 12,70 | 20 1610 010 | 16,75 | • 1" | 25,40 | 20 1610 050 | 24,90 | • 1.1/2" | 38,10 | 20 1610 090 | 41,55 | • 2" | 50,80 | 20 1610 130 | 65,45 |
| • 9/16" | 14,28 | 20 1610 015 | 17,05 | • 1.1/16" | 26,98 | 20 1610 055 | 26,45 | • 1.9/16" | 39,68 | 20 1610 095 | 45,60 | • 2.1/16" | 52,38 | 20 1610 135 | 69,70 |
| • 5/8" | 15,87 | 20 1610 020 | 18,35 | • 1.1/8" | 28,57 | 20 1610 060 | 28,45 | • 1.5/8" | 41,27 | 20 1610 100 | 45,60 | | | | |
| • 11/16" | 17,46 | 20 1610 025 | 18,35 | • 1.3/16" | 30,13 | 20 1610 065 | 29,85 | • 1.11/16" | 42,86 | 20 1610 105 | 49,20 | | | | |
| • 3/4" | 19,04 | 20 1610 030 | 19,20 | • 1.1/4" | 31,75 | 20 1610 070 | 31,15 | • 1.3/4" | 44,45 | 20 1610 110 | 54,00 | | | | |
| • 13/16" | 20,63 | 20 1610 035 | 20,25 | • 1.5/16" | 33,33 | 20 1610 075 | 31,15 | • 1.13/16" | 46,03 | 20 1610 115 | 58,05 | | | | |
| • 7/8" | 22,22 | 20 1610 040 | 24,05 | • 1.3/8" | 34,92 | 20 1610 080 | 32,85 | • 1.7/8" | 47,62 | 20 1610 120 | 61,30 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1610

GOLD-DRILL LINE
ZOLL / INCH 30

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS

4,74 x 77 mm
 • **Ø 7/16"** **20 1482**
 • € 6,95
 Packnorm 2 Stk. · Packaging unit 2 pcs.

6,34 x 77 mm
 • **Ø 1/2" - 2.1/16"** **20 1261**
 • € 6,65
 Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1610

GOLD-DRILL LINE
ZOLL / INCH 30

SETS / DISPLAYS Seite / Page 556

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1610 GOLD-DRILL LINE30 – siehe Seite 556. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1610 GOLD-DRILL LINE30 – see page 556. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie

1296

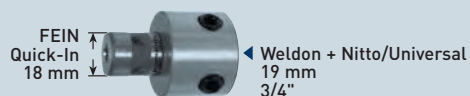
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Zubehör für HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 30 mm
 Accessories for HSS-XE annular cutter, Nitto/Universal shank, drill depth 30 mm | 1"

GOLD-DRILL LINE 30
ZOLL / INCH

20 1610

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS



20 1263
 € 17,50



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1271
 € 7,65



21 0048
 € 14,15



Packnorm 2 Stk. - Packaging unit 2 pcs.

Ø 7/16" 20 1482
 € 6,95

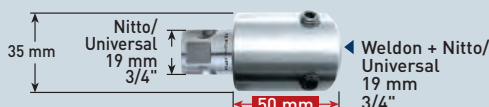


Packnorm 2 Stk. - Packaging unit 2 pcs.

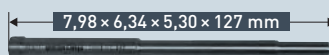
Ø 1/2" - 2.1/16" 20 1261
 € 6,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS



20 1406
 € 22,10

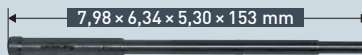


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1433
 € 15,70



20 1407
 € 24,40

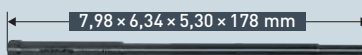


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1396
 € 16,45



20 1409
 € 29,05



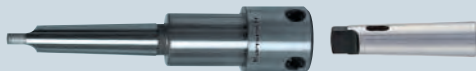
Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1411
 € 17,05

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

ZUBEHÖR • SETS • DISPLAYS • ERSATZTEILE / ACCESSORIES • SETS • DISPLAYS • SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



Kegelsenker mit Weldonschaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 4-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 4-12 mm



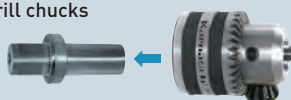
Sets • Displays 534-561
 Sets • Displays



Gewindeadapter Weldon + Gewindebohrer M 6 - M 30 623-624
 Tapping adapter Weldon + taps M 6 - M 30



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts



20 1620

GOLD-DRILL LINE
ZOLL / INCH 55

HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 55 mm
HSS-XE annular cutter, Nitto/Universal shank, drill depth 55 mm | 2"



ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|------------|-------|-------------|-------|------------|-------|-------------|-------|
| • 7/16" | 11,10 | 20 1620 005 | 21,00 | • 15/16" | 23,81 | 20 1620 045 | 30,10 | • 1.7/16" | 36,51 | 20 1620 085 | 48,80 | • 1.15/16" | 49,21 | 20 1620 125 | 76,35 |
| • 1/2" | 12,70 | 20 1620 010 | 21,00 | • 1" | 25,40 | 20 1620 050 | 30,10 | • 1.1/2" | 38,10 | 20 1620 090 | 51,80 | • 2" | 50,80 | 20 1620 130 | 86,15 |
| • 9/16" | 14,28 | 20 1620 015 | 21,65 | • 1.1/16" | 26,98 | 20 1620 055 | 31,75 | • 1.9/16" | 39,68 | 20 1620 095 | 56,65 | • 2.1/16" | 52,38 | 20 1620 135 | 88,55 |
| • 5/8" | 15,87 | 20 1620 020 | 23,10 | • 1.1/8" | 28,57 | 20 1620 060 | 34,60 | • 1.5/8" | 41,27 | 20 1620 100 | 56,65 | | | | |
| • 11/16" | 17,46 | 20 1620 025 | 23,10 | • 1.3/16" | 30,13 | 20 1620 065 | 36,30 | • 1.11/16" | 42,86 | 20 1620 105 | 61,20 | | | | |
| • 3/4" | 19,04 | 20 1620 030 | 24,05 | • 1.1/4" | 31,75 | 20 1620 070 | 38,85 | • 1.3/4" | 44,45 | 20 1620 110 | 67,25 | | | | |
| • 13/16" | 20,63 | 20 1620 035 | 25,05 | • 1.5/16" | 33,33 | 20 1620 075 | 38,85 | • 1.13/16" | 46,03 | 20 1620 115 | 72,30 | | | | |
| • 7/8" | 22,22 | 20 1620 040 | 28,45 | • 1.3/8" | 34,92 | 20 1620 080 | 41,45 | • 1.7/8" | 47,62 | 20 1620 120 | 76,35 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1620

GOLD-DRILL LINE
ZOLL / INCH 55

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE · EJECTOR PINS

Ø 7/16" **20 1485**
• € 8,00
Packnorm 2 Stk. · Packaging unit 2 pcs.

Ø 1/2" - 2.1/16" **20 1271**
• € 7,65
Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1620

GOLD-DRILL LINE
ZOLL / INCH 55

SETS / DISPLAYS Seite / Page 557

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1620 GOLD-DRILL LINE55 – siehe Seite 557. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1620 GOLD-DRILL LINE55 – see page 557. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



1296

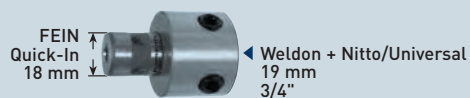
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Zubehör für HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 55 mm
 Accessories for HSS-XE annular cutter, Nitto/Universal shank, drill depth 55 mm | 2"

GOLD-DRILL LINE 55
ZOLL / INCH

20 1620

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS



20 1263
 € 17,50



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1160
 € 9,20



21 0048
 € 14,15



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1485
 € 8,00



Packnorm 2 Stk. - Packaging unit 2 pcs.

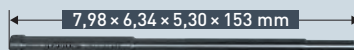
20 1271
 € 7,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS



20 1406
 € 22,10

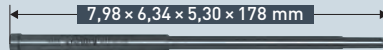


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1396
 € 16,45



20 1407
 € 24,40



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1411
 € 17,05



20 1409
 € 29,05



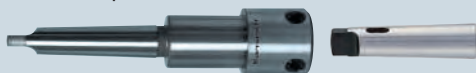
Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1426
 € 18,35

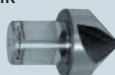
Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

ZUBEHÖR • SETS • DISPLAYS • ERSATZTEILE / ACCESSORIES • SETS • DISPLAYS • SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kegelsenker mit Weldonschaft 524/525
 Countersinks with Weldon shank



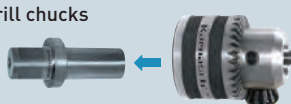
Spiralbohradapter Weldon + Spiralbohrer Ø 4-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 4-12 mm



Gewindeadapter Weldon + Gewindebohrer M 6 - M 30 623-624
 Tapping adapter Weldon + taps M 6 - M 30



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



Sets • Displays 534-561
 Sets • Displays



Ersatzteile 530-532
 Spare parts



20 1625

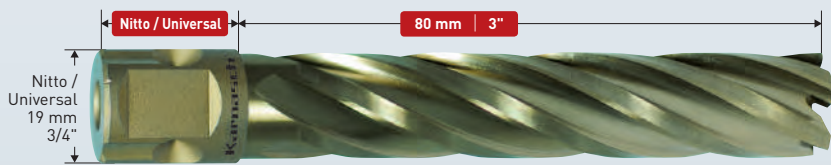
GOLD-DRILL LINE
ZOLL / INCH 80

HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 80 mm
HSS-XE annular cutter, Nitto/Universal shank, drill depth 80 mm | 3"



ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|-----------|-------|-------------|-------|-----------|-------|-------------|-------|
| 11/16" | 17,46 | 20 1625 025 | 18,60 | 1.1/16" | 26,98 | 20 1625 055 | 24,10 | 1.7/16" | 36,51 | 20 1625 085 | 35,00 | 1.13/16" | 46,03 | 20 1625 115 | 51,45 |
| 3/4" | 19,04 | 20 1625 030 | 18,60 | 1.1/8" | 28,57 | 20 1625 060 | 26,25 | 1.1/2" | 38,10 | 20 1625 090 | 37,15 | 1.7/8" | 47,62 | 20 1625 120 | 55,00 |
| 13/16" | 20,63 | 20 1625 035 | 19,35 | 1.3/16" | 30,13 | 20 1625 065 | 27,60 | 1.9/16" | 39,68 | 20 1625 095 | 40,60 | 1.15/16" | 49,21 | 20 1625 125 | 57,95 |
| 7/8" | 22,22 | 20 1625 040 | 22,00 | 1.1/4" | 31,75 | 20 1625 070 | 29,55 | 1.5/8" | 41,27 | 20 1625 100 | 40,60 | 2" | 50,80 | 20 1625 130 | 61,80 |
| 15/16" | 23,81 | 20 1625 045 | 23,30 | 1.5/16" | 33,33 | 20 1625 075 | 29,55 | 1.11/16" | 42,86 | 20 1625 105 | 43,70 | 2.1/16" | 52,38 | 20 1625 135 | 63,00 |
| 1" | 25,40 | 20 1625 050 | 24,10 | 1.3/8" | 34,92 | 20 1625 080 | 30,90 | 1.3/4" | 44,45 | 20 1625 110 | 48,25 | | | | |

Ersatzartikel siehe Art. 20 1925 Seite 418 mit passendem Adapter Art. 20 1314 + Auswerferstift Art. 20 1436, Seite 419 · **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Replacement article Art. 20 1925 page 418 with suitable adapter Art. 20 1314 + ejector pin Art. 20 1436, page 419 · **Attention:** The inch sizes do not correspond exactly to the mm diameters.

20 1625

GOLD-DRILL LINE
ZOLL / INCH 80

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE 1-TEILIG · EJECTOR PINS 1-PIECE

20 1439
€ 13,05



1-teilig / 1 piece

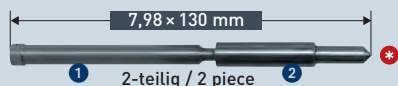
Packnorm 2 Stk. · Packaging unit 2 pcs.

Zusammen mit Aufnahmehalter 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (siehe Seite 522–523) kann dieser einteilige Auswerferstift verwendet werden. Es kann ohne Umstecken bis 110 mm Schnitttiefe in einem Arbeitsgang gebohrt werden. Robust und einfach.

It is possible to use this one-piece ejector pin in combination with tool holder article 20 1842, 20 1291, 20 1843, 20 1845, 20 1846 (see page 522–523). You can drill as deep as 110 mm in one working process without changing. Robust and easy.

AUSWERFERSTIFTE 2-TEILIG
EJECTOR PINS 2-PIECE

20 1427
€ 22,10



2-teilig / 2 piece

Packnorm 2 Stk. · Packaging unit 2 pcs.

ANWENDUNG AUSWERFERSTIFTE 2-TEILIG
APPLICATION EJECTOR PINS 2-PIECE



Anwendung:

Teil 1 in den Schaft des Kernbohrers einführen. Teil 2 auf Teil 1 schieben. Bohren Sie bis ca. 50 mm Schnitttiefe. Danach Teil 2 entfernen und weiter bohren.

Application:

Insert piece 1 into the annular cutter shank. Push piece 2 onto part 1. Drill as deep as 50 mm cutting depth. Then remove piece 2 and continue drilling.

* **Warum 2-teilige Auswerferstifte?** In der Regel haben Standard Morsekonus-Aufnahmehalter eine Schnitttiefenkapazität von 50 mm. Wenn **keine extra langen** Aufnahmehalter verwendet werden (wie auf Seite 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), müssen bei Schnitttiefen über 50 mm 2-teilige Auswerferstifte verwendet werden.

* **Why use 2-part ejector pins?** Usually, standard morse taper holders have a cutting depth capacity of 50 mm. If **no extra-long** holders are used (e.g. as on page 522–523 Art. 20 1842, 20 1291, 20 1843, 20 1845, 20 1846), you need for drill depths above 50 mm 2-part ejector pins.

Schnittdaten

Film Movie



1296

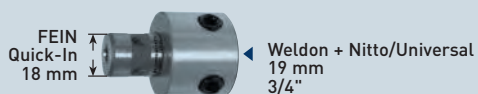


Zubehör für HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 80 mm
 Accessories for HSS-XE annular cutter, Nitto/Universal shank, drill depth 80 mm | 3"

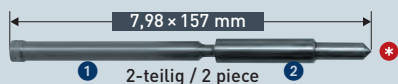
GOLD-DRILL LINE 80
ZOLL / INCH

20 1625

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS



20 1161
 € 17,45

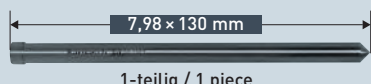


20 1436
 € 25,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

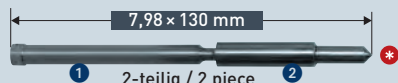


21 0048
 € 14,15



20 1439
 € 13,05

Packnorm 2 Stk. · Packaging unit 2 pcs.



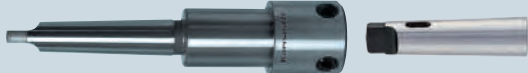
20 1427
 € 22,10

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen 521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves



Kühlmittel-Druckflaschen 528
 Coolant pressure bottles



Kegelsenker mit Weldonchaft 524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne 529
 Magnetic stick for chip removal



Spiralbohradapter Weldon + Spiralbohrer Ø 2,5-12 mm 622
 Twist drill adaptors Weldon + twist drills Ø 2,5-12 mm



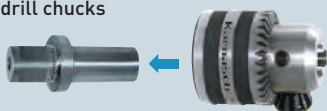
Sets · Displays 534-561
 Sets · Displays



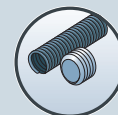
Gewindeadapter Weldon + Gewindebohrer M 3 - M 30 623-624
 Tapping adapter Weldon + taps M 3 - M 30



Adapter + passende Bohrfutter 528
 Adapters + suitable drill chucks



Ersatzteile 530-532
 Spare parts



20 1240

GOLD-DRILL LINE SANDWICH 30

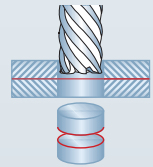
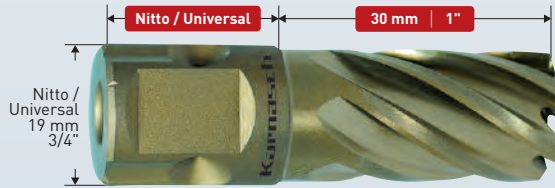
HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 30 mm
HSS-XE annular cutter, Nitto/Universal shank, drill depth 30 mm | 1"

20 1241

GOLD-DRILL LINE SANDWICH ZOLL / INCH 30

ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



Mehrschichtenbohrer. Spezialgeometrie zum Bohren übereinanderliegender Metallplatten bis 1100 N (Sandwich)
Multi layer drill. For stack drilling (sandwich) in steel until 1100 N

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 20 1240 016 | 16 | 5/8" | 9,90 | 20 1240 026 | 26 | 1.1/32" | 14,25 |
| 20 1240 019 | 19 | 3/4" | 10,35 | 20 1240 030 | 30 | 1.3/16" | 16,05 |
| 20 1240 020 | 20 | 25/32" | 10,90 | 20 1240 032 | 32 | 1.17/64" | 16,80 |
| 20 1240 022 | 22 | 55/64" | 12,95 | | | | |
| 20 1240 024 | 24 | 15/16" | 13,40 | | | | |
| 20 1240 025 | 25 | 63/64" | 13,40 | | | | |

| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|
| 5/8" | 15,87 | 20 1241 010 | 9,90 | 15/16" | 23,81 | 20 1241 035 | 13,40 |
| 3/4" | 19,04 | 20 1241 020 | 10,35 | 1.1/16" | 26,98 | 20 1241 045 | 14,25 |
| 13/16" | 20,63 | 20 1241 025 | 10,90 | | | | |
| 7/8" | 22,22 | 20 1241 030 | 12,95 | | | | |

⊗ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmesser.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1240

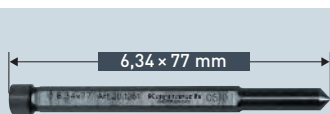
GOLD-DRILL LINE SANDWICH 30

20 1241

GOLD-DRILL LINE SANDWICH ZOLL / INCH 30

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



20 1261
€ 6,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

Schnittdaten
Cutting data

Film
Movie



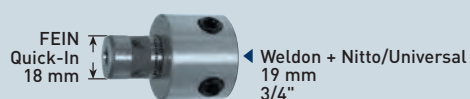
1296

Zubehör für HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 30 mm
 Accessories for HSS-XE annular cutter, Nitto/Universal shank, drill depth 30 mm | 1"

20 1240
GOLD-DRILL LINE
 SANDWICH **30**

20 1241
GOLD-DRILL LINE
 SANDWICH ZOLL / INCH **30**

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS



20 1263
 € 17,50



Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1271
 € 7,65



21 0048
 € 14,15

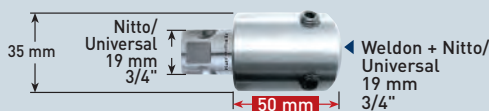


Packnorm 2 Stk. · Packaging unit 2 pcs.

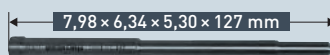
20 1261
 € 6,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS



20 1406
 € 22,10

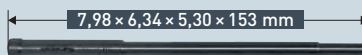


Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1433
 € 15,70

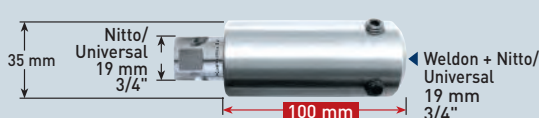


20 1407
 € 24,40



Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1396
 € 16,45



20 1409
 € 29,05




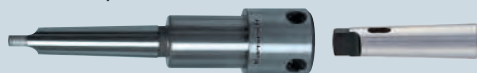
Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1411
 € 17,05

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

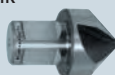
Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen  521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves




Kühlmittel-Druckflaschen  528
 Coolant pressure bottles




Kegelsenker mit Weldonschaft  524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne  529
 Magnetic stick for chip removal




Spiralbohradapter Weldon + Spiralbohrer Ø 4-12 mm  622
 Twist drill adaptors Weldon + twist drills Ø 4-12 mm



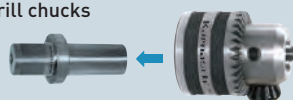
Sets · Displays  534-561
 Sets · Displays



Gewindeadapter Weldon + Gewindebohrer M 6 - M 30  623-624
 Tapping adapter Weldon + taps M 6 - M 30



Adapter + passende Bohrfutter  528
 Adapters + suitable drill chucks



Ersatzteile  530-532
 Spare parts



20 1242

GOLD-DRILL LINE SANDWICH 55

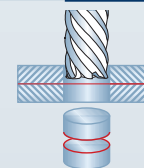
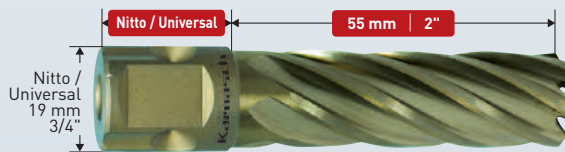
HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 55 mm
HSS-XE annular cutter, Nitto/Universal shank, drill depth 55 mm | 2"

20 1243

GOLD-DRILL LINE SANDWICH ZOLL / INCH 55

ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



Mehrschichtenbohrer. Spezialgeometrie zum Bohren übereinanderliegender Metallplatten bis 1100 N (Sandwich)
Multi layer drill. For stack drilling (sandwich) in steel until 1100 N

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 20 1242 014 | 14 | 35/64" | 12,10 | 20 1242 025 | 25 | 63/64" | 16,20 |
| 20 1242 016 | 16 | 5/8" | 12,45 | 20 1242 026 | 26 | 1.1/32" | 17,10 |
| 20 1242 019 | 19 | 3/4" | 12,95 | 20 1242 030 | 30 | 1.3/16" | 19,60 |
| 20 1242 020 | 20 | 25/32" | 13,50 | 20 1242 032 | 32 | 1.17/64" | 20,95 |
| 20 1242 022 | 22 | 55/64" | 15,35 | | | | |
| 20 1242 024 | 24 | 15/16" | 16,20 | | | | |

| Zoll/Inch | Ø mm | Art. | € | Zoll/Inch | Ø mm | Art. | € |
|-----------|-------|-------------|-------|-----------|-------|-------------|-------|
| 9/16" | 14,28 | 20 1243 005 | 12,10 | 7/8" | 22,22 | 20 1243 030 | 15,35 |
| 5/8" | 15,87 | 20 1243 010 | 12,45 | 15/16" | 23,81 | 20 1243 035 | 16,25 |
| 3/4" | 19,04 | 20 1243 020 | 12,95 | 1" | 25,40 | 20 1243 040 | 16,25 |
| 13/16" | 20,63 | 20 1243 025 | 13,50 | 1.1/16" | 26,98 | 20 1243 045 | 17,10 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmesser.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1242

GOLD-DRILL LINE SANDWICH 55

20 1243

GOLD-DRILL LINE SANDWICH ZOLL / INCH 55

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



20 1271
€ 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

Schnittdaten
Cutting data

Film
Movie



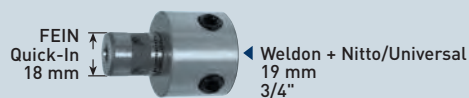
1296

Zubehör für HSS-XE Kernbohrer, Nitto/Universalschaft, Nutzlänge 55 mm
 Accessories for HSS-XE annular cutter, Nitto/Universal shank, drill depth 55 mm | 2"

20 1242
GOLD-DRILL LINE
 SANDWICH **55**

20 1243
GOLD-DRILL LINE
 SANDWICH ZOLL / INCH **55**

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS



20 1263
 € 17,50



Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1160
 € 9,20



21 0048
 € 14,15



Packnorm 2 Stk. · Packaging unit 2 pcs.

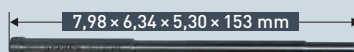
20 1271
 € 7,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS



20 1406
 € 22,10

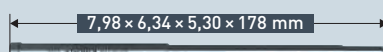


Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1396
 € 16,45

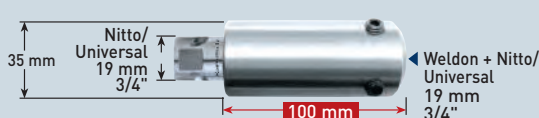


20 1407
 € 24,40



Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1411
 € 17,05



20 1409
 € 29,05




Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1426
 € 18,35

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

ZUBEHÖR · SETS · DISPLAYS · ERSATZTEILE / ACCESSORIES · SETS · DISPLAYS · SPARE PARTS

Aufnahmehalter mit Morsekonus 2 / 3 / 4 / 5 und Reduzierhülsen  521-523
 Tool holders with morse taper 2 / 3 / 4 / 5 and reduction sleeves




Kühlmittel-Druckflaschen  528
 Coolant pressure bottles




Kegelsenker mit Weldonschaft  524/525
 Countersinks with Weldon shank



Magnetstab zur Entfernung der Bohrspäne  529
 Magnetic stick for chip removal




Spiralbohradapter Weldon + Spiralbohrer Ø 4-12 mm  622
 Twist drill adaptors Weldon + twist drills Ø 4-12 mm



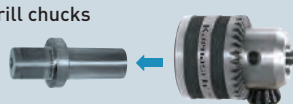
Sets · Displays  534-561
 Sets · Displays



Gewindeadapter Weldon + Gewindebohrer M 6 - M 30  623-624
 Tapping adapter Weldon + taps M 6 - M 30



Adapter + passende Bohrfutter  528
 Adapters + suitable drill chucks



Ersatzteile  530-532
 Spare parts



**KERNBOHRER FEIN QUICK-IN SCHAFT 18 MM /
FEIN QUICK-IN MAX-SCHAFT 32 MM**

**ANNULAR CUTTERS FEIN QUICK-IN SHANK 18 MM /
FEIN QUICK-IN MAX-SHANK 32 MM (1.1/4")**



Passende Kernbohrmaschinen von Fein:
Matching machines made by Fein:

















































FEIN TYPE: KBM 32 Q · KBM 50 Q · KBM 50 U · KBM 50 AUTO ·
KBM 65 U · KBM 80 QUICK-IN MAX

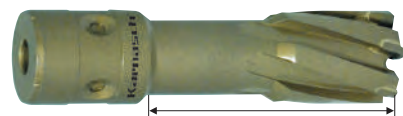
FEIN QUICK-IN



Übersicht Kernbohrer Fein Quick-In Schaft

Overview annular cutters Fein Quick-In shank

| TYPE | Ø | Beschreibung · Specification | Anwendung · Application | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|---|--|---|---|---|---|-----------|-----------|-----------------------|-------|-----------------------|-------|--------------------|----------------|-----------|--------------------|------------|-----------|---|------------|---|--|---|--|--|--|--------------|--------------|--|--|--|---------|
| HARD-LINE | Ø 12-65 mm Ø 15/32-2.9/16" | <p>Kernbohrer Hartmetall-bestückt Die leistungsstärksten Kernbohrer in unserem Sortiment. Exzellente für alle Stähle bis 1400 N Festigkeit sowie für alle Edelstähle.</p> <p>Annular cutters carbide-tipped The most powerful annular cutters in our range. Excellent for all steels up to a strength of 1400 N and for all stainless steels.</p> | <table border="1"> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Stahl</td> <td>Edelstahl</td> <td>Grauguss</td> <td>Alu</td> <td>Kupfer, Messing, Zinn</td> </tr> <tr> <td>Steel</td> <td>Stainless</td> <td>Grey cast iron</td> <td>Alu</td> <td>Copper, brass, tin</td> </tr> <tr> <td>< 1400 N ✓</td> <td>> 900 N ✓</td> <td>✓</td> <td>> 10% Si ✓</td> <td>✓</td> </tr> </table> |  |  |  |  |  | Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | < 1400 N ✓ | > 900 N ✓ | ✓ | > 10% Si ✓ | ✓ | 490-493 | | | | | | | | | | |
|  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| < 1400 N ✓ | > 900 N ✓ | ✓ | > 10% Si ✓ | ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BLUE-DRILL LINE | Ø 12-60 mm Ø 15/32-2.23/64" | <p>Kernbohrer aus HSS-XE Spezialstahl + DURABLU- Beschichtung. Der am meisten verwendete beschichtete Kernbohrer für alle Stähle bis 1100 N Festigkeit sowie für alle Edelstähle.</p> <p>Annular cutters made of HSS-XE special steel + DURABLU-coating. The most-often used coated annular cutter for all steels up to a strength of 1100 N and for all stainless steels.</p> | <table border="1"> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Stahl</td> <td>Edelstahl</td> <td>Grauguss</td> <td>Alu</td> <td>Kupfer, Messing, Zinn</td> </tr> <tr> <td>Steel</td> <td>Stainless</td> <td>Grey cast iron</td> <td>Alu</td> <td>Copper, brass, tin</td> </tr> <tr> <td>< 1100 N ✓</td> <td>< 900 N ✓</td> <td>✓</td> <td>> 10% Si ✓</td> <td>✓</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Hardox 400 ✓</td> <td>Hardox 450 ✓</td> <td></td> <td></td> <td></td> </tr> </table> |  |  |  |  |  | Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | < 1100 N ✓ | < 900 N ✓ | ✓ | > 10% Si ✓ | ✓ |  |  | | | | Hardox 400 ✓ | Hardox 450 ✓ | | | | 494-496 |
|  |  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| < 1100 N ✓ | < 900 N ✓ | ✓ | > 10% Si ✓ | ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hardox 400 ✓ | Hardox 450 ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GOLD-DRILL LINE | Ø 12-60 mm Ø 15/32-2.23/64" | <p>Kernbohrer aus HSS-XE Spezialstahl + GOLD-TECH-Behandlung. Der am meisten verwendete nicht beschichtete Kernbohrer für alle Stähle bis 900 N Festigkeit. Auch noch für Edelstahl geeignet.</p> <p>Annular cutters made of HSS-XE special steel + GOLD-TECH treatment. The most-often used uncoated annular cutter for all steels up to a strength of 900 N. Still suitable for stainless steels.</p> | <table border="1"> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Stahl</td> <td>Edelstahl</td> <td>Alu</td> <td>Kupfer, Messing, Zinn</td> </tr> <tr> <td>Steel</td> <td>Stainless</td> <td>Alu</td> <td>Copper, brass, tin</td> </tr> <tr> <td>< 900 N ✓</td> <td>< 900 N ✓</td> <td>< 10% Si ✓</td> <td>✓</td> </tr> </table> |  |  |  |  | Stahl | Edelstahl | Alu | Kupfer, Messing, Zinn | Steel | Stainless | Alu | Copper, brass, tin | < 900 N ✓ | < 900 N ✓ | < 10% Si ✓ | ✓ | 498-500 | | | | | | | | | | | | | | |
|  |  |  |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stahl | Edelstahl | Alu | Kupfer, Messing, Zinn | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Steel | Stainless | Alu | Copper, brass, tin | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| < 900 N ✓ | < 900 N ✓ | < 10% Si ✓ | ✓ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



40, 55 mm
1.1/2", 2"

Schnittiefen
Drill depths



40 mm
1.1/2"

Schnittiefen
Drill depths



40 mm
1.1/2"

Schnittiefen
Drill depths



HARTMETALL-BESTÜCKTE KERNBOHRER CARBIDE-TIPPED ANNULAR CUTTERS



HARD-LINE

Der beste Kernbohrer ist grundsätzlich Hartmetall-bestückt.

Nur diese Bohrer bieten das optimale Preis-Leistungs-Verhältnis für nahezu alle Materialien. Neben der höchsten Standzeit in allen Stählen bieten nur Hartmetall-bestückte Kernbohrer:

- Bohren in Stähle bis 40 Rockwell (HRC)
- Bohren in alle Edelstähle
- Bohren in schwierigste Legierungen (Hardox/Inconel/Titan)
- Bohren hervorragend auch in weiche Werkstoffe wie Alu, Kupfer, Messing u.ä.

Mit Durchmessern von 12-150 mm in Schnitttiefen von 40, 55, 80, 110 mm steht Ihnen weltweit das umfangreichste Lagerprogramm zur Verfügung.

The fact is: The best annular cutters are carbide tipped.

Only these drills offer the best value for money for almost all materials. Besides maximum cutting capacity in all kind of steels provide only carbide tipped annular cutters:

- Drilling in hardened steel up to 40 Rockwell (HRC)
- Drilling in all sorts of stainless steel
- Drilling in most difficult alloys (Hardox/Inconel/Titan)
- Drilling also excellent in all non-ferrous metals such as alu, copper, brass

Available in diameter 12-150 mm. Available in drill depths 40 mm, 55 mm, 80 mm and 110 mm. Simply the world's largest stock range of carbide tipped annular cutter.

EIGENSCHAFTEN · PROPERTIES



Karnasch Hartmetall-bestückte Kernbohrer (HARD-LINE) werden mit konischer Spirale gefertigt für: Sauberen Spanfluss und höchste Zerspanleistung auch bei schwierigen Materialien.

Karnasch carbide tipped annular cutters (HARD-LINE) are made with a conical helix for: clean chip flow and highest cutting ability even with difficult materials.



Karnasch Hartmetall-bestückte Kernbohrer (HARD-LINE) werden ausschließlich mit Sandvik Hartmetallzähnen bestückt. Wir meinen: Nur das beste Hartmetall ist gut genug für Karnasch Kernbohrer.

Karnasch carbide tipped annular cutters (HARD-LINE) are exclusively equipped with Sandvik carbide teeth. Our opinion is: Only the best carbide is good enough for Karnasch annular cutters.



Karnasch Hartmetall-bestückte Kernbohrer (HARD-LINE) sind in einer aufwendigen Vor-Mittel-Nachsneider-Geometrie gefertigt. Dies ergibt: ratterfreies, ruhiges und leichtes Zerspanen mit höchsten Standzeiten.

Karnasch carbide tipped annular cutters (HARD-LINE) are made in an elaborate pre-/intermediate-/after-cutting geometry. This results in: clatter-free, silent and easy cutting with highest lifetimes.

ANWENDUNG · APPLICATION

| | | | | | | | | |
|----------|-----------|----------|-----------------------|---------------------|----------------|----------|--|----------|
| | | | | | | | | |
| Stahl | Edelstahl | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Grauguss | Graphit | Hastelloy, Inconel, Nimonic, Exotische Materialien | Schienen |
| Steel | Stainless | Alu | Copper, brass, tin | Plastics GRP/CRP | Grey cast iron | Graphite | Hastelloy, Inconel, Nimonic, exotic materials | Rails |
| < 1400 N | > 900 N | > 10% Si | | | | | | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL · OPTIMAL

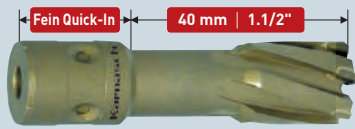
✓ GUT · GOOD

✓ MÖGLICH · POSSIBLE

HARTMETALL-BESTÜCKTE KERNBOHRER CARBIDE-TIPPED ANNULAR CUTTERS

HARD-LINE

Schnittiefe · Drill depths



| Ø mm | Ø Zoll/Inch | Art. / Type | |
|-------|----------------|--------------------------------|-----|
| 12-65 | 15/32-2.9/16" | 20 1147 HARD-LINE/40 | 492 |
| 12-60 | 15/32-2.23/64" | 20 1148 HARD-LINE/55 | 493 |

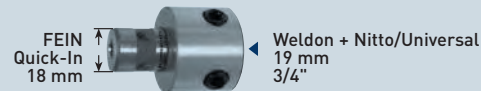
HINWEISE · NOTES

Sie benötigen größere Schnittiefen wie z. B. 80 mm oder 110 mm?

Arbeiten Sie mit Fein Adapter + Weldon Kernbohrer.
Siehe Art. 20 1650 (Schnittiefe 80 mm) Seite 370
Siehe Art. 20 1660 (Schnittiefe 110 mm) Seite 372

You need larger drill depths such as 80 mm or 110 mm?

Work with adapter Fein + Weldon annular cutters.
See Art. 20 1650 (cutting depth 80 mm) page 370
See Art. 20 1660 (cutting depth 110 mm) page 372



Packnorm 2 Stk.
Packaging unit 2 pcs.

Sie benötigen größere Durchmesser bis 100 mm?

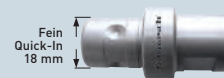
Arbeiten Sie mit Fein Quick-In und Fein Quick-In Max Adaptern + Power-Max Lochsagen siehe Seite 564

You need larger diameter up to 100 mm?

Work with adapter Fein Quick-In or Fein Quick-In Max + our Power-Max hole saws see page 564

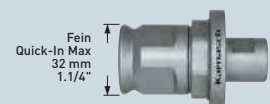
FEIN QUICK-IN 18 mm

Passend für Maschinen · Suitable for machines
FEIN KBM 32 Q · KBM 50 Q · KBM 50 U · KBM 50 Auto · KBM 65 U



FEIN QUICK-IN MAX 32 mm 1.1/4"

Für Fein Maschine · For Fein machine
FEIN KBM 80 Quick-In Max



DRILL-LINE 30 PRO



Adapter · Adapter

Sie benötigen kleinere Durchmesser wie:

6 mm, 8 mm, 9,8 mm, 10 mm, 11 mm?
Siehe Artikel 20 1430 Seite 430

You need smaller diameter such as:

6 mm, 8 mm, 9,8 mm, 10 mm, 11 mm?
See article 20 1430 page 430

1



2



3



4



5



6



7



8



9



Index

20 1147

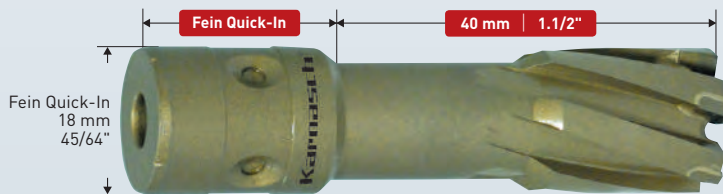
HARD-LINE/40

Hartmetall-bestückter Kernbohrer, Fein Quick-In Schaft, Nutzlänge 40 mm
Carbide-tipped annular cutter, Fein Quick-In shank, drill depth 40 mm | 1.1/2"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|-------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 20 1147 012 | 12 | 15/32" | 30,05 | 20 1147 026 | 26 | 1.1/32" | 33,60 | 20 1147 040 | 40 | 1.37/64" | 44,75 | 20 1147 054 | 54 | 2.1/8" | 69,70 |
| 20 1147 013 | 13 | 33/64" | 30,05 | 20 1147 027 | 27 | 1.1/16" | 33,65 | 20 1147 041 | 41 | 1.39/64" | 52,70 | 20 1147 055 | 55 | 2.11/64" | 71,00 |
| 20 1147 014 | 14 | 35/64" | 30,90 | 20 1147 028 | 28 | 1.7/64" | 33,65 | 20 1147 042 | 42 | 1.21/32" | 52,70 | 20 1147 056 | 56 | 2.13/64" | 73,30 |
| 20 1147 015 | 15 | 19/32" | 30,90 | 20 1147 029 | 29 | 1.9/64" | 33,65 | 20 1147 043 | 43 | 1.11/16" | 52,70 | 20 1147 057 | 57 | 2.1/4" | 74,85 |
| 20 1147 016 | 16 | 5/8" | 30,90 | 20 1147 030 | 30 | 1.3/16" | 33,65 | 20 1147 044 | 44 | 1.47/64" | 52,70 | 20 1147 058 | 58 | 2.9/32" | 76,25 |
| 20 1147 017 | 17 | 43/64" | 30,90 | 20 1147 031 | 31 | 1.7/32" | 39,55 | 20 1147 045 | 45 | 1.49/64" | 52,70 | 20 1147 059 | 59 | 2.21/64" | 77,40 |
| 20 1147 018 | 18 | 45/64" | 30,90 | 20 1147 032 | 32 | 1.17/64" | 39,55 | 20 1147 046 | 46 | 1.13/16" | 56,55 | 20 1147 060 | 60 | 2.23/64" | 78,85 |
| 20 1147 019 | 19 | 3/4" | 30,90 | 20 1147 033 | 33 | 1.19/64" | 39,55 | 20 1147 047 | 47 | 1.27/32" | 56,55 | 20 1147 061 | 61 | 2.13/32" | 80,95 |
| 20 1147 020 | 20 | 25/32" | 30,90 | 20 1147 034 | 34 | 1.11/32" | 39,55 | 20 1147 048 | 48 | 1.57/64" | 56,55 | 20 1147 062 | 62 | 2.7/16" | 83,75 |
| 20 1147 021 | 21 | 53/64" | 30,90 | 20 1147 035 | 35 | 1.3/8" | 39,55 | 20 1147 049 | 49 | 1.59/64" | 56,55 | 20 1147 063 | 63 | 2.31/64" | 86,80 |
| 20 1147 022 | 22 | 55/64" | 30,90 | 20 1147 036 | 36 | 1.27/64" | 44,70 | 20 1147 050 | 50 | 1.31/32" | 59,60 | 20 1147 064 | 64 | 2.33/64" | 89,30 |
| 20 1147 023 | 23 | 29/32" | 30,90 | 20 1147 037 | 37 | 1.29/64" | 44,75 | 20 1147 051 | 51 | 2.1/64" | 64,30 | 20 1147 065 | 65 | 2.9/16" | 91,90 |
| 20 1147 024 | 24 | 15/16" | 30,90 | 20 1147 038 | 38 | 1.1/2" | 44,75 | 20 1147 052 | 52 | 2.3/64" | 67,40 | | | | |
| 20 1147 025 | 25 | 63/64" | 30,90 | 20 1147 039 | 39 | 1.17/32" | 44,75 | 20 1147 053 | 53 | 2.3/32" | 67,40 | | | | |

Größere Ø Schnitttiefe 30 mm siehe Art. 20 1130A + Adapter Fein Seite 574-577 · Größere Ø Schnitttiefe 55 mm siehe Art. 20 1141 + Adapter Fein Seite 578-581 · Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Larger Ø in cutting depth 30 mm see Art. 20 1130A + adapter Fein page 574-577 · Larger Ø in cutting depth 55 mm see Art. 20 1141 + adapter Fein page 578-581 · Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1147

HARD-LINE/40

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS

Art. 20 1388
€ 10,05

Packnorm 2 Stk. · Packaging unit 2 pcs.

**ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS**

Weldon 19 mm 3/4" Fein Quick-In 18 mm

Art. 20 1385
€ 21,05

Art. 20 1318
€ 8,30

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weiteres Zubehör siehe Übersichtsseite 491
Further accessories see overview page 491

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
Spare allen screws for all adapters see page 530

20 1147

HARD-LINE/40

SETS / DISPLAYS Seite / Page 558

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1147 HARD-LINE40 – siehe Seite 558. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
We offer a large selection of sets / displays – recommended content 20 1147 HARD-LINE40 – see page 558. Other content possible by individually equipped sets / displays.



Schnittdaten Cutting data | Film Movie

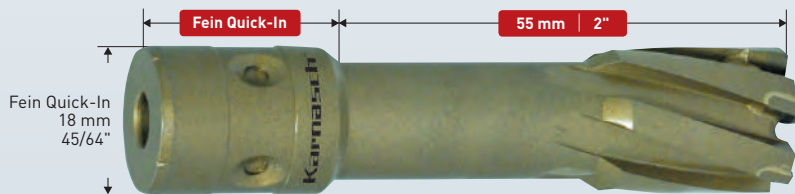
1295

Hartmetall-bestückter Kernbohrer, Fein Quick-In Schaft, Nutzlänge 55 mm
Carbide-tipped annular cutter, Fein Quick-In shank, drill depth 55 mm | 2"

HARD-LINE 55 20 1148

ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 20 1148 012 | 12 | 15/32" | 33,35 | 20 1148 026 | 26 | 1.1/32" | 37,30 |
| 20 1148 013 | 13 | 33/64" | 33,35 | 20 1148 027 | 27 | 1.1/16" | 37,35 |
| 20 1148 014 | 14 | 35/64" | 34,30 | 20 1148 028 | 28 | 1.7/64" | 37,35 |
| 20 1148 015 | 15 | 19/32" | 34,30 | 20 1148 029 | 29 | 1.9/64" | 37,35 |
| 20 1148 016 | 16 | 5/8" | 34,30 | 20 1148 030 | 30 | 1.3/16" | 37,35 |
| 20 1148 017 | 17 | 43/64" | 34,30 | 20 1148 031 | 31 | 1.7/32" | 43,90 |
| 20 1148 018 | 18 | 45/64" | 34,30 | 20 1148 032 | 32 | 1.17/64" | 43,90 |
| 20 1148 019 | 19 | 3/4" | 34,30 | 20 1148 033 | 33 | 1.19/64" | 43,90 |
| 20 1148 020 | 20 | 25/32" | 34,30 | 20 1148 034 | 34 | 1.11/32" | 43,90 |
| 20 1148 021 | 21 | 53/64" | 34,30 | 20 1148 035 | 35 | 1.3/8" | 43,90 |
| 20 1148 022 | 22 | 55/64" | 34,30 | 20 1148 036 | 36 | 1.27/64" | 49,60 |
| 20 1148 023 | 23 | 29/32" | 34,30 | 20 1148 037 | 37 | 1.29/64" | 49,65 |
| 20 1148 024 | 24 | 15/16" | 34,30 | 20 1148 038 | 38 | 1.1/2" | 49,65 |
| 20 1148 025 | 25 | 63/64" | 34,30 | 20 1148 039 | 39 | 1.17/32" | 49,65 |

| Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|
| 20 1148 040 | 40 | 1.37/64" | 49,65 |
| 20 1148 041 | 41 | 1.39/64" | 30,25 |
| 20 1148 042 | 42 | 1.21/32" | 30,25 |
| 20 1148 043 | 43 | 1.11/16" | 30,25 |
| 20 1148 044 | 44 | 1.47/64" | 30,25 |
| 20 1148 045 | 45 | 1.49/64" | 58,50 |
| 20 1148 046 | 46 | 1.13/16" | 32,45 |
| 20 1148 047 | 47 | 1.27/32" | 32,45 |
| 20 1148 048 | 48 | 1.57/64" | 32,45 |
| 20 1148 049 | 49 | 1.59/64" | 32,45 |
| 20 1148 050 | 50 | 1.31/32" | 66,10 |
| 20 1148 051 | 51 | 2.1/64" | 36,90 |
| 20 1148 052 | 52 | 2.3/64" | 38,65 |
| 20 1148 053 | 53 | 2.3/32" | 38,65 |

| Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|
| 20 1148 054 | 54 | 2.1/8" | 39,95 |
| 20 1148 055 | 55 | 2.11/64" | 78,80 |
| 20 1148 056 | 56 | 2.13/64" | 42,05 |
| 20 1148 057 | 57 | 2.1/4" | 42,95 |
| 20 1148 058 | 58 | 2.9/32" | 43,75 |
| 20 1148 059 | 59 | 2.21/64" | 44,40 |
| 20 1148 060 | 60 | 2.23/64" | 87,55 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

Alternativartikel bis Ø 100 mm siehe Seite 578-581 Art. 20 1141A + Adapter Fein Art. 20 1443 -
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Alternative article up to Ø 100 mm see page 578-581 Art. 20 1141A + adapter Fein Art. 20 1443 -
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1148 HARD-LINE 55 ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS

20 1154
• € 9,95

6,34 x 102 mm

Packnorm 2 Stk. · Packaging unit 2 pcs.

**ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS**

20 1385
• € 21,05

Weldon 19 mm 3/4" Fein Quick-In 18 mm

6,34 x 130 mm

20 1160
• € 9,20

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weiteres Zubehör siehe Übersichtsseite 491
Further accessories see overview page 491

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
Spare allen screws for all adapters see page 530

20 1148 HARD-LINE 55 SETS / DISPLAYS Seite / Page 559

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1148 HARD-LINE55 – siehe Seite 559. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.

We offer a large selection of sets / displays – recommended content 20 1148 HARD-LINE55 – see page 559. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data



1295

Film
Movie



493

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

HSS-XE + DURABLU E BESCHICHTETE KERNBOHRER

HSS-XE + DURABLU E-COATED ANNULAR CUTTERS



BLUE-DRILL LINE

Neben Hartmetall-bestückten Kernbohrern bieten beschichtete HSS-XE Kernbohrer das optimale Preis-Leistungs-Verhältnis.

Im harten Einsatz kann nur in den seltensten Fällen auf optimale Drehzahlen und Kühlung Rücksicht genommen werden. Die Karnasch DURABLU E-Beschichtung macht den Kernbohrer „Fehlerresistent“.

BLUE-DRILL LINE ist der am häufigsten verwendete Karnasch Kernbohrer. Der HSS-XE Bohrer mit dem besten Preis-Leistungs-Verhältnis für alle Stähle bis 1100 N Festigkeit sowie Edelstähle.

Besides carbide tipped annular cutters provide coated HSS-XE cutters the optimal price-performance ratio.

Under hard field conditions only in the rarest cases optimum speed and cooling can be considered. The Karnasch DURABLU E-coating makes the annular cutter "error-resistant".

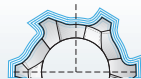
BLUE-DRILL LINE annular cutters are the most commonly used Karnasch cutters. This HSS-XE cutter is offering the best price-performance ratio for all steels up to a strength of 1100 N and stainless steel.

EIGENSCHAFTEN · PROPERTIES



Gefertigt aus hochlegiertem HSS-XE Spezialstahl. Für extreme Härte an den Zahnsitzen (bis 68 HRC). Somit hohe Verschleißfestigkeit und Standzeit.

Made of high-alloyed HSS-XE special steel. For extreme hardness at the tip of the tooth (up to 68 HRC). A high wear resistance and lifetime.



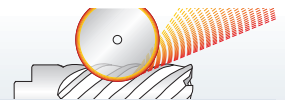
Unsere hochwertigsten Kernbohrer erhalten die einzigartige und patentierte DURABLU E-Beschichtung. Extreme Oberflächenhärte- und -glätte ergeben extreme Standzeiten auch unter nicht optimalen Arbeitsbedingungen wie „Über Kopf arbeiten“, Trockenbohrungen, u.s.w.

Our first-class annular cutters are equipped with the unique and patented DURABLU E-coating. Extreme surface hardness and sleekness yield extreme lifetimes even under non-optimum conditions like "overhead work", dry drilling, etc.



Nur wenige Hersteller sind in der Lage in Stufen gehärtete Kernbohrer zu fertigen. Für uns ist dies „Standard“. Dadurch erreichen wir extrem harte Zahnsitzen (68 HRC) und dennoch einen flexiblen Kernbohrer.

Only few manufacturers are capable of producing step-hardened annular cutters. For us this is "standard". Only this makes us produce extremely hard tooth tips (68 HRC) and yet a flexible annular cutter.



Aus dem vollen Material komplett geschliffen. Dieser Feinschliff erhöht die Zerspanleistung bei gleichzeitiger Reduzierung der Reibung. Für ein Mehr an Standzeit.

Completely made "FULLY GROUND". This refining rises the cutting ability with reducing friction at the same time. For an exceeded lifetime.

ANWENDUNG · APPLICATION

| | | | | | | | | | | | | |
|---------|----------|----------|-----------|-----------|----------|----------|-----------------------|---------------------|----------------|--|------------|------------|
| | | | | | | | | | | | | |
| Stahl | Stahl | Stahl | Edelstahl | Edelstahl | Alu | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Grauguss | Hastelloy, Inconel, Nimonic, Exotische Materialien | Hardox 400 | Hardox 450 |
| Steel | Steel | Steel | Stainless | Stainless | Alu | Alu | Copper, brass, tin | Plastics GRP/CRP | Grey cast iron | Hastelloy, Inconel, Nimonic, exotic materials | Hardox 400 | Hardox 450 |
| < 900 N | < 1100 N | < 1400 N | < 900 N | > 900 N | < 10% Si | > 10% Si | | | | | | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL · OPTIMAL

✓ GUT · GOOD

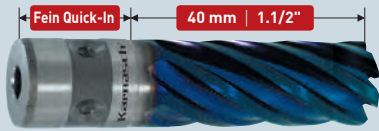
✓ MÖGLICH · POSSIBLE

HSS-XE + DURABLUK BESCHICHTETE KERNBOHRER

HSS-XE + DURABLUK-COATED ANNULAR CUTTERS

BLUE-DRILL LINE

Schnitttiefe · Drill depths



| Ø mm | Ø Zoll/Inch | Art. / Type | |
|-------|----------------|--------------------------------------|-----|
| 12-60 | 15/32-2.23/64" | 20 1146 BLUE-DRILL LINE 40 | 496 |

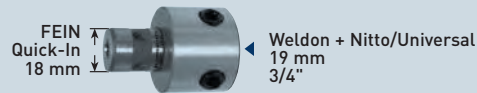
HINWEISE · NOTES

Sie benötigen größere Schnitttiefen wie z. B. 80 mm oder 110 mm?

Arbeiten Sie mit Fein Adapter + Weldon Kernbohrer.
Siehe Art. 20 1650 (Schnitttiefe 80 mm) Seite 370
Siehe Art. 20 1660 (Schnitttiefe 110 mm) Seite 372

You need larger drill depths such as 80 mm or 110 mm?

Work with adapter Fein + Weldon annular cutters.
See Art. 20 1650 (cutting depth 80 mm) page 370
See Art. 20 1660 (cutting depth 110 mm) page 372



Packnorm 2 Stk.
Packaging unit 2 pcs.

Sie benötigen größere Durchmesser bis 100 mm?

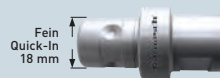
Arbeiten Sie mit Fein Quick-In und Fein Quick-In Max Adaptern + Power-Max Lochsagen siehe Seite 564

You need larger diameter up to 100 mm?

Work with adapter Fein Quick-In or Fein Quick-In Max + our Power-Max hole saws see page 564

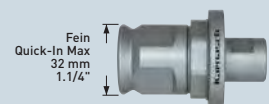
FEIN QUICK-IN 18 mm

Passend für Maschinen · Suitable for machines
FEIN KBM 32 Q · KBM 50 Q · KBM 50 U · KBM 50 Auto · KBM 65 U



FEIN QUICK-IN MAX 32 mm 1.1/4"

Für Fein Maschine · For Fein machine
FEIN KBM 80 Quick-In Max



DRILL-LINE 30 PRO



Sie benötigen kleinere Durchmesser wie:

6 mm, 8 mm, 9,8 mm, 10 mm, 11 mm?
Siehe Artikel 20 1430 Seite 430

You need smaller diameter such as:

6 mm, 8 mm, 9,8 mm, 10 mm, 11 mm?
See article 20 1430 page 430



20 1146

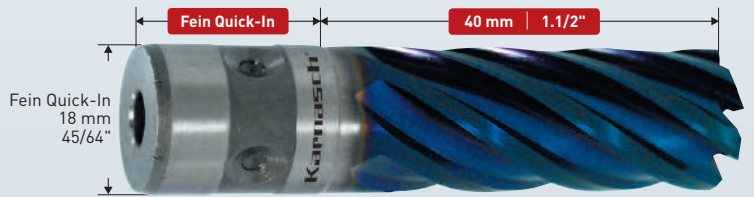
BLUE-DRILL LINE/40

HSS-XE + DURABLUe-beschichteter Kernbohrer, Fein Quick-In Schaft, Nutzlänge 40 mm
 HSS-XE + DURABLUe-coated annular cutter, Fein Quick-In shank, drill depth 40 mm | 1.1/2"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 1100 N | < 900 N | | > 10% Si | | | |



☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
 Special price / sale article. While stocks last.

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|--------|
| 20 1146 012 | 12 | 15/32" | 25,80 | 20 1146 025 | 25 | 63/64" | 34,30 | 20 1146 038 | 38 | 1.1/2" | 62,35 | 20 1146 052 | 52 | 2.3/64" | 36,45 |
| 20 1146 013 | 13 | 33/64" | 25,80 | 20 1146 026 | 26 | 1.1/32" | 35,95 | 20 1146 039 | 39 | 1.17/32" | 62,35 | 20 1146 053 | 53 | 2.3/32" | 37,50 |
| 20 1146 014 | 14 | 35/64" | 26,10 | 20 1146 027 | 27 | 1.1/16" | 36,00 | 20 1146 040 | 40 | 1.37/64" | 66,75 | 20 1146 054 | 54 | 2.1/8" | 38,65 |
| 20 1146 015 | 15 | 19/32" | 26,10 | 20 1146 028 | 28 | 1.7/64" | 38,05 | 20 1146 041 | 41 | 1.39/64" | 23,40 | 20 1146 055 | 55 | 2.11/64" | 100,05 |
| 20 1146 016 | 16 | 5/8" | 27,15 | 20 1146 029 | 29 | 1.9/64" | 38,05 | 20 1146 042 | 42 | 1.21/32" | 25,15 | 20 1146 056 | 56 | 2.13/64" | 41,05 |
| 20 1146 017 | 17 | 43/64" | 27,15 | 20 1146 030 | 30 | 1.3/16" | 39,45 | 20 1146 043 | 43 | 1.11/16" | 25,15 | 20 1146 057 | 57 | 2.1/4" | 42,45 |
| 20 1146 018 | 18 | 45/64" | 28,20 | 20 1146 031 | 31 | 1.7/32" | 39,45 | 20 1146 045 | 45 | 1.49/64" | 75,60 | 20 1146 058 | 58 | 2.9/32" | 43,45 |
| 20 1146 019 | 19 | 3/4" | 28,20 | 20 1146 032 | 32 | 1.17/64" | 41,00 | 20 1146 046 | 46 | 1.13/16" | 29,65 | 20 1146 059 | 59 | 2.21/64" | 44,85 |
| 20 1146 020 | 20 | 25/32" | 29,20 | 20 1146 033 | 33 | 1.19/64" | 41,00 | 20 1146 047 | 47 | 1.27/32" | 29,65 | 20 1146 060 | 60 | 2.23/64" | 113,70 |
| 20 1146 021 | 21 | 53/64" | 29,20 | 20 1146 034 | 34 | 1.11/32" | 42,70 | 20 1146 048 | 48 | 1.57/64" | 31,35 | | | | |
| 20 1146 022 | 22 | 55/64" | 32,60 | 20 1146 035 | 35 | 1.3/8" | 42,70 | 20 1146 049 | 49 | 1.59/64" | 31,35 | | | | |
| 20 1146 023 | 23 | 29/32" | 33,40 | 20 1146 036 | 36 | 1.27/64" | 47,25 | 20 1146 050 | 50 | 1.31/32" | 87,50 | | | | |
| 20 1146 024 | 24 | 15/16" | 34,30 | 20 1146 037 | 37 | 1.29/64" | 59,55 | 20 1146 051 | 51 | 2.1/64" | 33,50 | | | | |

Alternativartikel siehe Art. 20 1147 Seite 492 · **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
 Alternative article see Art. 20 1147 page 492 · **Attention:** The inch sizes do not correspond exactly to the mm diameters.

20 1146

BLUE-DRILL LINE/40

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



☞ **20 1388**
 • € 10,05

Packnorm 2 Stk. · Packaging unit 2 pcs.

**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**



☞ **20 1385**
 • € 21,05

☞ **20 1318**
 • € 8,30

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weiteres Zubehör siehe Übersichtsseite 491
 Further accessories see overview page 491

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

20 1146

BLUE-DRILL LINE/40

SETS / DISPLAYS Seite / Page 560

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1146 BLUE-DRILL LINE40 – siehe Seite 560. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
 We offer a large selection of sets / displays – recommended content 20 1146 BLUE-DRILL LINE40 – see page 560. Other content possible by individually equipped sets / displays.



Schnittdaten
 Cutting data

Film
 Movie



1296

Qualitätsprodukte für die Metallbearbeitung.
Quality products for metalworking.

PREMIUM-QUALITÄT IN JEDEM TEIL VON WERKZEUG BIS MASCHINE

Premium quality in all components,
from tools to machinery



DAS KARNASCH PRODUKTSORTIMENT ONLINE! Nutzen Sie unseren Onlineshop und profitieren Sie von den speziellen Vorteilen für Onlineshop-Kunden.

THE KARNASCH PRODUCT RANGE ONLINE! Use our onlineshop and benefit from the special advantages for onlineshop customers.

 <https://shop.karnasch.tools>

1



2



3



4



5



6



7



8



9

Index

HSS-XE KERNBOHRER

HSS-XE ANNULAR CUTTERS



GOLD-DRILL LINE

Karnasch GOLD-DRILL LINE Kernbohrer sind die am meisten verwendeten nicht beschichteten HSS-XE Kernbohrer.

Durch spezial GOLD-TECH Oberflächenbehandlung + Vollschliff + HSS-XE Spezialstahl hervorragend zum Bohren in Stähle bis 900 N und sogar geeignet für Edelstähle.

Karnasch GOLD-DRILL LINE annular cutters are the most commonly used non-coated HSS-XE annular cutter.

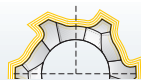
By special surface treatment GOLD-TECH + FULLY GROUND + special steel HSS-XE ideal for drilling in steel up to a strength of 900 N and even suitable for stainless steels.

EIGENSCHAFTEN · PROPERTIES



Gefertigt aus hochlegiertem HSS-XE Spezialstahl. Für extreme Härte an den Zahnspitzen (bis 68 HRC). Somit hohe Verschleißfestigkeit und Standzeit.

Made of high-alloyed HSS-XE special steel. For extreme hardness at the tip of the tooth (up to 68 HRC). A high wear resistance and lifetime.



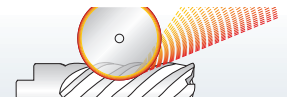
Gold-Tech Oberflächenbehandlung. Die Spezialbehandlung für höhere Standzeiten

Gold-Tech surface treatment. The special treatment for higher lifetimes.



Nur wenige Hersteller sind in der Lage in Stufen gehärtete Kernbohrer zu fertigen. Für uns ist dies „Standard“. Dadurch erreichen wir extrem harte Zahnspitzen (68 HRC) und dennoch einen flexiblen Kernbohrer.

Only few manufacturers are capable of producing step-hardened annular cutters. For Karnasch this is "standard". Only this makes us produce extremely hard tooth tips (68 HRC) and yet a flexible annular cutter.



Aus dem vollen Material komplett geschliffen. Dieser Feinschliff erhöht die Zerspanleistung bei gleichzeitiger Reduzierung der Reibung. Für ein Mehr an Standzeit.

Completely made "FULLY GROUND". This refining rises the cutting ability with reducing friction at the same time. For an exceeded lifetime.

ANWENDUNG · APPLICATION

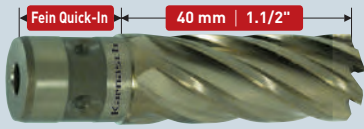
| | | | | | | | | | |
|---------|---------|----------|-----------|----------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | | | |
| Stahl | Stahl | Stahl | Edelstahl | Alu | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Steel | Steel | Stainless | Alu | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 750 N | < 900 N | < 1100 N | < 900 N | < 10% Si | > 10% Si | | | | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

HSS-XE KERNBOHRER HSS-XE ANNULAR CUTTERS

GOLD-DRILL LINE

Schnitttiefe · Drill depths



Ø mm

Ø Zoll/Inch

Art. / Type



12-60

15/32-
2.23/64"

20 1146U

GOLD-DRILL LINE / 40

500

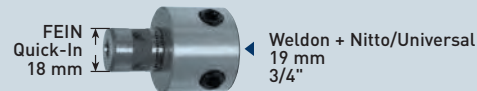
HINWEISE · NOTES

Sie benötigen größere Schnitttiefen wie z. B. 80 mm oder 110 mm?

Arbeiten Sie mit Fein Adapter + Weldon Kernbohrer.
Siehe Art. 20 1650 (Schnitttiefe 80 mm) Seite 370
Siehe Art. 20 1660 (Schnitttiefe 110 mm) Seite 372

You need larger drill depths such as 80 mm or 110 mm?

Work with adapter Fein + Weldon annular cutters.
See Art. 20 1650 (cutting depth 80 mm) page 370
See Art. 20 1660 (cutting depth 110 mm) page 372



Packnorm 2 Stk.
Packaging unit 2 pcs.

Sie benötigen größere Durchmesser bis 100 mm?

Arbeiten Sie mit Fein Quick-In und Fein Quick-In Max Adaptern +
Power-Max Lochsagen siehe Seite 564

You need larger diameter up to 100 mm?

Work with adapter Fein Quick-In or Fein Quick-In Max + our
Power-Max hole saws see page 564

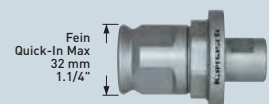
FEIN QUICK-IN 18 mm

Passend für Maschinen · Suitable for machines
FEIN KBM 32 Q · KBM 50 Q · KBM 50 U · KBM 50 Auto · KBM 65 U



FEIN QUICK-IN MAX 32 mm 1.1/4"

Für Fein Maschine · For Fein machine
FEIN KBM 80 Quick-In Max



DRILL-LINE 30 PRO



Fein Quick-In 18 mm

Adapter · Adapter

Sie benötigen kleinere Durchmesser wie:

6 mm, 8 mm, 9,8 mm, 10 mm, 11 mm?
Siehe Artikel 20 1430 Seite 430

You need smaller diameter such as:

6 mm, 8 mm, 9,8 mm, 10 mm, 11 mm?
See article 20 1430 page 430



20 1146U

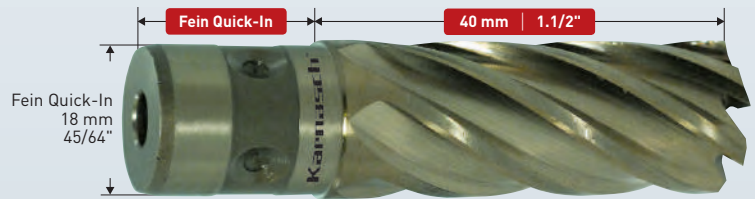
GOLD-DRILL LINE / 40

HSS-XE Kernbohrer, Fein Quick-In Schaft, Nutzlänge 40 mm
HSS-XE annular cutter, Fein Quick-In shank, drill depth 40 mm | 1.1/2"



ANWENDUNG · APPLICATION

| | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|-----------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400, 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400, 450 |
| < 900 N | < 900 N | | < 10% Si | | | |



☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|-------|--------------|------|-------------|-------|
| 20 1146u 012 | 12 | 15/32" | 18,45 | 20 1146u 025 | 25 | 63/64" | 26,10 | 20 1146u 038 | 38 | 1.1/2" | 43,55 | 20 1146u 051 | 51 | 2.1/64" | 33,50 |
| 20 1146u 013 | 13 | 33/64" | 18,45 | 20 1146u 026 | 26 | 1.1/32" | 27,75 | 20 1146u 039 | 39 | 1.17/32" | 43,55 | 20 1146u 052 | 52 | 2.3/64" | 36,45 |
| 20 1146u 014 | 14 | 35/64" | 18,75 | 20 1146u 027 | 27 | 1.1/16" | 27,80 | 20 1146u 040 | 40 | 1.37/64" | 47,95 | 20 1146u 053 | 53 | 2.3/32" | 37,50 |
| 20 1146u 015 | 15 | 19/32" | 18,75 | 20 1146u 028 | 28 | 1.7/64" | 29,85 | 20 1146u 041 | 41 | 1.39/64" | 23,40 | 20 1146u 054 | 54 | 2.1/8" | 38,65 |
| 20 1146u 016 | 16 | 5/8" | 19,75 | 20 1146u 029 | 29 | 1.9/64" | 29,85 | 20 1146u 042 | 42 | 1.21/32" | 25,15 | 20 1146u 055 | 55 | 2.11/64" | 81,25 |
| 20 1146u 017 | 17 | 43/64" | 19,75 | 20 1146u 030 | 30 | 1.3/16" | 31,25 | 20 1146u 043 | 43 | 1.11/16" | 25,15 | 20 1146u 056 | 56 | 2.13/64" | 41,05 |
| 20 1146u 018 | 18 | 45/64" | 20,80 | 20 1146u 031 | 31 | 1.7/32" | 31,25 | 20 1146u 044 | 44 | 1.47/64" | 27,70 | 20 1146u 057 | 57 | 2.1/4" | 42,45 |
| 20 1146u 019 | 19 | 3/4" | 20,80 | 20 1146u 032 | 32 | 1.17/64" | 32,80 | 20 1146u 045 | 45 | 1.49/64" | 56,80 | 20 1146u 058 | 58 | 2.9/32" | 43,45 |
| 20 1146u 020 | 20 | 25/32" | 21,85 | 20 1146u 033 | 33 | 1.19/64" | 32,80 | 20 1146u 046 | 46 | 1.13/16" | 29,65 | 20 1146u 059 | 59 | 2.21/64" | 44,85 |
| 20 1146u 021 | 21 | 53/64" | 21,85 | 20 1146u 034 | 34 | 1.11/32" | 34,55 | 20 1146u 047 | 47 | 1.27/32" | 29,65 | 20 1146u 060 | 60 | 2.23/64" | 94,90 |
| 20 1146u 022 | 22 | 55/64" | 25,20 | 20 1146u 035 | 35 | 1.3/8" | 34,55 | 20 1146u 048 | 48 | 1.57/64" | 31,35 | | | | |
| 20 1146u 023 | 23 | 29/32" | 25,20 | 20 1146u 036 | 36 | 1.27/64" | 39,10 | 20 1146u 049 | 49 | 1.59/64" | 31,35 | | | | |
| 20 1146u 024 | 24 | 15/16" | 26,10 | 20 1146u 037 | 37 | 1.29/64" | 40,70 | 20 1146u 050 | 50 | 1.31/32" | 68,70 | | | | |

Alternativartikel siehe Art. 20 1147 Seite 492 · **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Alternative article see Art. 20 1147 page 492 · **Attention:** The inch sizes do not correspond exactly to the mm diameters.

20 1146U

GOLD-DRILL LINE / 40

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



20 1388
€ 10,05

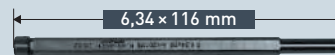
Packnorm 2 Stk. · Packaging unit 2 pcs.

Weiteres Zubehör siehe Übersichtsseite 491
Further accessories see overview page 491

ADAPTER + PASSENDE AUSWERFERSTIFTE ADAPTER + SUITABLE EJECTOR PINS



20 1385
€ 21,05



20 1318
€ 8,30

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
Spare allen screws for all adapters see page 530

20 1146U

GOLD-DRILL LINE / 40

SETS / DISPLAYS Seite / Page 561

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1146U GOLD-DRILL LINE40 – siehe Seite 561. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.

We offer a large selection of sets / displays – recommended content 20 1146U GOLD-DRILL LINE40 – see page 561. Other content possible by individually equipped sets / displays.



Schnittdaten
Cutting data

Film
Movie



1296

SCHIENENBOHRER

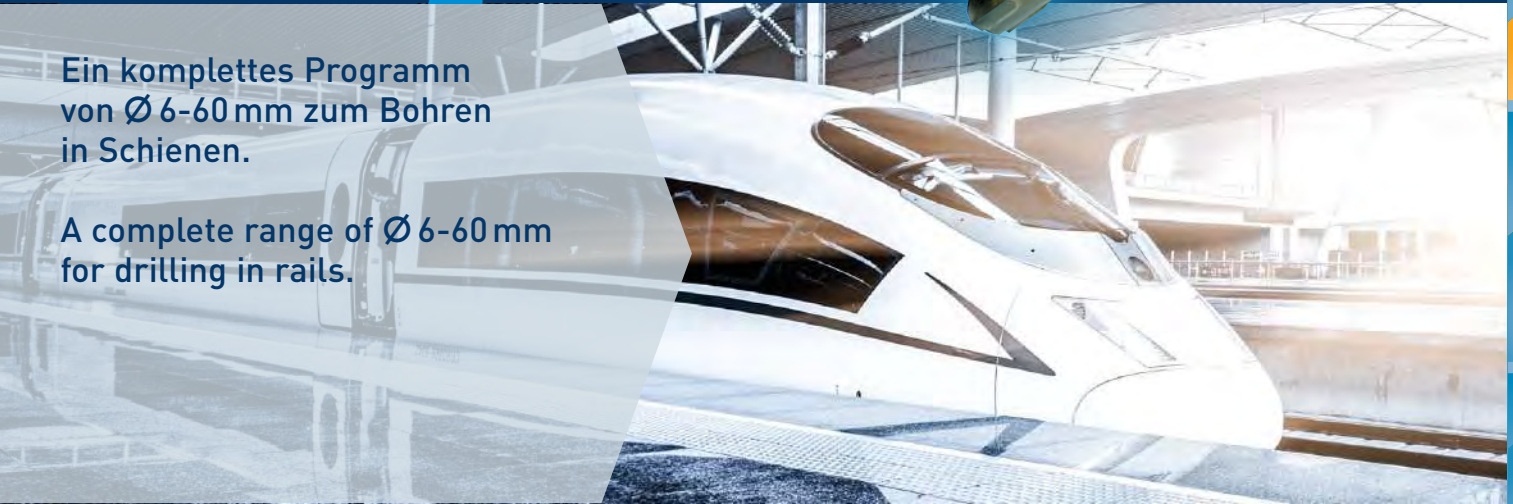
RAILWAY CUTTERS



RAIL-LINE

Ein komplettes Programm von \varnothing 6-60 mm zum Bohren in Schienen.

A complete range of \varnothing 6-60 mm for drilling in rails.



RAIL-LINE PRO

Kernbohrer Hartmetall-bestückt. Mehr als 200 Bohrungen möglich

Annular cutter tungsten carbide tipped. More than 200 holes possible



20 1680
20 1690

RAIL-LINE

Kernbohrer Hartmetall-bestückt. Mehr als 100 Bohrungen möglich

Annular cutter tungsten carbide tipped. More than 100 holes possible



20 1306
20 1309

BLUE-DRILL LINE RAIL PRO

Kernbohrer aus Pulverstahl + DURABLU beschichtet. Mehr als 100 Bohrungen möglich

Annular cutter powder steel + DURABLU-coated. More than 100 holes possible



20 1284
20 1317

SILVER-DRILL LINE RAIL

Kernbohrer aus HSS-XE Spezialstahl. Mehr als 60 Bohrungen möglich

Annular cutter made of HSS-XE special steel. More than 60 holes possible



20 1460
20 1480

DRILL-LINE RAIL PRO

Spiralbohrer aus Pulverstahl + DURABLU beschichtet. Mehr als 100 Bohrungen möglich

Twist drills made of powder steel + DURABLU-coated. More than 100 holes possible



20 1430
20 1465

DRILL-LINE RAIL

Spiralbohrer aus HSS-XE Spezialstahl. Mehr als 60 Bohrungen möglich

Twist drills made of HSS-XE special steel. More than 60 holes possible



20 1710

502-505

506-509

510-513

514-517

518-519

520

1



2



3



4



5



6



7



8



9

Index

20 1680

RAIL-LINE 25 PRO

Hartmetall-bestückter Kernbohrer, Weldonschaft, Nutzlänge 25 mm
Carbide-tipped annular cutter, Weldon shank, drill depth 25 mm | 1"



ANWENDUNG · APPLICATION



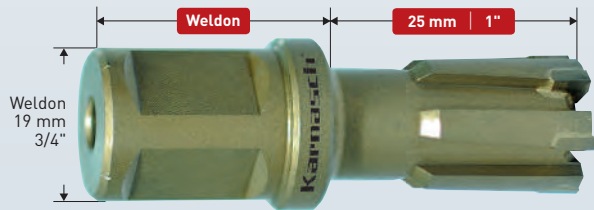
Für alle Schienentypen bis 1100 N (UIC 60).
Mehr als 200 Bohrungen in UIC 60 Schienen möglich.

Schienen

For all rail types up to 1100 N (UIC 60).

Rails

More than 200 holes in UIC 60 rails possible.



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 20 1680 014 | 14 | 35/64" | 48,40 | 20 1680 022 | 22 | 55/64" | 48,40 | 20 1680 030 | 30 | 1.3/16" | 53,30 | 20 1680 038 | 38 | 1.1/2" | 63,70 |
| 20 1680 015 | 15 | 19/32" | 48,40 | 20 1680 023 | 23 | 29/32" | 48,40 | 20 1680 031 | 31 | 1.7/32" | 59,30 | 20 1680 039 | 39 | 1.17/32" | 63,70 |
| 20 1680 016 | 16 | 5/8" | 48,40 | 20 1680 024 | 24 | 15/16" | 48,40 | 20 1680 032 | 32 | 1.17/64" | 59,30 | 20 1680 040 | 40 | 1.37/64" | 63,70 |
| 20 1680 017 | 17 | 43/64" | 48,40 | 20 1680 025 | 25 | 63/64" | 48,40 | 20 1680 033 | 33 | 1.19/64" | 59,30 | | | | |
| 20 1680 018 | 18 | 45/64" | 48,40 | 20 1680 026 | 26 | 1.1/32" | 53,25 | 20 1680 034 | 34 | 1.11/32" | 59,30 | | | | |
| 20 1680 019 | 19 | 3/4" | 48,40 | 20 1680 027 | 27 | 1.1/16" | 53,30 | 20 1680 035 | 35 | 1.3/8" | 59,30 | | | | |
| 20 1680 020 | 20 | 25/32" | 48,40 | 20 1680 028 | 28 | 1.7/64" | 53,30 | 20 1680 036 | 36 | 1.27/64" | 63,70 | | | | |
| 20 1680 021 | 21 | 53/64" | 48,40 | 20 1680 029 | 29 | 1.9/64" | 53,30 | 20 1680 037 | 37 | 1.29/64" | 63,70 | | | | |

Größere Ø siehe Art. 20 1690 Seite 504 · **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Larger Ø see Art. 20 1690 page 504 · **Attention:** The inch sizes do not correspond exactly to the mm diameters.

20 1680

RAIL-LINE 25 PRO

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



Ø 12-40 mm 20 1261 € 6,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

EIGENSCHAFTEN · PROPERTIES



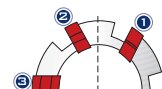
Karnasch RAIL-LINE-PRO Kernbohrer werden mit konischer Spirale gefertigt für sauberen Spanfluss und höchste Zerspanleistung.

Karnasch RAIL-LINE-PRO carbide tipped annular cutters are made with a conical helix for clean chip flow and highest cutting ability.



Karnasch RAIL-LINE-PRO Kernbohrer kommen mit optimiertem Hartmetall zum Bohren in schwierigste Schienenstähle (z.B. UIC 60)

Karnasch RAIL-LINE-PRO annular cutters comes with optimized carbide teeth for excellent result drilling in most difficult rail steel (e.g. UIC 60)



Karnasch RAIL-LINE-PRO Kernbohrer sind in einer aufwendigen Vor-Mittel-Nachscheider-Geometrie gefertigt. Dies ergibt: ratterfreies, ruhiges und leichtes Zerspanen mit höchsten Standzeiten. **Die Schnittwinkel sind zum Bohren von Schienen optimiert.**

Karnasch RAIL-LINE-PRO annular cutters are made in an elaborate pre-/ intermediate-/ after-cutting geometry. This results in: clatter-free, silent and easy cutting with highest lifetimes. **The cutting angles are optimized for drilling in rails.**

TOOLTIPP

Unser bestes Modell zum Bohren schwierigster Schienenstähle.
Our best model for drilling in most difficult types of rail steel.



Schnittdaten
Cutting data

Film
Movie



1300



Zubehör für Hartmetall-bestückte Kernbohrer, Weldonschaft, Nutzlänge 25 mm
Accessories for carbide-tipped annular cutter, Weldon shank, drill depth 25 mm | 1"

RAIL-LINE 25 PRO 20 1680

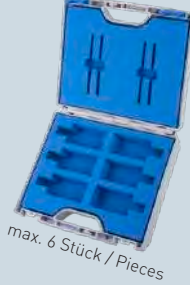
SETS / DISPLAYS

20 1344
€ 102,05



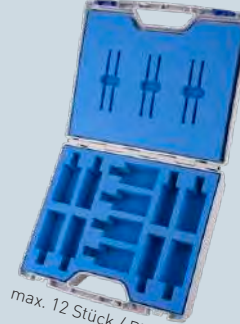
max. 44 Stück / Pieces

20 1138
€ 13,15



max. 6 Stück / Pieces

20 1132
€ 26,10



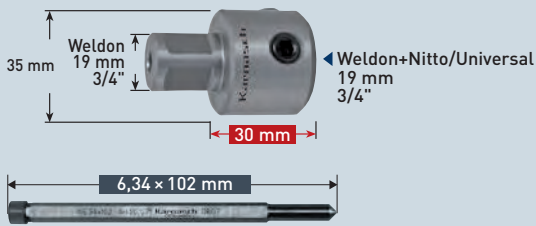
max. 12 Stück / Pieces

20 1139
€ 61,65



max. 50 Stück / Pieces

Sie möchten Ihren Inhalt selbst aussuchen? Kein Problem. Kontaktieren Sie uns und wir stellen Ihr Wunsch-Set oder Wunsch-Display zusammen.
You would like to select your own contents? No Problem. Contact us and we create your individual set or display.



20 1432
€ 16,45

Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1271
€ 7,65

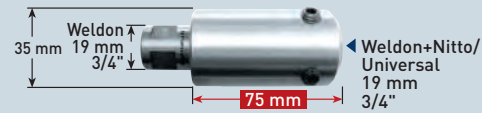
VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS



20 1387
€ 18,95

Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1433
€ 15,70



20 1402
€ 20,95

Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1396
€ 16,45

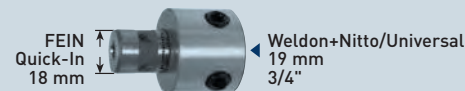


20 1417
€ 24,95

Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1411
€ 17,05

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

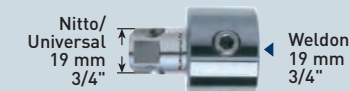


20 1263
€ 17,50



20 1271
€ 7,65

Packnorm 2 Stk. - Packaging unit 2 pcs.



20 1311
€ 16,30



20 1271
€ 7,65

Packnorm 2 Stk. - Packaging unit 2 pcs.



21 0048
€ 14,15



20 1261
€ 6,65

Packnorm 2 Stk. - Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 491
Further accessories see overview page 491

Spezialverlängerungen + passender Auswerferstift von 25 mm auf 50 mm.
Somit kann in vielen Fällen auf die längeren Kernbohrer RAIL-LINE 50 PRO verzichtet werden.

Special extension + suitable ejector pin from 25 mm to 50 mm. This allows to renounce the longer annular cutter RAIL-LINE 50 PRO.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
Spare allen screws for all adapters see page 530



20 1690

RAIL-LINE 50 PRO

Hartmetall-bestückter Kernbohrer, Weldonschaft, Nutzlänge 50 mm
Carbide-tipped annular cutter, Weldon shank, drill depth 50 mm | 2"



ANWENDUNG · APPLICATION



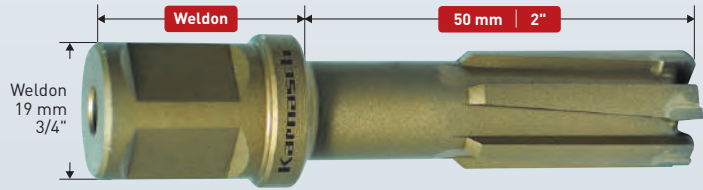
Für alle Schienentypen bis 1100 N (UIC 60).
Mehr als 200 Bohrungen in UIC 60 Schienen möglich.

Schienen

For all rail types up to 1100 N (UIC 60).

Rails

More than 200 holes in UIC 60 rails possible.



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|--------|
| 20 1690 014 | 14 | 35/64" | 55,70 | 20 1690 026 | 26 | 1.1/32" | 61,20 | 20 1690 038 | 38 | 1.1/2" | 73,30 | 20 1690 050 | 50 | 1.31/32" | 86,55 |
| 20 1690 015 | 15 | 19/32" | 55,70 | 20 1690 027 | 27 | 1.1/16" | 61,30 | 20 1690 039 | 39 | 1.17/32" | 73,30 | 20 1690 051 | 51 | 2.1/64" | 101,35 |
| 20 1690 016 | 16 | 5/8" | 55,70 | 20 1690 028 | 28 | 1.7/64" | 61,30 | 20 1690 040 | 40 | 1.37/64" | 73,30 | 20 1690 052 | 52 | 2.3/64" | 101,35 |
| 20 1690 017 | 17 | 43/64" | 55,70 | 20 1690 029 | 29 | 1.9/64" | 61,30 | 20 1690 041 | 41 | 1.39/64" | 80,55 | 20 1690 053 | 53 | 2.3/32" | 101,35 |
| 20 1690 018 | 18 | 45/64" | 55,70 | 20 1690 030 | 30 | 1.3/16" | 61,30 | 20 1690 042 | 42 | 1.21/32" | 80,55 | 20 1690 054 | 54 | 2.1/8" | 101,35 |
| 20 1690 019 | 19 | 3/4" | 55,70 | 20 1690 031 | 31 | 1.7/32" | 68,20 | 20 1690 043 | 43 | 1.11/16" | 80,55 | 20 1690 055 | 55 | 2.11/64" | 101,35 |
| 20 1690 020 | 20 | 25/32" | 55,70 | 20 1690 032 | 32 | 1.17/64" | 68,20 | 20 1690 044 | 44 | 1.47/64" | 80,55 | 20 1690 056 | 56 | 2.13/64" | 115,70 |
| 20 1690 021 | 21 | 53/64" | 55,70 | 20 1690 033 | 33 | 1.19/64" | 68,20 | 20 1690 045 | 45 | 1.49/64" | 80,55 | 20 1690 057 | 57 | 2.1/4" | 115,70 |
| 20 1690 022 | 22 | 55/64" | 55,70 | 20 1690 034 | 34 | 1.11/32" | 68,20 | 20 1690 046 | 46 | 1.13/16" | 86,55 | 20 1690 058 | 58 | 2.9/32" | 115,70 |
| 20 1690 023 | 23 | 29/32" | 55,70 | 20 1690 035 | 35 | 1.3/8" | 68,20 | 20 1690 047 | 47 | 1.27/32" | 86,55 | 20 1690 059 | 59 | 2.21/64" | 115,70 |
| 20 1690 024 | 24 | 15/16" | 55,70 | 20 1690 036 | 36 | 1.27/64" | 73,30 | 20 1690 048 | 48 | 1.57/64" | 86,55 | 20 1690 060 | 60 | 2.23/64" | 115,70 |
| 20 1690 025 | 25 | 63/64" | 55,70 | 20 1690 037 | 37 | 1.29/64" | 73,30 | 20 1690 049 | 49 | 1.59/64" | 86,55 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern. · Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1690

RAIL-LINE 50 PRO

ZUBEHÖR · ACCESSORIES

AUSWERFERSTIFTE · EJECTOR PINS



Packnorm 2 Stk. · Packaging unit 2 pcs.

EIGENSCHAFTEN · PROPERTIES



Karnasch RAIL-LINE-PRO Kernbohrer werden mit konischer Spirale gefertigt für sauberen Spanfluss und höchste Zerspanleistung.

Karnasch RAIL-LINE-PRO carbide tipped annular cutters are made with a conical helix for clean chip flow and highest cutting ability.



Karnasch RAIL-LINE-PRO Kernbohrer kommen mit optimiertem Hartmetall zum bohren in schwierigste Schienenstähle (z.B. UIC 60)

Karnasch RAIL-LINE-PRO annular cutters comes with optimized carbide teeth for excellent result drilling in most difficult rail steel (e.g. UIC 60)



Karnasch RAIL-LINE-PRO Kernbohrer sind in einer aufwendigen Vor-Mittel-Nachscheider-Geometrie gefertigt. Dies ergibt: ratterfreies, ruhiges und leichtes Zerspanen mit höchsten Standzeiten. Die Schnittwinkel sind zum Bohren von Schienen optimiert.

Karnasch RAIL-LINE-PRO annular cutters are made in an elaborate pre-/ intermediate-/ after-cutting geometry. This results in: clatter-free, silent and easy cutting with highest lifetimes. The cutting angles are optimized for drilling in rails.

TOOLTIPP

Unser bestes Modell zum Bohren schwierigster Schienenstähle.
Our best model for drilling in most difficult types of rail steel.



Schnittdaten
Cutting data

Film
Movie



1300

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Zubehör für Hartmetall-bestückte Kernbohrer, Weldonschaft, Nutzlänge 50 mm
 Accessories for carbide-tipped annular cutter, Weldon shank, drill depth 50 mm | 2"

RAIL-LINE 50 PRO 20 1690

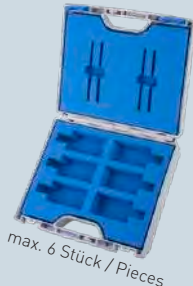
SETS / DISPLAYS

20 1344
 € 102,05



max. 44 Stück / Pieces

20 1138
 € 13,15



max. 6 Stück / Pieces

20 1132
 € 26,10



max. 12 Stück / Pieces

20 1139
 € 61,65

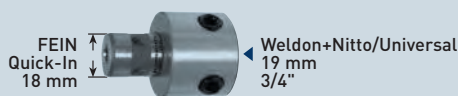


max. 50 Stück / Pieces

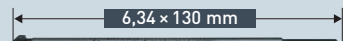
Sie möchten Ihren Inhalt selbst aussuchen? Kein Problem. Kontaktieren Sie uns und wir stellen Ihr Wunsch-Set oder Wunsch-Display zusammen.

You would like to select your own contents? No Problem. Contact us and we create your individual set or display.

**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**



20 1263
 € 17,50

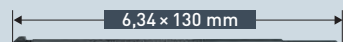


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1160
 € 9,20



20 1311
 € 16,30

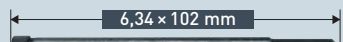


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1160
 € 9,20



21 0048
 € 14,15



Packnorm 2 Stk. - Packaging unit 2 pcs.

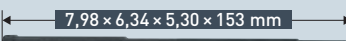
20 1271
 € 7,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

**VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
 EXTENSIONS + SUITABLE EJECTOR PINS**

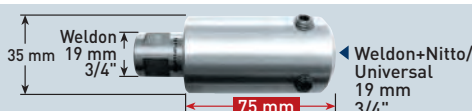


20 1387
 € 18,95



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1396
 € 16,45



20 1402
 € 20,95



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1411
 € 17,05



20 1417
 € 24,95



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1426
 € 18,35

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 491
 Further accessories see overview page 491



20 1306

RAIL-LINE 30

Hartmetall-bestückter Kernbohrer, Weldonschaft, Nutzlänge 30 mm
Carbide-tipped annular cutter, Weldon shank, drill depth 30 mm | 1"



ANWENDUNG · APPLICATION



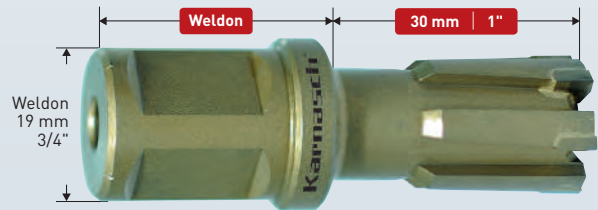
Für alle Schienentypen bis 1100 N (UIC 60).
Mehr als 100 Bohrungen in UIC 60 Schienen möglich.

Schienen

For all rail types up to 1100 N (UIC 60).

Rails

More than 100 holes in UIC 60 rails possible.



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 20 1306 018 | 18 | 45/64" | 41,80 | 20 1306 024 | 24 | 15/16" | 41,80 | 20 1306 030 | 30 | 1.3/16" | 46,00 | 20 1306 036 | 36 | 1.27/64" | 55,25 |
| 20 1306 019 | 19 | 3/4" | 41,80 | 20 1306 025 | 25 | 63/64" | 41,80 | 20 1306 031 | 31 | 1.7/32" | 51,25 | 20 1306 038 | 38 | 1.1/2" | 55,25 |
| 20 1306 020 | 20 | 25/32" | 41,80 | 20 1306 026 | 26 | 1.1/32" | 46,00 | 20 1306 032 | 32 | 1.17/64" | 51,25 | | | | |
| 20 1306 021 | 21 | 53/64" | 41,80 | 20 1306 027 | 27 | 1.1/16" | 46,00 | 20 1306 033 | 33 | 1.19/64" | 51,25 | | | | |
| 20 1306 022 | 22 | 55/64" | 41,80 | 20 1306 028 | 28 | 1.7/64" | 46,00 | 20 1306 034 | 34 | 1.11/32" | 51,25 | | | | |
| 20 1306 023 | 23 | 29/32" | 41,80 | 20 1306 029 | 29 | 1.9/64" | 46,00 | 20 1306 035 | 35 | 1.3/8" | 51,25 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1306

RAIL-LINE 30

ZUBEHÖR · ACCESSORIES



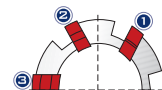
AUSWERFERSTIFTE · EJECTOR PINS



20 1261
• € 6,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

EIGENSCHAFTEN · PROPERTIES



Karnasch Hartmetall-bestückte Kernbohrer (HARD-LINE) werden mit konischer Spirale gefertigt für: Sauberen Spanfluss und höchste Zerspanleistung auch bei schwierigen Materialien.

Karnasch carbide tipped annular cutters (HARD-LINE) are made with a conical helix for: clean chip flow and highest cutting ability even with difficult materials.

Karnasch Hartmetall-bestückte Kernbohrer (HARD-LINE) werden ausschließlich mit Sandvik Hartmetallzähnen bestückt. Wir meinen: Nur das beste Hartmetall ist gut genug für Karnasch Kernbohrer.

Karnasch carbide tipped annular cutters (HARD-LINE) are exclusively equipped with Sandvik carbide teeth. Our opinion is: Only the best carbide is good enough for Karnasch annular cutters.

Karnasch Hartmetall-bestückte Kernbohrer (HARD-LINE) sind in einer aufwendigen Vor-Mittel-Nachsneider-Geometrie gefertigt. Dies ergibt: ratterfreies, ruhiges und leichtes Zerspanen mit höchsten Standzeiten. **Die Schnittwinkel sind zum Bohren von Schienen optimiert.**

Karnasch carbide tipped annular cutters (HARD-LINE) are made in an elaborate pre-/intermediate-/after-cutting geometry. This results in: clatter-free, silent and easy cutting with highest lifetimes. **The cutting angles are optimized for drilling in rails.**

Schnittdaten
Cutting data

Film
Movie



1295



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Zubehör für Hartmetall-bestückte Kernbohrer, Weldonschaft, Nutzlänge 30 mm
 Accessories for carbide-tipped annular cutter, Weldon shank, drill depth 30 mm | 1"

RAIL-LINE 730 20 1306

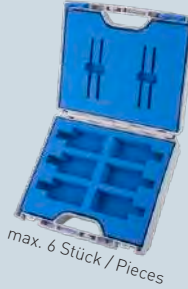
SETS / DISPLAYS

20 1344
 € 102,05



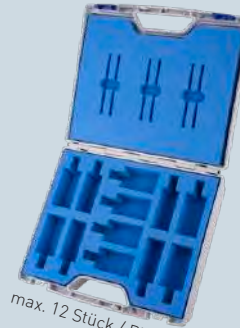
max. 44 Stück / Pieces

20 1138
 € 13,15



max. 6 Stück / Pieces

20 1132
 € 26,10



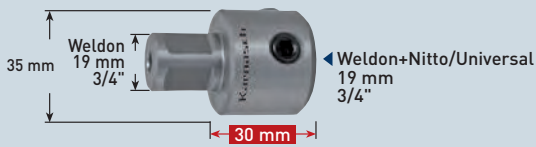
max. 12 Stück / Pieces

20 1139
 € 61,65

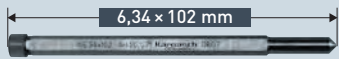


max. 50 Stück / Pieces

Sie möchten Ihren Inhalt selbst aussuchen? Kein Problem. Kontaktieren Sie uns und wir stellen Ihr Wunsch-Set oder Wunsch-Display zusammen.
 You would like to select your own contents? No Problem. Contact us and we create your individual set or display.



20 1432
 € 16,45



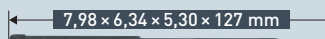
Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1271
 € 7,65

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS



20 1387
 € 18,95



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1433
 € 15,70



20 1402
 € 20,95

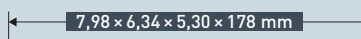


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1396
 € 16,45



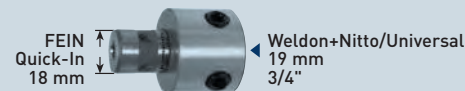
20 1417
 € 24,95



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1411
 € 17,05

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS



20 1263
 € 17,50



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1271
 € 7,65



20 1311
 € 16,30

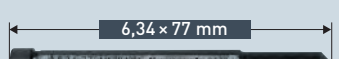


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1271
 € 7,65



21 0048
 € 14,15



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1261
 € 6,65

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 491
 Further accessories see overview page 491

Spezialverlängerungen + passender Auswerferstift von 30 mm auf 55 mm.
 Somit kann in vielen Fällen auf die längeren Kernbohrer RAIL-LINE 55 verzichtet werden.

Special extension + suitable ejector pin from 30 mm to 55 mm. This allows to renounce the longer annular cutter RAIL-LINE 55.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530



20 1309

RAIL-LINE 755

Hartmetall-bestückter Kernbohrer, Weldonschaft, Nutzlänge 55 mm
Carbide-tipped annular cutter, Weldon shank, drill depth 55 mm | 2"



ANWENDUNG · APPLICATION



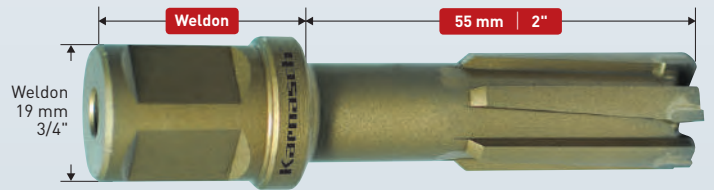
Für alle Schienentypen bis 1100 N (UIC 60).
Mehr als 100 Bohrungen in UIC 60 Schienen möglich.

Schienen

For all rail types up to 1100 N (UIC 60).

Rails

More than 100 holes in UIC 60 rails possible.



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 20 1309 018 | 18 | 45/64" | 50,05 | 20 1309 024 | 24 | 15/16" | 50,05 | 20 1309 030 | 30 | 1.3/16" | 54,70 | 20 1309 036 | 36 | 1.27/64" | 65,40 |
| 20 1309 019 | 19 | 3/4" | 50,05 | 20 1309 025 | 25 | 63/64" | 50,05 | 20 1309 031 | 31 | 1.7/32" | 60,50 | | | | |
| 20 1309 020 | 20 | 25/32" | 50,05 | 20 1309 026 | 26 | 1.1/32" | 54,70 | 20 1309 032 | 32 | 1.17/64" | 60,50 | | | | |
| 20 1309 021 | 21 | 53/64" | 50,05 | 20 1309 027 | 27 | 1.1/16" | 54,70 | 20 1309 033 | 33 | 1.19/64" | 60,50 | | | | |
| 20 1309 022 | 22 | 55/64" | 50,05 | 20 1309 028 | 28 | 1.7/64" | 54,70 | 20 1309 034 | 34 | 1.11/32" | 60,50 | | | | |
| 20 1309 023 | 23 | 29/32" | 50,05 | 20 1309 029 | 29 | 1.9/64" | 54,70 | 20 1309 035 | 35 | 1.3/8" | 60,50 | | | | |

Weitere Ø siehe Art. 20 1690 Seite 504 · **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Further Ø see Art. 20 1690 page 504 · **Attention:** The inch sizes do not correspond exactly to the mm diameters.

20 1309

RAIL-LINE 755

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE · EJECTOR PINS



20 1271
€ 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

EIGENSCHAFTEN · PROPERTIES



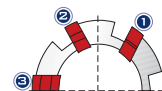
Karnasch Hartmetall-bestückte Kernbohrer (HARD-LINE) werden mit konischer Spirale gefertigt für: Sauberen Spanfluss und höchste Zerspanleistung auch bei schwierigen Materialien.

Karnasch carbide tipped annular cutters (HARD-LINE) are made with a conical helix for: clean chip flow and highest cutting ability even with difficult materials.



Karnasch Hartmetall-bestückte Kernbohrer (HARD-LINE) werden ausschließlich mit Sandvik Hartmetallzähnen bestückt. Wir meinen: Nur das beste Hartmetall ist gut genug für Karnasch Kernbohrer.

Karnasch carbide tipped annular cutters (HARD-LINE) are exclusively equipped with Sandvik carbide teeth. Our opinion is: Only the best carbide is good enough for Karnasch annular cutters.



Karnasch Hartmetall-bestückte Kernbohrer (HARD-LINE) sind in einer aufwendigen Vor-Mittel-Nachschneider-Geometrie gefertigt. Dies ergibt: ratterfreies, ruhiges und leichtes Zerspanen mit höchsten Standzeiten. Die **Schnittwinkel sind zum Bohren von Schienen optimiert.**

Karnasch carbide tipped annular cutters (HARD-LINE) are made in an elaborate pre-/intermediate-/after-cutting geometry. This results in: clatter-free, silent and easy cutting with highest lifetimes. **The cutting angles are optimized for drilling in rails.**

Schnittdaten
Cutting data



1295

Film
Movie



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Zubehör für Hartmetall-bestückte Kernbohrer, Weldonschaft, Nutzlänge 55 mm
 Accessories for carbide-tipped annular cutter, Weldon shank, drill depth 55 mm | 2"

RAIL-LINE 755 20 1309

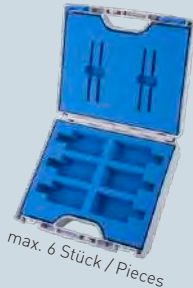
SETS / DISPLAYS

20 1344
 € 102,05



max. 44 Stück / Pieces

20 1138
 € 13,15



max. 6 Stück / Pieces

20 1132
 € 26,10



max. 12 Stück / Pieces

20 1139
 € 61,65



max. 50 Stück / Pieces

Sie möchten Ihren Inhalt selbst aussuchen? Kein Problem. Kontaktieren Sie uns und wir stellen Ihr Wunsch-Set oder Wunsch-Display zusammen.

You would like to select your own contents? No Problem. Contact us and we create your individual set or display.

**ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS**



20 1263
 € 17,50



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1160
 € 9,20



20 1311
 € 16,30



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1160
 € 9,20



21 0048
 € 14,15



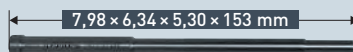
Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1271
 € 7,65

**VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
 EXTENSIONS + SUITABLE EJECTOR PINS**

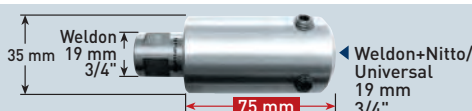


20 1387
 € 18,95

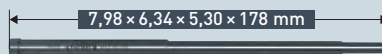


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1396
 € 16,45



20 1402
 € 20,95



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1411
 € 17,05



20 1417
 € 24,95



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1426
 € 18,35

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 491
 Further accessories see overview page 491



20 1284

BLUE-DRILL LINE 30 RAIL PRO

Pulverstahl + DURABLU-beschichteter Kernbohrer, Weldonschaft, Nutzlänge 30 mm
Powder steel + DURABLU-coated annular cutter, Weldon shank, drill depth 30 mm | 1"



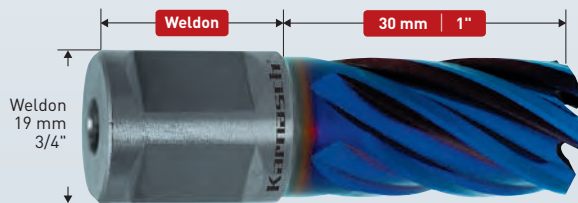
ANWENDUNG · APPLICATION



Für alle Schienentypen bis 1100 N (UIC 60).
Mehr als 100 Bohrungen in UIC 60 Schienen möglich.

Schienen
Rails

For all rail types up to 1100 N (UIC 60).
More than 100 holes in UIC 60 rails possible.



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|--------|-------------|------|-------------|--------|
| 20 1284 012 | 12 | 15/32" | 48,55 | 20 1284 020 | 20 | 25/32" | 55,55 | 20 1284 028 | 28 | 1.7/64" | 82,85 | 20 1284 036 | 36 | 1.27/64" | 111,25 |
| 20 1284 013 | 13 | 33/64" | 48,55 | 20 1284 021 | 21 | 53/64" | 55,90 | 20 1284 029 | 29 | 1.9/64" | 84,20 | | | | |
| 20 1284 014 | 14 | 35/64" | 48,55 | 20 1284 022 | 22 | 55/64" | 58,70 | 20 1284 030 | 30 | 1.3/16" | 86,25 | | | | |
| 20 1284 015 | 15 | 19/32" | 52,75 | 20 1284 023 | 23 | 29/32" | 61,75 | 20 1284 031 | 31 | 1.7/32" | 88,55 | | | | |
| 20 1284 016 | 16 | 5/8" | 52,75 | 20 1284 024 | 24 | 15/16" | 65,90 | 20 1284 032 | 32 | 1.17/64" | 92,25 | | | | |
| 20 1284 017 | 17 | 43/64" | 52,75 | 20 1284 025 | 25 | 63/64" | 65,90 | 20 1284 033 | 33 | 1.19/64" | 97,70 | | | | |
| 20 1284 018 | 18 | 45/64" | 52,75 | 20 1284 026 | 26 | 1.1/32" | 75,00 | 20 1284 034 | 34 | 1.11/32" | 97,70 | | | | |
| 20 1284 019 | 19 | 3/4" | 52,75 | 20 1284 027 | 27 | 1.1/16" | 75,10 | 20 1284 035 | 35 | 1.3/8" | 101,40 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1284

BLUE-DRILL LINE 30 RAIL PRO

ZUBEHÖR · ACCESSORIES

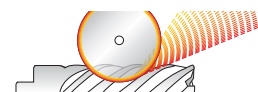
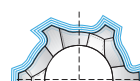
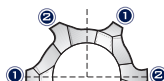
AUSWERFERSTIFTE · EJECTOR PINS



20 1261
€ 6,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

EIGENSCHAFTEN · PROPERTIES



Gefertigt aus ASP Pulverstahl zum Bohren auch schwierigster Materialien wie Eisenbahnschienen, Edelstähle, exotische Legierungen. Immer dort einsetzbar wo höchste Verschleißfestigkeit und Standzeit benötigt wird.

Made of ASP powder steel for drilling of difficult materials like railway tracks, stainless steels, exotic alloys. Applicable wherever a high wear resistance and lifetime are required.

Nur wenige Hersteller sind in der Lage in Stufen gehärtete Kernbohrer zu fertigen. Für uns ist dies „Standard“. Dadurch erreichen wir extrem harte Zahnspitzen (68 HRC) und dennoch einen flexiblen Kernbohrer.

Only few manufacturers are capable of producing step-hardened annular cutters. For Karnasch this is "standard". Only this makes us produce extremely hard tooth tips (68 HRC) and yet a flexible annular cutter.

Sieben verschiedene Schneidgeometrien je nach Durchmesser und Schnitttiefe des Kernbohrers optimiert ergeben höchste Zerspanleistung.

Seven different cutting geometries optimally adapted to the different diameter and drill depths leads to high performance cutting results.

Unsere hochwertigsten Kernbohrer erhalten die einzigartige und patentierte DURABLU-Beschichtung. Extreme Oberflächenhärte- und -glätte ergeben extreme Standzeiten auch unter nicht optimalen Arbeitsbedingungen wie „Über Kopf arbeiten“, Trockenbohrungen, u.s.w.

Our first-class annular cutters are equipped with the unique and patented DURABLU-coating. Extreme surface hardness and sleekness yield extreme lifetimes even under non-optimum circumstances like "overhead work", dry drilling, etc.

Aus dem vollen Material komplett geschliffen. Dieser Feinschliff erhöht die Zerspanleistung bei gleichzeitiger Reduzierung der Reibung. Für ein Mehr an Standzeit.

Completely made "FULLY GROUND". This refining rises the cutting ability with reducing friction at the same time. For an exceeded lifetime.

Schnittdaten
Cutting data

Film
Movie



1296



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Zubehör für Pulverstahl + DURABLU-beschichteten Kernbohrer, Weldonschaft, Nutzlänge 30 mm
 Accessories for Powder steel + DURABLU-coated annular cutter, Weldon shank, drill depth 30 mm | 1"

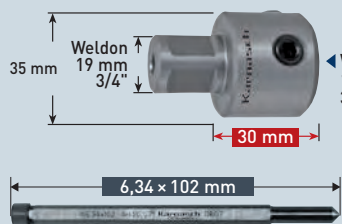
BLUE-DRILL LINE 30
RAIL PRO

20 1284

BLUE-DRILL LINE 30
RAIL PRO

SETS / DISPLAYS Seite / Page 538

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1284 BLUE-DRILL LINE 30 RAIL PRO – siehe Seite 538. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
 We offer a large selection of sets / displays – recommended content 20 1284 BLUE-DRILL LINE 30 RAIL PRO – see page 538. Other content possible by individually equipped sets / displays.

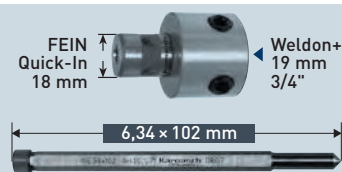


Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1432
 € 16,45

20 1271
 € 7,65

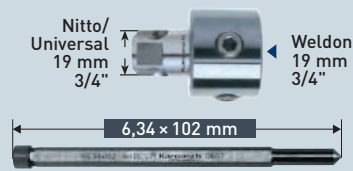
ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS



Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1263
 € 17,50

20 1271
 € 7,65



Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1311
 € 16,30

20 1271
 € 7,65



Packnorm 2 Stk. · Packaging unit 2 pcs.

21 0048
 € 14,15

20 1261
 € 6,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS



Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1387
 € 18,95

20 1433
 € 15,70



Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1402
 € 20,95

20 1396
 € 16,45



Packnorm 2 Stk. · Packaging unit 2 pcs.

20 1417
 € 24,95

20 1411
 € 17,05

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 491
 Further accessories see overview page 491

Spezialverlängerungen + passender Auswerferstift von 30 mm auf 50 mm.
 Somit kann in vielen Fällen auf die längeren Kernbohrer RAIL-LINE 50 verzichtet werden.

Special extension + suitable ejector pin from 30 mm to 50 mm. This allows to renounce the longer annular cutter RAIL-LINE 50.



20 1317

BLUE-DRILL LINE 55 RAIL PRO

Pulverstahl + DURABLU-beschichteter Kernbohrer, Weldonschaft, Nutzlänge 55 mm
Powder steel + DURABLU-coated annular cutter, Weldon shank, drill depth 55 mm | 2"



ANWENDUNG · APPLICATION

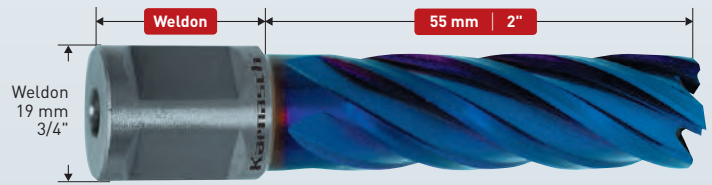


Für alle Schienentypen bis 1100 N (UIC 60).
Mehr als 100 Bohrungen in UIC 60 Schienen möglich.

Schienen

For all rail types up to 1100 N (UIC 60).
More than 100 holes in UIC 60 rails possible.

Rails



% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|--------|-------------|------|-------------|-------|
| 20 1317 012 | 12 | 15/32" | 61,55 | 20 1317 020 | 20 | 25/32" | 69,25 | 20 1317 028 | 28 | 1.7/64" | 54,00 | 20 1317 036 | 36 | 1.27/64" | 62,65 |
| 20 1317 013 | 13 | 33/64" | 61,55 | 20 1317 021 | 21 | 53/64" | 71,90 | 20 1317 029 | 29 | 1.9/64" | 54,80 | | | | |
| 20 1317 014 | 14 | 35/64" | 61,55 | 20 1317 022 | 22 | 55/64" | 73,25 | 20 1317 030 | 30 | 1.3/16" | 107,85 | | | | |
| 20 1317 015 | 15 | 19/32" | 65,10 | 20 1317 023 | 23 | 29/32" | 76,65 | 20 1317 031 | 31 | 1.7/32" | 54,00 | | | | |
| 20 1317 016 | 16 | 5/8" | 65,10 | 20 1317 024 | 24 | 15/16" | 82,85 | 20 1317 032 | 32 | 1.17/64" | 115,60 | | | | |
| 20 1317 017 | 17 | 43/64" | 65,10 | 20 1317 025 | 25 | 63/64" | 82,85 | 20 1317 033 | 33 | 1.19/64" | 122,80 | | | | |
| 20 1317 018 | 18 | 45/64" | 65,10 | 20 1317 026 | 26 | 1.1/32" | 89,50 | 20 1317 034 | 34 | 1.11/32" | 60,00 | | | | |
| 20 1317 019 | 19 | 3/4" | 65,10 | 20 1317 027 | 27 | 1.1/16" | 93,20 | 20 1317 035 | 35 | 1.3/8" | 62,60 | | | | |

Ersatzartikel siehe Art. 20 1284 Seite 510 + Adapter 20 1432, Art. 20 1309 Seite 508.
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Replacement article see Art. 20 1284 page 510 + adapter 20 1432, Art. 20 1309 page 508.
Attention: The inch sizes do not correspond exactly to the mm diameters.

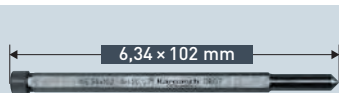
20 1317

BLUE-DRILL LINE 55 RAIL PRO

ZUBEHÖR · ACCESSORIES



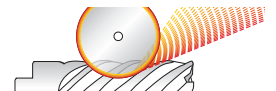
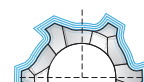
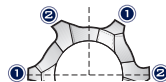
AUSWERFERSTIFTE · EJECTOR PINS



20 1271
€ 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

EIGENSCHAFTEN · PROPERTIES



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Aus dem vollen Material komplett geschliffen. Dieser Feinschliff erhöht die Zerspanleistung bei gleichzeitiger Reduzierung der Reibung. Für ein Mehr an Standzeit.

Completely made "FULLY GROUND". This refining rises the cutting ability with reducing friction at the same time. For an exceeded lifetime.

Schnittdaten Cutting data

Film Movie



1296



Zubehör für Pulverstahl + DURABLU- beschichteten Kernbohrer, Weldonschaft, Nutzlänge 55 mm
 Accessories for Powder steel + DURABLU-coated annular cutter, Weldon shank, drill depth 55 mm | 2"

BLUE-DRILL LINE 55
RAIL PRO

20 1317

BLUE-DRILL LINE 55
RAIL PRO

SETS / DISPLAYS Seite / Page 539

Wir bieten eine große Auswahl an Sets / Displays – Inhaltsvorschläge 20 1317 BLUE-DRILL LINE 55 RAIL PRO – siehe Seite 539. Anderer Inhalt auf Wunsch möglich, durch individuell bestückbare Sets / Displays.
 We offer a large selection of sets / displays – recommended content 20 1317 BLUE-DRILL LINE 55 RAIL PRO – see page 539. Other content possible by individually equipped sets / displays.



ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS

FEIN Quick-In 18 mm | **Weldon+Nitto/Universal 19 mm 3/4"**

• **20 1263**
 • € 17,50

6,34 × 130 mm

• **20 1160**
 • € 9,20

Packnorm 2 Stk. · Packaging unit 2 pcs.

Nitto/Universal 19 mm 3/4" | **Weldon 19 mm 3/4"**

• **20 1311**
 • € 16,30

6,34 × 130 mm

• **20 1160**
 • € 9,20

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 32 mm 1.1/4" | **Weldon + Nitto/Universal 19 mm 3/4"**

• **21 0048**
 • € 14,15

6,34 × 102 mm

• **20 1271**
 • € 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS

Weldon 19 mm 3/4" | **Weldon+Nitto/Universal 19 mm 3/4"**

35 mm | 50 mm

• **20 1387**
 • € 18,95

7,98 × 6,34 × 5,30 × 153 mm

• **20 1396**
 • € 16,45

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 19 mm 3/4" | **Weldon+Nitto/Universal 19 mm 3/4"**

35 mm | 75 mm

• **20 1402**
 • € 20,95

7,98 × 6,34 × 5,30 × 178 mm

• **20 1411**
 • € 17,05

Packnorm 2 Stk. · Packaging unit 2 pcs.

Weldon 19 mm 3/4" | **Weldon+Nitto/Universal 19 mm 3/4"**

35 mm | 100 mm

• **20 1417**
 • € 24,95

7,98 × 6,34 × 5,30 × 203 mm

• **20 1426**
 • € 18,35

Packnorm 2 Stk. · Packaging unit 2 pcs.

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 491
 Further accessories see overview page 491



20 1460

SILVER-DRILL LINE RAIL 30

HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 30 mm
HSS-XE annular cutter, Weldon shank, drill depth 30 mm | 1"



ANWENDUNG · APPLICATION



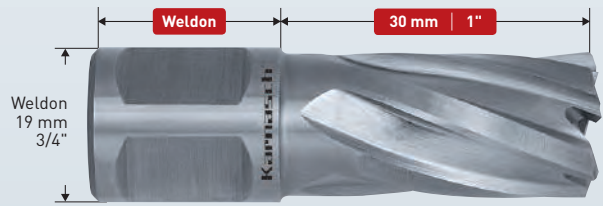
Für alle Schienentypen bis 1100 N (UIC 60).
Mehr als 60 Bohrungen in UIC 60 Schienen möglich.

Schienen

For all rail types up to 1100 N (UIC 60).

Rails

More than 60 holes in UIC 60 rails possible.



☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 20 1460 016 | 16 | 5/8" | 12,75 | 20 1460 022 | 22 | 55/64" | 17,20 | 20 1460 029 | 29 | 1.9/64" | 20,35 | 20 1460 035 | 35 | 1.3/8" | 23,55 |
| 20 1460 017 | 17 | 43/64" | 12,75 | 20 1460 023 | 23 | 29/32" | 17,20 | 20 1460 030 | 30 | 1.3/16" | 21,35 | 20 1460 036 | 36 | 1.27/64" | 26,65 |
| 20 1460 018 | 18 | 45/64" | 12,75 | 20 1460 024 | 24 | 15/16" | 17,85 | 20 1460 031 | 31 | 1.7/32" | 21,35 | | | | |
| 20 1460 019 | 19 | 3/4" | 12,75 | 20 1460 026 | 26 | 1.1/32" | 18,90 | 20 1460 032 | 32 | 1.17/64" | 22,30 | | | | |
| 20 1460 020 | 20 | 25/32" | 14,50 | 20 1460 027 | 27 | 1.1/16" | 18,90 | 20 1460 033 | 33 | 1.19/64" | 22,30 | | | | |
| 20 1460 021 | 21 | 53/64" | 14,50 | 20 1460 028 | 28 | 1.7/64" | 20,35 | 20 1460 034 | 34 | 1.11/32" | 23,55 | | | | |

Alternativartikel: Ø 13,5 mm siehe Art. 20 1430 S. 518 + Adapter, Art. 20 1284 S. 510, Art. 20 1306 S. 506 ·
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Alternative article Ø 13,5 mm see Art. 20 1430 p. 518 + adapter, Art. 20 1284 p. 510, Art. 20 1306 p. 506 ·
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1460

SILVER-DRILL LINE RAIL 30

ZUBEHÖR · ACCESSORIES



AUSWERFERSTIFTE · EJECTOR PINS



20 1261
€ 6,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

EIGENSCHAFTEN · PROPERTIES



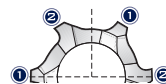
Gefertigt aus hochlegiertem HSS-XE Spezialstahl. Für extreme Härte an den Zahnsitzen (bis 68 HRC). Somit hohe Verschleißfestigkeit und Standzeit.

Made of high-alloyed HSS-XE special steel. For extreme hardness at the tip of the tooth (up to 68 HRC). Thus guaranteeing a high wear resistance and lifetime.



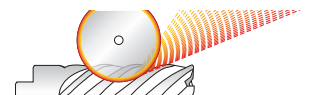
Nur wenige Hersteller sind in der Lage in Stufen gehärtete Kernbohrer zu fertigen. Für uns ist dies „Standard“. Dadurch erreichen wir extrem harte Zahnsitzen (68 HRC) und dennoch einen flexiblen Kernbohrer.

Only few manufacturers are capable of producing step-hardened annular cutters. For Karnasch this is "standard". Only this makes us produce extremely hard tooth tips (68 HRC) and yet a flexible annular cutter.



Sieben verschiedene Schneidgeometrien je nach Durchmesser und Schnitttiefe des Kernbohrers optimiert ergeben höchste Zerspanleistung.

Seven different cutting geometries optimally adapted to the different diameter and drill depths leads to high performance cutting results.



Aus dem vollen Material komplett geschliffen. Dieser Feinschliff erhöht die Zerspanleistung bei gleichzeitiger Reduzierung der Reibung. Für ein Mehr an Standzeit.

Completely made "FULLY GROUND". This refining rises the cutting ability with reducing friction at the same time. For an exceeded lifetime.

Schnittdaten
Cutting data



1296

Film
Movie



Zubehör für HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 30 mm
 Accessories for HSS-XE annular cutter, Weldon shank, drill depth 30 mm | 1"

SILVER-DRILL LINE **30**
RAIL

20 1460

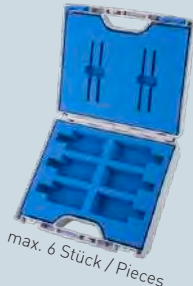
SETS / DISPLAYS

20 1344
 € 102,05



max. 44 Stück / Pieces

20 1138
 € 13,15



max. 6 Stück / Pieces

20 1132
 € 26,10



max. 12 Stück / Pieces

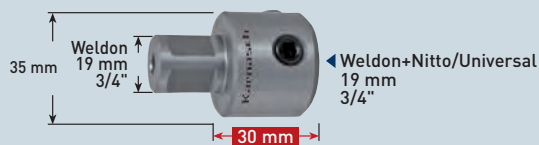
20 1139
 € 61,65



max. 50 Stück / Pieces

Sie möchten Ihren Inhalt selbst aussuchen? Kein Problem. Kontaktieren Sie uns und wir stellen Ihr Wunsch-Set oder Wunsch-Display zusammen.

You would like to select your own contents? No Problem. Contact us and we create your individual set or display.



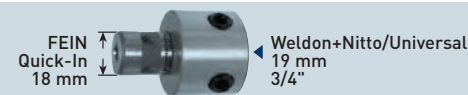
20 1432
 € 16,45



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1271
 € 7,65

ADAPTER + PASSENDE AUSWERFERSTIFTE
ADAPTER + SUITABLE EJECTOR PINS



20 1263
 € 17,50



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1271
 € 7,65



20 1311
 € 16,30

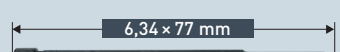


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1271
 € 7,65



21 0048
 € 14,15



Packnorm 2 Stk. - Packaging unit 2 pcs.

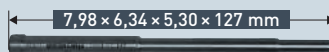
20 1261
 € 6,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
EXTENSIONS + SUITABLE EJECTOR PINS



20 1387
 € 18,95



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1433
 € 15,70



20 1402
 € 20,95



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1396
 € 16,45



20 1417
 € 24,95



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1411
 € 17,05

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 491
 Further accessories see overview page 491



20 1480

SILVER-DRILL LINE RAIL 55

HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 55 mm
HSS-XE annular cutter, Weldon shank, drill depth 55 mm | 2"



ANWENDUNG · APPLICATION



Für alle Schienentypen bis 1100 N (UIC 60).
Mehr als 60 Bohrungen in UIC 60 Schienen möglich.

Schienen

For all rail types up to 1100 N (UIC 60).

Rails

More than 60 holes in UIC 60 rails possible.



% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € |
|-------------|------|--------|-------|-------------|------|---------|-------|-------------|------|----------|-------|-------------|------|----------|-------|
| 20 1480 018 | 18 | 45/64" | 15,60 | 20 1480 023 | 23 | 29/32" | 19,50 | 20 1480 029 | 29 | 1.9/64" | 23,10 | 20 1480 034 | 34 | 1.11/32" | 26,65 |
| 20 1480 019 | 19 | 3/4" | 15,60 | 20 1480 024 | 24 | 15/16" | 20,25 | 20 1480 030 | 30 | 1.3/16" | 24,20 | 20 1480 035 | 35 | 1.3/8" | 26,65 |
| 20 1480 020 | 20 | 25/32" | 16,45 | 20 1480 025 | 25 | 63/64" | 20,25 | 20 1480 031 | 31 | 1.7/32" | 24,20 | 20 1480 036 | 36 | 1.27/64" | 30,25 |
| 20 1480 021 | 21 | 53/64" | 16,45 | 20 1480 027 | 27 | 1.1/16" | 21,45 | 20 1480 032 | 32 | 1.17/64" | 25,30 | | | | |
| 20 1480 022 | 22 | 55/64" | 19,50 | 20 1480 028 | 28 | 1.7/64" | 23,10 | 20 1480 033 | 33 | 1.19/64" | 25,30 | | | | |

Alternativartikel: Art. 20 1317 Seite 512, Art. 20 1309 Seite 508.
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Alternative article: Art. 20 1317 page 512, Art. 20 1309 page 508.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1480

SILVER-DRILL LINE RAIL 55

ZUBEHÖR · ACCESSORIES



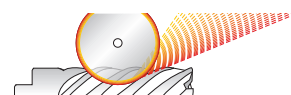
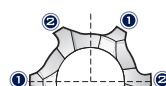
AUSWERFERSTIFTE · EJECTOR PINS



20 1271
• € 7,65

Packnorm 2 Stk. · Packaging unit 2 pcs.

EIGENSCHAFTEN · PROPERTIES



Gefertigt aus hochlegiertem HSS-XE Spezialstahl. Für extreme Härte an den Zahnsitzen (bis 68 HRC). Somit hohe Verschleißfestigkeit und Standzeit.

Made of high-alloyed HSS-XE special steel. For extreme hardness at the tip of the tooth (up to 68 HRC). Thus guaranteeing a high wear resistance and lifetime.

Nur wenige Hersteller sind in der Lage in Stufen gehärtete Kernbohrer zu fertigen. Für uns ist dies „Standard“. Dadurch erreichen wir extrem harte Zahnsitzen (68 HRC) und dennoch einen flexiblen Kernbohrer.

Only few manufacturers are capable of producing step-hardened annular cutters. For Karnasch this is "standard". Only this makes us produce extremely hard tooth tips (68 HRC) and yet a flexible annular cutter.

Sieben verschiedene Schneidgeometrien je nach Durchmesser und Schnitttiefe des Kernbohrers optimiert ergeben höchste Zerspanleistung.

Seven different cutting geometries optimally adapted to the different diameter and drill depths lead to high performance cutting results.

Aus dem vollen Material komplett geschliffen. Dieser Feinschliff erhöht die Zerspanleistung bei gleichzeitiger Reduzierung der Reibung. Für ein Mehr an Standzeit.

Completely made "FULLY GROUND". This refining rises the cutting ability with reducing friction at the same time. For an exceeded lifetime.

Schnittdaten
Cutting data

Film
Movie



1296



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Zubehör für HSS-XE Kernbohrer, Weldonschaft, Nutzlänge 55 mm
 Accessories for HSS-XE annular cutter, Weldon shank, drill depth 55 mm | 2"

SILVER-DRILL LINE RAIL 55 20 1480

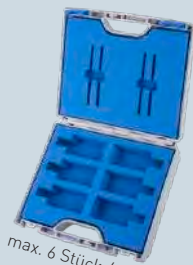
SETS / DISPLAYS

20 1344
 € 102,05



max. 44 Stück / Pieces

20 1138
 € 13,15



max. 6 Stück / Pieces

20 1132
 € 26,10



max. 12 Stück / Pieces

20 1139
 € 61,65

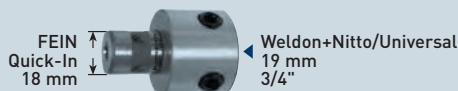


max. 50 Stück / Pieces

Sie möchten Ihren Inhalt selbst aussuchen? Kein Problem. Kontaktieren Sie uns und wir stellen Ihr Wunsch-Set oder Wunsch-Display zusammen.

You would like to select your own contents? No Problem. Contact us and we create your individual set or display.

ADAPTER + PASSENDE AUSWERFERSTIFTE
 ADAPTER + SUITABLE EJECTOR PINS

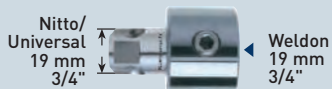


20 1263
 € 17,50



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1160
 € 9,20



20 1311
 € 16,30



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1160
 € 9,20



21 0048
 € 14,15



Packnorm 2 Stk. - Packaging unit 2 pcs.

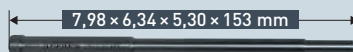
20 1271
 € 7,65

Ersatz-Innensechskantschrauben für alle Adapter siehe Seite 530
 Spare allen screws for all adapters see page 530

VERLÄNGERUNGEN + PASSENDE AUSWERFERSTIFTE
 EXTENSIONS + SUITABLE EJECTOR PINS

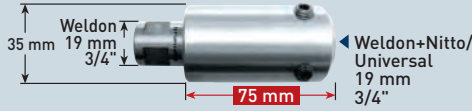


20 1387
 € 18,95

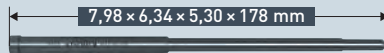


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1396
 € 16,45



20 1402
 € 20,95

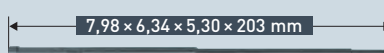


Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1411
 € 17,05



20 1417
 € 24,95



Packnorm 2 Stk. - Packaging unit 2 pcs.

20 1426
 € 18,35

Ersatz-Innensechskantschrauben für alle Verlängerungen siehe Seite 530
 Spare allen screws for all extensions see page 530

Weiteres Zubehör siehe Übersichtsseite 491
 Further accessories see overview page 491



20 1430

DRILL-LINE 30
RAIL PRO



Pulverstahl + DURABLUE-beschichteter Spiralbohrer, Nutzlänge 30 mm, Weldonschaft oder Fein Quick-In Schaft
Powder steel + DURABLUE-coated twist drill, drill depth 30 mm | 1", Weldon shank or Fein Quick-In shank

ANWENDUNG · APPLICATION

I Für alle Schienentypen bis 1100 N (UIC 60). Mehr als 100 Bohrungen in UIC 60 Schienen möglich.

Schienen For all rail types up to 1100 N (UIC 60).
Rails More than 100 holes in UIC 60 rails possible.



Weldon 19 mm 3/4" Adapter siehe Zubehör
Fein Quick-In 18 mm Adapter see accessories

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|--------------|------|-------------|-------|
| 20 1430 006 | 6 | 15/64" | 23,70 | 20 1430 013 | 13 | 33/64" | 44,35 |
| 20 1430 008 | 8 | 5/16" | 23,70 | 20 1430 0135 | 13,5 | 17/32" | 51,95 |
| 20 1430 0098 | 9,8 | 25/64" | 28,85 | 20 1430 014 | 14 | 35/64" | 52,75 |
| 20 1430 010 | 10 | 25/64" | 28,85 | 20 1430 015 | 15 | 19/32" | 54,90 |
| 20 1430 011 | 11 | 7/16" | 32,40 | 20 1430 016 | 16 | 5/8" | 62,50 |
| 20 1430 012 | 12 | 15/32" | 36,05 | | | | |

Für Ø 6 - 16 mm benötigen Sie Adapter (siehe Zubehör).
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
For Ø 6 - 16 mm you need adapter (see accessories).
Attention: The inch sizes do not correspond exactly to the mm diameters.

ZUBEHÖR · ACCESSORY

Adapter mit Bolzen zum Öffnen der Kühlmittelzufuhr
Adapter with pin for opening the coolant supply

WELDON 19 mm (3/4")

Weldon 19 mm 3/4" • Ø 6-12 mm 20 1431 • € 11,60

Weldon 19 mm 3/4" • Ø 13-16 mm 20 1434 • € 11,60

FEIN QUICK-IN

Fein Quick-In 18 mm • Ø 6-12 mm 20 1421 • € 11,60

Fein Quick-In 18 mm • Ø 13-16 mm 20 1422 • € 11,60

20 1430

DRILL-LINE 40
RAIL PRO

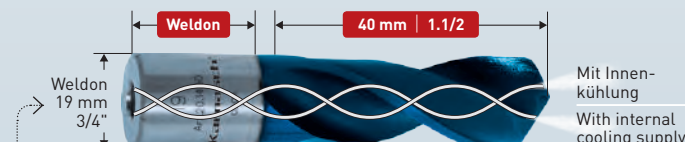


Pulverstahl + DURABLUE-beschichteter Spiralbohrer mit Innenkühlung, Nutzlänge 40 mm, Weldonschaft
Powder steel + DURABLUE-coated twist drill with internal cooling supply, drill depth 40 mm | 1.1/2", Weldon shank

ANWENDUNG · APPLICATION

I Für alle Schienentypen bis 1100 N (UIC 60). Mehr als 100 Bohrungen in UIC 60 Schienen möglich.

Schienen For all rail types up to 1100 N (UIC 60).
Rails More than 100 holes in UIC 60 rails possible.



Ø 17-27,5 mm wird ohne Bolzen zum Öffnen der Kühlmittelzufuhr geliefert (wenn benötigt siehe Zubehör).
Ø 17-27,5 mm will be delivered without pin for opening the cooling supply (see accessories if required).

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|--------------|------|-------------|-------|
| 20 1430 017 | 17 | 43/64" | 63,55 | 20 1430 023 | 23 | 29/32" | 80,70 |
| 20 1430 018 | 18 | 45/64" | 64,50 | 20 1430 024 | 24 | 15/16" | 82,80 |
| 20 1430 019 | 19 | 3/4" | 68,30 | 20 1430 0275 | 27,5 | 1.5/64" | 88,30 |
| 20 1430 020 | 20 | 25/32" | 70,85 | | | | |
| 20 1430 021 | 21 | 53/64" | 72,70 | | | | |
| 20 1430 022 | 22 | 55/64" | 74,70 | | | | |

Weitere Abmessungen sowie Schnitttiefe 50 mm siehe nächste Seite Art. 20 1465.
Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
More dimensions and cutting depth 50 mm see next page art. 20 1465.
Attention: The inch sizes do not correspond exactly to the mm diameters.

ZUBEHÖR · ACCESSORY

Der Bolzen ist nur notwendig, wenn Aufnahmehalter mit Innenkühlung verwendet werden (Siehe Seite 521-523).
The pin is only necessary if you use tool holders with internal cooling supply (see page 521-523).

Bolzen zum Öffnen der Kühlmittelzufuhr
Pin for opening the cooling supply

• 20 1435 • € 4,25

Schnittdaten Cutting data | Film Movie

i | Play

1296

Pulverstahl + DURABLU-beschichteter Spiralbohrer mit Innenkühlung, Nutzlänge 50 mm, Weldonschaft
 Powder steel + DURABLU-coated twist drill with internal cooling supply, drill depth 50 mm | 2", Weldon shank

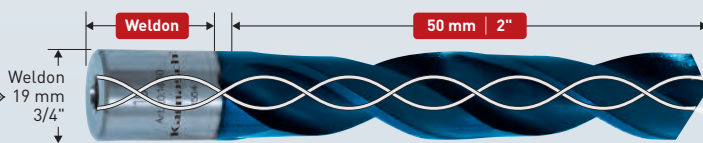
DRILL-LINE **RAIL** **50** **PRO** **20 1465**

ANWENDUNG · APPLICATION

Für alle Schienentypen bis 1100 N (UIC 60).
 Mehr als 100 Bohrungen in UIC 60 Schienen möglich.

Schienen
 Rails

For all rail types up to 1100 N (UIC 60).
 More than 100 holes in UIC 60 rails possible.



Mit Innenkühlung
 With internal cooling supply

Wird ohne Bolzen zum Öffnen der Kühlmittelzufuhr geliefert (wenn benötigt siehe Zubehör).
 Will be delivered without pin for opening the cooling supply (see accessories if required).

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|--------|-------------|------|-------------|--------|
| 20 1465 014 | • 14 | 35/64" | 80,85 | 20 1465 020 | • 20 | 25/32" | 90,25 | 20 1465 026 | • 26 | 1.1/32" | 123,80 |
| 20 1465 015 | • 15 | 19/32" | 80,85 | 20 1465 021 | • 21 | 53/64" | 90,25 | 20 1465 027 | • 27 | 1.1/16" | 123,80 |
| 20 1465 016 | • 16 | 5/8" | 83,85 | 20 1465 022 | • 22 | 55/64" | 97,35 | 20 1465 028 | • 28 | 1.7/64" | 143,50 |
| 20 1465 017 | • 17 | 43/64" | 83,85 | 20 1465 023 | • 23 | 29/32" | 98,15 | 20 1465 030 | • 30 | 1.3/16" | 159,35 |
| 20 1465 018 | • 18 | 45/64" | 83,85 | 20 1465 024 | • 24 | 15/16" | 109,30 | 20 1465 032 | • 32 | 1.17/64" | 172,05 |
| 20 1465 019 | • 19 | 3/4" | 83,85 | 20 1465 025 | • 25 | 63/64" | 109,30 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmesser.

Attention: The inch sizes do not correspond exactly to the mm diameters.

ZUBEHÖR · ACCESSORY

Der Bolzen ist nur notwendig, wenn Aufnahmehalter mit Innenkühlung verwendet werden (Siehe Seite 521-523).

The pin is only necessary if you use tool holders with internal cooling supply (see page 521-523).

Bolzen zum Öffnen der Kühlmittelzufuhr
 Pin for opening the cooling supply



20 1435
 • € 4,25

EIGENSCHAFTEN · PROPERTIES

Für Art. 20 1430 Seite 518 sowie für Art. 20 1465 · For Art. 20 1430 page 518 and for Art. 20 1465



Gefertigt aus ASP Pulverstahl zum Bohren auch schwierigster Materialien wie Eisenbahnschienen, Edelstähle, exotische Legierungen. Immer dort einsetzbar wo höchste Verschleißfestigkeit und Standzeit benötigt wird.

Made of ASP powder steel for drilling of difficult materials like railway tracks, stainless steels, exotic alloys. Applicable wherever a high wear resistance and lifetime are required.

Karnasch Spiralbohrer werden mit einer Hochleistungsgeometrie gefertigt für: Sofortiges Selbstzentrieren, leichteres Zerspanen, höchste Standzeiten.

Karnasch twist drills are produced in a heavy-duty geometry for immediate self-centering, easy cutting, highest lifetimes.

Unsere hochwertigsten Spiralbohrer erhalten die einzigartige und patentierte DURABLU-Beschichtung. Extreme Oberflächenhärte- und -glätte ergeben extreme Standzeiten auch unter nicht optimalen Arbeitsbedingungen wie „Über Kopf arbeiten“, Trockenbohrungen, u.s.w.

Our first-class twist drills are equipped with the unique and patented DURABLU-coating. Extreme surface hardness and sleekness yield extreme lifetimes even under non-optimum conditions like "overhead work", dry drilling, etc.

Schnittdaten
 Cutting data



1296

Film
 Movie



519





20 1710

DRILL-LINE RAIL 30



HSS-XE Spiralbohrer, Nutzlänge 30 mm, Weldonschaft
HSS-XE twist drill, drill depth 30 mm | 1", Weldon shank

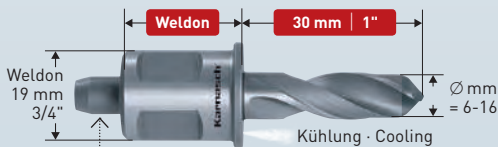
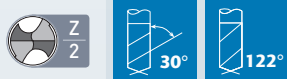
ANWENDUNG · APPLICATION



Für alle Schienentypen bis 1100 N (UIC 60).
Mehr als 60 Bohrungen in UIC 60 Schienen möglich.

Schienen
Rails

For all rail types up to 1100 N (UIC 60).
More than 60 holes in UIC 60 rails possible.



Ø 6-16 mm wird mit Bolzen zum Öffnen der Kühlmittelzufuhr geliefert.
Ø 6-16 mm will be delivered with pin for opening the cooling supply.

| Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € |
|--------------|------|--------|-------|--------------|------|--------|-------|
| 20 1710 006 | 6 | 15/64" | 14,90 | 20 1710 012 | 12 | 15/32" | 17,40 |
| 20 1710 008 | 8 | 5/16" | 14,90 | 20 1710 013 | 13 | 33/64" | 21,45 |
| 20 1710 0095 | 9,5 | 25/64" | 13,60 | 20 1710 0135 | 13,5 | 17/32" | 19,55 |
| 20 1710 0098 | 9,8 | 25/64" | 13,60 | 20 1710 014 | 14 | 35/64" | 21,45 |
| 20 1710 010 | 10 | 25/64" | 14,90 | 20 1710 015 | 15 | 19/32" | 25,60 |
| 20 1710 011 | 11 | 7/16" | 17,40 | 20 1710 016 | 16 | 5/8" | 25,60 |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1710

DRILL-LINE RAIL 40



HSS-XE Spiralbohrer mit Innenkühlung, Nutzlänge 40 mm, Weldonschaft
HSS-XE twist drill with internal cooling supply, drill depth 40 mm | 1", Weldon shank

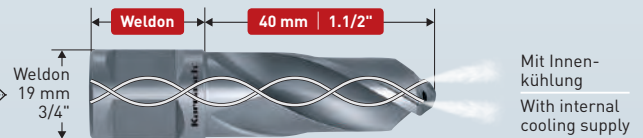
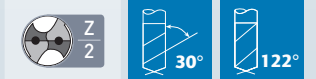
ANWENDUNG · APPLICATION



Für alle Schienentypen bis 1100 N (UIC 60).
Mehr als 60 Bohrungen in UIC 60 Schienen möglich.

Schienen
Rails

For all rail types up to 1100 N (UIC 60).
More than 60 holes in UIC 60 rails possible.



Ø 17-27,5 mm wird ohne Bolzen zum Öffnen der Kühlmittelzufuhr geliefert (wenn benötigt siehe Zubehör).
Ø 17-27,5 mm will be delivered without pin for opening the cooling supply (see accessories if required).

| Art. | Ø mm | Ø Zoll | € | Art. | Ø mm | Ø Zoll | € |
|-------------|------|--------|-------|--------------|------|---------|-------|
| 20 1710 017 | 17 | 43/64" | 17,25 | 20 1710 023 | 23 | 29/32" | 21,40 |
| 20 1710 018 | 18 | 45/64" | 17,25 | 20 1710 024 | 24 | 15/16" | 21,40 |
| 20 1710 019 | 19 | 3/4" | 18,15 | 20 1710 0275 | 27,5 | 1.5/64" | 23,90 |
| 20 1710 020 | 20 | 25/32" | 18,15 | | | | |
| 20 1710 021 | 21 | 53/64" | 19,85 | | | | |
| 20 1710 022 | 22 | 55/64" | 19,85 | | | | |

Ersatzartikel siehe Art. 20 1430 Seite 518 / Replacement article see Art. 20 1430 page 518

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
Attention: The inch sizes do not correspond exactly to the mm diameters.



ZUBEHÖR · ACCESSORY

Der Bolzen ist nur notwendig, wenn Aufnahmehalter mit Innenkühlung verwendet werden (Siehe Seite 521-523).
The pin is only necessary if you use tool holders with internal cooling supply (see page 521-523).

Bolzen zum Öffnen der Kühlmittelzufuhr
Pin for opening the cooling supply



20 1435
€ 4,25

EIGENSCHAFTEN · PROPERTIES



Gefertigt aus hochlegiertem HSS-XE Spezialstahl. Für extreme Härte an den Zahnsitzen (bis 68 HRC). Somit hohe Verschleißfestigkeit und Standzeit.

Karnasch Spiralbohrer werden mit einer Hochleistungsgeometrie gefertigt für: Sofortiges Selbstzentrieren, leichteres Zerspanen, höchste Standzeiten.

Made of high-alloyed HSS-XE special steel. For extreme hardness at the tip of the tooth (up to 68 HRC). Thus guaranteeing a high wear resistance and lifetime.

Karnasch twist drills are produced in a heavy-duty geometry for immediate self-centering, easy cutting, highest lifetimes.

Schnittdaten
Cutting data



% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Schnittdaten
Cutting data



Film
Movie



Sekundenschneller Kernbohrwechsel ohne Werkzeug. Passend für alle Kernbohrer mit Weldon + Nitto / Universalschaft 19 mm (3/4").

- Für alle HSS-XE-Kernbohrer bis max. Ø 60 mm sowie max. Schnitttiefe 55 mm
- Für alle HM-Kernbohrer bis max. Ø 50 mm sowie max. Schnitttiefe 55 mm

Alle Schnellwechsel Aufnahmen sind komplett verchromt und somit Schmutz- und Rostbeständig. Selbstverständlich kommen alle Aufnahmen, mit Innenkühlung, mit dem bewährten Schnellwechsel-Kühlmittelschlauchsystem.

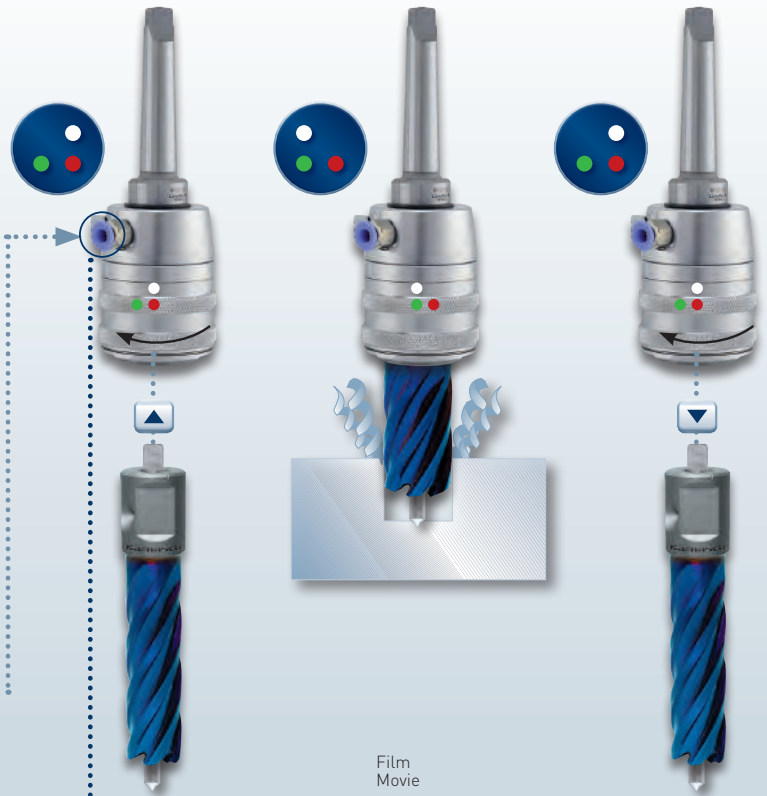
Verwenden Sie Karnasch **QUICK-CHANGE** -Halter nur mit Original Karnasch Kernbohrern. Die einwandfreie Funktion des Karnasch **QUICK-CHANGE** -Halters mit anderen Fabrikaten können wir nicht garantieren.

Changing annular cutters in a matter of seconds without tools. Suitable for all annular cutters with Weldon shank / Universal + Weldon shank 19 mm (3/4").

- All HSS-XE annular cutters up to a diameter of 60 mm. Cutting depth 55 mm.
- All carbide tipped annular cutters up to a diameter of 50 mm. Cutting depth 55 mm.

All Quick-Change holders are fully chromed and thus dirt and rust resistant. Additionally comes all Quick-Change holders, with internal cooling, with the proven Quick-change coolant hose system.

Use Karnasch **QUICK-CHANGE** holders only with original Karnasch annular cutters. We cannot guarantee a faultless operation of the Karnasch **QUICK-CHANGE** holder in combination with other products.



Film Movie



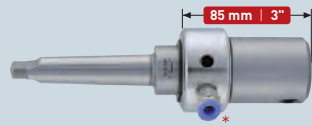

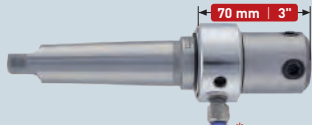
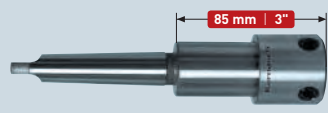
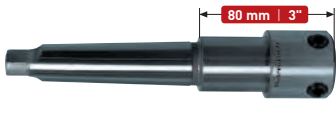
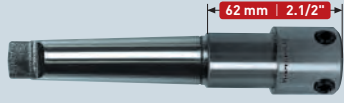
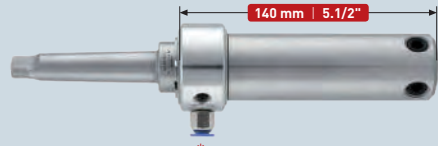
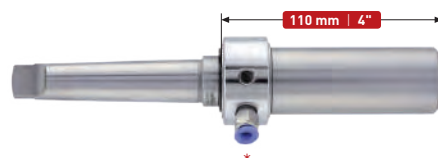
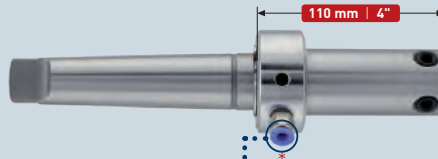

21 0047
€ 1,70



Ersatzteil: Schnellwechsel-Kühlmittelschlauchhalter für alle MK Aufnahmen mit Innenkühlung
Spare part: Quick-change coolant hose holder for all Morse taper holders with internal cooling

| Aufnahmehalter Tool holder | QUICK-CHANGE | MIT INNENKÜHLUNG WITH INTERNAL COOLING | für Kernbohrer mit Schaft for annular cutter with shank | : Weldon + Nitto / Universal 19 mm (3/4") |
|---------------------------------------|------------------------------|---|---|---|
| Morsekegel (MK) · Morse taper (MT) | Aufnahmehalter · Tool holder | Art. | Hinweise · Notes | |
| 2 | | 20 1303 € 113,45 | Bei Schnitttiefen über 55 mm sind 2-teilige Auswerferstifte zu verwenden. | |
| 3 | | 20 1307 € 117,05 | For drill depths more than 55 mm 2-part ejector pins must be used. | |
| Aufnahmehalter Tool holder | QUICK-CHANGE | OHNE INNENKÜHLUNG WITHOUT INTERNAL COOLING | für Kernbohrer mit Schaft for annular cutter with shank | : Weldon + Nitto / Universal 19 mm (3/4") |
| Morsekegel (MK) · Morse taper (MT) | Aufnahmehalter · Tool holder | Art. | Hinweise · Notes | |
| 2 | | 20 1301 € 83,35 | Bei Schnitttiefen über 55 mm sind 2-teilige Auswerferstifte zu verwenden. | |
| 3 | | 20 1437 € 85,70 | For drill depths more than 55 mm 2-part ejector pins must be used. | |

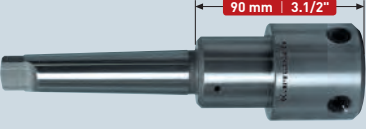
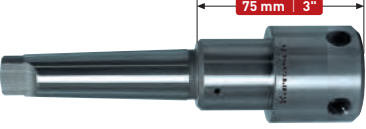



| Aufnahmehalter Tool holder | | MIT INNENKÜHLUNG WITH INTERNAL COOLING | für Kernbohrer mit Schaft for annular cutter with shank | : Weldon + Nitto / Universal 19 mm (3/4") | |
|---|---|---|--|---|--|
| Morsekegel (MK) - Morse taper (MT) | Aufnahmehalter · Tool holder | Art. | Hinweise · Notes | | |
| 2 |  | 20 1287 € 83,00 | Bei Schnitttiefen über 55 mm sind 2-teilige Auswerferstifte zu verwenden. * Alle Aufnahmen, mit Innenkühlung, kommen mit dem bewährten Schnellwechsel-Kühlmittelschlauchsystm. For drill depths more than 55 mm 2-part ejector pins must be used. * All Quick-Change holders with internal cooling, comes with the proven Quick-change coolant hose system. | | |
| 3 |  | 20 1289 € 87,80 | | | |
| 4 |  | 20 1310 € 92,10 | | | |
| Aufnahmehalter Tool holder | | OHNE INNENKÜHLUNG WITHOUT INTERNAL COOLING | für Kernbohrer mit Schaft for annular cutter with shank | : Weldon + Nitto / Universal 19 mm (3/4") | |
| Morsekegel (MK) - Morse taper (MT) | Aufnahmehalter · Tool holder | Art. | Hinweise · Notes | | |
| 2 |  | 20 1283 € 43,35 | Bei Schnitttiefen über 55 mm sind 2-teilige Auswerferstifte zu verwenden. For drill depths more than 55 mm 2-part ejector pins must be used. | | |
| 3 |  | 20 1293 € 46,55 | | | |
| 4 |  | 20 1841 € 52,90 | | | |
| Aufnahmehalter extra lang Tool holder extra long | | MIT INNENKÜHLUNG WITH INTERNAL COOLING | für Kernbohrer mit Schaft for annular cutter with shank | : Weldon + Nitto / Universal 19 mm (3/4") | |
| Morsekegel (MK) - Morse taper (MT) | Aufnahmehalter · Tool holder | Art. | Hinweise · Notes | | |
| 2 |  | 20 1842 € 104,40 | Bei den Aufnahmehaltern entfällt das Umstecken 2-teiliger Auswerferstifte. Es kann mit 1-teiligen Auswerferstiften kontinuierlich bis 110 mm Schnitttiefe gebohrt werden. * Alle Aufnahmen, mit Innenkühlung, kommen mit dem bewährten Schnellwechsel-Kühlmittelschlauchsystm. With these tool holders replugging of the 2-piece ejector pins is not necessary. You can drill as deep as 110 mm in one working process with a 1-part ejector pin. * All Quick-Change holders with internal cooling, comes with the proven Quick-change coolant hose system. | | |
| 3 |  | 20 1291 € 109,45 | | | |
| 4 |  | 20 1843 € 118,10 | | | |
| 21 0047 |  | € 1,70 | | | |


Ersatzteil: Schnellwechsel-Kühlmittelschlauchhalter für alle MK Aufnahmen mit Innenkühlung
Spare part: Quick-change coolant hose holder for all MT holders with internal cooling



| Aufnahmehalter Tool holder | MIT INNENKÜHLUNG WITH INTERNAL COOLING | für Kernbohrer mit Schaft for annular cutter with shank | : Weldon 32 mm (1.1/4") | |
|---------------------------------------|---|--|---|--|
| Morsekegel [MK] - Morse taper [MT] | Aufnahmehalter - Tool holder | Art. | Hinweise - Notes | |
| 3 |  |  20 1290 € 98,95 | Bei Schnitttiefen über 55 mm sind 2-teilige Auswerferstifte zu verwenden. Bei Durchmessern über 100 mm empfehlen wir MK 4 oder MK 5 Morsekegel. | |
| 4 |  |  20 1292 € 99,75 | * Alle Aufnahmen, mit Innenkühlung, kommen mit dem bewährten Schnellwechsel-Kühlmittelschlauchsystem. | |
| 5 |  |  20 1395 € 124,15 | For drill depths more than 55 mm 2 part ejector pins must be used. For diameters more than 100 mm we recommend MT 4 or MT 5 morse taper. * All Quick-Change holders with internal cooling, comes with the proven Quick-change coolant hose system. | |

| Aufnahmehalter Tool holder | OHNE INNENKÜHLUNG WITHOUT INTERNAL COOLING | für Kernbohrer mit Schaft for annular cutter with shank | : Weldon 32 mm (1.1/4") | |
|---------------------------------------|---|---|---|--|
| Morsekegel [MK] - Morse taper [MT] | Aufnahmehalter - Tool holder | Art. | Hinweise - Notes | |
| 3 |  |  20 1286 € 40,00 | Bei Schnitttiefen über 55 mm sind 2-teilige Auswerferstifte zu verwenden. Bei Durchmessern über 100 mm empfehlen wir MK 4 Morsekegel. | |
| 4 |  |  20 1844 € 56,05 | For drill depths more than 55 mm 2 part ejector pins must be used. For diameters more than 100 mm we recommend MT 4 morse taper. | |

| Aufnahmehalter extra lang Tool holder extra long | MIT INNENKÜHLUNG WITH INTERNAL COOLING | für Kernbohrer mit Schaft for annular cutter with shank | : Weldon 32 mm (1.1/4") | |
|---|---|--|---|--|
| Morsekegel [MK] - Morse taper [MT] | Aufnahmehalter - Tool holder | Art. | Hinweise - Notes | |
| 3 |  |  20 1845 € 114,30 | Bei diesen Aufnahmehaltern entfällt das Umstecken 2-teiliger Auswerferstifte. Es kann mit 1-teiligen Auswerferstiften kontinuierlich bis 110 mm Schnitttiefe gebohrt werden. Bei Durchmessern über 100 mm empfehlen wir MK 4 Morsekegel. | |
| 4 |  |  20 1846 € 123,10 | With this tool holders replugging of the 2-pieces ejector pins is not necessary. You can drill as deep as 110 mm in one working process with a 1-part ejector pin. For diameter more than 100 mm we recommend MT 4 morse taper. * All Quick-Change holders with internal cooling, comes with the proven Quick-change coolant hose system. | |

| Zubehör Aufnahmehalter Accessories Tool holder | Reduzierhülsen Reduction sleeves | | | |
|--|---|----------------|------------------|-------|
| | Beschreibung - Specification | Länge - Length | Art. | € |
|  | Reduzierung von MK 3 (außen) auf MK 2 (innen) Reduction from MT 3 (outside) to MT 2 (inside) | 112 mm | • 21 0052 | 10,60 |
| | Reduzierung von MK 4 (außen) auf MK 3 (innen) Reduction from MT 4 (outside) to MT 3 (inside) | 140 mm | • 21 0053 | 13,15 |



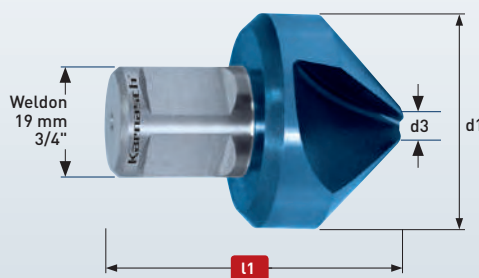
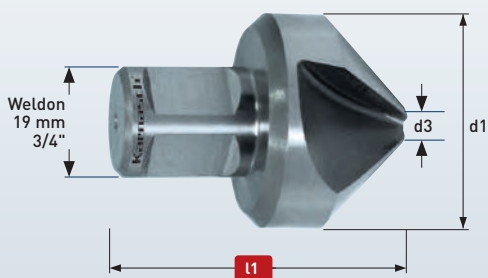


ANWENDUNG · APPLICATION

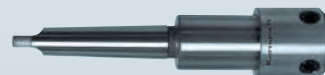
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|---------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 900 N | < 900 N | | > 10% Si | | | | |

ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 1100 N | < 900 N | | > 10% Si | | | | |



Passende Morsekonusaufnahmen siehe Seite 521-523 · Suitable morse taper see page 521-523



EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

20 1295

Gefertigt aus hochlegierten Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

Ideal zum Senken in:

- Stahl
- Guss
- Bunt- und Leichtmetalle

HSS-XE Stahl + BLUE-TEC beschichtet

20 1195

Gefertigt aus hochlegierten Spezialstahl "XE" für wesentlich höhere Standzeit gegenüber HSS-Stähle. BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung).

Zum Senken in:

- Edelmstähle (V2A / V4A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

HSS-XE steel

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

Excellent for countersinking in:

- Steel
- Cast iron
- Non ferrous metals

HSS-XE steel + BLUE-TEC coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel. BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/little cooling).

Excellent for countersinking in:

- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Steel
- Cast iron
- Non ferrous metals

| d1 Ø mm | d3 Ø mm | Gesamtlänge Total length L1 mm | 20 1295 | |
|------------|------------|--------------------------------------|-------------|-------|
| | | | € | |
| • 25 | 4 | 45 | 20 1295 025 | 21,00 |
| • 30 | 4 | 47 | 20 1295 030 | 26,45 |
| • 40 | 7 | 52 | 20 1295 040 | 37,90 |
| • 55 | 9 | 60 | 20 1295 055 | 70,55 |

| d1 Ø mm | d3 Ø mm | Gesamtlänge Total length L1 mm | 20 1195 | |
|------------|------------|--------------------------------------|-------------|-------|
| | | | € | |
| • 25 | 4 | 45 | 20 1195 025 | 21,00 |
| • 30 | 4 | 47 | 20 1195 030 | 26,45 |
| • 40 | 7 | 52 | 20 1195 040 | 37,85 |
| • 55 | 9 | 60 | 20 1195 055 | 70,55 |

Schnittdaten
Cutting data

Film
Movie



1317



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

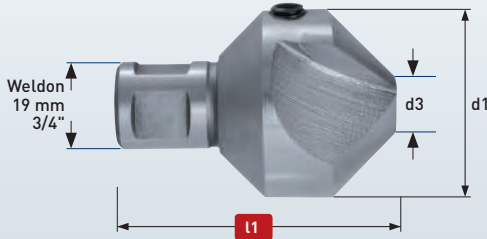


20 1796 040 • € 71,15



ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|-----|-----------------------|---------------------|---|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien | Hardox 400 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials | Hardox 400 |
| < 1400 N | < 900 N | > 10% Si | | | | | |



| d1 Ø mm | d3 Ø mm | Gesamtlänge Total length L1 mm |
|------------|------------|--------------------------------------|
| 40 | 10 | 60 |

Passende Morsekonusaufnahmen
siehe Seite 521-523 ·
Suitable morse taper see page 521-523

EIGENSCHAFTEN · PROPERTIES

Hartmetall-bestückt für höchste Standzeiten
auch bei schwierigsten Materialien.

Ideal zum Senken in:

- Abrasive und harte Stähle über 1000 N/mm²
- Grauguss (GG) über 240 HB
- Rost- und säurebeständige Stähle
- Titan- und Titanlegierungen
- Alle weiteren Stähle, Guss und Leichtmetalle wo höchste Standzeiten erwünscht sind.

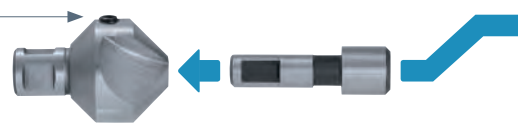
Tungsten Carbide tipped for maximum tool
life, even in most difficult materials.

For countersinking in:

- Abrasive and hard steel with a strength of over 1000 N/mm²
- Grey cast iron over 240 HB
- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Titanium and titanium alloys
- All further steel sorts, cast iron, non ferrous metals where maximum tool life are desired.

Die Führungsstifte ergeben hervorragende Stabilität und Genauigkeit.
Sollte ohne Führungsbohrer gearbeitet werden, bitte den Kegelsenker
100% mittig zur Bohrung ausrichten.

The pilots gives great stability and accuracy. If drilling without pilots,
please take care, that the countersink is adjusted absolutely centrally
to the drilled hole.



Ersatzteil
Ersatzschraube zum Befestigen
der Führungsstifte

20 1455
€ 0,10



Spare part
Spare screw for fixing the pilots

FÜHRUNGSSTIFTE · PILOTS

| | | | |
|--|-------------------|--|-------------------|
| | 20 1797 € 4,85 | | 21 1784 € 6,35 |
| | 21 1780 € 4,85 | | 21 1785 € 6,35 |
| | 21 1781 € 5,30 | | 20 1799 € 6,65 |
| | 21 1782 € 5,30 | | 21 1786 € 6,65 |
| | 20 1798 € 5,75 | | 21 1787 € 6,95 |
| | 21 1783 € 5,75 | | 21 1788 € 6,95 |

Schnittdaten
Cutting data



1214





20 1786 045 • € 126,05



ANWENDUNG · APPLICATION

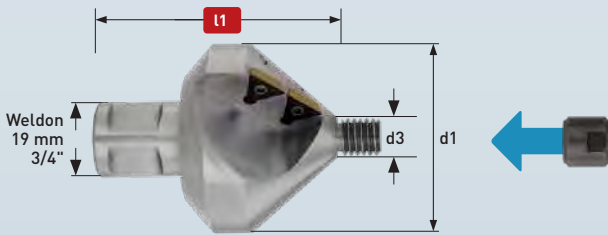
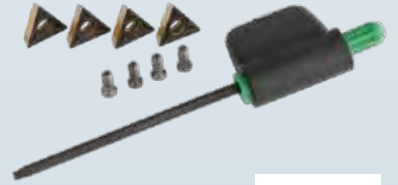
| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien | Hardox 400 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials | Hardox 400 |
| < 1400 N | < 900 N | | > 10% Si | | | | |

Dieser Kegelsenker wird geliefert mit:

- 4 Stück Hartmetall-Einsätze beschichtet inkl. 4 TORX Befestigungsschrauben sowie 1 TORX Befestigungsschlüssel komplett montiert.
- Die dreieckigen Einsätze sind drehbar. Somit sind alle 3 Schneidflächen einsetzbar für 3-fache Standzeit.
- **Passende Führungsstifte siehe unten.**

These countersinks comes inclusive:

- 4 pieces carbide inserts coated incl. 4 TORX mounting screws and 1 TORX wrench. Fully assembled.
- The triangular inserts are rotatable. This means that all 3 cutting surfaces can be used for 3 times more lifetime.
- **Suitable pilots pins see below.**

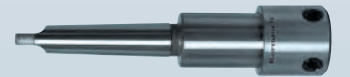


| d1 Ø mm | d3 Ø mm | Gesamtlänge Total length L1 mm |
|------------|------------|--------------------------------------|
| 45 | 10 | 72 |

Passende Morsekonusaufnahmen

siehe Seite 521-523

Suitable morse taper see page 521-523



Schnittdaten
 Cutting data



EIGENSCHAFTEN · PROPERTIES

Hartmetall-bestückt für höchste Standzeiten auch bei schwierigsten Materialien.

Ideal zum Senken in:

- Abrasive und harte Stähle über 1000 N/mm²
- Grauguss (GG) über 240 HB
- Rost- und säurebeständige Stähle
- Titan- und Titanlegierungen
- Alle weiteren Stähle, Guss und Leichtmetalle wo höchste Standzeiten erwünscht sind.

Tungsten carbide tipped for maximum tool life, even in the most difficult materials.

For countersinking in:

- Abrasive and hard steel with a strength of over 1000 N/mm²
- Grey cast iron over 240 HB
- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Titanium and titanium alloys
- All further steel sorts, cast iron, non ferrous metals where maximum tool life are desired.

Die Führungsstifte ergeben hervorragende Stabilität und Genauigkeit. Sollte ohne Führungsbohrer gearbeitet werden, bitte den Kegelsenker 100% mittig zur Bohrung ausrichten.

The pilots gives great stability and accuracy. If drilling without pilots, please take care, that the countersink is adjusted absolutely centrally to the drilled hole.



FÜHRUNGSSTIFTE · PILOTS

| | | | |
|--|-------------------------|--|-------------------------|
| | 20 1787 010 • € 3,05 | | 20 1787 060 • € 3,50 |
| | 20 1787 020 • € 3,05 | | 20 1787 070 • € 3,70 |
| | 20 1787 030 • € 3,25 | | 20 1787 075 • € 3,70 |
| | 20 1787 040 • € 3,25 | | 20 1787 080 • € 3,70 |
| | 20 1787 045 • € 3,50 | | 20 1787 090 • € 4,20 |
| | 20 1787 050 • € 3,50 | | 20 1787 100 • € 4,20 |

ERSATZTEILE · SPARE PARTS

Auswechselbare Platten Packnorm 4 Stück
 Carbide inserts Packing unit 4 pcs. **20 1787 110**
 • € 41,55

4x TORX Befestigungsschrauben Packnorm 4 Stück
 4x TORX mounting screw Packing unit 4 pcs. **20 1787 120**
 • € 14,90

1x Befestigungsschlüssel
 1x TORX wrench **22 9011 0175**
 • € 9,90

**KEGELSELSNER 82°
MIT WELDONSCHAFT**
COUNTERSINKS 82°
WITH WELDON SHANK

**+ MIT AUSWECHSELBAREN
HARTMETALLPLATTEN**
+ WITH REPLACEABLE
CARBIDE INSERTS

+ FÜHRUNGSSTIFTE
+ PILOTS

**· 2-SCHNEIDEN
4 EINSÄTZE**
· 2-CUTTING
4 INSERTS



Karnasch®

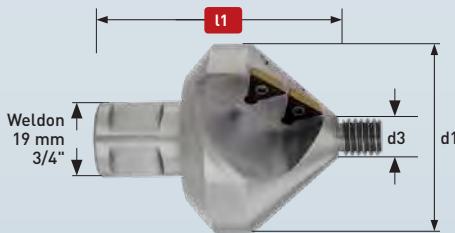


20 1776 045 • € 126,05



ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, Exotische Materialien | Hardox 400 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials | Hardox 400 |
| < 1400 N | < 900 N | | > 10% Si | | | | |



| d1 | d1 | d3 | d3 | Gesamtlänge L1 | |
|-------------|------|-------------|------|----------------|----|
| Ø Zoll/Inch | Ø mm | Ø Zoll/Inch | Ø mm | Zoll/Inch | mm |
| 1.49/64" | 45 | 3/8" | 10 | 2.53/64" | 72 |

Dieser Kegelsenker wird geliefert mit:

- 4 Stück Hartmetall-Einsätze beschichtet inkl. 4 TORX Befestigungsschrauben sowie 1 TORX Befestigungsschlüssel komplett montiert.
- Die dreieckigen Einsätze sind drehbar. Somit sind alle 3 Schneidflächen einsetzbar für 3-fache Standzeit.
- **Passende Führungsstifte siehe unten.**

These countersinks comes inclusive:

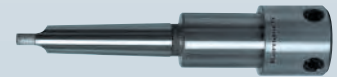
- 4 pieces carbide inserts coated incl. 4 TORX mounting screws and 1 TORX wrench. Fully assembled.
- The triangular inserts are rotatable. This means that all 3 cutting surfaces can be used for 3 times more lifetime.
- **Suitable pilots pins see below.**



Schnittdaten
Cutting data



**Passende Morsekonusaufnahmen
siehe Seite 521-523**
Suitable morse taper see page 521-523



EIGENSCHAFTEN · PROPERTIES

**Hartmetall-bestückt für höchste Standzeiten
auch bei schwierigsten Materialien.**

Ideal zum Senken in:

- Abrasive und harte Stähle über 1000 N/mm²
- Grauguss (GG) über 240 HB
- Rost- und säurebeständige Stähle
- Titan- und Titanlegierungen
- Alle weiteren Stähle, Guss und Leichtmetalle wo höchste Standzeiten erwünscht sind.

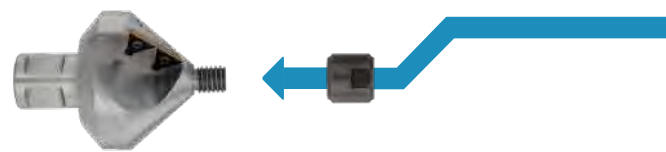
**Tungsten carbide tipped for maximum tool life,
even in the most difficult materials.**

For countersinking in:

- Abrasive and hard steel with a strength of over 1000 N/mm²
- Grey cast iron over 240 HB
- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Titanium and titanium alloys
- All further steel sorts, cast iron, non ferrous metals where maximum tool life are desired.

**Die Führungsstifte ergeben hervorragende Stabilität und Genauigkeit.
Sollte ohne Führungsbohrer gearbeitet werden, bitte den Kegelsenker
100% mittig zur Bohrung ausrichten.**

**The pilots gives great stability and accuracy. If drilling without pilots,
please take care, that the countersink is adjusted absolutely centrally
to the drilled hole.**



FÜHRUNGSSTIFTE · PILOTS

| | | | |
|--|-------------------------|--|-------------------------|
| | 20 1777 010 • € 3,05 | | 20 1777 050 • € 3,50 |
| | 20 1777 020 • € 3,05 | | 20 1777 060 • € 4,20 |
| | 20 1777 030 • € 3,05 | | 20 1777 070 • € 4,20 |
| | 20 1777 040 • € 3,05 | | |

ERSATZTEILE · SPARE PARTS

| | | |
|--|--|--------------------------|
| | Auswechselbare Platten Packnorm 4 Stück Carbide inserts Packing unit 4 pcs. | 20 1787 110 • € 41,55 |
| | 4x TORX Befestigungsschrauben Packnorm 4 Stück 4x TORX mounting screw Packing unit 4 pcs. | 20 1787 120 • € 14,90 |
| | 1x Befestigungsschlüssel 1x TORX wrench | 22 9011 0175 • € 9,90 |



Index



• € 12,05 **20 1384**
 Weldon 19 mm 3/4"

• € 12,40 **20 1372**
 Fein Quick-In 18 mm

• € 17,00 **20 1515**
 MORSEKONUS MORSE TAPER 2

• € 19,70 **20 1524**
 MORSEKONUS MORSE TAPER 3

• € 53,30 **20 1375**
 Selbstspannendes Bohrfutter für Spiralbohrer Ø 1-13 mm

Quick release (keyless) drill chuck for twist drills Ø 1-13 mm

• € 23,80 **20 1525**

Bohrfutter für Spiralbohrer Ø 1-13 mm
 Drill chuck for twist drills Ø 1-13 mm

KÜHLMITTEL-DRUCKFLASCHEN · COOLING PRESSURE BOTTLES

Zum Anschluss an alle Aufnahmehalter mit automatischer Innenkühlung (siehe Seite 521-523). Zusätzlich bieten wir eine Sprühnebeldüse an, welche ideal zum äußeren Kühlen geeignet ist.

- Nur wenige Pumpstöße nötig zum idealen Aufbau des Drucks
- Dank großvolumiger 1,5/3,0 Liter-Flasche wird der Druck auch bei vielen Bohrungen gehalten.
- Durch Feinjustierung, sparsamste Dosierung möglich ①
- Auch ideal zum äußeren Kühlen durch neue Sprühnebeldüse Art. 21 0025!
- Wir empfehlen Karnasch Hochleistungsschneidöl Mecutoil 100 (siehe ab Seite 1143).

For connection to all tool holders with automatic internal cooling (see page 521-523). In addition we offer an atomized nozzle, which is ideal for external cooling.

- You only need to use the pump a few times for obtaining an ideal pressure build-up
- Thanks to the large-volume 1.5/3.0 litre bottle the pressure will be maintained even in case of many borings.
- Best dosing economy thanks to fine adjustment ①
- Also ideal for external cooling due to the new atomized nozzle Art. 21 0025!
- We recommend Karnasch heavy-duty cutting oil Mecutoil 100 (see from page 1143).

21 0025
 • € 1,45

Nur passend für Art. 20 1308
Only suitable for Art. 20 1308

20 1308
 • € 9,50
 1,5 ltr.

20 1327
 • € 20,90
 3,0 ltr.



• € 28,00

21 0001

1. SCHRITT: Nehmen Sie die Metallspäne mit dem Karnasch-Magnetstab auf.

1. STEP: Take the chips with the Karnasch magnetic stick.



2. SCHRITT: Lösen Sie die Späne durch Ziehen des Stabs und des innenliegenden Magneten.

2. STEP: Release the chips by pulling the rod.



1



2



3



4



5



6



7



8

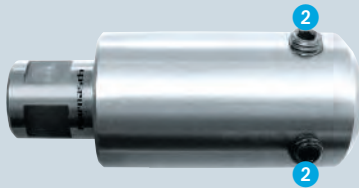


9

ERSATZ-INNENSECHSKANTSCHRAUBEN **2** FÜR ADAPTER · SPARE ALLEN SCREWS **2** FOR ADAPTERS



| 2 | Ø mm | Für Adapter Art. · For adapter art. | | ART. | € | |
|----------|--------------------|---|-------------------|----------------|--------|--|
| | 3 mm M 6x6 | 20 1234 | 427 | 20 1330 | • 0,10 | |
| | | Gewindeadapter · Tapping adapter | 623 | | | |
| | 4 mm M 8x8 | 20 1421 · 20 1422 · 20 1431 · 20 1434 | Diverse · Various | 20 1343 | • 0,15 | |
| | | Spiralbohradapter · Twist drill adapter | 622 | | | |
| | 5 mm M 10x10 | 20 1161 · 20 1263 · 20 1311 · 20 1314 · 20 1386 | Diverse · Various | 20 1353 | • 0,10 | |
| | M 6x10 | 20 1796 040 | 525 | 20 1455 | • 0,10 | |
| | Spezial Spezial | 20 1385 | Diverse · Various | 21 0045 | • 0,10 | |
| | Spezial Spezial | 21 0048 | Diverse · Various | 21 0049 | • 0,15 | |



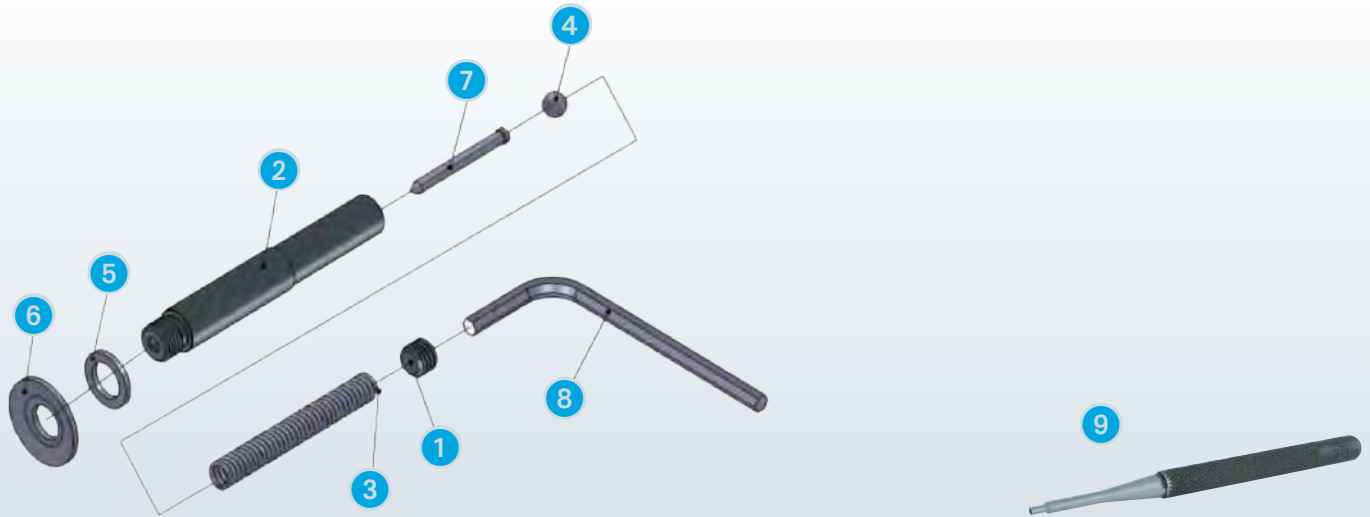
Ersatz-Innensechskantschrauben **2** für Verlängerungen 50 mm, 75 mm, 100 mm.
Spare allen screws **2** for extensions 50 mm, 75 mm, 100 mm.

| 2 | Ø mm | Für Verlängerungen Artikel For extensions article | | Artikel Schraube Article screw | € |
|----------|-----------------|--|--------------------|-----------------------------------|--------|
| | 5 mm M 10x10 | 20 1387 · 20 1402 · 20 1417 20 1406 · 20 1407 · 20 1409 | Diverse Various | 20 1353 | • 0,10 |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

ERSATZTEILE HALTER · SPARE PARTS HOLDER

21 0002

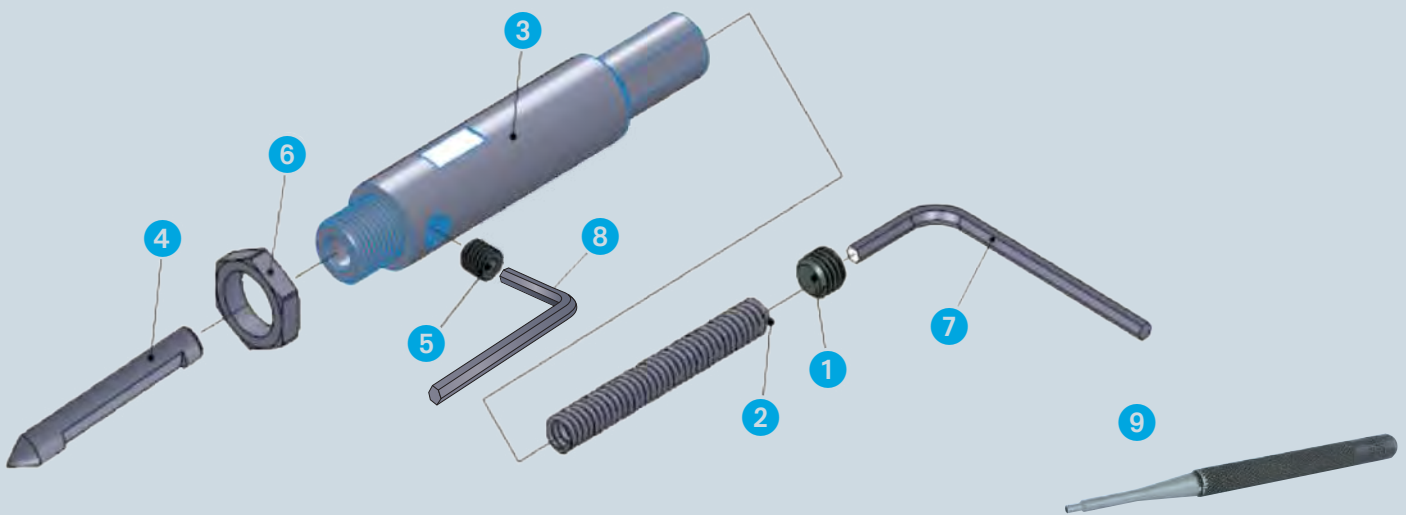


| No. | Beschreibung · Description | Art. | € |
|-----|---|---------|---------|
| 1 | Inbusschraube · Allen screw | 21 0004 | • 0,10 |
| 2 | Halter Körper · Arbor body | 21 0005 | • 11,30 |
| 3 | Auswurfeder · Ejector spring | 21 0006 | • 1,10 |
| 4 | Stahlkugel · Round steel bead | 21 0007 | • 0,10 |
| 5 | Unterlegscheibe · Flat washer | 21 0008 | • 0,50 |
| 6 | Konkave Distanzscheibe · Concave gasket | 21 0009 | • 0,60 |
| 7 | Auswerferstift · Ejector pin | 21 0010 | • 1,45 |
| 8 | Inbusschlüssel groß · Allen key big | 21 0011 | • 0,50 |
| 9 | Körner · Center punch | 20 1238 | • 2,30 |

Dieser Halter ist geeignet zum Lösen von punktgeschweißten Blechteilen. Die Frästiefe sowie Federdruck ist durch die Schraube 1 einstellbar.
 This arbor is suitable for removing spot welds from sheet metal. Adjustable milling depth and spring force with setting screw 1.

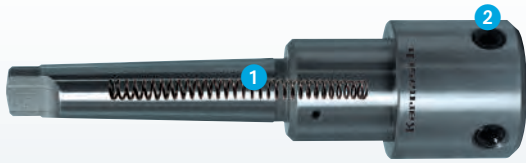
ERSATZTEILE HALTER · SPARE PARTS HOLDER Ø 21-25 mm

21 0003



| No. | Beschreibung · Description | Art. | € |
|-----|--|---------|---------|
| 1 | Inbusschraube · Allen screw | 21 0012 | • 0,10 |
| 2 | Auswurfeder · Ejector spring | 21 0013 | • 1,75 |
| 3 | Halter Körper · Arbor body | 21 0014 | • 23,90 |
| 4 | Auswerferstift · Ejector pin | 21 0015 | • 2,35 |
| 5 | Inbusschraube · Allen screw | 21 0016 | • 0,10 |
| 6 | Unterlegscheibe · Flat washer | 21 0017 | • 0,60 |
| 7 | Inbusschlüssel groß · Allen key big | 21 0011 | • 0,50 |
| 8 | Inbusschlüssel klein · Allen key small | 21 0055 | • 0,50 |
| 9 | Körner · Center punch | 20 1238 | • 2,30 |





Ersatz-Auswurffeder **1** + Ersatz-Innensechskantschrauben **2** für Aufnahmehalter siehe Katalog Seite 521-523

Ejector spare springs **1** + spare allen screws **2** for tool holders see catalogue page 521-523

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

| 1 | d1 L1 | Für Aufnahmehalter Artikel For tool holders article | | Artikel Feder Article spring | € |
|----------|-----------------|--|---------|-----------------------------------|--------|
| | 13 x 150 mm | 20 1290 · 20 1292 · 20 1289 · 20 1307 · 20 1437 | 521-523 | 20 1296 | • 3,05 |
| | 10 x 125 mm | 20 1283 | 521-523 | 20 1297 | • 2,90 |
| | 14 x 195 mm | 20 1291 · 20 1842 · 20 1845 · 20 1846 | 521-523 | 20 1298 | • 3,80 |
| | 10 x 133 mm | 20 1287 · 20 1303 · 20 1301 | 521-523 | 20 1299 | • 2,70 |
| | 13 x 135 mm | 20 1293 · 20 1286 · 20 1289 · 20 1310 · 20 1844 | 521-523 | 20 1294 | • 2,90 |
| | 13 x 135 mm | 20 1400 · 20 1401 | 355 | 21 0044 | • 1,90 |
| | | | | | |
| 2 | Ø mm | Für Aufnahmehalter Artikel For tool holders article | | Artikel Schraube Article screw | € |
| | 6 mm M 12x10 | 20 1283 · 20 1293 · 20 1287 · 20 1289 · 20 1291 | 521-523 | 20 1300 | • 0,10 |
| | 6 mm M 12x12 | 20 1286 · 20 1290 · 20 1292 | 521-523 | 20 1305 | • 0,15 |
| | - | Diverse · Various | 521-523 | 21 0047 | • 1,70 |

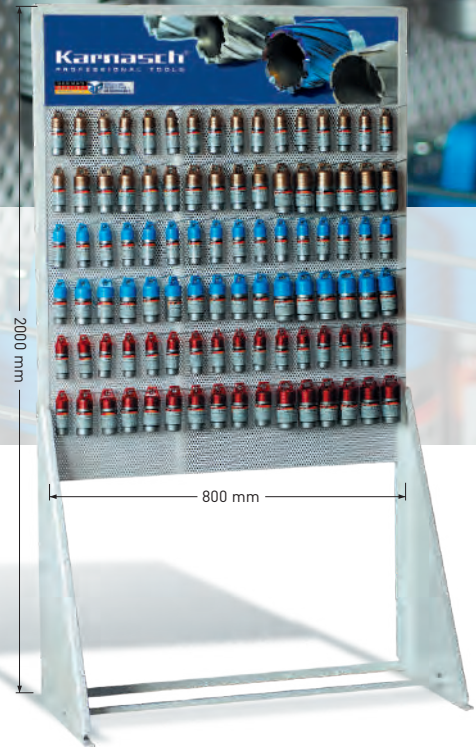
20 1346 



Kernbohr-Display Core drilling display

Stellen Sie Ihr individuelles Display zusammen. Wir beraten Sie gerne.
Preise auf Anfrage.

Create your own individual display.
We would be pleased to help you.
Prices on request.



20 1346 



Power-Max Lochsägen-Display Power-Max hole saw display

Stellen Sie Ihr individuelles Display zusammen. Wir beraten Sie gerne.
Preise auf Anfrage.

Create your own individual display.
We would be pleased to help you.
Prices on request.



HARD-LINE 40

SETS / DISPLAYS: INHALT 20 1315
SETS / DISPLAYS: CONTENT 20 1315

BEST
SELLER

Lagerprogramm + Zubehör siehe Seite 366-367
Stock range + accessories see page 366-367

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

6
Stück
Pieces

SET BASIC

20 1901
€ 182,60

neu new



Ø 2×14, 2×18, 2×22 mm
4x Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS

20 1336
€ 181,15



Ø 12, 14, 16, 18, 20, 22 mm
4x Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 22 mm
BESTSELLER up to Ø 22 mm

SET INDIVIDUAL

20 1138
€ 13,15



Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12
Stück
Pieces

SET PROFI

20 1902
€ 341,25

neu new




Ø 4×14, 4×18, 4×22 mm
4x Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET PROFI PLUS

20 1903
€ 338,30

neu new



Ø 2×12, 2×14, 2×16, 2×18, 2×20, 2×22 mm
4x Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 22 mm
BESTSELLER up to Ø 22 mm

SET PROFI INDIVIDUAL

20 1132
€ 26,10

neu new



Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50
Stück
Pieces

SET DELUXE

20 1366
€ 1362,08



Das komplette Sortiment 12-50 mm in 1,0 mm aufsteigend (39 Stück)
The hole range 12-50 mm in 1,0 mm steps (39 pieces)
6x Auswerferstifte / Ejector pins

SET DELUXE PLUS

20 1904
€ 1353,45

neu new



Ø 4×12, 2×13, 4×14, 2×15, 4×16, 2×17, 4×18, 2×19, 4×20, 4×22, 2×23, 2×24, 4×25, 2×26, 2×27, 2×28, 2×30, 2×32 mm
6x Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 32 mm
BESTSELLER up to Ø 32 mm

SET DELUXE INDIVIDUAL

20 1139
€ 61,65



Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44
Stück
Pieces

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY


20 1604
€ 1328,05



Ø 2×12, 2×13, 2×14, 2×15, 2×16, 2×17, 2×18, 2×19, 2×20, 2×21, 2×22, 2×23, 2×24, 2×25, 2×26, 2×27, 2×28, 2×30, 2×32, 1×33, 1×35, 1×36, 1×40, 1×45, 1×50 mm
6x Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 50 mm
BESTSELLER up to Ø 50 mm

DISPLAY INDIVIDUAL

20 1344
€ 102,05



Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

HARD-LINE 755

SETS / DISPLAYS: INHALT 20 1316
SETS / DISPLAYS: CONTENT 20 1316

**BEST
SELLER**

Lagerprogramm + Zubehör siehe Seite 368-369
Stock range + accessories see page 368-369

**6
Stück
Pieces**

SET BASIC

• **20 1905**
€ 204,50

neu new

Ø 2×14, 2×18, 2×22 mm
4× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS

• **20 1339**
€ 206,15

Ø 14, 16, 18, 20, 22, 26 mm
4× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET INDIVIDUAL

• **20 1138**
€ 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

**12
Stück
Pieces**

SET PROFI

• **20 1906**
€ 385,85

neu new

Ø 3×14, 3×18, 3×22, 3×26 mm
4× Auswerferstifte / Ejector pins
Die meistverkauften vier Abmessungen in einem Set
The best selling four dimensions in a set

SET PROFI PLUS

• **20 1907**
€ 382,45

neu new

Ø 2×14, 2×16, 2×18, 2×20, 2×22, 2×26 mm
4× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET PROFI INDIVIDUAL

• **20 1132**
€ 26,10

neu new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

**39/50
Stück
Pieces**

SET DELUXE

• **20 1369**
€ 1414,45

Das komplette Sortiment 12-50 mm in 1,0 mm aufsteigend (39 Stück)
The hole range 12-50 mm in 1,0 mm steps (39 pieces)
6× Auswerferstifte / Ejector pins

SET DELUXE PLUS

• **20 1908**
€ 1514,65

neu new

Ø 2×12, 2×13, 4×14, 2×15, 2×16, 2×17, 4×18, 2×19, 4×20, 4×22, 4×23, 2×24, 4×25, 4×26, 2×27, 2×28, 2×30, 2×32 mm
6× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 32 mm
BESTSELLER up to Ø 32 mm

SET DELUXE INDIVIDUAL

• **20 1139**
€ 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

**44
Stück
Pieces**

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY

• **20 1624**
€ 1473,95

Ø 2×12, 2×13, 2×14, 2×15, 2×16, 2×17, 2×18, 2×19, 2×20, 2×21, 2×22, 2×23, 2×24, 2×25, 2×26, 2×27, 2×28, 2×30, 2×32, 1×33, 1×35, 1×36, 1×40, 1×45, 1×50 mm
6× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 50 mm
BESTSELLER up to Ø 50 mm

DISPLAY INDIVIDUAL

• **20 1344**
€ 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

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HARD-LINE
ZOLL / INCH

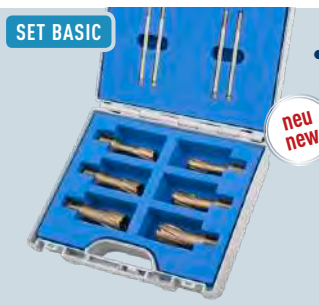





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SETS / DISPLAYS: INHALT 20 1930
SETS / DISPLAYS: CONTENT 20 1930

Lagerprogramm + Zubehör siehe Seite 376-377
Stock range + accessories see page 376-377



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- 2
- 3
- 4
- 5
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|---------------------------------------|--|---|--|---|
| <p>6 Stück Pieces</p> | <p>SET BASIC</p>  <p>20 1909 € 198,70</p> <p>neu new</p> <p>Ø 2×5/8", 2×13/16", 2×15/16" 4x Auswerferstifte / Ejector pins Die meistverkauften drei Abmessungen in einem Set The best selling three dimensions in a set</p> | <p>SET BASIC PLUS</p>  <p>20 1978 € 199,55</p> <p>Ø 9/16", 5/8", 3/4", 13/16", 15/16", 1.1/16" 4x Auswerferstifte / Ejector pins Die BESTSELLER bis Ø 1.1/16" BESTSELLER up to Ø 1.1/16"</p> | <p>SET INDIVIDUAL</p>  <p>20 1138 € 13,15</p> <p>Leer für max. 6 Kernbohrer + 4 Auswerferstifte. Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 6 annular cutters + 4 ejector pins. Maximum possible Ø 40 mm. We also compile your desired set on request.</p> | |
| | <p>12 Stück Pieces</p> | <p>SET PROFI</p>  <p>20 1911 € 381,85</p> <p>neu new</p> <p>Ø 4×5/8", 4×13/16", 4×15/16" 4x Auswerferstifte / Ejector pins Die meistverkauften drei Abmessungen in einem Set The best selling three dimensions in a set</p> | <p>SET PROFI PLUS</p>  <p>20 1914 € 383,60</p> <p>neu new</p> <p>Ø 2×9/16", 2×5/8", 2×3/4", 2×13/16", 2×15/16", 2×1.1/16" 4x Auswerferstifte / Ejector pins Die BESTSELLER bis Ø 1.1/16" BESTSELLER up to Ø 1.1/16"</p> | <p>SET PROFI INDIVIDUAL</p>  <p>20 1132 € 26,10</p> <p>neu new</p> <p>Leer für max. 12 Kernbohrer + 4 Auswerferstifte. Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 12 annular cutters + 4 ejector pins. Maximum possible Ø 40 mm. We also compile your desired set on request.</p> |
| | | <p>39/50 Stück Pieces</p> | | |
| <p>44 Stück Pieces</p> | | | <p>Abschließbares Acrydisplay Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.</p> <p>Lockable acrylic display Ideal as showcase and small warehouse. All current sizes directly visible and available.</p> | |
| | | | | |


HARD-LINE 55
ZOLL / INCH

SETS / DISPLAYS: INHALT 20 1940
SETS / DISPLAYS: CONTENT 20 1940

Lagerprogramm + Zubehör siehe Seite 378-379
Stock range + accessories see page 378-379

6 Stück Pieces

SET BASIC



20 1915
• € 223,20

neu new

Ø 2× 13/16", 2× 15/16", 2× 1.1/16"
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

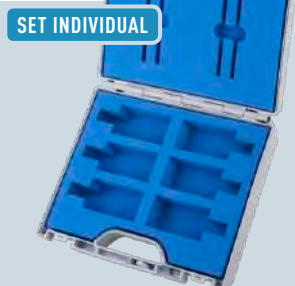
SET BASIC PLUS



20 1979
• € 218,25

Ø 5/8", 11/16", 3/4", 13/16", 15/16", 1.1/16"
4× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 1.1/16"
BESTSELLER up to Ø 1.1/16"

SET INDIVIDUAL



20 1138
• € 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12 Stück Pieces

SET PROFI



20 1916
• € 431,15

neu new

Ø 4× 13/16", 4× 15/16", 4× 1.1/16"
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET PROFI PLUS



20 1917
• € 421,25

neu new

Ø 2× 5/8", 2× 11/16", 2× 3/4", 2× 13/16", 2× 15/16", 2× 1.1/16"
4× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 1.1/16"
BESTSELLER up to Ø 1.1/16"

SET PROFI INDIVIDUAL



20 1132
• € 26,10

neu new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50 Stück Pieces

SET DELUXE INDIVIDUAL



20 1139
• € 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44 Stück Pieces

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY INDIVIDUAL



20 1344
• € 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.





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BLUE-DRILL LINE 30 PRO
RAIL 30 PRO

SETS / DISPLAYS: INHALT 20 1284
SETS / DISPLAYS: CONTENT 20 1284

Lagerprogramm + Zubehör siehe Seite 390-391 + 510-511
Stock range + accessories see page 390-391 + 510-511

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
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|----------------------------------|--|--|---|
| <p>6 Stück Pieces</p> | <p>SET BASIC</p>  <p>20 1944 € 331,55</p> <p>neu new</p> | <p>SET BASIC PLUS</p>  <p>20 1331 € 356,55</p> | <p>SET INDIVIDUAL</p>  <p>20 1138 € 13,15</p> |
| | <p>Ø 2×12, 2×16, 2×18 mm 2× Auswerferstifte / Ejector pins Die meistverkauften drei Abmessungen in einem Set The best selling three dimensions in a set</p> | <p>Ø 12, 14, 16, 18, 20, 26 mm 2× Auswerferstifte / Ejector pins Die BESTSELLER bis Ø 26 mm BESTSELLER up to Ø 26 mm</p> | <p>Leer für max. 6 Kernbohrer + 4 Auswerferstifte. Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 6 annular cutters + 4 ejector pins. Maximum possible Ø 40 mm. We also compile your desired set on request.</p> |
| | <p>Ø 3×12, 3×14, 3×16, 3×18 mm 2× Auswerferstifte / Ejector pins Die meistverkauften vier Abmessungen in einem Set The best selling four dimensions in a set</p> | <p>Ø 2×12, 2×14, 2×16, 2×18, 2×20, 2×26 mm 2× Auswerferstifte / Ejector pins Die BESTSELLER bis Ø 26 mm BESTSELLER up to Ø 26 mm</p> | <p>Leer für max. 12 Kernbohrer + 4 Auswerferstifte. Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 12 annular cutters + 4 ejector pins. Maximum possible Ø 40 mm. We also compile your desired set on request.</p> |
| <p>39/50 Stück Pieces</p> | | | <p>SET DELUXE INDIVIDUAL</p>  <p>20 1139 € 61,65</p> |
| | <p>Abschließbares Acrydisplay Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.</p> <p>Lockable acrylic display Ideal as showcase and small warehouse. All current sizes directly visible and available.</p> | | |
| <p>44 Stück Pieces</p> | | | <p>Leer für max. 44 Kernbohrer bis Ø 60 mm möglich. Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.</p> |

BLUE-DRILL LINE **55**
PRO
BLUE-DRILL LINE **55**
RAIL PRO

SETS / DISPLAYS: INHALT 20 1317
SETS / DISPLAYS: CONTENT 20 1317

Lagerprogramm + Zubehör siehe Seite 392-393 + 512-513
Stock range + accessories see page 392-393 + 512-513

SET BASIC



20 1947
• € 416,10

neu new

6 Stück Pieces

Ø 2×14, 2×18, 2×20 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS



20 1334
• € 436,35

neu new

Ø 12, 14, 16, 18, 20, 26 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm


SET INDIVIDUAL



20 1138
• € 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

SET PROFI



20 1948
• € 889,55

neu new

12 Stück Pieces

Ø 3×14, 3×18, 3×20, 3×26 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften vier Abmessungen in einem Set
The best selling four dimensions in a set

SET PROFI PLUS




20 1949
• € 857,45

neu new

Ø 2×12, 2×14, 2×16, 2×18, 2×20, 2×26 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET PROFI INDIVIDUAL




20 1132
• € 26,10

neu new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50 Stück Pieces

SET DELUXE INDIVIDUAL



20 1139
• € 61,65

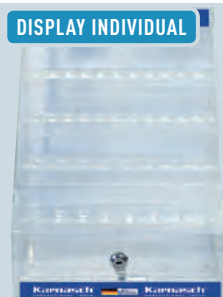
Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

44 Stück Pieces

DISPLAY INDIVIDUAL



20 1344
• € 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.



BLUE-DRILL LINE 30

SETS / DISPLAYS: INHALT 20 1312
SETS / DISPLAYS: CONTENT 20 1312

**BEST
SELLER**

Lagerprogramm + Zubehör siehe Seite 396-397
Stock range + accessories see page 396-397



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

**6
Stück
Pieces**

SET BASIC

• **20 1950**
€ 151,15

**neu
new**

Ø 2×14, 2×18, 2×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS

• **20 1325**
€ 147,15

Ø 12, 14, 16, 18, 20, 22 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 22 mm
BESTSELLER up to Ø 22 mm

SET INDIVIDUAL

• **20 1138**
€ 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

**12
Stück
Pieces**

SET PROFI

• **20 1951**
€ 279,60

**neu
new**

Ø 3×12, 3×14, 3×18, 3×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften vier Abmessungen in einem Set
The best selling four dimensions in a set

SET PROFI PLUS

• **20 1952**
€ 280,10

**neu
new**

Ø 2×12, 2×14, 2×16, 2×18, 2×20, 2×22 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 22 mm
BESTSELLER up to Ø 22 mm

SET PROFI INDIVIDUAL

• **20 1132**
€ 26,10

**neu
new**

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

**39/50
Stück
Pieces**

SET DELUXE

• **20 1360**
€ 1507,60

Das komplette Sortiment 12-50 mm in 1,0 mm aufsteigend (39 Stück)
The hole range 12-50 mm in 1,0 mm steps (39 pieces)
6× Auswerferstifte / Ejector pins

SET DELUXE PLUS

• **20 1953**
€ 1228,75

**neu
new**

Ø 4×12, 2×13, 4×14, 2×15, 4×16, 2×17, 4×18, 2×19, 4×20, 4×22, 2×23, 2×24, 2×25, 4×26, 2×27, 2×28, 2×30, 2×32 mm
6× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 32 mm
BESTSELLER up to Ø 32 mm

SET DELUXE INDIVIDUAL

• **20 1139**
€ 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

**44
Stück
Pieces**

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY

• **20 1603**
€ 1289,30

• **20 1344**
€ 102,05

DISPLAY INDIVIDUAL

Ø 2×12, 2×13, 2×14, 2×15, 2×16, 2×17, 2×18, 2×19, 2×20, 2×21, 2×22, 2×23, 2×24, 2×25, 2×26, 2×27, 2×28, 2×30, 2×32, 1×33, 1×35, 1×36, 1×40, 1×45, 1×50 mm
6× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 50 mm
BESTSELLER up to Ø 50 mm

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

BLUE-DRILL LINE / 55


SETS / DISPLAYS: INHALT 20 1313
SETS / DISPLAYS: CONTENT 20 1313

**BEST
SELLER**

Lagerprogramm + Zubehör siehe Seite 398-399
Stock range + accessories see page 398-399

6 Stück Pieces

SET BASIC



20 1954
€ 173,30

neu new

Ø 2×14, 2×18, 2×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set


SET BASIC PLUS



20 1328
€ 179,50

Ø 14, 16, 18, 20, 22, 26 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET INDIVIDUAL




20 1138
€ 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12 Stück Pieces

SET PROFI



20 1955
€ 331,35

neu new

Ø 4×14, 4×18, 4×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET PROFI PLUS



20 1956
€ 343,80

neu new

Ø 2×14, 2×16, 2×18, 2×20, 2×22, 2×26 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET PROFI INDIVIDUAL



20 1132
€ 26,10

neu new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50 Stück Pieces

SET DELUXE



20 1363
€ 1770,90

Das komplette Sortiment 12-50 mm in 1,0 mm aufsteigend (39 Stück)
The hole range 12-50 mm in 1,0 mm steps (39 pieces)
6× Auswerferstifte / Ejector pins

SET DELUXE PLUS



20 1957
€ 1423,20

neu new

Ø 4×12, 2×13, 4×14, 2×15, 4×16, 2×17, 4×18, 2×19, 4×20, 2×21, 4×22, 2×24, 2×25, 4×26, 2×27, 2×28, 2×30, 2×32 mm
6× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 32 mm
BESTSELLER up to Ø 32 mm

SET DELUXE INDIVIDUAL



20 1139
€ 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44 Stück Pieces

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY



20 1609
€ 1502,25

Ø 2×12, 2×13, 2×14, 2×15, 2×16, 2×17, 2×18, 2×19, 2×20, 2×21, 2×22, 2×23, 2×24, 2×25, 2×26, 2×27, 2×28, 2×30, 2×32, 1×33, 1×35, 1×36, 1×40, 1×45, 1×50 mm
6× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 50 mm
BESTSELLER up to Ø 50 mm

DISPLAY INDIVIDUAL



20 1344
€ 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

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GOLD-DRILL LINE 30

SETS / DISPLAYS: INHALT 20 1260U
SETS / DISPLAYS: CONTENT 20 1260U

**BEST
SELLER**

Lagerprogramm + Zubehör siehe Seite 406-407
Stock range + accessories see page 406-407



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

**6
Stück
Pieces**

SET BASIC

20 1967
€ 115,70

**neu
new**

Ø 2×14, 2×18, 2×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS

20 1322
€ 111,75

Ø 12, 14, 16, 18, 20, 22 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 22 mm
BESTSELLER up to Ø 22 mm

SET INDIVIDUAL

20 1138
€ 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

**12
Stück
Pieces**

SET PROFI

20 1968
€ 208,75

**neu
new**

Ø 3×12, 3×14, 3×18, 3×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften vier Abmessungen in einem Set
The best selling four dimensions in a set

SET PROFI PLUS

20 1969
€ 209,25

**neu
new**

Ø 2×12, 2×14, 2×16, 2×18, 2×20, 2×22 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 22 mm
BESTSELLER up to Ø 22 mm

SET PROFI INDIVIDUAL

20 1132
€ 26,10

**neu
new**

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

**39/50
Stück
Pieces**

SET DELUXE

20 1361
€ 1140,25

Das komplette Sortiment 12–50 mm in 1,0 mm aufsteigend (39 Stück)
The hole range 12–50 mm in 1,0 mm steps (39 pieces)
6× Auswerferstifte / Ejector pins

SET DELUXE PLUS

20 1971
€ 885,35

**neu
new**

Ø 4×12, 2×13, 4×14, 2×15, 4×16, 2×17, 4×18, 2×19, 4×20, 4×22, 2×23, 2×24, 2×25, 4×26, 2×27, 2×28, 2×30, 2×32 mm
6× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 32 mm
BESTSELLER up to Ø 32 mm

SET DELUXE INDIVIDUAL

20 1139
€ 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

**44
Stück
Pieces**

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY

20 1602
€ 989,75

Ø 2×12, 2×13, 2×14, 2×15, 2×16, 2×17, 2×18, 2×19, 2×20, 2×21, 2×22, 2×23, 2×24, 2×25, 2×26, 2×27, 2×28, 2×30, 2×32, 1×33, 1×35, 1×36, 1×40, 1×45, 1×50 mm
6× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 50 mm
BESTSELLER up to Ø 50 mm

DISPLAY INDIVIDUAL

20 1344
€ 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

GOLD-DRILL LINE / 55

SETS / DISPLAYS: INHALT 20 1270U
SETS / DISPLAYS: CONTENT 20 1270U

**BEST
SELLER**

Lagerprogramm + Zubehör siehe Seite 408-409
Stock range + accessories see page 408-409

6 Stück Pieces

SET BASIC

20 1972
€ 137,85

neu new

Ø 2×14, 2×18, 2×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS

20 1332
€ 134,00

Ø 12, 14, 16, 18, 20, 22 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 22 mm
BESTSELLER up to Ø 22 mm

SET INDIVIDUAL

20 1138
€ 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12 Stück Pieces

SET PROFI

20 1973
€ 260,50

neu new

Ø 4×14, 4×18, 4×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET PROFI PLUS

20 1974
€ 252,80

neu new

Ø 2×12, 2×14, 2×16, 2×18, 2×20, 2×22 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 22 mm
BESTSELLER up to Ø 22 mm

SET PROFI INDIVIDUAL

20 1132
€ 26,10

neu new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50 Stück Pieces

SET DELUXE

20 1365
€ 1403,55

Das komplette Sortiment 12-50 mm in 1,0 mm aufsteigend (39 Stück)
The hole range 12-50 mm in 1,0 mm steps (39 pieces)
6× Auswerferstifte / Ejector pins

SET DELUXE PLUS

20 1980
€ 1122,90

neu new

Ø 4×12, 2×13, 4×14, 2×15, 4×16, 2×17, 4×18, 2×19, 4×20, 4×22, 2×23, 2×24, 2×25, 4×26, 2×27, 2×28, 2×30, 2×32 mm
6× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 32 mm
BESTSELLER up to Ø 32 mm

SET DELUXE INDIVIDUAL

20 1139
€ 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44 Stück Pieces

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY

20 1608
€ 1202,75

Ø 2×12, 2×13, 2×14, 2×15, 2×16, 2×17, 2×18, 2×19, 2×20, 2×21, 2×22, 2×23, 2×24, 2×25, 2×26, 2×27, 2×28, 2×30, 2×32, 1×33, 1×35, 1×36, 1×40, 1×45, 1×50 mm
6× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 50 mm
BESTSELLER up to Ø 50 mm

DISPLAY INDIVIDUAL

20 1344
€ 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

1

2

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7

8

9

GOLD-DRILL LINE 30
ZOLL / INCH

SETS / DISPLAYS: INHALT 20 1910
SETS / DISPLAYS: CONTENT 20 1910

Lagerprogramm + Zubehör siehe Seite 414-415
Stock range + accessories see page 414-415

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

6 Stück Pieces

SET BASIC

• **20 1993**
€ 134,65

neu new



Ø 2×5/8", 2×13/16", 2×9/16"
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS

• **20 1976**
€ 140,60



Ø 9/16", 5/8", 11/16, 3/4", 13/16", 7/8"
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 7/8"
BESTSELLER up to Ø 7/8"

SET INDIVIDUAL

• **20 1138**
€ 13,15



Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12 Stück Pieces

SET PROFI

• **20 1994**
€ 225,05

neu new



Ø 4×5/8", 4×13/16", 4×9/16"
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET PROFI PLUS

• **20 1995**
€ 266,95

neu new



Ø 2×9/16", 2×5/8", 2×11/16, 2×3/4", 2×13/16", 2×7/8"
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 7/8"
BESTSELLER up to Ø 7/8"

SET PROFI INDIVIDUAL

• **20 1132**
€ 26,10

neu new




Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50 Stück Pieces

SET DELUXE INDIVIDUAL

• **20 1139**
€ 61,65



Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44 Stück Pieces

Abschließbares Acrydisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.



DISPLAY INDIVIDUAL

• **20 1344**
€ 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.


GOLD-DRILL LINE 55
ZOLL / INCH

SETS / DISPLAYS: INHALT 20 1920
SETS / DISPLAYS: CONTENT 20 1920

Lagerprogramm + Zubehör siehe Seite 416-417
Stock range + accessories see page 416-417

6 Stück Pieces

SET BASIC




20 1996
€ 166,85

neu new

Ø 2×5/8", 2×11/16", 2×13/16"
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS



20 1977
€ 169,75

neu new

Ø 9/16", 5/8", 11/16", 3/4", 13/16", 7/8"
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 7/8"
BESTSELLER up to Ø 7/8"

SET INDIVIDUAL




20 1138
€ 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12 Stück Pieces

SET PROFI



20 1997
€ 332,55

neu new

Ø 3×5/8", 3×11/16", 3×13/16", 3×7/8"
2× Auswerferstifte / Ejector pins
Die meistverkauften vier Abmessungen in einem Set
The best selling four dimensions in a set

SET PROFI PLUS



20 1998
€ 324,25

neu new

Ø 2×9/16", 2×5/8", 2×11/16", 2×3/4", 2×13/16", 2×7/8"
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 7/8"
BESTSELLER up to Ø 7/8"

SET PROFI INDIVIDUAL



20 1132
€ 26,10

neu new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50 Stück Pieces

SET DELUXE INDIVIDUAL



20 1139
€ 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44 Stück Pieces

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY INDIVIDUAL



20 1344
€ 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

SILVER-DRILL LINE 25

SETS / DISPLAYS: INHALT 20 1255
SETS / DISPLAYS: CONTENT 20 1255

BEST
SELLER

Lagerprogramm + Zubehör siehe Seite 422-423
Stock range + accessories see page 422-423



Index

6
Stück
Pieces

SET BASIC

20 2003
€ 97,95

neu new

Ø 2×14, 2×18, 2×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS

20 1474
€ 94,00

Ø 12, 14, 16, 18, 20, 22 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 22 mm
BESTSELLER up to Ø 22 mm

SET INDIVIDUAL

20 1138
€ 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12
Stück
Pieces

SET PROFI

20 2004
€ 175,25

neu new

Ø 3×12, 3×14, 3×18, 3×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften vier Abmessungen in einem Set
The best selling four dimensions in a set

SET PROFI PLUS

20 2005
€ 175,65

neu new

Ø 2×12, 2×14, 2×16, 2×18, 2×20, 2×22 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 22 mm
BESTSELLER up to Ø 22 mm

SET PROFI INDIVIDUAL

20 1132
€ 26,10

neu new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50
Stück
Pieces

SET DELUXE

20 1153
€ 993,45

Das komplette Sortiment 12–50 mm in 1,0 mm aufsteigend (39 Stück)
The hole range 12–50 mm in 1,0 mm steps (39 pieces)
6× Auswerferstifte / Ejector pins

SET DELUXE PLUS

20 2006
€ 781,25

neu new

Ø 4×12, 2×13, 4×14, 2×15, 4×16, 2×17, 4×18, 2×19, 4×20, 4×22, 2×23, 2×24, 2×25, 4×26, 2×27, 2×28, 2×30, 2×32 mm
6× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 32 mm
BESTSELLER up to Ø 32 mm

SET DELUXE INDIVIDUAL

20 1139
€ 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44
Stück
Pieces

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY

20 1158
€ 885,15

Ø 2×12, 2×13, 2×14, 2×15, 2×16, 2×17, 2×18, 2×19, 2×20, 2×21, 2×22, 2×23, 2×24, 2×25, 2×26, 2×27, 2×28, 2×30, 2×32, 1×33, 1×35, 1×36, 1×40, 1×45, 1×50 mm
6× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 50 mm
BESTSELLER up to Ø 50 mm

DISPLAY INDIVIDUAL

20 1344
€ 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

SILVER-DRILL LINE / 50

SETS / DISPLAYS: INHALT 20 1265
SETS / DISPLAYS: CONTENT 20 1265

**BEST
SELLER**

Lagerprogramm + Zubehör siehe Seite 424-425
Stock range + accessories see page 424-425

6 Stück Pieces

SET BASIC

20 2007
€ 117,45

neu new

Ø 2×14, 2×18, 2×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS

20 1475
€ 122,80

Ø 14, 16, 18, 20, 22, 26 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET INDIVIDUAL

20 1138
€ 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12 Stück Pieces

SET PROFI

20 2008
€ 221,95

neu new

Ø 4×14, 4×18, 4×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET PROFI PLUS

20 2009
€ 232,70

neu new

Ø 2×14, 2×16, 2×18, 2×20, 2×22, 2×26 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET PROFI INDIVIDUAL

20 1132
€ 26,10

neu new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50 Stück Pieces

SET DELUXE

20 1483
€ 1234,30

Das komplette Sortiment 12-50 mm in 1,0 mm aufsteigend (39 Stück)
The hole range 12-50 mm in 1,0 mm steps (39 pieces)
6× Auswerferstifte / Ejector pins

SET DELUXE PLUS

20 2010
€ 969,60

neu new

Ø 4×12, 2×13, 4×14, 2×15, 4×16, 2×17, 4×18, 2×19, 4×20, 2×21, 4×22, 2×24, 2×25, 4×26, 2×27, 2×28, 2×30, 2×32 mm
6× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 32 mm
BESTSELLER up to Ø 32 mm

SET DELUXE INDIVIDUAL

20 1139
€ 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44 Stück Pieces

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY

20 1607
€ 1047,55

Ø 2×12, 2×13, 2×14, 2×15, 2×16, 2×17, 2×18, 2×19, 2×20, 2×21, 2×22, 2×23, 2×24, 2×25, 2×26, 2×27, 2×28, 2×30, 2×32, 1×33, 1×35, 1×36, 1×40, 1×45, 1×50 mm
6× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 50 mm
BESTSELLER up to Ø 50 mm

DISPLAY INDIVIDUAL

20 1344
€ 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

1

2

3

4

5

6

7

8

9

Index

HARD-LINE 40

SETS / DISPLAYS: INHALT 20 1315N
SETS / DISPLAYS: CONTENT 20 1315N

Lagerprogramm + Zubehör siehe Seite 438-439
Stock range + accessories see page 438-439



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

6 Stück Pieces

SET BASIC

20 1918
€ 202,50

neu new

Ø 2×18, 2×22, 2×26 mm
2x Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS

20 1329
€ 206,35

Ø 12, 14, 16, 18, 22, 26 mm
4x Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET INDIVIDUAL

20 1138
€ 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12 Stück Pieces

SET PROFI

20 1919
€ 393,65

neu new

Ø 3×14, 3×18, 3×22, 3×26 mm
4x Auswerferstifte / Ejector pins
Die meistverkauften vier Abmessungen in einem Set
The best selling four dimensions in a set

SET PROFI PLUS

20 1921
€ 388,70

neu new

Ø 2×12, 2×14, 2×16, 2×18, 2×22, 2×26 mm
4x Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

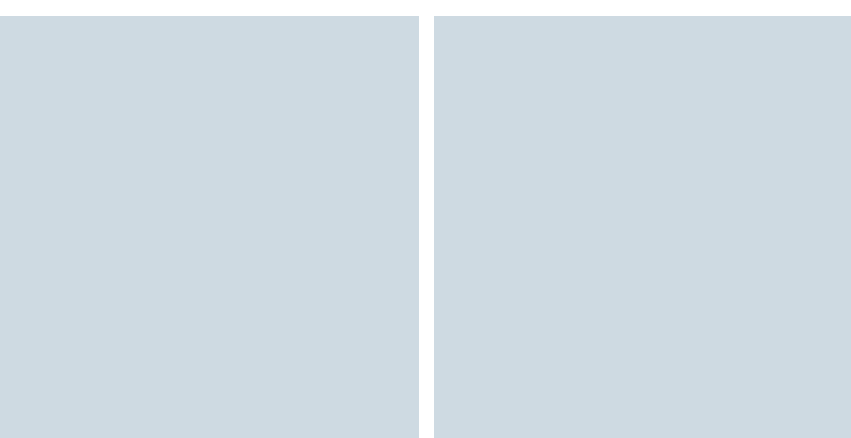
SET PROFI INDIVIDUAL

20 1132
€ 26,10

neu new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50 Stück Pieces



SET DELUXE INDIVIDUAL

20 1139
€ 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44 Stück Pieces

Abschließbares Acrydisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY INDIVIDUAL

20 1344
€ 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

HARD-LINE 55

SETS / DISPLAYS: INHALT 20 1316N
SETS / DISPLAYS: CONTENT 20 1316N

Lagerprogramm + Zubehör siehe Seite 440-441
Stock range + accessories see page 440-441

6
Stück
Pieces

SET BASIC

• **20 1922**
• € 229,95

neu new

Ø 2×14, 2×18, 2×22 mm
4× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS

• **20 1338**
• € 231,90

Ø 12, 14, 16, 18, 22, 26 mm
4× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET INDIVIDUAL

• **20 1138**
• € 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12
Stück
Pieces

SET PROFI

• **20 1923**
• € 437,80

neu new

Ø 3×14, 3×18, 3×22, 3×26 mm
4× Auswerferstifte / Ejector pins
Die meistverkauften vier Abmessungen in einem Set
The best selling four dimensions in a set

SET PROFI PLUS

• **20 1924**
• € 433,90

neu new

Ø 2×14, 2×16, 2×18, 2×20, 2×22, 2×26 mm
4× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET PROFI INDIVIDUAL

• **20 1132**
• € 26,10

neu new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50
Stück
Pieces

SET DELUXE INDIVIDUAL

• **20 1139**
• € 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44
Stück
Pieces

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

• **20 1344**
• € 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

DISPLAY INDIVIDUAL

• **20 1344**
• € 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.




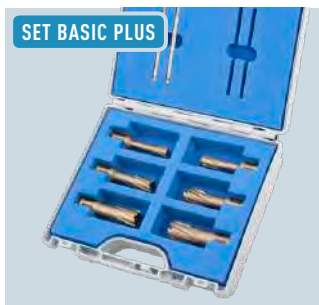




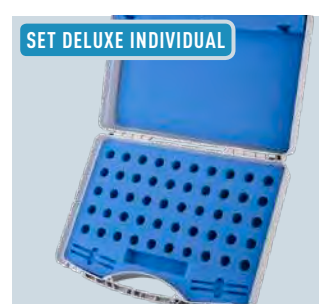

HARD-LINE 40
ZOLL / INCH

SETS / DISPLAYS: INHALT 20 1630
SETS / DISPLAYS: CONTENT 20 1630

Lagerprogramm + Zubehör siehe Seite 446-447
Stock range + accessories see page 446-447



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

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|----------------------------------|---|---|---|
| <p>6 Stück Pieces</p> | <p>SET BASIC</p>  <p>20 1926 € 198,70</p> <p><i>neu new</i></p> | <p>SET BASIC PLUS</p>  <p>20 1478 € 199,55</p> | <p>SET INDIVIDUAL</p>  <p>20 1138 € 13,15</p> |
| | <p>Ø 2× 5/8", 2× 13/16", 2× 15/16" 2× Auswerferstifte / Ejector pins Die meistverkauften drei Abmessungen in einem Set The best selling three dimensions in a set</p> | <p>Ø 9/16", 5/8", 3/4", 13/16", 15/16", 1.1/16" 2× Auswerferstifte / Ejector pins Die BESTSELLER bis Ø 1.1/16" BESTSELLER up to Ø 1.1/16"</p> | <p>Leer für max. 6 Kernbohrer + 4 Auswerferstifte. Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 6 annular cutters + 4 ejector pins. Maximum possible Ø 40 mm. We also compile your desired set on request.</p> |
| | | | |
| <p>12 Stück Pieces</p> | <p>SET PROFI</p>  <p>20 1927 € 381,85</p> <p><i>neu new</i></p> | <p>SET PROFI PLUS</p>  <p>20 1928 € 383,60</p> <p><i>neu new</i></p> | <p>SET PROFI INDIVIDUAL</p>  <p>20 1132 € 26,10</p> <p><i>neu new</i></p> |
| | <p>Ø 4× 5/8", 4× 13/16", 4× 15/16" 2× Auswerferstifte / Ejector pins Die meistverkauften drei Abmessungen in einem Set The best selling three dimensions in a set</p> | <p>Ø 2× 9/16", 2× 5/8", 2× 3/4", 2× 13/16", 2× 15/16", 2× 1.1/16" 2× Auswerferstifte / Ejector pins Die BESTSELLER bis Ø 1.1/16" BESTSELLER up to Ø 1.1/16"</p> | <p>Leer für max. 12 Kernbohrer + 4 Auswerferstifte. Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 12 annular cutters + 4 ejector pins. Maximum possible Ø 40 mm. We also compile your desired set on request.</p> |
| | | | |
| <p>39/50 Stück Pieces</p> | | | <p>SET DELUXE INDIVIDUAL</p>  <p>20 1139 € 61,65</p> |
| | | | <p>Leer für max. 50 Kernbohrer bis Ø 120 mm möglich. Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.</p> |
| | | | |
| <p>44 Stück Pieces</p> | <p>Abschließbares Acryldisplay Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.</p> <p>Lockable acrylic display Ideal as showcase and small warehouse. All current sizes directly visible and available.</p> | | <p>DISPLAY INDIVIDUAL</p>  <p>20 1344 € 102,05</p> |
| | | | <p>Leer für max. 44 Kernbohrer bis Ø 60 mm möglich. Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.</p> |
| | | | |

HARD-LINE
ZOLL / INCH

55

SETS / DISPLAYS: INHALT 20 1640
SETS / DISPLAYS: CONTENT 20 1640

Lagerprogramm + Zubehör siehe Seite 448-449
Stock range + accessories see page 448-449

6
Stück
Pieces

SET BASIC



20 1929
• € 223,20

neu new

Ø 2× 13/16", 2× 15/16", 2× 1.1/16"
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

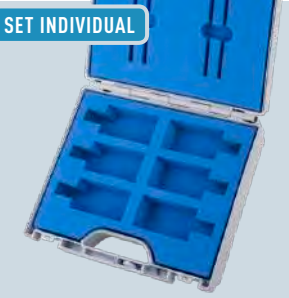
SET BASIC PLUS



20 1479
• € 218,25

Ø 5/8", 11/16", 3/4", 13/16", 15/16", 1.1/16"
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 1.1/16"
BESTSELLER up to Ø 1.1/16"

SET INDIVIDUAL



20 1138
• € 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12
Stück
Pieces

SET PROFI



20 1931
• € 431,15

neu new

Ø 4× 13/16", 4× 15/16", 4× 1.1/16"
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET PROFI PLUS



20 1932
• € 417,30

neu new

Ø 2× 5/8", 2× 11/16", 2× 3/4", 2× 13/16", 2× 15/16", 2× 1.1/16"
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 1.1/16"
BESTSELLER up to Ø 1.1/16"

SET PROFI INDIVIDUAL



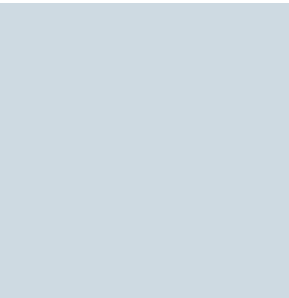
20 1132
• € 26,10

neu new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50
Stück
Pieces

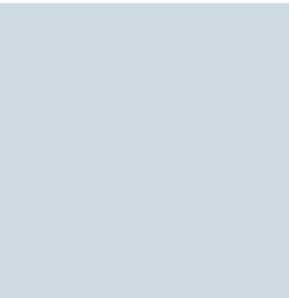
SET DELUXE



20 1139
• € 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

SET DELUXE INDIVIDUAL



20 1139
• € 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

DISPLAY INDIVIDUAL



20 1344
• € 102,05

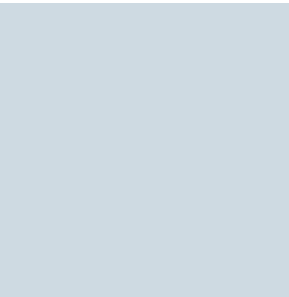
Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

44
Stück
Pieces

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY INDIVIDUAL



20 1344
• € 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

DISPLAY INDIVIDUAL



20 1344
• € 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.





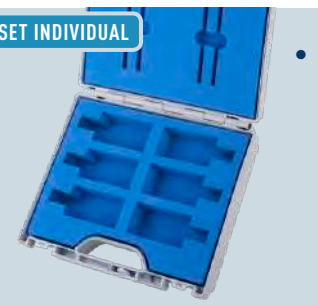





BLUE-DRILL LINE 30

SETS / DISPLAYS: INHALT 20 1312N
SETS / DISPLAYS: CONTENT 20 1312N

Lagerprogramm + Zubehör siehe Seite 454-455
Stock range + accessories see page 454-455



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

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|-------------------------------|--|---|--|---|
| <p>6 Stück Pieces</p> | <p>SET BASIC</p> <p>20 1958 € 185,50</p> <p>neu new</p>  <p>Ø 2×16, 2×18, 2×22 mm 2× Auswerferstifte / Ejector pins Die meistverkauften drei Abmessungen in einem Set The best selling three dimensions in a set</p> | <p>SET BASIC PLUS</p> <p>20 1348 € 188,80</p>  <p>Ø 14, 16, 18, 20, 22, 26 mm 2× Auswerferstifte / Ejector pins Die BESTSELLER bis Ø 26 mm BESTSELLER up to Ø 26 mm</p> | <p>SET INDIVIDUAL</p> <p>20 1138 € 13,15</p>  <p>Leer für max. 6 Kernbohrer + 4 Auswerferstifte. Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 6 annular cutters + 4 ejector pins. Maximum possible Ø 40 mm. We also compile your desired set on request.</p> | |
| | <p>12 Stück Pieces</p> | <p>SET PROFI</p> <p>20 1959 € 352,70</p> <p>neu new</p>  <p>Ø 3×14, 3×18, 3×20, 3×22 mm 2× Auswerferstifte / Ejector pins Die meistverkauften vier Abmessungen in einem Set The best selling four dimensions in a set</p> | <p>SET PROFI PLUS</p> <p>20 1960 € 363,30</p> <p>neu new</p>  <p>Ø 2×14, 2×16, 2×18, 2×20, 2×22, 2×26 mm 2× Auswerferstifte / Ejector pins Die BESTSELLER bis Ø 26 mm BESTSELLER up to Ø 26 mm</p> | <p>SET PROFI INDIVIDUAL</p> <p>20 1132 € 26,10</p> <p>neu new</p>  <p>Leer für max. 12 Kernbohrer + 4 Auswerferstifte. Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 12 annular cutters + 4 ejector pins. Maximum possible Ø 40 mm. We also compile your desired set on request.</p> |
| | <p>39/50 Stück Pieces</p> | <p>Abschließbares Acrydisplay Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.</p> <p>Lockable acrylic display Ideal as showcase and small warehouse. All current sizes directly visible and available.</p> | <p>SET DELUXE INDIVIDUAL</p> <p>20 1139 € 61,65</p>  <p>Leer für max. 50 Kernbohrer bis Ø 120 mm möglich. Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.</p> | |
| <p>44 Stück Pieces</p> | <p>DISPLAY INDIVIDUAL</p> <p>20 1344 € 102,05</p>  <p>Leer für max. 44 Kernbohrer bis Ø 60 mm möglich. Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.</p> | | | |

BLUE-DRILL LINE / 55

SETS / DISPLAYS: INHALT 20 1313N
SETS / DISPLAYS: CONTENT 20 1313N


Lagerprogramm + Zubehör siehe Seite 456-457
Stock range + accessories see page 456-457

6 Stück Pieces

SET BASIC

20 1961
€ 210,50

neu new



Ø 2×14, 2×18, 2×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS

20 1349
€ 218,25



Ø 14, 16, 18, 20, 22, 26 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET INDIVIDUAL

20 1138
€ 13,15



Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12 Stück Pieces

SET PROFI

20 1962
€ 407,55

neu new



Ø 3×14, 3×18, 3×20, 3×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften vier Abmessungen in einem Set
The best selling four dimensions in a set

SET PROFI PLUS

20 1963
€ 421,25

neu new



Ø 2×14, 2×16, 2×18, 2×20, 2×22, 2×26 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET PROFI INDIVIDUAL

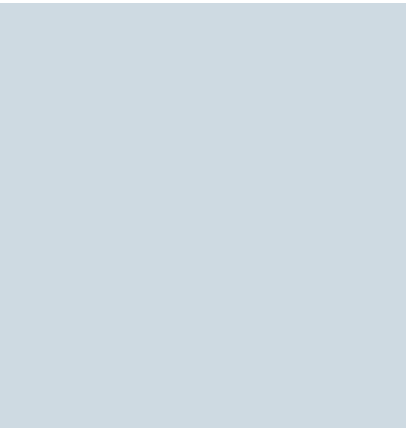
20 1132
€ 26,10

neu new



Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50 Stück Pieces

SET DELUXE INDIVIDUAL

20 1139
€ 61,65

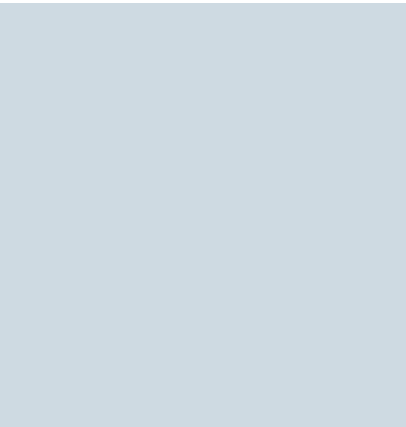


Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44 Stück Pieces

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY INDIVIDUAL

20 1344
€ 102,05



Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

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GOLD-DRILL LINE 30

SETS / DISPLAYS: INHALT 20 1260N
SETS / DISPLAYS: CONTENT 20 1260N

Lagerprogramm + Zubehör siehe Seite 470-471
Stock range + accessories see page 470-471



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- 2
- 3
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- 5
- 6
- 7
- 8
- 9

6 Stück Pieces

SET BASIC 20 1987
€ 143,85



neu
new

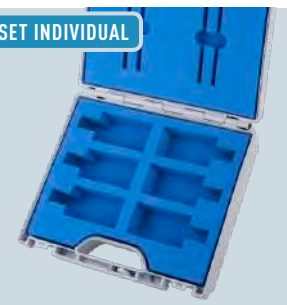
Ø 2×14, 2×18, 2×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS 20 1324
€ 138,85



Ø 12, 14, 16, 18, 20, 22 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 22 mm
BESTSELLER up to Ø 22 mm

SET INDIVIDUAL 20 1138
€ 13,15



Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12 Stück Pieces

SET PROFI 20 1988
€ 273,40



neu
new

Ø 4×14, 4×18, 4×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set


SET PROFI PLUS 20 1989
€ 263,50



neu
new

Ø 2×12, 2×14, 2×16, 2×18, 2×20, 2×22 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 22 mm
BESTSELLER up to Ø 22 mm

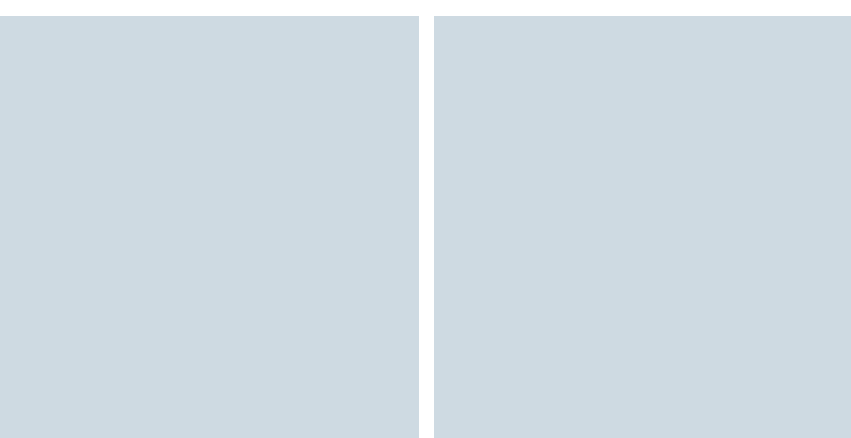
SET PROFI INDIVIDUAL 20 1132
€ 26,10



neu
new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50 Stück Pieces



SET DELUXE INDIVIDUAL 20 1139
€ 61,65



Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44 Stück Pieces

Abschließbares Acrydisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY INDIVIDUAL 20 1344
€ 102,05



Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.


GOLD-DRILL LINE / 55

SETS / DISPLAYS: INHALT 20 1270N
SETS / DISPLAYS: CONTENT 20 1270N

Lagerprogramm + Zubehör siehe Seite 472-473
Stock range + accessories see page 472-473

6 Stück Pieces

SET BASIC



20 1990
• € 172,50

neu new

Ø 2x14, 2x18, 2x22 mm
2x Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS



20 1326
• € 167,50

Ø 12, 14, 16, 18, 22, 26 mm
2x Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET INDIVIDUAL




20 1138
• € 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12 Stück Pieces

SET PROFI



20 1991
• € 329,75

neu new

Ø 4x14, 4x18, 4x22 mm
2x Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET PROFI PLUS



20 1992
• € 333,15

neu new

Ø 2x12, 2x14, 2x16, 2x18, 2x22, 2x26 mm
2x Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET PROFI INDIVIDUAL



20 1132
• € 26,10

neu new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50 Stück Pieces

SET DELUXE INDIVIDUAL



20 1139
• € 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44 Stück Pieces

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY INDIVIDUAL



20 1344
• € 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

GOLD-DRILL LINE 30
ZOLL / INCH

SETS / DISPLAYS: INHALT 20 1610
SETS / DISPLAYS: CONTENT 20 1610

Lagerprogramm + Zubehör siehe Seite 478-479
Stock range + accessories see page 478-479



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

6 Stück Pieces

SET BASIC

20 1981
€ 128,35

neu new

Ø 2×5/8", 2×13/16", 2×9/16"
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS

20 1476
€ 134,00

Ø 9/16", 5/8", 11/16", 3/4", 13/16", 7/8"
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 7/8"
BESTSELLER up to Ø 7/8"

SET INDIVIDUAL

20 1138
€ 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12 Stück Pieces

SET PROFI

20 1982
€ 242,50

neu new

Ø 4×5/8", 4×13/16", 4×9/16"
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET PROFI PLUS

20 1983
€ 253,70

neu new

Ø 2×9/16", 2×5/8", 2×11/16", 2×3/4", 2×13/16", 2×7/8"
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 7/8"
BESTSELLER up to Ø 7/8"

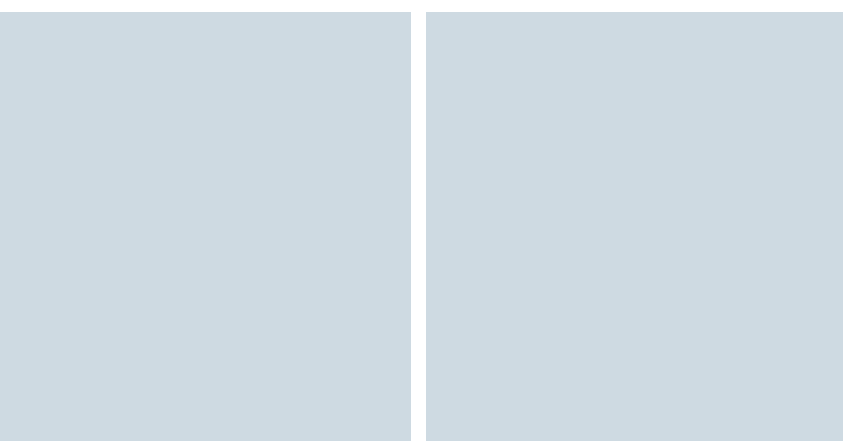
SET PROFI INDIVIDUAL

20 1132
€ 26,10

neu new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50 Stück Pieces



SET DELUXE INDIVIDUAL

20 1139
€ 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44 Stück Pieces

Abschließbares Acrydisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY INDIVIDUAL

20 1344
€ 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.


GOLD-DRILL LINE 55
ZOLL / INCH

SETS / DISPLAYS: INHALT 20 1620
SETS / DISPLAYS: CONTENT 20 1620

Lagerprogramm + Zubehör siehe Seite 480-481
Stock range + accessories see page 480-481

6 Stück Pieces

SET BASIC




20 1984
€ 164,75

neu new

Ø 2×5/8", 2×11/16", 2×13/16"
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set


SET BASIC PLUS



20 1477
€ 169,70

Ø 9/16", 5/8", 11/16", 3/4", 13/16", 7/8"
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 7/8"
BESTSELLER up to Ø 7/8"

SET INDIVIDUAL




20 1138
€ 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12 Stück Pieces

SET PROFI



20 1985
€ 332,40

neu new

Ø 3×5/8", 3×11/16", 3×13/16", 3×7/8"
2× Auswerferstifte / Ejector pins
Die meistverkauften vier Abmessungen in einem Set
The best selling four dimensions in a set

SET PROFI PLUS



20 1986
€ 247,15

neu new

Ø 2×9/16", 2×5/8", 2×11/16", 2×3/4", 2×13/16", 2×7/8"
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 7/8"
BESTSELLER up to Ø 7/8"

SET PROFI INDIVIDUAL



20 1132
€ 26,10

neu new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50 Stück Pieces

SET DELUXE INDIVIDUAL



20 1139
€ 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44 Stück Pieces

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY INDIVIDUAL



20 1344
€ 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

HARD-LINE 40

SETS / DISPLAYS: INHALT 20 1147
SETS / DISPLAYS: CONTENT 20 1147

Lagerprogramm + Zubehör siehe Seite 492
Stock range + accessories see page 492

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

6 Stück Pieces

SET BASIC

20 1933
€ 212,10

neu new



Ø 2×14, 2×18, 2×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS


20 1337
€ 214,80



Ø 14, 16, 18, 20, 22, 26 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET INDIVIDUAL

20 1138
€ 13,15



Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12 Stück Pieces

SET PROFI

20 1934
€ 406,55

neu new



Ø 4×14, 4×18, 4×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET PROFI PLUS

20 1935
€ 411,95

neu new



Ø 2×14, 2×16, 2×18, 2×20, 2×22, 2×26 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET PROFI INDIVIDUAL

20 1132
€ 26,10

neu new




Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50 Stück Pieces

SET DELUXE INDIVIDUAL

20 1139
€ 61,65



Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44 Stück Pieces

Abschließbares Acrydisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.



DISPLAY INDIVIDUAL

20 1344
€ 102,05



Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

HARD-LINE 55

SETS / DISPLAYS: INHALT 20 1148
SETS / DISPLAYS: CONTENT 20 1148

Lagerprogramm + Zubehör siehe Seite 493
Stock range + accessories see page 493

6
Stück
Pieces

SET BASIC

• **20 1941**
• € 232,55

neu new

Ø 2×14, 2×18, 2×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS

• **20 1354**
• € 234,55

Ø 12, 14, 18, 20, 22, 26 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET INDIVIDUAL

• **20 1138**
• € 13,15

Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12
Stück
Pieces

SET PROFI

• **20 1942**
• € 447,50

neu new

Ø 4×14, 4×18, 4×22 mm
2× Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET PROFI PLUS

• **20 1943**
• € 451,55

neu new

Ø 2×12, 2×14, 2×18, 2×20, 2×22, 2×26 mm
2× Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 26 mm
BESTSELLER up to Ø 26 mm

SET PROFI INDIVIDUAL

• **20 1132**
• € 26,10

neu new

Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50
Stück
Pieces

SET DELUXE INDIVIDUAL

• **20 1139**
• € 61,65

Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

DISPLAY INDIVIDUAL

• **20 1344**
• € 102,05

Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

44
Stück
Pieces

INDEX

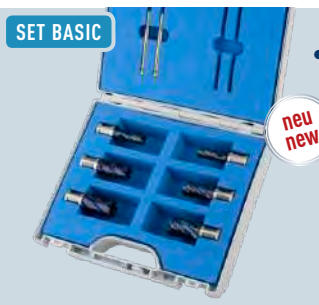







1
2
3
4
5
6
7
8
9

Index

BLUE-DRILL LINE 40

SETS / DISPLAYS: INHALT 20 1146
SETS / DISPLAYS: CONTENT 20 1146

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

| | | | |
|----------------------------------|---|---|---|
| <p>6 Stück Pieces</p> | <p>SET BASIC</p>  <p>20 1964 € 200,50</p> <p><i>neu new</i></p> | <p>SET BASIC PLUS</p>  <p>20 1333 € 205,90</p> | <p>SET INDIVIDUAL</p>  <p>20 1138 € 13,15</p> |
| | <p>Ø 2×14, 2×18, 2×22 mm 2× Auswerferstifte / Ejector pins Die meistverkauften drei Abmessungen in einem Set The best selling three dimensions in a set</p> | <p>Ø 14, 16, 18, 20, 22, 26 mm 2× Auswerferstifte / Ejector pins Die BESTSELLER bis Ø 26 mm BESTSELLER up to Ø 26 mm</p> | <p>Leer für max. 6 Kernbohrer + 4 Auswerferstifte. Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 6 annular cutters + 4 ejector pins. Maximum possible Ø 40 mm. We also compile your desired set on request.</p> |
| | <p>Ø 3×14, 3×18, 3×20, 3×22 mm 2× Auswerferstifte / Ejector pins Die meistverkauften vier Abmessungen in einem Set The best selling four dimensions in a set</p> | <p>Ø 2×14, 2×16, 2×18, 2×20, 2×22, 2×26 mm 2× Auswerferstifte / Ejector pins Die BESTSELLER bis Ø 26 mm BESTSELLER up to Ø 26 mm</p> | <p>Leer für max. 12 Kernbohrer + 4 Auswerferstifte. Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 12 annular cutters + 4 ejector pins. Maximum possible Ø 40 mm. We also compile your desired set on request.</p> |
| <p>39/50 Stück Pieces</p> | <p>SET PROFI</p>  <p>20 1965 € 384,05</p> <p><i>neu new</i></p> | <p>SET PROFI PLUS</p>  <p>20 1966 € 394,15</p> <p><i>neu new</i></p> | <p>SET PROFI INDIVIDUAL</p>  <p>20 1132 € 26,10</p> <p><i>neu new</i></p> |
| | <p>Abschließbares Acryldisplay Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.</p> <p>Lockable acrylic display Ideal as showcase and small warehouse. All current sizes directly visible and available.</p> | <p>Leer für max. 50 Kernbohrer bis Ø 120 mm möglich. Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.</p> | <p>SET DELUXE INDIVIDUAL</p>  <p>20 1139 € 61,65</p> |
| <p>44 Stück Pieces</p> | | | <p>DISPLAY INDIVIDUAL</p>  <p>20 1344 € 102,05</p> |
| | | | <p>Leer für max. 44 Kernbohrer bis Ø 60 mm möglich. Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen. Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.</p> |

GOLD-DRILL LINE / 40

SETS / DISPLAYS: INHALT 20 1146U
SETS / DISPLAYS: CONTENT 20 1146U


Lagerprogramm + Zubehör siehe Seite 500
Stock range + accessories see page 500

6 Stück Pieces

SET BASIC

20 1999
€ 156,20

neu new



Ø 2x14, 2x18, 2x22 mm
2x Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET BASIC PLUS


20 1335
€ 151,50



Ø 12, 14, 16, 18, 20, 22 mm
2x Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 22 mm
BESTSELLER up to Ø 22 mm

SET INDIVIDUAL

20 1138
€ 13,15




Leer für max. 6 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 6 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

12 Stück Pieces

SET PROFI

20 2001
€ 294,75

neu new



Ø 4x14, 4x18, 4x22 mm
2x Auswerferstifte / Ejector pins
Die meistverkauften drei Abmessungen in einem Set
The best selling three dimensions in a set

SET PROFI PLUS

20 2002
€ 285,35

neu new



Ø 2x12, 2x14, 2x16, 2x18, 2x20, 2x22 mm
2x Auswerferstifte / Ejector pins
Die BESTSELLER bis Ø 22 mm
BESTSELLER up to Ø 22 mm

SET PROFI INDIVIDUAL

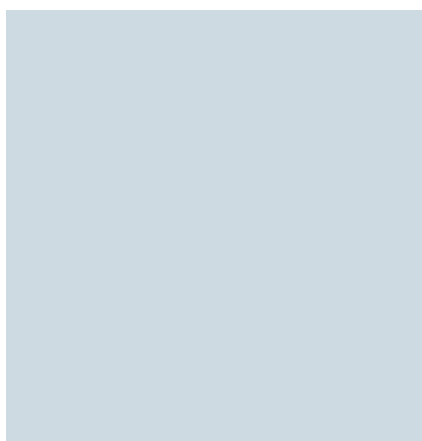
20 1132
€ 26,10

neu new



Leer für max. 12 Kernbohrer + 4 Auswerferstifte.
Max. Ø 40 mm möglich. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 12 annular cutters + 4 ejector pins.
Maximum possible Ø 40 mm. We also compile your desired set on request.

39/50 Stück Pieces

SET DELUXE INDIVIDUAL

20 1139
€ 61,65

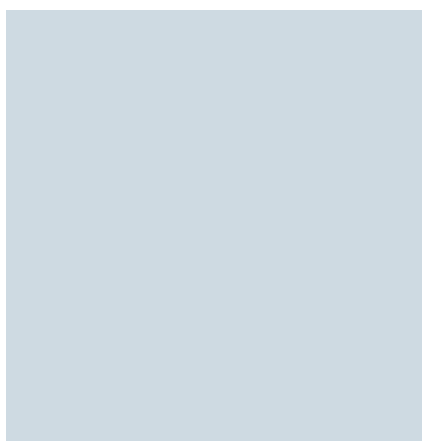


Leer für max. 50 Kernbohrer bis Ø 120 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 50 annular cutters. Maximum possible Ø 120 mm. Quantity ejector pins on request. We also compile your desired set on request.

44 Stück Pieces

Abschließbares Acryldisplay
Ideal als Showcase und Mini-Lager. Alle gängigen Abmessungen sofort sichtbar und griffbereit.

Lockable acrylic display
Ideal as showcase and small warehouse. All current sizes directly visible and available.

DISPLAY INDIVIDUAL

20 1344
€ 102,05

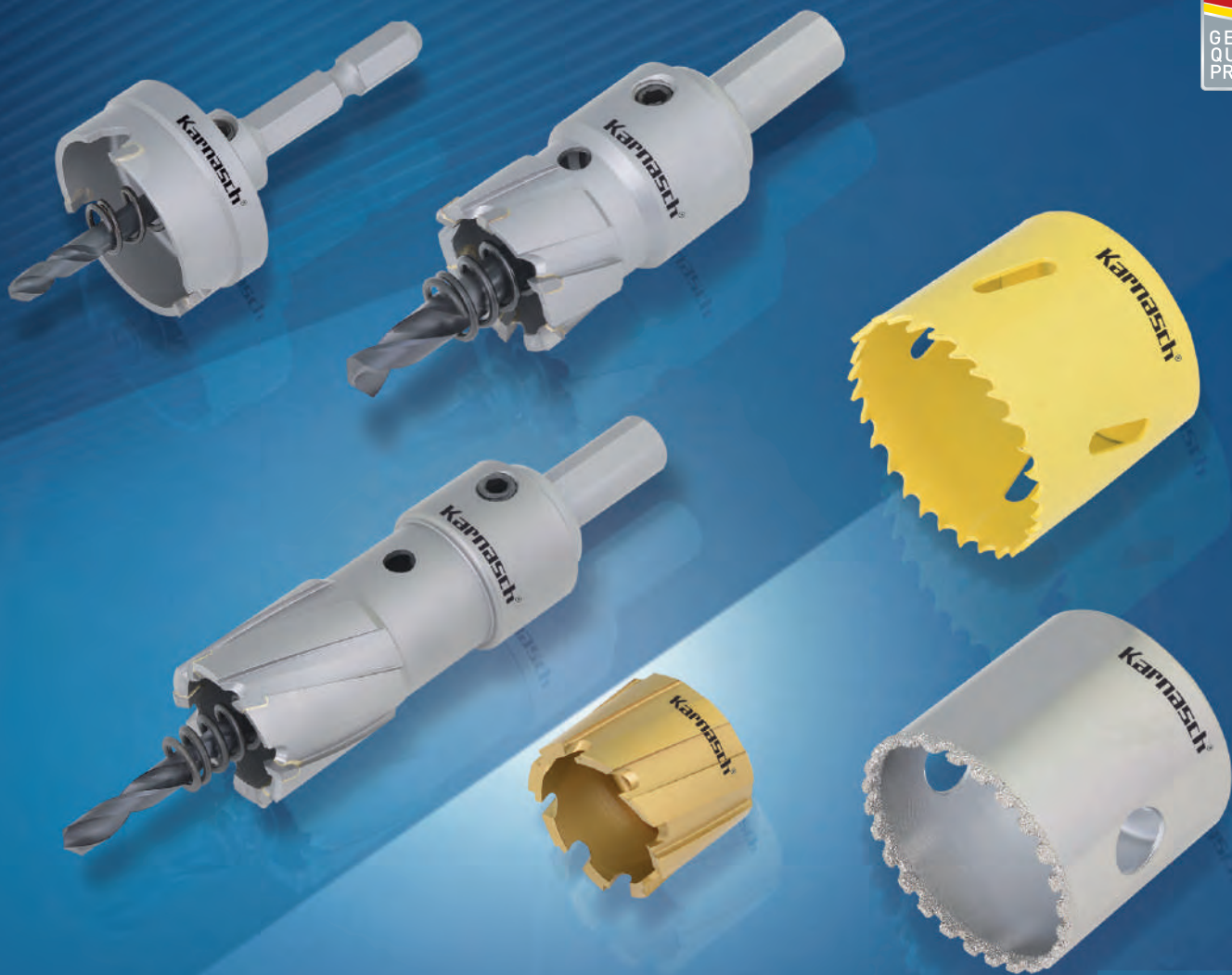


Leer für max. 44 Kernbohrer bis Ø 60 mm möglich.
Anzahl der Auswerferstifte nach Wunsch. Gerne stellen wir auch Ihr Wunschset zusammen.
Empty for max. 44 annular cutters. Maximum possible Ø 60 mm. Quantity ejector pins on request. We also compile your desired set on request.

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

LOCHSÄGEN

HOLE SAWS



2.5

KONTAKT | CONTACT

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









































<http://shop.karnasch.tools>



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




































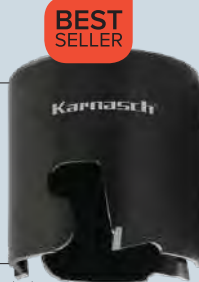

















POWER-MAX RANGE

| Type | Anwendung · Application | | | | | |
|--|---|---|--|---|--|---------|
| <p>20 1010</p> <p>POWER-MAX HEAVY-DUTY 10</p> <p>Ø 14-120 mm Ø 35/64-4.23/32"</p>  <p>12 mm 2,2 mm</p> <p>Komplett mit Schaft Zentrierbohrer und Auswurfeder</p> <p>Completely with shank, center drill and ejector spring</p> | <p>20 1010A</p> <p>POWER-MAX HEAVY-DUTY 10</p> <p>Ø 14-120 mm Ø 35/64-4.23/32"</p>  <p>Nur Lochsägenkörper Durch austauschbares Schaftsystem für alle Maschinentypen einsetzbar</p> <p>Hole saw body only Because of exchangeable shank system suitable for all types of machines</p> |  Stahl Steel |  Grauguss Grey cast iron |  Edelstahl Stainless |  Alu Alu | 566-569 |
|  Kupfer, Messing, Zinn Copper, brass, tin |  Kunststoffe GFK/CFK Plastics GRP/CRP |  Sandwich-Material Sandwich materials | | | | |
| <p>20 1015</p> <p>POWER-MAX HEAVY-DUTY 20</p> <p>Ø 14-120 mm Ø 35/64-4.23/32"</p>  <p>30 mm 3,0 mm</p> <p>Komplett mit Schaft Zentrierbohrer und Auswurfeder</p> <p>Completely with shank, center drill and ejector spring</p> | <p>20 1015A</p> <p>POWER-MAX HEAVY-DUTY 20</p> <p>Ø 14-120 mm Ø 35/64-4.23/32"</p>  <p>Nur Lochsägenkörper Durch austauschbares Schaftsystem für alle Maschinentypen einsetzbar</p> <p>Hole saw body only Because of exchangeable shank system suitable for all types of machines</p> |  Stahl Steel |  Grauguss Grey cast iron |  Edelstahl Stainless |  Alu Alu | 570-573 |
|  Kupfer, Messing, Zinn Copper, brass, tin |  Kunststoffe GFK/CFK Plastics GRP/CRP |  Sandwich-Material Sandwich materials | | | | |
| <p>20 1130</p> <p>POWER-MAX SUPER HEAVY-DUTY 30</p> <p>Ø 14-150 mm Ø 35/64-5.29/32"</p>  <p>30 mm 4,0 mm</p> <p>Komplett mit Schaft Zentrierbohrer und Auswurfeder</p> <p>Completely with shank, center drill and ejector spring</p> <p>BEST SELLER</p> | <p>20 1130A</p> <p>POWER-MAX SUPER HEAVY-DUTY 30</p> <p>Ø 14-150 mm Ø 35/64-5.29/32"</p>  <p>Nur Lochsägenkörper Durch austauschbares Schaftsystem für alle Maschinentypen einsetzbar</p> <p>Hole saw body only Because of exchangeable shank system suitable for all types of machines</p> <p>BEST SELLER</p> |  Stahl Steel |  Grauguss Grey cast iron |  Edelstahl Stainless |  Alu Alu | 574-577 |
|  Kupfer, Messing, Zinn Copper, brass, tin |  Kunststoffe GFK/CFK Plastics GRP/CRP |  Sandwich-Material Sandwich materials | | | | |
| <p>20 1141</p> <p>POWER-MAX SUPER HEAVY-DUTY 55</p> <p>Ø 14-150 mm Ø 35/64-5.29/32"</p>  <p>55 mm 4,0 mm</p> <p>Komplett mit Schaft Zentrierbohrer und Auswurfeder</p> <p>Completely with shank, center drill and ejector spring</p> | <p>20 1141A</p> <p>POWER-MAX SUPER HEAVY-DUTY 55</p> <p>Ø 14-150 mm Ø 35/64-5.29/32"</p>  <p>Nur Lochsägenkörper Durch austauschbares Schaftsystem für alle Maschinentypen einsetzbar</p> <p>Hole saw body only Because of exchangeable shank system suitable for all types of machines</p> |  Stahl Steel |  Grauguss Grey cast iron |  Edelstahl Stainless |  Alu Alu | 578-581 |
|  Kupfer, Messing, Zinn Copper, brass, tin |  Kunststoffe GFK/CFK Plastics GRP/CRP |  Sandwich-Material Sandwich materials | | | | |
| <p>20 1121</p> <p>POWER-MAX ALLROUND 60</p> <p>Ø 25-105 mm Ø 63/64-4.9/64"</p>  <p>60 mm 2,4 mm</p> <p>Komplett mit Schaft Zentrierbohrer und Auswurfeder</p> <p>Completely with shank, center drill and ejector spring</p> | <p>20 1121A</p> <p>POWER-MAX ALLROUND 60</p> <p>Ø 25-105 mm Ø 63/64-4.9/64"</p>  <p>Nur Lochsägenkörper Durch austauschbares Schaftsystem für alle Maschinentypen einsetzbar</p> <p>Hole saw body only Because of exchangeable shank system suitable for all types of machines</p> |  Weichholz, Hartholz, Exotenh Holz, Furniere Soft wood, hard wood, exotic wood, veneers |  Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten Bonded wood, blockboard and veneer plywood, laminated wood |  Spanplatten, Hartfaserplatten, Kunststoff beschichtet/furniert, MDF, HDF Chipboard, hard fibre board, plasticcoated/veneered, MDF, HDF |  Kunststoffe, Plexiglas, Duro- und Thermoplaste Plastics, plexiglass, acrylics, duro- and thermoplastics | 582-585 |
|  HPL (Schichtstoffplatten) Trespa®, Resopal® HPL (High-Pressure-Laminate) Trespa®, Resopal® |  Faserzementplatte, Eternit®, Stein-/Glaswolle, Rockwool®, Isover® Fibre cement panel, Eternit®, mineral/glass wool, Rockwool®, Isover® |  Dünnbleche, Sandwich Material, Verbundstoffe Thin iron sheets, sandwich material, composites |  Ne-Metall wie Alu, Messing, Kupfer, Zinn Non ferrous metals like Alu, copper, brass, tin | | | |

Ersatzteile für die POWER-MAX Reihe siehe Seite 604 · Spare parts for the POWER-MAX range see page 604

Easy-Cut · Extra Easy-Cut · Mini-Cut · BI-Metall Cobalt 8 % · Allround 60 ECO · Diamond Grit

| Type | Anwendung · Application | |
|---|--|---------|
| 20 1020 EASY-CUT Ø 14-200 mm Ø 35/64-7.7/8"  12 mm 1,8-2,0 mm BEST SELLER |  Stahl Steel  Grauguss Grey cast iron  Edelstahl Stainless  Alu Alu  Kupfer, Messing, Zinn Copper, brass, tin  Kunststoffe GFK/CFK Plastics GRP/CRP  Sandwich-Material Sandwich materials | 586-587 |
| 20 1025 EXTRA EASY-CUT Ø 14-38 mm Ø 35/64-1.1/2"  8 mm 1,8 mm |  Stahl Steel  Grauguss Grey cast iron  Edelstahl Stainless  Alu Alu  Kupfer, Messing, Zinn Copper, brass, tin  Kunststoffe GFK/CFK Plastics GRP/CRP  Sandwich-Material Sandwich materials | 588-589 |
| 21 1000 MINI-CUT Ø 6-20 mm = 8 mm Ø 6-25 mm = 13 mm Ø 15/64-63/64"  2,3 mm |  Stahl Steel  Grauguss Grey cast iron  Edelstahl Stainless  Alu Alu  Kupfer, Messing, Zinn Copper, brass, tin  Kunststoffe GFK/CFK Plastics GRP/CRP  Sandwich-Material Sandwich materials | 590-591 |
| 20 1500 BI-METALL COBALT 8% Ø 14-305 mm Ø 35/64-12.1/64"  38 mm 2,5 mm BEST SELLER |  Stahl Steel  Kunststoffe GFK/CFK Plastics GRP/CRP  Dünneleche, Sandwich Material, Verbundstoffe Thin iron sheets, sandwich material, composites  Ne-Metall wie Alu, Messing, Kupfer, Zinn Non ferrous metals like alu, copper, brass, tin  Weichholz, Hartholz, Exotenholz, Furniere Soft wood, hard wood, exotic wood, veneers  Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten Bonded wood, block-board and veneer plywood, laminated wood  Spanplatten, Hartfaserplatten, Kunststoff beschichtet/furniert, MDF, HDF Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF  Mineralwerkstoff, Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid® Mineral material Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®  HPL (Schichtstoffplatten) Trespa®, Resopal® HPL (High-Pressure-Laminat) Trespa®, Resopal®  Faserzementplatte, Eternit®, Stein-/Glaswolle, Rockwool®, Isover® Fibre cement panel, Eternit®, mineral/glass wool, Rockwool®, Isover®  Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF  Mineralwerkstoff, Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid® Mineral material Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®  HPL (Schichtstoffplatten) Trespa®, Resopal® HPL (High-Pressure-Laminat) Trespa®, Resopal®  Faserzementplatte, Eternit®, Stein-/Glaswolle, Rockwool®, Isover® Fibre cement panel, Eternit®, mineral/glass wool, Rockwool®, Isover® | 592-595 |
| 20 1150 ALLROUND ECO 60 Ø 19-127 mm Ø 3/4-5"  60 mm Schnittbreite Cutting width 16-100 mm = 3,5 mm 102-152 mm = 4,0 mm BEST SELLER |  Weichholz, Hartholz, Exotenholz, Furniere Soft wood, hard wood, exotic wood, veneers  Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten Bonded wood, block-board and veneer plywood, laminated wood  Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF  Spanplatten, Hartfaserplatten, Kunststoff beschichtet/furniert, MDF, HDF Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF  Kunststoffe GFK/CFK Plastics GRP/CRP  Ne-Metall wie Alu, Messing, Kupfer, Zinn Non ferrous metals like alu, copper, brass, tin  Faserzementplatte, Eternit®, Stein-/Glaswolle, Rockwool®, Isover® Fibre cement panel, Eternit®, mineral/glass wool, Rockwool®, Isover®  Mineralwerkstoff, Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid® Mineral material Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®  HPL (Schichtstoffplatten) Trespa®, Resopal® HPL (High-Pressure-Laminat) Trespa®, Resopal® | 596-598 |
| 21 1500 DIAMOND GRIT Ø 14-152 mm Ø 35/64-5.63/64"  38 mm 2,0 mm BEST SELLER |  Kunststoffe, Plexiglas, Glasfaser Plastics, plexiglass, fibreglass  Keramik, Wandfliesen, Feinsteinzeugfliesen Ceramic, wall tiles, stoneware tiles  Porzellan, Stein Porcelain, stone  Mauerwerk Brick & Masonry  Glas Glass | 600-601 |

1 

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Ersatzteile für die POWER-MAX Reihe siehe Seite 604 · Spare parts for the POWER-MAX range see page 604

20 1010

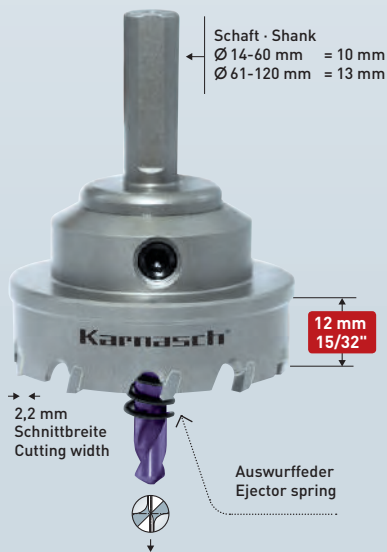
POWER-MAX
HEAVY-DUTY 10



Hartmetall-bestückte Lochsäge, Nutzlänge 12 mm.
Komplett mit Schaft, Zentrierbohrer und Auswurfeder
Carbide tipped hole saw, drill depth 12 mm | 15/32".
Completely with shank, center drill and ejector spring

ANWENDUNG · APPLICATION

| | | | | | | |
|----------------|------------------------|----------------------------|------------|---|---|--|
| | | | | | | |
| Stahl Steel | Edelstahl Stainless | Grauguss Grey cast iron | Alu Alu | Kupfer, Messing, Zinn Copper, brass, tin | Kunststoffe GFK/CFK Plastics GRP/CRP | Sandwich- Material Sandwich materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



Zentrierbohrer TIALN Art. 20 1440 / 20 1441 beschichtet mit Kreuzschliff zum Anbohren ohne Verlaufen (Ankörnen ist überflüssig)

Center drill TIALN Art. 20 1440 / 20 1441 coated comes with cross grinding for centering without running off (center punching not necessary)

20 1010A

POWER-MAX
HEAVY-DUTY 10



Hartmetall-bestückte Lochsäge, Nutzlänge 12 mm.
Nur Lochsägekörper
Carbide tipped hole saw, drill depth 12 mm | 15/32".
Hole saw body only

ANWENDUNG · APPLICATION

| | | | | | | |
|----------------|------------------------|----------------------------|------------|---|---|--|
| | | | | | | |
| Stahl Steel | Edelstahl Stainless | Grauguss Grey cast iron | Alu Alu | Kupfer, Messing, Zinn Copper, brass, tin | Kunststoffe GFK/CFK Plastics GRP/CRP | Sandwich- Material Sandwich materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



Machen Sie aus Ihrer Lochsäge ein Universal-Werkzeug für nahezu alle Maschinentypen. Wählen Sie aus dem Zubehör (siehe Seite 568-569) Ihren gewünschten Schaft.

Make from the hole saw a universal tool for almost all types of machines. Choose from the accessories (see page 568-569) your suitable shank.

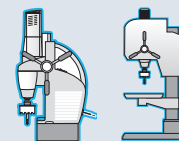
EIGENSCHAFTEN · PROPERTIES

Handmaschinen · Handheld machines



| | | |
|---------------------------------|---------------|-----------------------------------|
| Maximal empfohlener Ø | 120 mm | Maximum recommended Ø |
| Maximal empfohlene Schnitttiefe | 6 mm | Maximum recommended cutting depth |
| Maximal mögliche Schnitttiefe | 12 mm | Maximum possible cutting depth |

Stationäre und Kernbohrmaschinen Stationary and core drilling machines



| | | |
|---------------------------------|---------------|-----------------------------------|
| Maximal empfohlener Ø | 120 mm | Maximum recommended Ø |
| Maximal empfohlene Schnitttiefe | 10 mm | Maximum recommended cutting depth |
| Maximal mögliche Schnitttiefe | 12 mm | Maximum possible cutting depth |

Extra schwere Ausführung

- Bei allen Lochsägen sind Schaft und Bohrer austauschbar
- Schnelle Bohrkernentfernung durch Auswurfeder bei allen Durchmessern

Anwendungshinweis:

Bei größeren Materialstärken pro Arbeitsgang 2-3 mm bohren, danach jeweils Späne entfernen. Bei maximalen Schnitttiefen ist die Auswurfeder zu entfernen. Verwenden Sie bitte bei allen Metallen gutes Schneidöl (siehe ab Seite 1143).

Extra heavy construction

- All hole saws come with exchangeable shank and drill
- Quick removal of drilled core through ejector spring for all hole saws

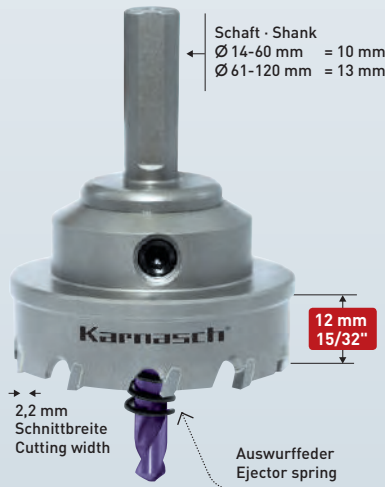
Application note:

At thicker materials: Cut 2-3 mm per cutting process, remove chips afterwards. If drilling maximum cutting depth please remove the ejector spring. Use only good cutting oil for metals (see from page 1143).



POWER-MAX HEAVY-DUTY 10 20 1010

Hartmetall-bestückte Lochsäge, Nutzlänge 12 mm.
Komplett mit Schaft, Zentrierbohrer und Auswurffeder
Carbide tipped hole saw, drill depth 12 mm | 15/32".
Completely with shank, center drill and ejector spring



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 20 1010 014 | 14 | 35/64" | 25,40 | 20 1010 048 | 48 | 1.57/64" | 34,25 |
| 20 1010 015 | 15 | 37/64" | 25,40 | 20 1010 049 | 49 | 1.59/64" | 34,25 |
| 20 1010 016 | 16 | 19/32" | 25,40 | 20 1010 050 | 50 | 1.31/32" | 34,25 |
| 20 1010 017 | 17 | 5/8" | 25,40 | 20 1010 051 | 51 | 1.63/64" | 35,90 |
| 20 1010 018 | 18 | 21/32" | 25,40 | 20 1010 052 | 52 | 2.1/64" | 35,90 |
| 20 1010 019 | 19 | 43/64" | 25,40 | 20 1010 053 | 53 | 2.3/64" | 36,25 |
| 20 1010 020 | 20 | 45/64" | 25,40 | 20 1010 054 | 54 | 2.3/32" | 36,25 |
| 20 1010 021 | 21 | 47/64" | 25,40 | 20 1010 055 | 55 | 2.1/8" | 36,25 |
| 20 1010 022 | 22 | 3/4" | 25,40 | 20 1010 056 | 56 | 2.11/64" | 36,25 |
| 20 1010 023 | 23 | 25/32" | 25,40 | 20 1010 057 | 57 | 2.13/64" | 40,75 |
| 20 1010 024 | 24 | 13/16" | 25,40 | 20 1010 058 | 58 | 2.1/4" | 40,75 |
| 20 1010 025 | 25 | 53/64" | 25,40 | 20 1010 059 | 59 | 2.9/32" | 40,75 |
| 20 1010 026 | 26 | 55/64" | 25,40 | 20 1010 060 | 60 | 2.21/64" | 41,15 |
| 20 1010 027 | 27 | 29/32" | 25,40 | 20 1010 061 | 61 | 2.3/32" | 41,15 |
| 20 1010 028 | 28 | 59/64" | 25,40 | 20 1010 062 | 62 | 2.3/8" | 44,40 |
| 20 1010 029 | 29 | 15/16" | 25,40 | 20 1010 063 | 63 | 2.13/32" | 45,00 |
| 20 1010 030 | 30 | 63/64" | 25,40 | 20 1010 064 | 64 | 2.7/16" | 45,00 |
| 20 1010 031 | 31 | 1" | 25,40 | 20 1010 065 | 65 | 2.31/64" | 45,00 |
| 20 1010 032 | 32 | 1.1/32" | 25,40 | 20 1010 066 | 66 | 2.33/64" | 45,00 |
| 20 1010 033 | 33 | 1.1/16" | 25,40 | 20 1010 067 | 67 | 2.9/16" | 45,00 |
| 20 1010 034 | 34 | 1.7/64" | 25,40 | 20 1010 068 | 68 | 1.7/64" | 52,30 |
| 20 1010 035 | 35 | 1.9/64" | 25,40 | 20 1010 069 | 69 | 2.41/64" | 52,30 |
| 20 1010 036 | 36 | 2.1/64" | 25,40 | 20 1010 070 | 70 | 2.43/64" | 52,30 |
| 20 1010 037 | 37 | 2.2/64" | 25,40 | 20 1010 071 | 71 | 2.23/32" | 52,30 |
| 20 1010 038 | 38 | 2.3/64" | 25,40 | 20 1010 072 | 72 | 2.3/4" | 52,30 |
| 20 1010 039 | 39 | 2.4/64" | 25,40 | 20 1010 073 | 73 | 2.51/64" | 56,85 |
| 20 1010 040 | 40 | 2.5/64" | 25,40 | 20 1010 074 | 74 | 2.53/64" | 56,85 |
| 20 1010 041 | 41 | 2.6/64" | 25,40 | 20 1010 075 | 75 | 2.7/8" | 56,85 |
| 20 1010 042 | 42 | 2.7/64" | 25,40 | 20 1010 076 | 76 | 2.29/32" | 56,85 |
| 20 1010 043 | 43 | 2.8/64" | 25,40 | 20 1010 077 | 77 | 2.61/64" | 56,85 |
| 20 1010 044 | 44 | 2.9/64" | 25,40 | 20 1010 078 | 78 | 2.63/64" | 61,70 |
| 20 1010 045 | 45 | 3.0/64" | 25,40 | 20 1010 079 | 79 | 3.1/32" | 61,70 |
| 20 1010 046 | 46 | 3.1/64" | 25,40 | 20 1010 080 | 80 | 3.5/64" | 61,70 |
| 20 1010 047 | 47 | 3.2/64" | 25,40 | 20 1010 081 | 81 | 3.5/32" | 61,70 |
| | | | | 20 1010 082 | 82 | 3.7/64" | 61,70 |
| | | | | 20 1010 083 | 83 | 3.9/64" | 61,70 |
| | | | | 20 1010 084 | 84 | 4.1/64" | 61,70 |
| | | | | 20 1010 085 | 85 | 4.3/64" | 61,70 |
| | | | | 20 1010 086 | 86 | 4.5/64" | 61,70 |
| | | | | 20 1010 087 | 87 | 4.7/64" | 61,70 |
| | | | | 20 1010 088 | 88 | 4.9/64" | 61,70 |
| | | | | 20 1010 089 | 89 | 5.1/64" | 61,70 |
| | | | | 20 1010 090 | 90 | 5.3/64" | 61,70 |
| | | | | 20 1010 091 | 91 | 5.5/64" | 61,70 |
| | | | | 20 1010 092 | 92 | 5.7/64" | 61,70 |
| | | | | 20 1010 093 | 93 | 5.9/64" | 61,70 |
| | | | | 20 1010 094 | 94 | 6.1/64" | 61,70 |
| | | | | 20 1010 095 | 95 | 6.3/64" | 61,70 |
| | | | | 20 1010 096 | 96 | 6.5/64" | 61,70 |
| | | | | 20 1010 097 | 97 | 6.7/64" | 61,70 |
| | | | | 20 1010 098 | 98 | 6.9/64" | 61,70 |
| | | | | 20 1010 099 | 99 | 7.1/64" | 61,70 |
| | | | | 20 1010 100 | 100 | 7.3/64" | 61,70 |
| | | | | 20 1010 101 | 101 | 7.5/64" | 61,70 |
| | | | | 20 1010 102 | 102 | 7.7/64" | 61,70 |
| | | | | 20 1010 103 | 103 | 7.9/64" | 61,70 |
| | | | | 20 1010 104 | 104 | 8.1/64" | 61,70 |
| | | | | 20 1010 105 | 105 | 8.3/64" | 61,70 |
| | | | | 20 1010 106 | 106 | 8.5/64" | 61,70 |
| | | | | 20 1010 107 | 107 | 8.7/64" | 61,70 |
| | | | | 20 1010 108 | 108 | 8.9/64" | 61,70 |
| | | | | 20 1010 109 | 109 | 9.1/64" | 61,70 |
| | | | | 20 1010 110 | 110 | 9.3/64" | 61,70 |
| | | | | 20 1010 111 | 111 | 9.5/64" | 61,70 |
| | | | | 20 1010 112 | 112 | 9.7/64" | 61,70 |
| | | | | 20 1010 113 | 113 | 9.9/64" | 61,70 |
| | | | | 20 1010 114 | 114 | 10.1/64" | 61,70 |
| | | | | 20 1010 115 | 115 | 10.3/64" | 61,70 |
| | | | | 20 1010 116 | 116 | 10.5/64" | 61,70 |
| | | | | 20 1010 117 | 117 | 10.7/64" | 61,70 |
| | | | | 20 1010 118 | 118 | 10.9/64" | 61,70 |
| | | | | 20 1010 119 | 119 | 11.1/64" | 61,70 |
| | | | | 20 1010 120 | 120 | 11.3/64" | 61,70 |

Zähnezahl: Ø 14-21=4 / 22-27=5 / 28-34=6 / 35-41=8 / 42-54=10 / 55-70=12 / 71-80=14 / 81-95=16 / 96-105=18 / 106-120=20 · Größere Ø siehe Art. 20 1020 Seite 587

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Number of teeth: Ø 14-21=4 / 22-27=5 / 28-34=6 / 35-41=8 / 42-54=10 / 55-70=12 / 71-80=14 / 81-95=16 / 96-105=18 / 106-120=20 · Larger Ø see Art. 20 1020 page 587

Attention: The inch sizes do not correspond exactly to the mm diameters.

SETS · SETS



Sie wünschen ein Set im Kunststoffkoffer?

Kein Problem. Nennen Sie uns einfach den gewünschten Inhalt. Preis auf Anfrage.

You require a set in a plastic case?

No problem. Just tell us the desired content. Price available on request.

Schnittdaten
Cutting data



1312

Film
Movie



567

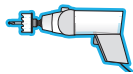


ZUBEHÖR
ACCESSORIES
568

Index

20 1010A

POWER-MAX
HEAVY-DUTY 10

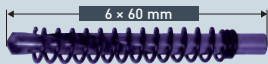


ZUBEHÖR FÜR HANDBOHRMASCHINEN
ACCESSORIES FOR HANDHELD MACHINES

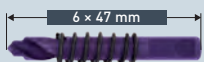
SCHÄFTE MIT PASSENDEM ZENTRIERBOHRER/FEDER
SHANKS WITH SUITABLE CENTER DRILL / SPRINGS



Ø 14-60 mm 20 1131
€ 6,35



20 1440
€ 3,70



20 1114
€ 4,10

Unser neuer Zentrierbohrer mit verjüngter Spitze: Für ein noch verbessertes Anbohren ohne Verlaufen. Ankörnen ist überflüssig speziell für dünne Materialien bis 3 mm. Kompaktes Werkzeug (Zentrierbohrer ragt nur ca. 10 mm über den Lochsägekörper hinaus).

Our new tapered center drill: For an even better centering without running off. Center punching is not necessary. Especially developed for thin materials up to 3 mm. Compact tool (center drill protrudes only about 10 mm beyond the hole saw body).



Ø 61-120 mm 20 1137
€ 6,35



20 1441
€ 4,30

SCHAFT MIT PASSENDEM ZENTRIERBOHRER/FEDER
SHANK WITH SUITABLE CENTER DRILL / SPRING



Ø 14-120 mm 20 1123
€ 10,70

Ohne Hammer-Funktion anwenden
Do not use hammer-function.



20 1441
€ 4,30

POWER-DRILL
4000



Ø 14-120 mm 20 1526
€ 46,55



Ersatz-Auswerferbohrer · Spare ejector drill

20 1527
€ 2,05



Funktionsweise:

- A. Das Werkstück ankörnen. Bei weichen Materialien wie Kunststoffen, Hölzern und Holzwerkstoffen kann ggf. auf das Ankörnen verzichtet werden.
- B. Setzen Sie den Auswerferbohrer 1 genau in die Mitte des Körnerpunktes an. Zu Beginn des Bohrprozesses wenig Druck (Vorschub) anwenden, bis die Lochsäge Minimum 0,5 mm Schnitttiefe erreicht hat. Die Lochsäge hat sich nun selbst zentriert. Der Vorschub kann erhöht werden.
- C. Eine Auswurffeder 2 im Schaft erzeugt Druck auf den Auswerferbohrer 1.
- D. Der Auswerferbohrer 1 wirft den Kern 4 nach dem Durchbohren aus. (Sollte der Kern nicht ausgeworfen werden, erhöhen Sie bitte den Federdruck am Auswerferbohrer durch drehen der Inbusschraube 3 im Uhrzeigersinn).

Vorteile:

1. Nach dem Bohren wird der Kern zuverlässig ausgeworfen.
2. Passt auf alle POWER-MAX Lochsägen ab Durchmesser 14 mm (Seite 564).
3. Da der Auswerferbohrer nicht das Material durchbohrt (wie sonst üblich bei Lochsägen mit Zentrierbohrern) entsteht ein kontinuierlicher Bohrvorgang.

Das unvermeidliche „Aufschlagen“ der Lochsäge nach dem Durchbrechen des Zentrierbohrers auf das Werkstück entfällt (Hauptgrund für Zahnbruch an der Lochsäge).

Operating mode:

- A. Center punch the work piece. Soft materials such as plastics, wood and wood based materials can possibly be done without the center punch.
- B. Place the ejector drill 1 in the middle of the center mark. Use little pressure (feed rate) until the hole saw reaches a minimum cutting depth of 0,5 mm. The hole saw in self-centered now. Feed rate can be increased.
- C. An ejector spring 2 which is installed in the arbor puts pressure on the ejector drill 1.
- D. The ejector drill 1 ejects the core 4 after drilling process. (If the core will not be ejected, please increase the spring pressure on the ejector drill by turning the Allen screw 3 clockwise).

Advantages:

1. After each drilling process the core will be ejected reliably.
2. Fits all POWER-MAX hole saw diameters from 14 mm (page 564).
3. Since the ejector drill does not drill through the material (as usual with hole saw with center drills), a continuous drilling operation is possible.

The inevitable "crashing" of the hole saw on the work piece after the break through of the center drill will be avoided (the main reason for tooth fracture at the hole saw).

Ersatzteile für Power-Drill 4000 siehe Seite 604 · Spare parts for Power-Drill 4000 see page 604



ZUBEHÖR FÜR MAGNET-KERNBOHRMASCHINEN ACCESSORIES FOR MAGNETIC HOLE CUTTING MACHINES

20 1010A

POWER-MAX
HEAVY-DUTY 10

ADAPTER+PASSENDE AUSWERFERSTIFTE ADAPTER+SUITABLE EJECTOR PINS

WELDON 19 mm (3/4")

Passend für Maschinen · Suitable for machines
Karnasch · Alfra-Rotabest + Alfra Rotaquick ·
BDS + BDS Keyless · Bektop · Bux · Cembre ·
Dubuis · Erico · Euroboor · Evolution · Hall
(Powerbor) · Hougen · Jancy · Magbroach · Mag-
tron · Magnetor · Metallkraft · Promag · Ruko ·
Rotabroach · Ruko + Ruko Easylock · Universal ...



Packnorm 2 Stk. · Packaging unit 2 pcs.

ADAPTER+PASSENDE AUSWERFERSTIFTE ADAPTER+SUITABLE EJECTOR PINS

NITTO / UNIVERSAL 19 mm (3/4")

Passend für Maschinen · Suitable for machines
Nitto Kohki "one touch" Type A05575 ·
WA 3500 · WA 5000 · QA 4000 · QA 6500



Packnorm 2 Stk. · Packaging unit 2 pcs.

ADAPTER+PASSENDE AUSWERFERSTIFTE ADAPTER+SUITABLE EJECTOR PINS

FEIN QUICK-IN 18 mm

Passend für Maschinen · Suitable for machines
FEIN KBM 32 Q · KBM 50 Q · KBM 50 U ·
KBM 50 Auto · KBM 65 U



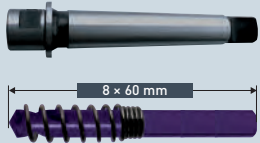
Packnorm 2 Stk. · Packaging unit 2 pcs.



ZUBEHÖR FÜR STATIONÄRE MASCHINEN ACCESSORIES FOR STATIONARY MACHINES

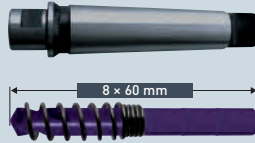
MORSEKONEN UND PASSENDE ZENTRIERBOHRER MIT FEDER MORSE TAPERS AND SUITABLE CENTER DRILLS WITH SPRING

MORSEKONUS
MORSE TAPER :2 Ø 14-120 mm **20 1135**
• € 19,25



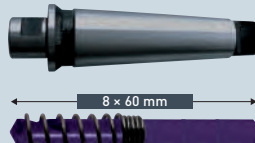
20 1441
• € 4,30

MORSEKONUS
MORSE TAPER :3 Ø 14-120 mm **20 1136**
• € 22,70



20 1441
• € 4,30

MORSEKONUS
MORSE TAPER :4 Ø 14-120 mm **21 0051**
• € 26,00



20 1441
• € 4,30

Achtung: Alle stationäre Maschinen können auch mit Morsekonus mit Auswerferstift-Funktion ausgerüstet werden. Siehe Seite 521-523

Attention: All stationary machines can also be equipped with morse tapers with ejector-pin function. See page 521-523



SETS · SETS



Sie wünschen ein Set im Kunststoffkoffer?

Kein Problem. Nennen Sie uns einfach den gewünschten Inhalt.
Preis auf Anfrage.

You require a set in a plastic case?

No problem. Just tell us the desired content.
Price available on request.

Film
Movie



569

1



2



3



4



5



6



7



8



9



Index

20 1015

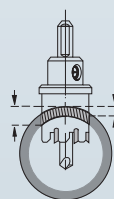
POWER-MAX
HEAVY-DUTY 20



Hartmetall-bestückte Lochsäge, Nutzlänge 30 mm.
Komplett mit Schaft, Zentrierbohrer und Auswurffeder
Carbide tipped hole saw, drill depth 30 mm | 1".
Completely with shank, center drill and ejector spring

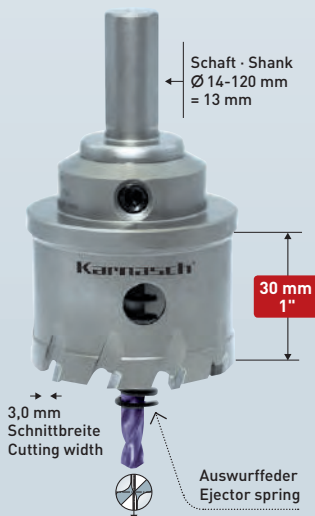
ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|--------------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Sandwich-Material |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Sandwich materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



Ideal auch zum Bohren in Rohre

Also ideal for drilling into pipes



Zentrierbohrer TIALN beschichtet mit Kreuzschliff zum Anbohren ohne Verlauf (Ankörnen ist überflüssig)

Center drill TIALN coated comes with cross grinding for centering without running off (center punching not necessary)

20 1015A

POWER-MAX
HEAVY-DUTY 20



Hartmetall-bestückte Lochsäge, Nutzlänge 30 mm.
Nur Lochsägekörper
Carbide tipped hole saw, drill depth 30 mm | 1".
Hole saw body only

ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|--------------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Sandwich-Material |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Sandwich materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



ZUBEHÖR
ACCESSORIES

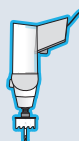
572

Machen Sie aus Ihrer Lochsäge ein Universal-Werkzeug für nahezu alle Maschinentypen. Wählen Sie aus dem Zubehör (siehe Seite 572-573) Ihren gewünschten Schaft.

Make from the hole saw a universal tool for almost all types of machines. Choose from the accessories (see page 572-573) your suitable shank.

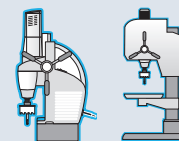
EIGENSCHAFTEN · PROPERTIES

Handmaschinen · Handheld machines



| | | |
|---------------------------------|--------|-----------------------------------|
| Maximal empfohlener Ø | 100 mm | Maximum recommended Ø |
| Maximal empfohlene Schnitttiefe | 15 mm | Maximum recommended cutting depth |
| Maximal mögliche Schnitttiefe | 30 mm | Maximum possible cutting depth |

Stationäre und Kernbohrmaschinen Stationary and core drilling machines



| | | |
|---------------------------------|--------|-----------------------------------|
| Maximal empfohlener Ø | 120 mm | Maximum recommended Ø |
| Maximal empfohlene Schnitttiefe | 20 mm | Maximum recommended cutting depth |
| Maximal mögliche Schnitttiefe | 30 mm | Maximum possible cutting depth |

Extra schwere Ausführung

- Bei allen Lochsägen sind Schaft und Bohrer austauschbar
- Schnelle Bohrkernentfernung durch Auswurffeder bei Ø 17-120 mm
- Bohrkernentfernung ab Ø 14 mm möglich mit Power-Drill 4000 System s. Seite 568

Anwendungshinweis:

Bei Materialstärken über 6 mm ist mehrfaches Absetzen und Entfernen der Späne notwendig. Bei maximalen Schnitttiefen ist die Auswurffeder zu entfernen. Verwenden Sie bitte bei allen Metallen gutes Schneidöl (siehe ab Seite 1143).

Extra heavy construction

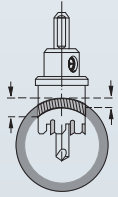
- All hole saws comes with exchangeable shank and drill
- Quick removal of drilled core through ejector spring for hole saws Ø 17-120 mm
- Quick removal of drilled core possible from Ø 14 mm see Power-Drill 4000 System see page 568

Application note:

For material thickness over 6 mm it is necessary to lift the drill and remove the chips several times. If drilling maximum cutting depth please remove the ejector spring. Use only good cutting oil for metals (see from page 1143).

POWER-MAX HEAVY-DUTY 20 20 1015

Hartmetall-bestückte Lochsäge, Nutzlänge 30 mm.
Komplett mit Schaft, Zentrierbohrer und Auswurffeder
Carbide tipped hole saw, drill depth 30 mm | 1".
Completely with shank, center drill and ejector spring



Ideal auch zum Bohren in Rohre

Also ideal for drilling into pipes



| Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|
| 20 1015 014 | 14 | 35/64" | 36,25 |
| 20 1015 015 | 15 | 19/32" | 36,25 |
| 20 1015 016 | 16 | 5/8" | 36,25 |
| 20 1015 017 | 17 | 43/64" | 36,25 |
| 20 1015 018 | 18 | 45/64" | 36,25 |
| 20 1015 019 | 19 | 3/4" | 36,25 |
| 20 1015 020 | 20 | 25/32" | 36,25 |
| 20 1015 021 | 21 | 53/64" | 36,25 |
| 20 1015 022 | 22 | 55/64" | 36,25 |
| 20 1015 023 | 23 | 29/32" | 36,25 |
| 20 1015 024 | 24 | 15/16" | 36,25 |
| 20 1015 025 | 25 | 63/64" | 36,25 |
| 20 1015 026 | 26 | 1.1/32" | 36,25 |
| 20 1015 027 | 27 | 1.1/16" | 36,25 |
| 20 1015 028 | 28 | 1.7/64" | 36,25 |
| 20 1015 029 | 29 | 1.9/64" | 36,25 |
| 20 1015 030 | 30 | 1.3/16" | 36,25 |
| 20 1015 031 | 31 | 1.7/32" | 36,35 |
| 20 1015 032 | 32 | 1.17/64" | 36,35 |
| 20 1015 033 | 33 | 1.19/64" | 36,35 |
| 20 1015 034 | 34 | 1.11/32" | 36,35 |
| 20 1015 035 | 35 | 1.3/8" | 36,35 |
| 20 1015 036 | 36 | 1.27/64" | 36,35 |
| 20 1015 037 | 37 | 1.29/64" | 36,35 |
| 20 1015 038 | 38 | 1.1/2" | 36,35 |
| 20 1015 039 | 39 | 1.17/32" | 36,35 |
| 20 1015 040 | 40 | 1.37/64" | 36,35 |
| 20 1015 041 | 41 | 1.39/64" | 39,80 |
| 20 1015 042 | 42 | 1.21/32" | 39,80 |
| 20 1015 043 | 43 | 1.11/16" | 39,85 |
| 20 1015 044 | 44 | 1.47/64" | 39,85 |
| 20 1015 045 | 45 | 1.49/64" | 39,85 |
| 20 1015 046 | 46 | 1.13/16" | 40,55 |
| 20 1015 047 | 47 | 1.27/32" | 40,55 |
| 20 1015 048 | 48 | 1.57/64" | 40,55 |
| 20 1015 049 | 49 | 1.59/64" | 40,55 |
| 20 1015 050 | 50 | 1.31/32" | 40,55 |
| 20 1015 051 | 51 | 2.1/64" | 40,55 |

| Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|--------|
| 20 1015 052 | 52 | 2.3/64" | 40,55 |
| 20 1015 053 | 53 | 2.3/32" | 41,00 |
| 20 1015 054 | 54 | 2.1/8" | 41,00 |
| 20 1015 055 | 55 | 2.11/64" | 41,00 |
| 20 1015 056 | 56 | 2.13/64" | 48,95 |
| 20 1015 057 | 57 | 2.1/4" | 48,95 |
| 20 1015 058 | 58 | 2.9/32" | 48,95 |
| 20 1015 059 | 59 | 2.21/64" | 48,95 |
| 20 1015 060 | 60 | 2.23/64" | 48,95 |
| 20 1015 061 | 61 | 2.13/32" | 54,05 |
| 20 1015 062 | 62 | 2.7/16" | 54,05 |
| 20 1015 063 | 63 | 2.31/64" | 54,05 |
| 20 1015 064 | 64 | 2.33/64" | 54,05 |
| 20 1015 065 | 65 | 2.9/16" | 54,05 |
| 20 1015 066 | 66 | 2.19/32" | 61,70 |
| 20 1015 067 | 67 | 2.41/64" | 61,70 |
| 20 1015 068 | 68 | 2.43/64" | 61,70 |
| 20 1015 069 | 69 | 2.23/32" | 61,70 |
| 20 1015 070 | 70 | 2.3/4" | 61,70 |
| 20 1015 075 | 75 | 2.61/64" | 65,95 |
| 20 1015 076 | 76 | 2.63/64" | 71,95 |
| 20 1015 078 | 78 | 3.5/64" | 71,95 |
| 20 1015 080 | 80 | 3.5/32" | 71,95 |
| 20 1015 085 | 85 | 3.11/32" | 80,40 |
| 20 1015 090 | 90 | 3.35/64" | 82,40 |
| 20 1015 095 | 95 | 3.47/64" | 87,00 |
| 20 1015 100 | 100 | 3.15/16" | 88,15 |
| 20 1015 105 | 105 | 4.9/64" | 93,70 |
| 20 1015 110 | 110 | 4.21/64" | 111,00 |
| 20 1015 115 | 115 | 4.17/32" | 130,90 |
| 20 1015 120 | 120 | 4.23/32" | 148,90 |

Größere Ø siehe Art. 20 1130
Seite 574-575 /
Larger Ø see Art. 20 1130
page 574-575

POWER-MAX HEAVY-DUTY 20 20 1015A

Hartmetall-bestückte Lochsäge, Nutzlänge 30 mm.
Nur Lochsägenkörper
Carbide tipped hole saw, drill depth 30 mm | 1".
Hole saw body only



ZUBEHÖR
ACCESSORIES
572

| Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|
| 20 1015A 014 | 14 | 35/64" | 25,90 |
| 20 1015A 015 | 15 | 19/32" | 25,90 |
| 20 1015A 016 | 16 | 5/8" | 25,90 |
| 20 1015A 017 | 17 | 43/64" | 25,90 |
| 20 1015A 018 | 18 | 45/64" | 25,90 |
| 20 1015A 019 | 19 | 3/4" | 25,90 |
| 20 1015A 020 | 20 | 25/32" | 25,90 |
| 20 1015A 021 | 21 | 53/64" | 25,90 |
| 20 1015A 022 | 22 | 55/64" | 25,90 |
| 20 1015A 023 | 23 | 29/32" | 25,90 |
| 20 1015A 024 | 24 | 15/16" | 25,90 |
| 20 1015A 025 | 25 | 63/64" | 25,90 |
| 20 1015A 026 | 26 | 1.1/32" | 25,90 |
| 20 1015A 027 | 27 | 1.1/16" | 25,90 |
| 20 1015A 028 | 28 | 1.7/64" | 25,90 |
| 20 1015A 029 | 29 | 1.9/64" | 25,90 |
| 20 1015A 030 | 30 | 1.3/16" | 25,90 |
| 20 1015A 031 | 31 | 1.7/32" | 26,00 |
| 20 1015A 032 | 32 | 1.17/64" | 26,00 |
| 20 1015A 033 | 33 | 1.19/64" | 26,00 |
| 20 1015A 034 | 34 | 1.11/32" | 26,00 |
| 20 1015A 035 | 35 | 1.3/8" | 26,00 |
| 20 1015A 036 | 36 | 1.27/64" | 26,00 |
| 20 1015A 037 | 37 | 1.29/64" | 26,00 |
| 20 1015A 038 | 38 | 1.1/2" | 26,00 |
| 20 1015A 039 | 39 | 1.17/32" | 26,00 |
| 20 1015A 040 | 40 | 1.37/64" | 26,00 |
| 20 1015A 041 | 41 | 1.39/64" | 29,40 |
| 20 1015A 042 | 42 | 1.21/32" | 29,40 |
| 20 1015A 043 | 43 | 1.11/16" | 29,50 |
| 20 1015A 044 | 44 | 1.47/64" | 29,50 |
| 20 1015A 045 | 45 | 1.49/64" | 29,50 |
| 20 1015A 046 | 46 | 1.13/16" | 30,20 |
| 20 1015A 047 | 47 | 1.27/32" | 30,20 |
| 20 1015A 048 | 48 | 1.57/64" | 30,20 |
| 20 1015A 049 | 49 | 1.59/64" | 30,20 |
| 20 1015A 050 | 50 | 1.31/32" | 30,20 |
| 20 1015A 051 | 51 | 2.1/64" | 30,20 |

Größere Ø siehe Art. 20 1130A
Seite 574-575 /
Larger Ø see Art. 20 1130A
page 574-575

Zähnezahl: Ø 14-15=4 / 16-35=6 / 36-45=8 / 46-65=10 / 66-105=12 / 106-115=14 / 116-120=16 • **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Number of teeth: Ø 14-15=4 / 16-35=6 / 36-45=8 / 46-65=10 / 66-105=12 / 106-115=14 / 116-120=16 • **Attention:** The inch sizes do not correspond exactly to the mm diameters.

SETS • SETS



Sie wünschen ein Set im Kunststoffkoffer?

Kein Problem. Nennen Sie uns einfach den gewünschten Inhalt.
Preis auf Anfrage.

You require a set in a plastic case?

No problem. Just tell us the desired content. Price available on request.

Schnittdaten
Cutting data



1312

Film
Movie



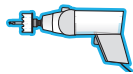
571



Index

20 1015A

POWER-MAX HEAVY-DUTY 20



ZUBEHÖR FÜR HANDBOHRMASCHINEN
ACCESSORIES FOR HANDHELD MACHINES

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

SCHÄFTE MIT PASSENDEN ZENTRIERBOHRER/FEDER
SHANKS WITH SUITABLE CENTER DRILL / SPRINGS

| | |
|--|---|
| | <p>☑ \varnothing 14-60 mm 20 1134</p> <p>• € 6,35</p> |
| | <p>☑ 20 1445</p> <p>• € 4,10</p> |
| | <p>☑ \varnothing 61-120 mm 20 1137</p> <p>• € 6,35</p> |
| | <p>☑ 20 1446</p> <p>• € 4,70</p> |

SDS PLUS SCHAFT MIT PASSENDEN ZENTRIERBOHRER/FEDER
SHANK WITH SUITABLE CENTER DRILL / SPRING

| | |
|--|--|
| | <p>☑ \varnothing 14-120 mm 20 1123</p> <p>• € 10,70</p> |
| | <p>☑ 20 1446</p> <p>• € 4,70</p> |

SDS PLUS Ohne Hammer-Funktion anwenden
Do not use hammer-function.

POWER-DRILL 4000

Ersatz-Auswerferbohrer · Spare ejector drill

☑ \varnothing 14-120 mm 20 1530

• € 52,65

☑ 20 1531

• € 2,20

Funktionsweise:

- A. Das Werkstück ankörnen. Bei weichen Materialien wie Kunststoffen, Hölzern und Holzwerkstoffen kann ggf. auf das Ankörnen verzichtet werden.
- B. Setzen Sie den Auswerferbohrer 1 genau in die Mitte des Körnerpunktes an. Zu Beginn des Bohrprozesses wenig Druck (Vorschub) anwenden, bis die Lochsäge Minimum 0,5 mm Schnitttiefe erreicht hat. Die Lochsäge hat sich nun selbst zentriert. Der Vorschub kann erhöht werden.
- C. Eine Auswurfeder 2 im Schaft erzeugt Druck auf den Auswerferbohrer 1.
- D. Der Auswerferbohrer 1 wirft den Kern 4 nach dem Durchbohren aus. (Sollte der Kern nicht ausgeworfen werden, erhöhen Sie bitte den Federdruck am Auswerferbohrer durch drehen der Inbusschraube 3 im Uhrzeigersinn).

Vorteile:

1. Nach dem Bohren wird der Kern zuverlässig ausgeworfen.
2. Passt auf alle POWER-MAX Lochsägen ab Durchmesser 14 mm (Seite 564).
3. Da der Auswerferbohrer nicht das Material durchbohrt (wie sonst üblich bei Lochsägen mit Zentrierbohrern) entsteht ein kontinuierlicher Bohrvorgang.

Das unvermeidliche „Aufschlagen“ der Lochsäge nach dem Durchbrechen des Zentrierbohrers auf das Werkstück entfällt (Hauptgrund für Zahnbruch an der Lochsäge).

Operating mode:

- A. Center punch the work piece. Soft materials such as plastics, wood and wood based materials can possibly be done without the center punch.
- B. Place the ejector drill 1 in the middle of the center mark. Use little pressure (feed rate) until the hole saw reaches a minimum cutting depth of 0,5 mm. The hole saw in self-centered now. Feed rate can be increased.
- C. An ejector spring 2 which is installed in the arbor puts pressure on the ejector drill 1.
- D. The ejector drill 1 ejects the core 4 after drilling process. (If the core will not be ejected, please increase the spring pressure on the ejector drill by turning the Allen screw 3 clockwise).

Advantages:

1. After each drilling process the core will be ejected reliably.
2. Fits all POWER-MAX hole saw diameters from 14 mm (page 564).
3. Since the ejector drill does not drill through the material (as usual with hole saw with center drills), a continuous drilling operation is possible.

The inevitable “crashing” of the hole saw on the work piece after the break through of the center drill will be avoided (the main reason for tooth fracture at the hole saw).

Ersatzteile für Power-Drill 4000 siehe Seite 604 · Spare parts for Power-Drill 4000 see page 604

Film Movie





ZUBEHÖR FÜR MAGNET-KERNBOHRMASCHINEN ACCESSORIES FOR MAGNETIC HOLE CUTTING MACHINES

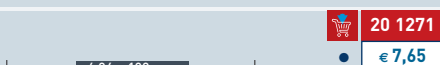
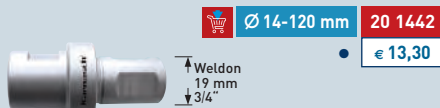
20 1015A

POWER-MAX
HEAVY-DUTY 20

ADAPTER+PASSENDE AUSWERFERSTIFTE ADAPTER+SUITABLE EJECTOR PINS

WELDON 19 mm (3/4")

Passend für Maschinen · Suitable for machines
Karnasch · Alfra-Rotabest + Alfra Rotaquick ·
BDS + BDS Keyless · Bektop · Bux · Cembre ·
Dubuis · Erico · Euroboor · Evolution · Hall
(Powerbor) · Hougen · Jancy · Magbroach · Mag-
tron · Magnetor · Metallkraft · Promag · Ruko ·
Rotabroach · Ruko + Ruko Easylock · Universal ...



Packnorm 2 Stk. · Packaging unit 2 pcs.

ADAPTER+PASSENDE AUSWERFERSTIFTE ADAPTER+SUITABLE EJECTOR PINS

NITTO / UNIVERSAL 19 mm (3/4")

Passend für Maschinen · Suitable for machines
Nitto Kohki "one touch" Type A05575 ·
WA 3500 · WA 5000 · QA 4000 · QA 6500

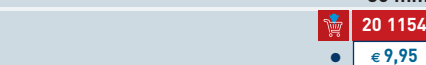


Packnorm 2 Stk. · Packaging unit 2 pcs.

ADAPTER+PASSENDE AUSWERFERSTIFTE ADAPTER+SUITABLE EJECTOR PINS

FEIN QUICK-IN 18 mm

Passend für Maschinen · Suitable for machines
FEIN KBM 32 Q · KBM 50 Q · KBM 50 U ·
KBM 50 Auto · KBM 65 U



Packnorm 2 Stk. · Packaging unit 2 pcs.

FEIN QUICK-IN MAX 32 mm 1.1/4"

Für Fein Maschine · For Fein machine
FEIN KBM 80 Quick-In Max



Packnorm 2 Stk. · Packaging unit 2 pcs.

SETS · SETS



Sie wünschen ein Set im Kunststoffkoffer?

Kein Problem. Nennen Sie uns einfach den gewünschten Inhalt.
Preis auf Anfrage.

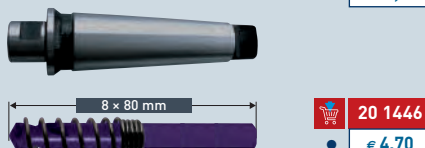
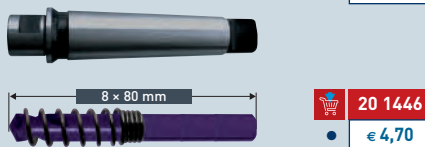
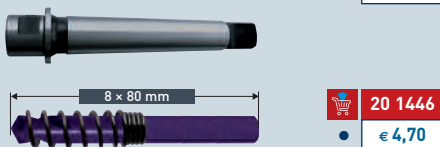
You require a set in a plastic case?

No problem. Just tell us the desired content.
Price available on request.



ZUBEHÖR FÜR STATIONÄRE MASCHINEN ACCESSORIES FOR STATIONARY MACHINES

MORSEKONEN UND PASSENDE ZENTRIERBOHRER MIT FEDER MORSE TAPERS AND SUITABLE CENTER DRILLS WITH SPRING



Achtung: Alle stationäre Maschinen können auch mit Morsekonus mit Auswerferstift-Funktion ausgerüstet werden. Siehe Seite 521-523

Attention: All stationary machines can also be equipped with morse tapers with ejector-pin function. See page 521-523



20 1130

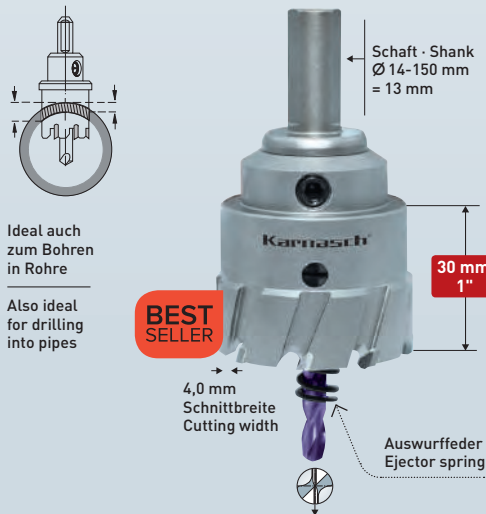
POWER-MAX
SUPER HEAVY-DUTY 30



Hartmetall-bestückte Lochsäge, Nutzlänge 30 mm.
Komplett mit Schaft, Zentrierbohrer und Auswurffeder
Carbide tipped hole saw, drill depth 30 mm | 1".
Completely with shank, center drill and ejector spring

ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|--------------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Sandwich-Material |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Sandwich materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



Ideal auch zum Bohren in Rohre

Also ideal for drilling into pipes

BEST SELLER

Zentrierbohrer TIALN beschichtet mit Kreuzschliff zum Anbohren ohne Verlauf (Ankörnen ist überflüssig)

Center drill TIALN coated comes with cross grinding for centering without running off (center punching not necessary)

20 1130A

POWER-MAX
SUPER HEAVY-DUTY 30



Hartmetall-bestückte Lochsäge, Nutzlänge 30 mm.
Nur Lochsägekörper
Carbide tipped hole saw, drill depth 30 mm | 1".
Hole saw body only

ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|--------------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Sandwich-Material |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Sandwich materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



BEST SELLER

ZUBEHÖR
ACCESSORIES

576

Machen Sie aus Ihrer Lochsäge ein Universal-Werkzeug für nahezu alle Maschinentypen. Wählen Sie aus dem Zubehör (siehe Seite 576-577) Ihren gewünschten Schaft.

Make from the hole saw a universal tool for almost all types of machines. Choose from the accessories (see page 576-577) your suitable shank.

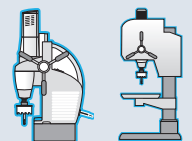
EIGENSCHAFTEN · PROPERTIES

Handmaschinen · Handheld machines



| | | |
|---------------------------------|--------------|-----------------------------------|
| Maximal empfohlener Ø | 40 mm | Maximum recommended Ø |
| Maximal empfohlene Schnitttiefe | 25 mm | Maximum recommended cutting depth |
| Maximal mögliche Schnitttiefe | 30 mm | Maximum possible cutting depth |

Stationäre und Kernbohrmaschinen Stationary and core drilling machines



| | | |
|---------------------------------|---------------|-----------------------------------|
| Maximal empfohlener Ø | 150 mm | Maximum recommended Ø |
| Maximal empfohlene Schnitttiefe | 30 mm | Maximum recommended cutting depth |
| Maximal mögliche Schnitttiefe | 30 mm | Maximum possible cutting depth |

Super schwere Ausführung

- Bei allen Lochsägen sind Schaft und Bohrer austauschbar
- Schnelle Bohrkernentfernung durch Auswurffeder bei Ø 19-150 mm
- Bohrkernentfernung ab Ø 14 mm möglich mit Power-Drill 4000 System s. Seite 572

Anwendungshinweis:

Bei Materialstärken über **15 mm** ist je nach Spanverlauf ggf. mehrfaches Absetzen und Entfernen der Späne notwendig. Bei maximalen Schnitttiefen ist die Auswurffeder zu entfernen. Verwenden Sie bitte bei allen Metallen gutes Schneidöl (siehe ab Seite 1143).

Super heavy construction

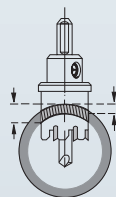
- All hole saws comes with exchangeable shank and drill
- Quick removal of drilled core through ejector spring for hole saws Ø 19-150 mm
- Quick removal of drilled core possible from Ø 14 mm see Power-Drill 4000 System see page 572

Application note:

For material thickness over **15 mm** it may be necessary (depending on the chip flow) to lift the drill and remove the chips several times. If drilling maximum cutting depth please remove the ejector spring. Use only good cutting oil for metals (see from page 1143).

POWER-MAX SUPER HEAVY-DUTY 30 20 1130

Hartmetall-bestückte Lochsäge, Nutzlänge 30 mm.
Komplett mit Schaft, Zentrierbohrer und Auswurffeder
Carbide tipped hole saw, drill depth 30 mm | 1".
Completely with shank, center drill and ejector spring



Ideal auch zum Bohren in Rohre

Also ideal for drilling into pipes



BEST SELLER

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|--------|-------------|-------|--------------|--------|-------------|--------|
| 20 1130 014 | • 14 | 35/64" | 30,20 | 20 1130 059 | • 59 | 2.21/64" | 40,80 |
| 20 1130 0145 | • 14,5 | 37/64" | 30,20 | 20 1130 060 | • 60 | 2.23/64" | 40,80 |
| 20 1130 015 | • 15 | 19/32" | 30,20 | 20 1130 0605 | • 60,5 | 2.3/8" | 44,55 |
| 20 1130 016 | • 16 | 5/8" | 30,20 | 20 1130 061 | • 61 | 2.13/32" | 45,05 |
| 20 1130 0165 | • 16,5 | 21/32" | 30,20 | 20 1130 062 | • 62 | 2.7/16" | 45,05 |
| 20 1130 017 | • 17 | 43/64" | 30,20 | 20 1130 063 | • 63 | 2.31/64" | 45,05 |
| 20 1130 018 | • 18 | 45/64" | 30,20 | 20 1130 064 | • 64 | 2.33/64" | 45,05 |
| 20 1130 0185 | • 18,5 | 47/64" | 30,20 | 20 1130 065 | • 65 | 2.9/16" | 45,05 |
| 20 1130 019 | • 19 | 3/4" | 30,20 | 20 1130 066 | • 66 | 2.19/32" | 51,40 |
| 20 1130 020 | • 20 | 25/32" | 30,20 | 20 1130 067 | • 67 | 2.41/64" | 51,40 |
| 20 1130 0205 | • 20,5 | 13/16" | 30,20 | 20 1130 068 | • 68 | 2.43/64" | 51,40 |
| 20 1130 021 | • 21 | 53/64" | 30,20 | 20 1130 069 | • 69 | 2.23/32" | 51,40 |
| 20 1130 022 | • 22 | 55/64" | 30,20 | 20 1130 070 | • 70 | 2.3/4" | 51,40 |
| 20 1130 0225 | • 22,5 | 57/64" | 30,20 | 20 1130 071 | • 71 | 2.51/64" | 54,95 |
| 20 1130 023 | • 23 | 29/32" | 30,20 | 20 1130 072 | • 72 | 2.53/64" | 54,95 |
| 20 1130 024 | • 24 | 15/16" | 30,20 | 20 1130 073 | • 73 | 2.7/8" | 54,95 |
| 20 1130 025 | • 25 | 63/64" | 30,20 | 20 1130 074 | • 74 | 2.29/32" | 54,95 |
| 20 1130 0255 | • 25,5 | 1" | 30,20 | 20 1130 075 | • 75 | 2.61/64" | 54,95 |
| 20 1130 026 | • 26 | 1.1/32" | 30,20 | 20 1130 076 | • 76 | 2.63/64" | 60,00 |
| 20 1130 027 | • 27 | 1.1/16" | 30,20 | 20 1130 077 | • 77 | 3.1/32" | 60,00 |
| 20 1130 028 | • 28 | 1.7/64" | 30,20 | 20 1130 078 | • 78 | 3.5/64" | 60,00 |
| 20 1130 029 | • 29 | 1.9/64" | 30,20 | 20 1130 079 | • 79 | 3.7/64" | 60,00 |
| 20 1130 030 | • 30 | 1.3/16" | 30,20 | 20 1130 080 | • 80 | 3.5/32" | 60,00 |
| 20 1130 0305 | • 30,5 | 1.13/64" | 30,30 | 20 1130 081 | • 81 | 3.3/16" | 67,00 |
| 20 1130 031 | • 31 | 1.7/32" | 30,30 | 20 1130 082 | • 82 | 3.15/64" | 67,00 |
| 20 1130 032 | • 32 | 1.17/64" | 30,30 | 20 1130 083 | • 83 | 3.17/64" | 67,00 |
| 20 1130 0325 | • 32,5 | 1.9/32" | 30,30 | 20 1130 084 | • 84 | 3.5/16" | 67,00 |
| 20 1130 033 | • 33 | 1.19/64" | 30,30 | 20 1130 085 | • 85 | 3.11/32" | 67,00 |
| 20 1130 034 | • 34 | 1.11/32" | 30,30 | 20 1130 086 | • 86 | 3.25/64" | 68,65 |
| 20 1130 035 | • 35 | 1.3/8" | 30,30 | 20 1130 087 | • 87 | 3.27/64" | 68,65 |
| 20 1130 036 | • 36 | 1.27/64" | 30,30 | 20 1130 088 | • 88 | 3.15/32" | 68,65 |
| 20 1130 037 | • 37 | 1.29/64" | 30,30 | 20 1130 089 | • 89 | 3.1/2" | 68,65 |
| 20 1130 038 | • 38 | 1.1/2" | 30,30 | 20 1130 090 | • 90 | 3.35/64" | 68,65 |
| 20 1130 0385 | • 38,5 | 1.33/64" | 30,30 | 20 1130 091 | • 91 | 3.37/64" | 72,50 |
| 20 1130 039 | • 39 | 1.17/32" | 30,30 | 20 1130 092 | • 92 | 3.5/8" | 72,50 |
| 20 1130 040 | • 40 | 1.37/64" | 30,30 | 20 1130 093 | • 93 | 3.21/32" | 72,50 |
| 20 1130 0405 | • 40,5 | 1.19/32" | 33,15 | 20 1130 094 | • 94 | 3.45/64" | 72,50 |
| 20 1130 041 | • *41 | 1.39/64" | 33,15 | 20 1130 095 | • 95 | 3.47/64" | 72,50 |
| 20 1130 042 | • 42 | 1.21/32" | 33,15 | 20 1130 096 | • 96 | 3.25/32" | 73,50 |
| 20 1130 043 | • 43 | 1.11/16" | 33,15 | 20 1130 097 | • 97 | 3.13/16" | 73,50 |
| 20 1130 044 | • 44 | 1.47/64" | 33,20 | 20 1130 098 | • 98 | 3.55/64" | 73,50 |
| 20 1130 045 | • 45 | 1.49/64" | 33,20 | 20 1130 099 | • 99 | 3.57/64" | 73,50 |
| 20 1130 046 | • 46 | 1.13/16" | 33,80 | 20 1130 100 | • 100 | 3.15/16" | 73,50 |
| 20 1130 047 | • 47 | 1.27/32" | 33,80 | 20 1130 105 | • 105 | 4.9/64" | 82,60 |
| 20 1130 048 | • 48 | 1.57/64" | 33,80 | 20 1130 110 | • 110 | 4.21/64" | 97,05 |
| 20 1130 049 | • 49 | 1.59/64" | 33,80 | 20 1130 115 | • 115 | 4.17/32" | 113,60 |
| 20 1130 050 | • 50 | 1.31/32" | 33,80 | 20 1130 120 | • 120 | 4.23/32" | 128,65 |
| 20 1130 0505 | • 50,5 | 1.63/64" | 33,80 | 20 1130 125 | • 125 | 4.59/64" | 142,75 |
| 20 1130 051 | • 51 | 2.1/64" | 33,80 | 20 1130 130 | • 130 | 5.1/8" | 156,65 |
| 20 1130 052 | • 52 | 2.3/64" | 33,80 | 20 1130 135 | • 135 | 5.5/16" | 172,10 |
| 20 1130 053 | • 53 | 2.3/32" | 34,15 | 20 1130 140 | • 140 | 5.33/64" | 187,85 |
| 20 1130 054 | • 54 | 2.1/8" | 34,15 | 20 1130 145 | • 145 | 5.45/64" | 205,10 |
| 20 1130 055 | • 55 | 2.11/64" | 34,15 | 20 1130 150 | • 150 | 5.29/32" | 222,35 |
| 20 1130 056 | • 56 | 2.13/64" | 40,80 | | | | |
| 20 1130 057 | • 57 | 2.1/4" | 40,80 | | | | |
| 20 1130 058 | • 58 | 2.9/32" | 40,80 | | | | |

POWER-MAX SUPER HEAVY-DUTY 30 20 1130A

Hartmetall-bestückte Lochsäge, Nutzlänge 30 mm.
Nur Lochsägenkörper
Carbide tipped hole saw, drill depth 30 mm | 1".
Hole saw body only



ZUBEHÖR ACCESSORIES
576

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|---------------|--------|-------------|-------|---------------|--------|-------------|--------|
| 20 1130A 014 | • 14 | 35/64" | 21,60 | 20 1130A 059 | • 59 | 2.21/64" | 32,20 |
| 20 1130A 0145 | • 14,5 | 37/64" | 21,60 | 20 1130A 060 | • 60 | 2.23/64" | 32,20 |
| 20 1130A 015 | • 15 | 19/32" | 21,60 | 20 1130A 0605 | • 60,5 | 2.3/8" | 35,95 |
| 20 1130A 016 | • 16 | 5/8" | 21,60 | 20 1130A 061 | • 61 | 2.13/32" | 35,95 |
| 20 1130A 0165 | • 16,5 | 21/32" | 21,60 | 20 1130A 062 | • 62 | 2.7/16" | 35,95 |
| 20 1130A 017 | • 17 | 43/64" | 21,60 | 20 1130A 063 | • 63 | 2.31/64" | 35,95 |
| 20 1130A 018 | • 18 | 45/64" | 21,60 | 20 1130A 064 | • 64 | 2.33/64" | 35,95 |
| 20 1130A 0185 | • 18,5 | 47/64" | 21,60 | 20 1130A 065 | • 65 | 2.9/16" | 35,95 |
| 20 1130A 019 | • 19 | 3/4" | 21,60 | 20 1130A 066 | • 66 | 2.19/32" | 42,30 |
| 20 1130A 020 | • 20 | 25/32" | 21,60 | 20 1130A 067 | • 67 | 2.41/64" | 42,30 |
| 20 1130A 0205 | • 20,5 | 13/16" | 21,60 | 20 1130A 068 | • 68 | 2.43/64" | 42,30 |
| 20 1130A 021 | • 21 | 53/64" | 21,60 | 20 1130A 069 | • 69 | 2.23/32" | 42,30 |
| 20 1130A 022 | • 22 | 55/64" | 21,60 | 20 1130A 070 | • 70 | 2.3/4" | 42,30 |
| 20 1130A 0225 | • 22,5 | 57/64" | 21,60 | 20 1130A 071 | • 71 | 2.51/64" | 45,80 |
| 20 1130A 023 | • 23 | 29/32" | 21,60 | 20 1130A 072 | • 72 | 2.53/64" | 45,80 |
| 20 1130A 024 | • 24 | 15/16" | 21,60 | 20 1130A 073 | • 73 | 2.7/8" | 45,80 |
| 20 1130A 025 | • 25 | 63/64" | 21,60 | 20 1130A 074 | • 74 | 2.29/32" | 45,80 |
| 20 1130A 0255 | • 25,5 | 1" | 21,60 | 20 1130A 075 | • 75 | 2.61/64" | 45,80 |
| 20 1130A 026 | • 26 | 1.1/32" | 21,60 | 20 1130A 076 | • 76 | 2.63/64" | 50,85 |
| 20 1130A 027 | • 27 | 1.1/16" | 21,60 | 20 1130A 077 | • 77 | 3.1/32" | 50,85 |
| 20 1130A 028 | • 28 | 1.7/64" | 21,60 | 20 1130A 078 | • 78 | 3.5/64" | 50,85 |
| 20 1130A 029 | • 29 | 1.9/64" | 21,60 | 20 1130A 079 | • 79 | 3.7/64" | 50,85 |
| 20 1130A 030 | • 30 | 1.3/16" | 21,60 | 20 1130A 080 | • 80 | 3.5/32" | 50,85 |
| 20 1130A 0305 | • 30,5 | 1.13/64" | 21,65 | 20 1130A 081 | • 81 | 3.3/16" | 57,90 |
| 20 1130A 031 | • 31 | 1.7/32" | 21,65 | 20 1130A 082 | • 82 | 3.15/64" | 57,90 |
| 20 1130A 032 | • 32 | 1.17/64" | 21,65 | 20 1130A 083 | • 83 | 3.17/64" | 57,90 |
| 20 1130A 0325 | • 32,5 | 1.9/32" | 21,65 | 20 1130A 084 | • 84 | 3.5/16" | 57,90 |
| 20 1130A 033 | • 33 | 1.19/64" | 21,65 | 20 1130A 085 | • 85 | 3.11/32" | 57,90 |
| 20 1130A 034 | • 34 | 1.11/32" | 21,65 | 20 1130A 086 | • 86 | 3.25/64" | 59,55 |
| 20 1130A 035 | • 35 | 1.3/8" | 21,65 | 20 1130A 087 | • 87 | 3.27/64" | 59,55 |
| 20 1130A 036 | • 36 | 1.27/64" | 21,65 | 20 1130A 088 | • 88 | 3.15/32" | 59,55 |
| 20 1130A 037 | • 37 | 1.29/64" | 21,65 | 20 1130A 089 | • 89 | 3.1/2" | 59,55 |
| 20 1130A 038 | • 38 | 1.1/2" | 21,65 | 20 1130A 090 | • 90 | 3.35/64" | 59,55 |
| 20 1130A 0385 | • 38,5 | 1.33/64" | 21,65 | 20 1130A 091 | • 91 | 3.37/64" | 63,35 |
| 20 1130A 039 | • 39 | 1.17/32" | 21,65 | 20 1130A 092 | • 92 | 3.5/8" | 63,35 |
| 20 1130A 040 | • 40 | 1.37/64" | 21,65 | 20 1130A 093 | • 93 | 3.21/32" | 63,35 |
| 20 1130A 0405 | • 40,5 | 1.19/32" | 24,50 | 20 1130A 094 | • 94 | 3.45/64" | 63,35 |
| 20 1130A 041 | • *41 | 1.39/64" | 24,50 | 20 1130A 095 | • 95 | 3.47/64" | 63,35 |
| 20 1130A 042 | • 42 | 1.21/32" | 24,50 | 20 1130A 096 | • 96 | 3.25/32" | 64,35 |
| 20 1130A 043 | • 43 | 1.11/16" | 24,50 | 20 1130A 097 | • 97 | 3.13/16" | 64,35 |
| 20 1130A 044 | • 44 | 1.47/64" | 24,55 | 20 1130A 098 | • 98 | 3.55/64" | 64,35 |
| 20 1130A 045 | • 45 | 1.49/64" | 24,55 | 20 1130A 099 | • 99 | 3.57/64" | 64,35 |
| 20 1130A 046 | • 46 | 1.13/16" | 25,15 | 20 1130A 100 | • 100 | 3.15/16" | 64,35 |
| 20 1130A 047 | • 47 | 1.27/32" | 25,15 | 20 1130A 105 | • 105 | 4.9/64" | 68,95 |
| 20 1130A 048 | • 48 | 1.57/64" | 25,15 | 20 1130A 110 | • 110 | 4.21/64" | 83,40 |
| 20 1130A 049 | • 49 | 1.59/64" | 25,15 | 20 1130A 115 | • 115 | 4.17/32" | 99,95 |
| 20 1130A 050 | • 50 | 1.31/32" | 25,15 | 20 1130A 120 | • 120 | 4.23/32" | 114,95 |
| 20 1130A 0505 | • 50,5 | 1.63/64" | 25,15 | 20 1130A 125 | • 125 | 4.59/64" | 129,10 |
| 20 1130A 051 | • 51 | 2.1/64" | 25,15 | 20 1130A 130 | • 130 | 5.1/8" | 143,00 |
| 20 1130A 052 | • 52 | 2.3/64" | 25,15 | 20 1130A 135 | • 135 | 5.5/16" | 158,45 |
| 20 1130A 053 | • 53 | 2.3/32" | 25,50 | 20 1130A 140 | • 140 | 5.33/64" | 174,20 |
| 20 1130A 054 | • 54 | 2.1/8" | 25,50 | 20 1130A 145 | • 145 | 5.45/64" | 191,45 |
| 20 1130A 055 | • 55 | 2.11/64" | 25,50 | 20 1130A 150 | • 150 | 5.29/32" | 208,70 |
| 20 1130A 056 | • 56 | 2.13/64" | 32,20 | | | | |
| 20 1130A 057 | • 57 | 2.1/4" | 32,20 | | | | |
| 20 1130A 058 | • 58 | 2.9/32" | 32,20 | | | | |

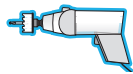
Zähnezahl: Ø 14-15=4 / 16-35=6 / 36-65=9 / 66-100=12 / 101-129=15 / 130-150=18 * Ab Ø 41 mm empfehlen wir den Einsatz von Morsekonen oder Kernbohradapter · **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Number of teeth: Ø 14-15=4 / 16-35=6 / 36-65=9 / 66-100=12 / 101-129=15 / 130-150=18 * From Ø 41 mm we recommend the use of morse tapers or annular cutter adapters. · **Attention:** The inch sizes do not correspond exactly to the mm diameters.

Schnittdaten Cutting data

20 1130A

POWER-MAX
SUPER HEAVY-DUTY 30



ZUBEHÖR FÜR HANDBOHRMASCHINEN
ACCESSORIES FOR HANDHELD MACHINES

SCHÄFTE MIT PASSENDEM ZENTRIERBOHRER/FEDER
SHANKS WITH SUITABLE CENTER DRILL / SPRINGS

| | |
|--|------------------------------------|
| | Ø 14-60,5 mm 20 1134 € 6,35 |
| | 20 1445 € 4,10 |
| | Ø 61-100 mm 20 1137 € 6,35 |
| | 20 1446 € 4,70 |
| | Ø 105-150 mm 20 1156 € 11,75 |
| | 20 1446 € 4,70 |

SDS PLUS SCHAFT MIT PASSENDEM ZENTRIERBOHRER/FEDER
SHANK WITH SUITABLE CENTER DRILL / SPRING

| | |
|---|-----------------------------------|
| | Ø 14-100 mm 20 1123 € 10,70 |
| SDS PLUS Ohne Hammer-Funktion anwenden Do not use hammer-function. | |
| | 20 1446 € 4,70 |

POWER-DRILL
4000



Ersatz-Auswerferbohrer · Spare ejector drill

Ø 14-120 mm 20 1530
€ 52,65

20 1531
€ 2,20



Funktionsweise:

- Das Werkstück ankörnen. Bei weichen Materialien wie Kunststoffen, Holzern und Holzwerkstoffen kann ggf. auf das Ankörnen verzichtet werden.
- Setzen Sie den Auswerferbohrer 1 genau in die Mitte des Körnerpunktes an. Zu Beginn des Bohrprozesses wenig Druck (Vorschub) anwenden, bis die Lochsäge Minimum 0,5 mm Schnitttiefe erreicht hat. Die Lochsäge hat sich nun selbst zentriert. Der Vorschub kann erhöht werden.
- Eine Auswurfeder 2 im Schaft erzeugt Druck auf den Auswerferbohrer 1.
- Der Auswerferbohrer 1 wirft den Kern 4 nach dem Durchbohren aus. (Sollte der Kern nicht ausgeworfen werden, erhöhen Sie bitte den Federdruck am Auswerferbohrer durch drehen der Inbusschraube 3 im Uhrzeigersinn).

Vorteile:

- Nach dem Bohren wird der Kern zuverlässig ausgeworfen.
- Passt auf alle POWER-MAX Lochsägen ab Durchmesser 14 mm (Seite 564).
- Da der Auswerferbohrer nicht das Material durchbohrt (wie sonst üblich bei Lochsägen mit Zentrierbohrern) entsteht ein kontinuierlicher Bohrvorgang.

Das unvermeidliche „Aufschlagen“ der Lochsäge nach dem Durchbrechen des Zentrierbohrers auf das Werkstück entfällt (Hauptgrund für Zahnbruch an der Lochsäge).

Operating mode:

- Center punch the work piece. Soft materials such as plastics, wood and wood based materials can possibly be done without the center punch.
- Place the ejector drill 1 in the middle of the center mark. Use little pressure (feed rate) until the hole saw reaches a minimum cutting depth of 0,5 mm. The hole saw in self-centered now. Feed rate can be increased.
- An ejector spring 2 which is installed in the arbor puts pressure on the ejector drill 1.
- The ejector drill 1 ejects the core 4 after drilling process. (If the core will not be ejected, please increase the spring pressure on the ejector drill by turning the Allen screw 3 clockwise).

Advantages:

- After each drilling process the core will be ejected reliably.
- Fits all POWER-MAX hole saw diameters from 14 mm (page 564).
- Since the ejector drill does not drill through the material (as usual with hole saw with center drills), a continuous drilling operation is possible.

The inevitable “crashing” of the hole saw on the work piece after the break through of the center drill will be avoided (the main reason for tooth fracture at the hole saw).

Ersatzteile für Power-Drill 4000 siehe Seite 604 · Spare parts for Power-Drill 4000 see page 604

Film
Movie





ZUBEHÖR FÜR MAGNET-KERNBOHRMASCHINEN ACCESSORIES FOR MAGNETIC HOLE CUTTING MACHINES

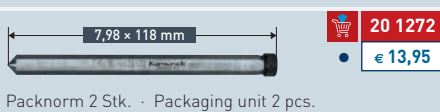
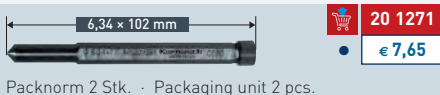
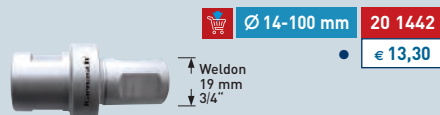
20 1130A

POWER-MAX
SUPER HEAVY-DUTY 30

ADAPTER+PASSENDE AUSWERFERSTIFTE ADAPTER+SUITABLE EJECTOR PINS

WELDON 19 + 32 mm (3/4" + 1.1/4")

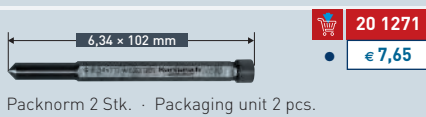
Passend für Maschinen · Suitable for machines
Karnasch · Alfra-Rotabest + Alfra Rotaquick · BDS + BDS Keyless · Bektop · Bux · Cembre · Dubuis · Erico · Euroboor · Evolution · Hall (Powerbor) · Hougen · Jancy · Magbroach · Magtron · Magnetor · Metallkraft · Promag · Ruko · Rotabroach · Ruko + Ruko Easylock · Universal ...



ADAPTER+PASSENDE AUSWERFERSTIFTE ADAPTER+SUITABLE EJECTOR PINS

NITTO / UNIVERSAL 19 mm (3/4")

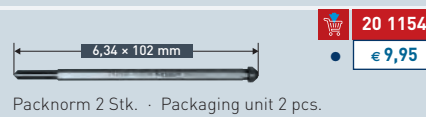
Passend für Maschinen · Suitable for machines
Nitto Kohki "one touch" Type A05575 · WA 3500 · WA 5000 · QA 4000 · QA 6500



ADAPTER+PASSENDE AUSWERFERSTIFTE ADAPTER+SUITABLE EJECTOR PINS

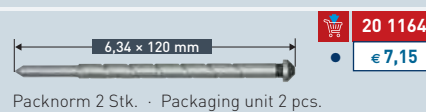
FEIN QUICK-IN 18 mm

Passend für Maschinen · Suitable for machines
FEIN KBM 32 Q · KBM 50 Q · KBM 50 U · KBM 50 Auto · KBM 65 U



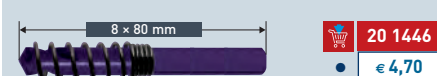
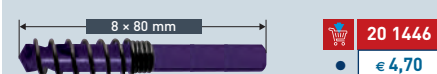
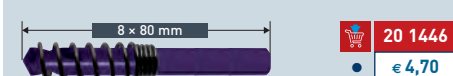
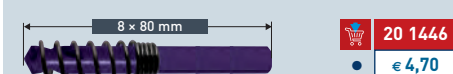
FEIN QUICK-IN MAX 32 mm 1.1/4"

Für Fein Maschine · For Fein machine
FEIN KBM 80 Quick-In Max



ZUBEHÖR FÜR STATIONÄRE MASCHINEN ACCESSORIES FOR STATIONARY MACHINES

MORSEKONEN UND PASSENDE ZENTRIERBOHRER MIT FEDER MORSE TAPERS AND SUITABLE CENTER DRILLS WITH SPRING



Achtung: Alle stationäre Maschinen können auch mit Morsekonus mit Auswerferstift-Funktion ausgerüstet werden. Siehe Seite 521-523

Attention: All stationary machines can also be equipped with morse tapers with ejector-pin function. See page 521-523



SETS · SETS



Sie wünschen ein Set im Kunststoffkoffer?

Kein Problem. Nennen Sie uns einfach den gewünschten Inhalt. Preis auf Anfrage.

You require a set in a plastic case?

No problem. Just tell us the desired content. Price available on request.





20 1141

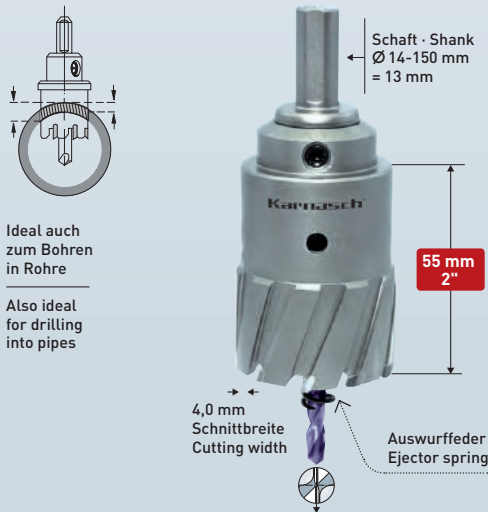
POWER-MAX
SUPER HEAVY-DUTY **55**



Hartmetall-bestückte Lochsäge, Nutzlänge 55 mm.
Komplett mit Schaft, Zentrierbohrer und Auswurffeder
Carbide tipped hole saw, drill depth 55 mm | 2".
Completely with shank, center drill and ejector spring

ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|--------------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Sandwich-Material |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Sandwich materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



Ideal auch zum Bohren in Rohre

Also ideal for drilling into pipes

Zentrierbohrer TIALN beschichtet mit Kreuzschliff zum Anbohren ohne Verlauf (Ankörnen ist überflüssig)

Center drill TIALN coated comes with cross grinding for centering without running off (center punching not necessary)

EIGENSCHAFTEN · PROPERTIES

Handmaschinen · Handheld machines



| | | |
|---------------------------------|--------------|-----------------------------------|
| Maximal empfohlener Ø | 40 mm | Maximum recommended Ø |
| Maximal empfohlene Schnitttiefe | 50 mm | Maximum recommended cutting depth |
| Maximal mögliche Schnitttiefe | 55 mm | Maximum possible cutting depth |

Super schwere Ausführung

- Bei allen Lochsägen sind Schaft und Bohrer austauschbar
- Schnelle Bohrkernentfernung durch Auswurffeder bei Ø 19-150 mm
- Bohrkernentfernung ab Ø 14 mm möglich mit Power-Drill 4000 System s. Seite 576

Anwendungshinweis:

Bei Materialstärken über **15 mm** ist je nach Spanverlauf ggf. mehrfaches Absetzen und Entfernen der Späne notwendig. Bei maximalen Schnitttiefen ist die Auswurffeder zu entfernen. Verwenden Sie bitte bei allen Metallen gutes Schneidöl (siehe ab Seite 1143).

20 1141A

POWER-MAX
SUPER HEAVY-DUTY **55**



Hartmetall-bestückte Lochsäge, Nutzlänge 55 mm.
Nur Lochsägekörper
Carbide tipped hole saw, drill depth 55 mm | 2".
Hole saw body only

ANWENDUNG · APPLICATION

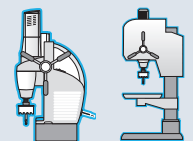
| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|--------------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Sandwich-Material |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Sandwich materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



Machen Sie aus Ihrer Lochsäge ein Universal-Werkzeug für nahezu alle Maschinentypen. Wählen Sie aus dem Zubehör (siehe Seite 580-581) Ihren gewünschten Schaft.

Make from the hole saw a universal tool for almost all types of machines. Choose from the accessories (see page 580-581) your suitable shank.

Stationäre und Kernbohrmaschinen Stationary and core drilling machines



| | | |
|---------------------------------|---------------|-----------------------------------|
| Maximal empfohlener Ø | 150 mm | Maximum recommended Ø |
| Maximal empfohlene Schnitttiefe | 55 mm | Maximum recommended cutting depth |
| Maximal mögliche Schnitttiefe | 55 mm | Maximum possible cutting depth |

Super heavy construction

- All hole saws comes with exchangeable shank and drill
- Quick removal of drilled core through ejector spring for hole saws Ø 19-150 mm
- Quick removal of drilled core possible from Ø 14 mm see Power-Drill 4000 System see page 576

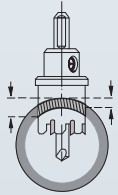
Application note:

For material thickness over **15 mm** it may be necessary (depending on the chip flow) to lift the drill and remove the chips several times. If drilling maximum cutting depth please remove the ejector spring. Use only good cutting oil for metals (see from page 1143).



POWER-MAX SUPER HEAVY-DUTY 55 20 1141

Hartmetall-bestückte Lochsäge, Nutzlänge 55 mm.
Komplett mit Schaft, Zentrierbohrer und Auswurffeder
Carbide tipped hole saw, drill depth 55 mm | 2".
Completely with shank, center drill and ejector spring



Ideal auch zum Bohren in Rohre

Also ideal for drilling into pipes



| Art. | Ø mm | Ø Zoll Inch | € |
|-------------|-------|-------------|-------|
| 20 1141 014 | • 14 | 35/64" | 43,85 |
| 20 1141 015 | • 15 | 19/32" | 43,85 |
| 20 1141 016 | • 16 | 5/8" | 43,85 |
| 20 1141 017 | • 17 | 43/64" | 43,85 |
| 20 1141 018 | • 18 | 45/64" | 43,85 |
| 20 1141 019 | • 19 | 3/4" | 43,85 |
| 20 1141 020 | • 20 | 25/32" | 43,85 |
| 20 1141 021 | • 21 | 53/64" | 43,85 |
| 20 1141 022 | • 22 | 55/64" | 43,85 |
| 20 1141 023 | • 23 | 29/32" | 43,85 |
| 20 1141 024 | • 24 | 15/16" | 43,85 |
| 20 1141 025 | • 25 | 63/64" | 43,85 |
| 20 1141 026 | • 26 | 1.1/32" | 43,85 |
| 20 1141 027 | • 27 | 1.1/16" | 43,85 |
| 20 1141 028 | • 28 | 1.7/64" | 43,85 |
| 20 1141 029 | • 29 | 1.9/64" | 43,85 |
| 20 1141 030 | • 30 | 1.3/16" | 43,85 |
| 20 1141 031 | • 31 | 1.7/32" | 44,00 |
| 20 1141 032 | • 32 | 1.17/64" | 44,00 |
| 20 1141 033 | • 33 | 1.19/64" | 44,00 |
| 20 1141 034 | • 34 | 1.11/32" | 44,00 |
| 20 1141 035 | • 35 | 1.3/8" | 44,00 |
| 20 1141 036 | • 36 | 1.27/64" | 44,00 |
| 20 1141 037 | • 37 | 1.29/64" | 44,00 |
| 20 1141 038 | • 38 | 1.1/2" | 44,00 |
| 20 1141 039 | • 39 | 1.17/32" | 44,00 |
| 20 1141 040 | • 40 | 1.37/64" | 44,00 |
| 20 1141 041 | • *41 | 1.39/64" | 48,10 |
| 20 1141 042 | • 42 | 1.21/32" | 48,10 |
| 20 1141 043 | • 43 | 1.11/16" | 48,20 |
| 20 1141 044 | • 44 | 1.47/64" | 48,20 |
| 20 1141 045 | • 45 | 1.49/64" | 48,20 |
| 20 1141 046 | • 46 | 1.13/16" | 49,05 |
| 20 1141 047 | • 47 | 1.27/32" | 49,05 |
| 20 1141 048 | • 48 | 1.57/64" | 49,05 |
| 20 1141 049 | • 49 | 1.59/64" | 49,05 |
| 20 1141 050 | • 50 | 1.31/32" | 49,05 |
| 20 1141 051 | • 51 | 2.1/64" | 49,05 |
| 20 1141 052 | • 52 | 2.3/64" | 49,05 |
| 20 1141 053 | • 53 | 2.3/32" | 49,55 |
| 20 1141 054 | • 54 | 2.1/8" | 49,55 |
| 20 1141 055 | • 55 | 2.11/64" | 49,55 |

| Art. | Ø mm | Ø Zoll Inch | € |
|-------------|-------|-------------|--------|
| 20 1141 056 | • 56 | 2.13/64" | 59,15 |
| 20 1141 057 | • 57 | 2.1/4" | 59,15 |
| 20 1141 058 | • 58 | 2.9/32" | 59,15 |
| 20 1141 059 | • 59 | 2.21/64" | 59,15 |
| 20 1141 060 | • 60 | 2.23/64" | 59,15 |
| 20 1141 061 | • 61 | 2.13/32" | 66,70 |
| 20 1141 062 | • 62 | 2.7/16" | 66,70 |
| 20 1141 063 | • 63 | 2.31/64" | 66,70 |
| 20 1141 064 | • 64 | 2.33/64" | 66,70 |
| 20 1141 065 | • 65 | 2.9/16" | 66,70 |
| 20 1141 066 | • 66 | 2.19/32" | 75,80 |
| 20 1141 067 | • 67 | 2.41/64" | 75,80 |
| 20 1141 068 | • 68 | 2.43/64" | 75,80 |
| 20 1141 069 | • 69 | 2.23/32" | 75,80 |
| 20 1141 070 | • 70 | 2.3/4" | 75,80 |
| 20 1141 071 | • 71 | 2.51/64" | 80,90 |
| 20 1141 072 | • 72 | 2.53/64" | 80,90 |
| 20 1141 073 | • 73 | 2.7/8" | 80,90 |
| 20 1141 074 | • 74 | 2.29/32" | 80,90 |
| 20 1141 075 | • 75 | 2.61/64" | 80,90 |
| 20 1141 076 | • 76 | 2.63/64" | 88,15 |
| 20 1141 077 | • 77 | 3.1/32" | 88,15 |
| 20 1141 078 | • 78 | 3.5/64" | 88,15 |
| 20 1141 079 | • 79 | 3.7/64" | 88,15 |
| 20 1141 080 | • 80 | 3.5/32" | 88,15 |
| 20 1141 085 | • 85 | 3.11/32" | 98,30 |
| 20 1141 090 | • 90 | 3.35/64" | 100,70 |
| 20 1141 095 | • 95 | 3.47/64" | 106,15 |
| 20 1141 100 | • 100 | 3.15/16" | 107,60 |
| 20 1141 105 | • 105 | 4.9/64" | 119,70 |
| 20 1141 110 | • 110 | 4.21/64" | 140,40 |
| 20 1141 115 | • 115 | 4.17/32" | 164,30 |
| 20 1141 120 | • 120 | 4.23/32" | 185,90 |
| 20 1141 125 | • 125 | 4.59/64" | 203,15 |
| 20 1141 130 | • 130 | 5.1/8" | 222,85 |
| 20 1141 135 | • 135 | 5.5/16" | 244,75 |
| 20 1141 140 | • 140 | 5.33/64" | 267,05 |
| 20 1141 145 | • 145 | 5.45/64" | 291,45 |
| 20 1141 150 | • 150 | 5.29/32" | 315,95 |

POWER-MAX SUPER HEAVY-DUTY 55 20 1141A

Hartmetall-bestückte Lochsäge, Nutzlänge 55 mm.
Nur Lochsägekörper
Carbide tipped hole saw, drill depth 55 mm | 2".
Hole saw body only



| Art. | Ø mm | Ø Zoll Inch | € |
|--------------|-------|-------------|-------|
| 20 1141A 014 | • 14 | 35/64" | 31,00 |
| 20 1141A 015 | • 15 | 19/32" | 31,00 |
| 20 1141A 016 | • 16 | 5/8" | 31,00 |
| 20 1141A 017 | • 17 | 43/64" | 31,00 |
| 20 1141A 018 | • 18 | 45/64" | 31,00 |
| 20 1141A 019 | • 19 | 3/4" | 31,00 |
| 20 1141A 020 | • 20 | 25/32" | 31,00 |
| 20 1141A 021 | • 21 | 53/64" | 31,00 |
| 20 1141A 022 | • 22 | 55/64" | 31,00 |
| 20 1141A 023 | • 23 | 29/32" | 31,00 |
| 20 1141A 024 | • 24 | 15/16" | 31,00 |
| 20 1141A 025 | • 25 | 63/64" | 31,00 |
| 20 1141A 026 | • 26 | 1.1/32" | 31,00 |
| 20 1141A 027 | • 27 | 1.1/16" | 31,00 |
| 20 1141A 028 | • 28 | 1.7/64" | 31,00 |
| 20 1141A 029 | • 29 | 1.9/64" | 31,00 |
| 20 1141A 030 | • 30 | 1.3/16" | 31,00 |
| 20 1141A 031 | • 31 | 1.7/32" | 31,15 |
| 20 1141A 032 | • 32 | 1.17/64" | 31,15 |
| 20 1141A 033 | • 33 | 1.19/64" | 31,15 |
| 20 1141A 034 | • 34 | 1.11/32" | 31,15 |
| 20 1141A 035 | • 35 | 1.3/8" | 31,15 |
| 20 1141A 036 | • 36 | 1.27/64" | 31,15 |
| 20 1141A 037 | • 37 | 1.29/64" | 31,15 |
| 20 1141A 038 | • 38 | 1.1/2" | 31,15 |
| 20 1141A 039 | • 39 | 1.17/32" | 31,15 |
| 20 1141A 040 | • 40 | 1.37/64" | 31,15 |
| 20 1141A 041 | • *41 | 1.39/64" | 35,30 |
| 20 1141A 042 | • 42 | 1.21/32" | 35,30 |
| 20 1141A 043 | • 43 | 1.11/16" | 35,35 |
| 20 1141A 044 | • 44 | 1.47/64" | 35,35 |
| 20 1141A 045 | • 45 | 1.49/64" | 35,35 |
| 20 1141A 046 | • 46 | 1.13/16" | 36,20 |
| 20 1141A 047 | • 47 | 1.27/32" | 36,20 |
| 20 1141A 048 | • 48 | 1.57/64" | 36,20 |
| 20 1141A 049 | • 49 | 1.59/64" | 36,20 |
| 20 1141A 050 | • 50 | 1.31/32" | 36,20 |
| 20 1141A 051 | • 51 | 2.1/64" | 36,20 |
| 20 1141A 052 | • 52 | 2.3/64" | 36,20 |
| 20 1141A 053 | • 53 | 2.3/32" | 36,70 |
| 20 1141A 054 | • 54 | 2.1/8" | 36,70 |
| 20 1141A 055 | • 55 | 2.11/64" | 36,70 |

| Art. | Ø mm | Ø Zoll Inch | € |
|--------------|-------|-------------|--------|
| 20 1141A 056 | • 56 | 2.13/64" | 46,30 |
| 20 1141A 057 | • 57 | 2.1/4" | 46,30 |
| 20 1141A 058 | • 58 | 2.9/32" | 46,30 |
| 20 1141A 059 | • 59 | 2.21/64" | 46,30 |
| 20 1141A 060 | • 60 | 2.23/64" | 46,30 |
| 20 1141A 061 | • 61 | 2.13/32" | 51,75 |
| 20 1141A 062 | • 62 | 2.7/16" | 51,75 |
| 20 1141A 063 | • 63 | 2.31/64" | 51,75 |
| 20 1141A 064 | • 64 | 2.33/64" | 51,75 |
| 20 1141A 065 | • 65 | 2.9/16" | 51,75 |
| 20 1141A 066 | • 66 | 2.19/32" | 60,85 |
| 20 1141A 067 | • 67 | 2.41/64" | 60,85 |
| 20 1141A 068 | • 68 | 2.43/64" | 60,85 |
| 20 1141A 069 | • 69 | 2.23/32" | 60,85 |
| 20 1141A 070 | • 70 | 2.3/4" | 60,85 |
| 20 1141A 071 | • 71 | 2.51/64" | 65,95 |
| 20 1141A 072 | • 72 | 2.53/64" | 65,95 |
| 20 1141A 073 | • 73 | 2.7/8" | 65,95 |
| 20 1141A 074 | • 74 | 2.29/32" | 65,95 |
| 20 1141A 075 | • 75 | 2.61/64" | 65,95 |
| 20 1141A 076 | • 76 | 2.63/64" | 73,20 |
| 20 1141A 077 | • 77 | 3.1/32" | 73,20 |
| 20 1141A 078 | • 78 | 3.5/64" | 73,20 |
| 20 1141A 079 | • 79 | 3.7/64" | 73,20 |
| 20 1141A 080 | • 80 | 3.5/32" | 73,20 |
| 20 1141A 085 | • 85 | 3.11/32" | 83,30 |
| 20 1141A 090 | • 90 | 3.35/64" | 85,70 |
| 20 1141A 095 | • 95 | 3.47/64" | 91,20 |
| 20 1141A 100 | • 100 | 3.15/16" | 92,65 |
| 20 1141A 105 | • 105 | 4.9/64" | 99,30 |
| 20 1141A 110 | • 110 | 4.21/64" | 120,00 |
| 20 1141A 115 | • 115 | 4.17/32" | 143,90 |
| 20 1141A 120 | • 120 | 4.23/32" | 165,50 |
| 20 1141A 125 | • 125 | 4.59/64" | 182,75 |
| 20 1141A 130 | • 130 | 5.1/8" | 202,45 |
| 20 1141A 135 | • 135 | 5.5/16" | 224,35 |
| 20 1141A 140 | • 140 | 5.33/64" | 246,65 |
| 20 1141A 145 | • 145 | 5.45/64" | 271,05 |
| 20 1141A 150 | • 150 | 5.29/32" | 295,50 |

Zähnezahl: Ø 14-15=4 / 16-35=6 / 36-45=8 / 46-65=10 / 66-105=12 / 106-115=14 / 116-129=16 / 130-150=18 • * Ab Ø 41 mm empfehlen wir den Einsatz von Morsekonen oder Kernbohradapter - **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Number of teeth: Ø 14-15=4 / 16-35=6 / 36-45=8 / 46-65=10 / 66-105=12 / 106-115=14 / 116-129=16 / 130-150=18 • * From Ø 41 mm we recommend the use of morse tapers or annular cutter adapters - **Attention:** The inch sizes do not correspond exactly to the mm diameters.

SETS · SETS



Sie wünschen ein Set im Kunststoffkoffer?

Kein Problem. Nennen Sie uns einfach den gewünschten Inhalt. Preis auf Anfrage.

You require a set in a plastic case?

No problem. Just tell us the desired content. Price available on request.

Schnittdaten
Cutting data



1312

Film
Movie



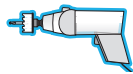
579



Index

20 1141A

POWER-MAX
SUPER HEAVY-DUTY 55



ZUBEHÖR FÜR HANDBOHRMASCHINEN
ACCESSORIES FOR HANDHELD MACHINES

SCHÄFTE MIT PASSENDEN ZENTRIERBOHRER/FEDER
SHANKS WITH SUITABLE CENTER DRILL / SPRINGS

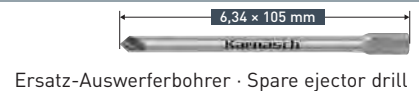
| | | | |
|--|--------------|---------|---------|
| | Ø 14-60 mm | 20 1134 | € 6,35 |
| | | 20 1113 | € 6,60 |
| | Ø 61-100 mm | 20 1137 | € 6,35 |
| | | 20 1115 | € 8,70 |
| | Ø 105-150 mm | 20 1156 | € 11,75 |
| | | 20 1115 | € 8,70 |

SCHAFT MIT PASSENDEN ZENTRIERBOHRER/FEDER
SHANK WITH SUITABLE CENTER DRILL / SPRING

| | | | |
|--|-------------|---------|---------|
| | Ø 14-100 mm | 20 1123 | € 10,70 |
| | | 20 1115 | € 8,70 |

SDS PLUS Ohne Hammer-Funktion anwenden
Do not use hammer-function.

POWER-DRILL
4000



Ø 14-120 mm 20 1532
€ 64,50

20 1533
€ 2,50

Ersatz-Auswerferbohrer · Spare ejector drill



Funktionsweise:

- Das Werkstück ankörnen. Bei weichen Materialien wie Kunststoffen, Holzern und Holzwerkstoffen kann ggf. auf das Ankörnen verzichtet werden.
- Setzen Sie den Auswerferbohrer 1 genau in die Mitte des Körnerpunktes an. Zu Beginn des Bohrprozesses wenig Druck (Vorschub) anwenden, bis die Lochsäge Minimum 0,5 mm Schnitttiefe erreicht hat. Die Lochsäge hat sich nun selbst zentriert. Der Vorschub kann erhöht werden.
- Eine Auswurfeder 2 im Schaft erzeugt Druck auf den Auswerferbohrer 1.
- Der Auswerferbohrer 1 wirft den Kern 4 nach dem Durchbohren aus. (Sollte der Kern nicht ausgeworfen werden, erhöhen Sie bitte den Federdruck am Auswerferbohrer durch drehen der Inbusschraube 3 im Uhrzeigersinn).

Vorteile:

- Nach dem Bohren wird der Kern zuverlässig ausgeworfen.
- Passt auf alle POWER-MAX Lochsägen ab Durchmesser 14 mm (Seite 564).
- Da der Auswerferbohrer nicht das Material durchbohrt (wie sonst üblich bei Lochsägen mit Zentrierbohrern) entsteht ein kontinuierlicher Bohrvorgang.

Das unvermeidliche „Aufschlagen“ der Lochsäge nach dem Durchbrechen des Zentrierbohrers auf das Werkstück entfällt (Hauptgrund für Zahnbruch an der Lochsäge).

Operating mode:

- Center punch the work piece. Soft materials such as plastics, wood and wood based materials can possibly be done without the center punch.
- Place the ejector drill 1 in the middle of the center mark. Use little pressure (feed rate) until the hole saw reaches a minimum cutting depth of 0,5 mm. The hole saw in self-centered now. Feed rate can be increased.
- An ejector spring 2 which is installed in the arbor puts pressure on the ejector drill 1.
- The ejector drill 1 ejects the core 4 after drilling process. (If the core will not be ejected, please increase the spring pressure on the ejector drill by turning the Allen screw 3 clockwise).

Advantages:

- After each drilling process the core will be ejected reliably.
- Fits all POWER-MAX hole saw diameters from 14 mm (page 564).
- Since the ejector drill does not drill through the material (as usual with hole saw with center drills), a continuous drilling operation is possible.

The inevitable "crashing" of the hole saw on the work piece after the break through of the center drill will be avoided (the main reason for tooth fracture at the hole saw).

Ersatzteile für Power-Drill 4000 siehe Seite 604 · Spare parts for Power-Drill 4000 see page 604

Film
Movie





**ZUBEHÖR FÜR MAGNET-KERNBOHRMASCHINEN
ACCESSORIES FOR MAGNETIC HOLE CUTTING MACHINES**

20 1141A

**POWER-MAX
SUPER HEAVY-DUTY 55**


**ADAPTER+PASSENDE AUSWERFERSTIFTE
ADAPTER+SUITABLE EJECTOR PINS**

WELDON 19 + 32 mm (3/4" + 1.1/4")

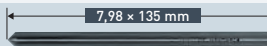
Passend für Maschinen · Suitable for machines
Karnasch · Alfra-Rotabest + Alfra Rotaquick · BDS + BDS Keyless · Bektop · Bux · Cembre · Dubuis · Erico · Euroboor · Evolution · Hall (Powerbor) · Hougen · Jancy · Magbroach · Magtron · Magnetor · Metallkraft · Promag · Ruko · Rotabroach · Ruko + Ruko Easylock · Universal ...


Ø 14-100 mm 20 1442
€ 13,30


Ø 61-100 mm 20 1453
€ 14,70
 Empfohlen Recommended


6,34 × 122 mm 20 1250
€ 5,20
 Packnorm 2 Stk. · Packaging unit 2 pcs.


Ø 105-150 mm 20 1458
€ 15,80



7,98 × 135 mm 20 1393
€ 13,70
 Packnorm 2 Stk. · Packaging unit 2 pcs.

**ADAPTER+PASSENDE AUSWERFERSTIFTE
ADAPTER+SUITABLE EJECTOR PINS**

NITTO / UNIVERSAL 19 mm (3/4")

Passend für Maschinen · Suitable for machines
Nitto Kohki "one touch" Type A05575 · WA 3500 · WA 5000 · QA 4000 · QA 6500


Ø 14-100 mm 20 1444
€ 15,30
 *Empfohlen bis: Recommended up to: 65 mm



6,34 × 122 mm 20 1250
€ 5,20
 Packnorm 2 Stk. · Packaging unit 2 pcs.

**ADAPTER+PASSENDE AUSWERFERSTIFTE
ADAPTER+SUITABLE EJECTOR PINS**

FEIN QUICK-IN 18 mm

Passend für Maschinen · Suitable for machines
FEIN KBM 32 Q · KBM 50 Q · KBM 50 U · KBM 50 Auto · KBM 65 U



Ø 14-100 mm 20 1443
€ 15,30
 *Empfohlen bis: Recommended up to: 65 mm


6,34 × 122 mm 20 1250
€ 5,20
 Packnorm 2 Stk. · Packaging unit 2 pcs.

FEIN QUICK-IN MAX 32 mm 1.1/4"

Für Fein Maschine · For Fein machine
FEIN KBM 80 Quick-In Max


Ø 14-100 mm 20 1163
€ 17,95



6,34 × 139 mm 20 1165
€ 7,90
 Packnorm 2 Stk. · Packaging unit 2 pcs.




**ZUBEHÖR FÜR STATIONÄRE MASCHINEN
ACCESSORIES FOR STATIONARY MACHINES**


**MORSEKONEN UND PASSENDE ZENTRIERBOHRER MIT FEDER
MORSE TAPERS AND SUITABLE CENTER DRILLS WITH SPRING**

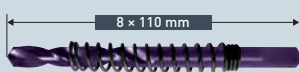
MORSEKONUS MORSE TAPER :2 Ø 16-100 mm 20 1135
€ 19,25





8 × 110 mm 20 1115
€ 8,70

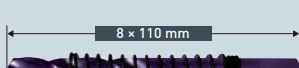
MORSEKONUS MORSE TAPER :3 Ø 16-100 mm 20 1136
€ 22,70





8 × 110 mm 20 1115
€ 8,70


MORSEKONUS MORSE TAPER :4 Ø 16-100 mm 21 0051
€ 26,00





8 × 110 mm 20 1115
€ 8,70

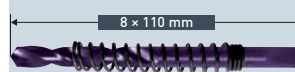
MORSEKONUS MORSE TAPER :3 Ø 105-150 mm 20 1459
€ 23,10




8 × 110 mm 20 1115
€ 8,70

MORSEKONUS MORSE TAPER :4 Ø 105-150 mm 20 1469
€ 27,40




8 × 110 mm 20 1115
€ 8,70

Achtung: Alle stationäre Maschinen können auch mit Morsekonus mit Auswerferstift-Funktion ausgerüstet werden. Siehe Seite 521-523

Attention: All stationary machines can also be equipped with morse tapers with ejector-pin function. See page 521-523



SETS · SETS



Sie wünschen ein Set im Kunststoffkoffer?

Kein Problem. Nennen Sie uns einfach den gewünschten Inhalt. Preis auf Anfrage.

You require a set in a plastic case?

No problem. Just tell us the desired content. Price available on request.

1



2



3



4



5



6



7



8



9



Index

20 1121

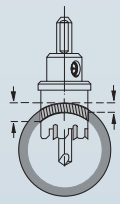
POWER-MAX ALLROUND 60



Hartmetall-bestückte Lochsäge, Nutzlänge 60 mm.
Komplett mit Schaft, Zentrierbohrer und Auswurffeder
Carbide tipped hole saw, drill depth 60 mm | 2".
Completely with shank, center drill and ejector spring

ANWENDUNG · APPLICATION

| | | | | | | | |
|---|---|---|--|--|---|--|---|
| | | | | | | | |
| Weichholz, Hartholz, Exotenholz, Furniere Soft wood, hard wood, exotic wood, veneers | Spanplatten, Hartfaserplatten, Kunststoff beschichtet/ furniert, MDF, HDF Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF | Kunststoffe GFK/CFK Plastics GRP/CRP | Mineralwerkstoff Corian®, Noblan®, Staron®, Rausolid® Mineral material Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid® | HPL (Schichtstoffplatten) Trespa®, Resopal® HPL (High-Pressure-Laminat) Trespa®, Resopal® | Faserzementplatte, Eternit®, Stein-/Glaswolle, Rockwool®, Isover® Fibre cement panel, Eternit®, mineral/glass wool, Rockwool®, Isover® | Dünnebleche, Sandwich Material, Verbundstoffe Thin iron sheets, sandwich material, composites | Ne-Metall wie Alu, Messing, Kupfer, Zinn Non ferrous metals like alu, copper, brass, tin |



Ideal auch zum Bohren in Rohre
Also ideal for drilling into pipes



20 1121A

POWER-MAX ALLROUND 60



Hartmetall-bestückte Lochsäge, Nutzlänge 60 mm.
Nur Lochsägenkörper
Carbide tipped hole saw, drill depth 60 mm | 2".
Hole saw body only

ANWENDUNG · APPLICATION

| | | | | | | | |
|---|---|---|--|--|---|--|---|
| | | | | | | | |
| Weichholz, Hartholz, Exotenholz, Furniere Soft wood, hard wood, exotic wood, veneers | Spanplatten, Hartfaserplatten, Kunststoff beschichtet/ furniert, MDF, HDF Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF | Kunststoffe GFK/CFK Plastics GRP/CRP | Mineralwerkstoff Corian®, Noblan®, Staron®, Rausolid® Mineral material Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid® | HPL (Schichtstoffplatten) Trespa®, Resopal® HPL (High-Pressure-Laminat) Trespa®, Resopal® | Faserzementplatte, Eternit®, Stein-/Glaswolle, Rockwool®, Isover® Fibre cement panel, Eternit®, mineral/glass wool, Rockwool®, Isover® | Dünnebleche, Sandwich Material, Verbundstoffe Thin iron sheets, sandwich material, composites | Ne-Metall wie Alu, Messing, Kupfer, Zinn Non ferrous metals like alu, copper, brass, tin |



Machen Sie aus Ihrer Lochsäge ein Universal-Werkzeug für nahezu alle Maschinentypen. Wählen Sie aus dem Zubehör (siehe Seite 584-585) Ihren gewünschten Schaft.

Make from the hole saw a universal tool for almost all types of machines. Choose from the accessories (see page 584-585) your suitable shank.

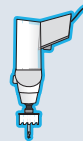
Zentrierbohrer TIALN beschichtet mit Kreuzschliff zum Anbohren ohne Verlauf (Ankörnen ist überflüssig)

Center drill TIALN coated comes with cross grinding for centering without running off (center punching not necessary)

EIGENSCHAFTEN · PROPERTIES

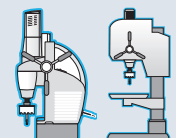
Handmaschinen · Handheld machines

| | | |
|---------------------------------|--------|-----------------------------------|
| Maximal empfohlener Ø | 105 mm | Maximum recommended Ø |
| Maximal empfohlene Schnitttiefe | 60 mm | Maximum recommended cutting depth |
| Maximal mögliche Schnitttiefe | 60 mm | Maximum possible cutting depth |



Stationäre und Kernbohrmaschinen
Stationary and core drilling machines

| | | |
|---------------------------------|--------|-----------------------------------|
| Maximal empfohlener Ø | 105 mm | Maximum recommended Ø |
| Maximal empfohlene Schnitttiefe | 60 mm | Maximum recommended cutting depth |
| Maximal mögliche Schnitttiefe | 60 mm | Maximum possible cutting depth |



Vielzahn-Ausführung

(ECO-Wenigzahn-Ausführung siehe Art. 20 1150 Seite 596)
→ Schnelle Bohrkernentfernung durch Auswurffeder bei allen Durchmessern. Durch höhere Anzahl von Zähnen gegenüber den gängigen Konkurrenzmodellen saubere Schnittkanten und höchste Standzeiten.

Die ideale „ALLROUND“ Lochsäge für:

- Elektriker
 - Bauhandwerk
 - Zimmereien
 - Sanitär- und Heizungsbauer
 - Möbeltischlereien
 - Treppen- und Küchenstudios usw...
- Zum Bohren fast aller Materialien (siehe Anwendung)

Anwendungshinweis:

Bei Vollmaterial, Ne-Metalle über 15 mm ist je nach Spanverlauf ggf. mehrfaches Absetzen und Entfernen der Späne notwendig. Bei maximalen Schnitttiefen ist die Auswurffeder zu entfernen. Verwenden Sie bei allen Metallen gutes Schneidöl (siehe ab Seite 1143).

High number of teeth model

(Eco-less tooth model see article 20 1150 page 596)
→ Quick removal of drilled core through ejector spring for all hole saws. Higher number of teeth compared with common competing models guarantees clean cutting edges as well as a longer durability.

The ideal "ALLROUND" hole saw for:

- Electrician
- Carpenters and cabinet makers
- Furniture makers
- Plumbing and heating engineers
- Construction site applications
- Stairway and kitchen studios and similar...

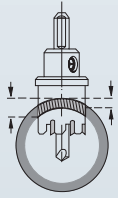
Application note:

For full material, non-ferrous metal over 15 mm it may be necessary (depending on the chip flow) to lift the drill and remove the chips several times. If drilling maximum cutting depth please remove the ejector spring. Use only good cutting oil. For metal (see from page 1143).



POWER-MAX ALLROUND 60 20 1121

Hartmetall-bestückte Lochsäge, Nutzlänge 60 mm.
Komplett mit Schaft, Zentrierbohrer und Auswurffeder
Carbide tipped hole saw, drill depth 60 mm | 2".
Completely with shank, center drill and ejector spring



Ideal auch zum Bohren in Rohre

Also ideal for drilling into pipes



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|-------|-------------|--------|
| 20 1121 025 | • 25 | 63/64" | 37,45 | 20 1121 070 | • 70 | 2.3/4" | 76,60 |
| 20 1121 030 | • 30 | 1.3/16" | 37,45 | 20 1121 071 | • 71 | 2.51/64" | 78,65 |
| 20 1121 035 | • 35 | 1.3/8" | 39,80 | 20 1121 074 | • 74 | 2.29/32" | 83,60 |
| 20 1121 040 | • 40 | 1.37/64" | 42,20 | 20 1121 075 | • 75 | 2.61/64" | 84,80 |
| 20 1121 045 | • 45 | 1.49/64" | 45,85 | 20 1121 076 | • 76 | 2.63/64" | 86,45 |
| 20 1121 050 | • 50 | 1.31/32" | 48,95 | 20 1121 078 | • 78 | 3.5/64" | 87,90 |
| 20 1121 055 | • 55 | 2.11/64" | 50,95 | 20 1121 080 | • 80 | 3.5/32" | 89,35 |
| 20 1121 058 | • 58 | 2.9/32" | 55,45 | 20 1121 085 | • 85 | 3.11/32" | 96,55 |
| 20 1121 060 | • 60 | 2.23/64" | 59,50 | 20 1121 090 | • 90 | 3.35/64" | 102,30 |
| 20 1121 063 | • 63 | 2.31/64" | 62,80 | 20 1121 095 | • 95 | 3.47/64" | 108,80 |
| 20 1121 065 | • 65 | 2.9/16" | 66,85 | 20 1121 100 | • 100 | 3.15/16" | 115,80 |
| 20 1121 068 | • 68 | 2.43/64" | 71,30 | 20 1121 105 | • 105 | 4.9/64" | 122,30 |

Zähnezahl: Ø 25-35=4 / 40-45=6 / 50-75=8 / 76-105=12 · **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Number of teeth: Ø 25-35=4 / 40-45=6 / 50-75=8 / 76-105=12 · **Attention:** The inch sizes do not correspond exactly to the mm diameters.

POWER-MAX ALLROUND 60 20 1121A

Hartmetall-bestückte Lochsäge, Nutzlänge 60 mm.
Nur Lochsägekörper
Carbide tipped hole saw, drill depth 60 mm | 2".
Hole saw body only



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|--------------|------|-------------|-------|--------------|-------|-------------|--------|
| 20 1121A 025 | • 25 | 63/64" | 22,50 | 20 1121A 070 | • 70 | 2.3/4" | 61,65 |
| 20 1121A 030 | • 30 | 1.3/16" | 22,50 | 20 1121A 071 | • 71 | 2.51/64" | 63,70 |
| 20 1121A 035 | • 35 | 1.3/8" | 24,80 | 20 1121A 074 | • 74 | 2.29/32" | 68,60 |
| 20 1121A 040 | • 40 | 1.37/64" | 27,20 | 20 1121A 075 | • 75 | 2.61/64" | 69,80 |
| 20 1121A 045 | • 45 | 1.49/64" | 30,90 | 20 1121A 076 | • 76 | 2.63/64" | 71,50 |
| 20 1121A 050 | • 50 | 1.31/32" | 34,00 | 20 1121A 078 | • 78 | 3.5/64" | 72,95 |
| 20 1121A 055 | • 55 | 2.11/64" | 36,00 | 20 1121A 080 | • 80 | 3.5/32" | 74,35 |
| 20 1121A 058 | • 58 | 2.9/32" | 40,45 | 20 1121A 085 | • 85 | 3.11/32" | 81,60 |
| 20 1121A 060 | • 60 | 2.23/64" | 44,55 | 20 1121A 090 | • 90 | 3.35/64" | 87,30 |
| 20 1121A 063 | • 63 | 2.31/64" | 47,85 | 20 1121A 095 | • 95 | 3.47/64" | 93,85 |
| 20 1121A 065 | • 65 | 2.9/16" | 51,90 | 20 1121A 100 | • 100 | 3.15/16" | 100,85 |
| 20 1121A 068 | • 68 | 2.43/64" | 56,35 | 20 1121A 105 | • 105 | 4.9/64" | 107,35 |

SETS · SETS



Sie wünschen ein Set im Kunststoffkoffer?

Kein Problem. Nennen Sie uns einfach den gewünschten Inhalt.
Preis auf Anfrage.

You require a set in a plastic case?

No problem. Just tell us the desired content.
Price available on request.

Schnittdaten
Cutting data



1313

Film
Movie



583

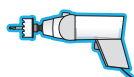
583



Index

20 1121A

POWER-MAX ALLROUND 60



ZUBEHÖR FÜR HANDBOHRMASCHINEN
ACCESSORIES FOR HANDHELD MACHINES

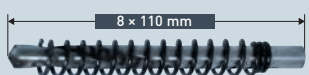
SCHÄFTE MIT PASSENDEM ZENTRIERBOHRER/FEDER
SHANKS WITH SUITABLE CENTER DRILL / SPRINGS



Ø 25-105 mm 20 1137
€ 6,35



20 1115
€ 8,70



20 1127
€ 4,55

Hartmetall-bestückter Zentrierbohrer zum Bohren in Gasbeton- und Ytongsteinen, Tonziegel und Hohlblocksteinen.

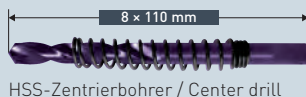
Carbide tipped center drill for drilling in Ytong stones (auto-claved concrete blocks) clay bricks and hollow gauged brick/stones.

SDS PLUS SCHAFT MIT PASSENDEM ZENTRIERBOHRER/FEDER
SHANK WITH SUITABLE CENTER DRILL / SPRING



Ø 25-105 mm 20 1123
€ 10,70

SDS PLUS Ohne Hammer-Funktion anwenden Do not use hammer-function.



20 1115
€ 8,70



20 1127
€ 4,55

Hartmetall-bestückter Zentrierbohrer zum Bohren in Gasbeton- und Ytongsteinen, Tonziegel und Hohlblocksteinen.

Carbide tipped center drill for drilling in Ytong stones (auto-claved concrete blocks) clay bricks and hollow gauged brick/stones.

POWER-DRILL 4000



Ø 14-120 mm 20 1532
€ 64,50



Ersatz-Auswerferbohrer · Spare ejector drill

20 1533
€ 2,50



Funktionsweise:

- A. Das Werkstück ankörnen. Bei weichen Materialien wie Kunststoffen, Hölzern und Holzwerkstoffen kann ggf. auf das Ankörnen verzichtet werden.
- B. Setzen Sie den Auswerferbohrer 1 genau in die Mitte des Körnerpunktes an. Zu Beginn des Bohrprozesses wenig Druck (Vorschub) anwenden, bis die Lochsäge Minimum 0,5 mm Schnitttiefe erreicht hat. Die Lochsäge hat sich nun selbst zentriert. Der Vorschub kann erhöht werden.
- C. Eine Auswurfeder 2 im Schaft erzeugt Druck auf den Auswerferbohrer 1.
- D. Der Auswerferbohrer 1 wirft den Kern 4 nach dem Durchbohren aus. (Sollte der Kern nicht ausgeworfen werden, erhöhen Sie bitte den Federdruck am Auswerferbohrer durch drehen der Inbusschraube 3 im Uhrzeigersinn).

Vorteile:

1. Nach dem Bohren wird der Kern zuverlässig ausgeworfen.
2. Passt auf alle POWER-MAX Lochsägen ab Durchmesser 14 mm (Seite 564).
3. Da der Auswerferbohrer nicht das Material durchbohrt (wie sonst üblich bei Lochsägen mit Zentrierbohrern) entsteht ein kontinuierlicher Bohrvorgang.

Das unvermeidliche „Aufschlagen“ der Lochsäge nach dem Durchbrechen des Zentrierbohrers auf das Werkstück entfällt (Hauptgrund für Zahnbruch an der Lochsäge).

Operating mode:

- A. Center punch the work piece. Soft materials such as plastics, wood and wood based materials can possibly be done without the center punch.
- B. Place the ejector drill 1 in the middle of the center mark. Use little pressure (feed rate) until the hole saw reaches a minimum cutting depth of 0,5 mm. The hole saw in self-centered now. Feed rate can be increased.
- C. An ejector spring 2 which is installed in the arbor puts pressure on the ejector drill 1.
- D. The ejector drill 1 ejects the core 4 after drilling process. (If the core will not be ejected, please increase the spring pressure on the ejector drill by turning the Allen screw 3 clockwise).

Advantages:

1. After each drilling process the core will be ejected reliably.
2. Fits all POWER-MAX hole saw diameters from 14 mm (page 564).
3. Since the ejector drill does not drill through the material (as usual with hole saw with center drills), a continuous drilling operation is possible.

The inevitable "crashing" of the hole saw on the work piece after the break through of the center drill will be avoided (the main reason for tooth fracture at the hole saw).

Ersatzteile für Power-Drill 4000 siehe Seite 604 · Spare parts for Power-Drill 4000 see page 604

Film Movie





ZUBEHÖR FÜR STATIONÄRE MASCHINEN
ACCESSORIES FOR STATIONARY MACHINES

20 1121A

POWER-MAX ALLROUND / 60

MORSEKONEN UND PASSENDE ZENTRIERBOHRER MIT FEDER
MORSE TAPERS AND SUITABLE CENTER DRILLS WITH SPRING

MORSEKONUS MORSE TAPER :2 Ø 25-105 mm **20 1135**
• € 19,25



8 x 110 mm **20 1115**
• € 8,70

HSS-Zentrierbohrer / Center drill

8 x 110 mm **20 1127**
• € 4,55



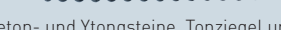
MORSEKONUS MORSE TAPER :3 Ø 25-105 mm **20 1136**
• € 22,70



8 x 110 mm **20 1115**
• € 8,70

HSS-Zentrierbohrer / Center drill

8 x 110 mm **20 1127**
• € 4,55



MORSEKONUS MORSE TAPER :4 Ø 25-105 mm **21 0051**
• € 26,00



8 x 110 mm **20 1115**
• € 8,70

HSS-Zentrierbohrer / Center drill

8 x 110 mm **20 1127**
• € 4,55



Hartmetall-bestückter Zentrierbohrer zum Bohren in Gasbeton- und Ytongsteine, Tonziegel und Hohlblocksteine.
Carbide tipped center drill for drilling in Ytong stones (auto-claved concrete blocks) clay bricks and hollow gauged brick/stones.

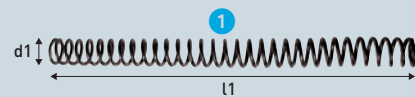


Achtung: Alle stationäre Maschinen können auch mit Morsekonus mit Auswerferstift-Funktion ausgerüstet werden.
Siehe Seite 521-523

Attention: All stationary machines can also be equipped with morse tapers with ejector-pin function.
See page 521-523

ERSATZTEILE FÜR POWER-MAX
SPARE PARTS FOR POWER-MAX

ERSATZ-AUSWURFFEDER FÜR ZENTRIERBOHRER
EJECTOR SPARE SPRINGS FOR CENTER DRILLS



ERSATZ-INNENSECHSKANTSCHRAUBE FÜR
SÄGENKÖRPER
SPARE ALLEN SCREWS FOR
HOLE SAW BODY



ERSATZ-INNENSECHSKANTSCHRAUBE FÜR
SCHAFT
SPARE ALLEN SCREWS FOR SHANK



| d1 1 | Für Lochsäge For hole saw | ART. | € | Ø mm 2 | Für Lochsäge For hole saw | ART. | € | Ø mm 3 | Für Halter Art. For shanks art. | ART. | € |
|------------|--|----------------|--------|-----------------|---|----------------|--------|-----------------|---|----------------|--------|
| 9x16 mm | 20 1010A POWER-MAX 10 HEAVY-DUTY Ø 14,5 - 60 mm | 20 1001 | • 0,55 | 4 mm M 8x8 | 20 1010A POWER-MAX 10 HEAVY-DUTY Ø 14 - 150 mm | 20 1343 | • 0,15 | 4 mm M 8x6 | 20 1123 · 20 1131 · 20 1134 · 20 1135 · 20 1136 · 20 1137 | 20 1340 | • 0,10 |
| 11,5x16 mm | 20 1010A POWER-MAX 10 HEAVY-DUTY Ø 61 - 150 mm | 20 1002 | • 0,55 | 4 mm M 8x8 | 20 1015A POWER-MAX 20 HEAVY-DUTY Ø 14 - 120 mm | 20 1343 | • 0,15 | 4 mm M 8x8 | 20 1459 · 20 1469 | 20 1343 | • 0,15 |
| 11x40 mm | 20 1015A POWER-MAX 20 HEAVY-DUTY Ø 17 - 60 mm | 20 1003 | • 0,65 | 4 mm M 8x8 | 20 1130A POWER-MAX 30 SUPER HEAVY-DUTY Ø 14 - 100 mm | 20 1343 | • 0,15 | 5 mm M 10x10 | 20 1156 | 20 1353 | • 0,10 |
| 13x40 mm | 20 1015A POWER-MAX 20 HEAVY-DUTY Ø 61 - 120 mm | 20 1006 | • 0,65 | 5 mm M 10x10 | 20 1130A POWER-MAX 30 SUPER HEAVY-DUTY Ø 105 - 150 mm | 20 1353 | • 0,10 | | | | |
| 11x40 mm | 20 1130A POWER-MAX 30 SUPER HEAVY-DUTY Ø 19 - 60 mm | 20 1003 | • 0,60 | 4 mm M 8x8 | 20 1141A POWER-MAX 55 SUPER HEAVY-DUTY Ø 14 - 100 mm | 20 1343 | • 0,15 | | | | |
| 13x40 mm | 20 1130A POWER-MAX 30 SUPER HEAVY-DUTY Ø 61 - 150 mm | 20 1006 | • 0,65 | 5 mm M 10x10 | 20 1141A POWER-MAX 55 SUPER HEAVY-DUTY Ø 105 - 150 mm | 20 1353 | • 0,10 | | | | |
| 11x67 mm | 20 1141A POWER-MAX 55 SUPER HEAVY-DUTY Ø 20 - 60 mm | 20 1007 | • 0,75 | 5 mm M 10x10 | 20 1121A POWER-MAX 60 ALLROUND Ø 25 - 105 mm | 20 1353 | • 0,10 | | | | |
| 13x69 mm | 20 1141A POWER-MAX 55 SUPER HEAVY-DUTY Ø 61 - 150 mm | 20 1005 | • 0,75 | | | | | | | | |
| 13x69 mm | 20 1121A POWER-MAX 60 ALLROUND Ø 25 - 105 mm | 20 1005 | • 0,75 | | | | | | | | |



20 1020

EASY-CUT 7 5



Hartmetall-bestückte Lochsäge, Nutzlänge 12 mm.
Komplett mit Schaft, Zentrierbohrer und Auswurfeder
Carbide tipped hole saw, drill depth 12 mm | 15/32".
Completely with shank, center drill and ejector spring

ANWENDUNG · APPLICATION

| | | | | | | |
|----------------|------------------------|----------------------------|------------|---|---|--|
| | | | | | | |
| Stahl Steel | Edelstahl Stainless | Grauguss Grey cast iron | Alu Alu | Kupfer, Messing, Zinn Copper, brass, tin | Kunststoffe GFK/CFK Plastics GRP/CRP | Sandwich- Material Sandwich materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



Verjüngter Zentrierbohrer zum Anbohren ohne Verlauf.
Ankörnen ist überflüssig.

Tapered center drill for centering without running off.
Center punching not necessary.

20 1020

EASY-CUT 7 5



Ersatzteile für Hartmetall-bestückte Lochsäge, Nutzlänge 12 mm.
Spare parts for Carbide tipped hole saw, drill depth 12 mm | 15/32".

SECHSKANTSCHRAUBE ZUM BEFESTIGEN DES ZENTRIERBOHRERS HEXAGON SCREW FOR FIXING THE CENTER DRILL

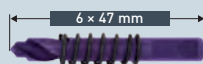
M6 x 8
= Für Lochsagen Ø 14-150 mm
= For hole saws Ø 14-150 mm

20 1404
€ 0,10

M8 x 8
= Für Lochsagen Ø 155-200 mm
= For hole saws Ø 155-200 mm

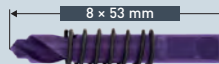
20 1523
€ 0,20

ZENTRIERBOHRER MIT FEDER CENTER DRILL WITH SPRING



Für Lochsagen Ø 14-150 mm
For hole saws Ø 14-150 mm

20 1114
€ 4,10



Für Lochsagen Ø 155-200 mm
For hole saws Ø 155-200 mm

20 1116
€ 5,15

EIGENSCHAFTEN · PROPERTIES

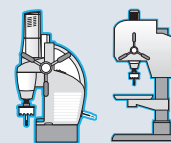
Handmaschinen · Handheld machines

| | | |
|---------------------------------|--------|-----------------------------------|
| Maximal empfohlener Ø | 180 mm | Maximum recommended Ø |
| Maximal empfohlene Schnitttiefe | 6 mm | Maximum recommended cutting depth |
| Maximal mögliche Schnitttiefe | 12 mm | Maximum possible cutting depth |



Stationäre und Kernbohrmaschinen Stationary and core drilling machines

| | | |
|---------------------------------|--------|-----------------------------------|
| Maximal empfohlener Ø | 200 mm | Maximum recommended Ø |
| Maximal empfohlene Schnitttiefe | 8 mm | Maximum recommended cutting depth |
| Maximal mögliche Schnitttiefe | 12 mm | Maximum possible cutting depth |



Leichtlauf Ausführung speziell für Handmaschinen

(selbstverständlich auch für stationäre Maschinen verwendbar)

Durch dünne Schnittbreite von nur 1,8-2,0 mm:

- wenig Schnittdruck
- schnelles und leichtgängiges Bohren
- exzellente Führung und Kontrolle während des Bohrvorgangs
- Schnelle Bohrkernentfernung durch Auswurfeder bei allen Durchmessern.

(Bei maximalen Schnitttiefen ist die Auswurfeder zu entfernen)

Anwendungshinweis:

Bei größeren Materialstärken pro Arbeitsgang 2-3 mm bohren, danach jeweils Späne entfernen. Verwenden Sie bitte bei allen Metallen gutes Schneidöl [siehe ab Seite 1143]

Smooth running version specifically for portable machines

(of course, also be used for stationary machines)

Because thin cutting width of only 1.8-2.0 mm:

- Low cutting pressure
- fast, smooth-running drilling
- excellent guidance and control during drilling
- Quick removal of drilled core through ejector spring for all hole saws. (If drilling maximum cutting depths please remove the ejector spring)

Application note:

At thicker materials: Cut 2-3 mm per cutting process, remove chips afterwards. Use only good cutting oil for metal [see from page 1143]

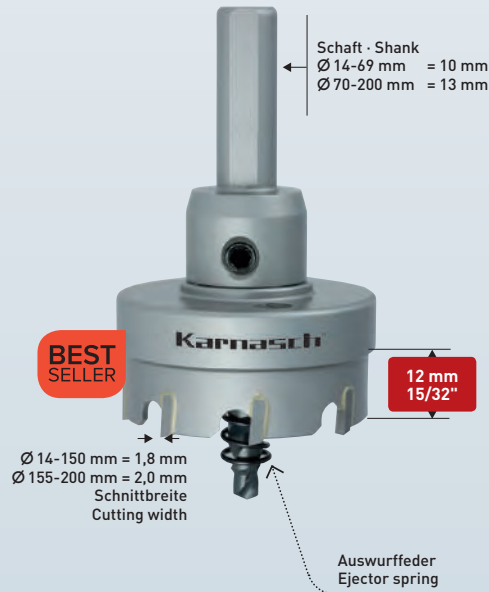


Hartmetall-bestückte Lochsäge, Nutzlänge 12 mm. Komplett mit Schaft, Zentrierbohrer und Auswurffeder
 Carbide tipped hole saw, drill depth 12 mm | 15/32". Completely with shank, center drill and ejector spring



EASY-CUT 5

20 1020



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|--------|
| 20 1020 014 | 14 | 35/64" | 12,15 | 20 1020 038 | 38 | 1.1/2" | 17,75 | 20 1020 062 | 62 | 2.7/16" | 28,00 | 20 1020 110 | 110 | 4.21/64" | 50,30 |
| 20 1020 015 | 15 | 19/32" | 12,15 | 20 1020 039 | 39 | 1.17/32" | 17,75 | 20 1020 063 | 63 | 2.31/64" | 28,00 | 20 1020 115 | 115 | 4.17/32" | 51,70 |
| 20 1020 016 | 16 | 5/8" | 12,15 | 20 1020 040 | 40 | 1.37/64" | 17,75 | 20 1020 064 | 64 | 2.33/64" | 28,00 | 20 1020 120 | 120 | 4.23/32" | 52,80 |
| 20 1020 017 | 17 | 43/64" | 12,15 | 20 1020 041 | 41 | 1.39/64" | 19,50 | 20 1020 065 | 65 | 2.9/16" | 28,00 | 20 1020 125 | 125 | 4.59/64" | 65,55 |
| 20 1020 018 | 18 | 45/64" | 12,15 | 20 1020 042 | 42 | 1.21/32" | 19,50 | 20 1020 066 | 66 | 2.19/32" | 29,85 | 20 1020 130 | 130 | 5.1/8" | 72,60 |
| 20 1020 019 | 19 | 3/4" | 12,15 | 20 1020 043 | 43 | 1.11/16" | 19,50 | 20 1020 067 | 67 | 2.41/64" | 29,85 | 20 1020 135 | 135 | 5.5/16" | 80,15 |
| 20 1020 020 | 20 | 25/32" | 12,15 | 20 1020 044 | 44 | 1.47/64" | 19,50 | 20 1020 068 | 68 | 2.43/64" | 29,85 | 20 1020 140 | 140 | 5.33/64" | 90,00 |
| 20 1020 021 | 21 | 53/64" | 13,75 | 20 1020 045 | 45 | 1.49/64" | 19,50 | 20 1020 069 | 69 | 2.23/32" | 29,85 | 20 1020 145 | 145 | 5.45/64" | 99,80 |
| 20 1020 022 | 22 | 55/64" | 13,75 | 20 1020 046 | 46 | 1.13/16" | 20,80 | 20 1020 070 | 70 | 2.3/4" | 29,85 | 20 1020 150 | 150 | 5.29/32" | 112,55 |
| 20 1020 023 | 23 | 29/32" | 13,75 | 20 1020 047 | 47 | 1.27/32" | 20,80 | 20 1020 071 | 71 | 2.51/64" | 33,15 | 20 1020 155 | 155 | 6.7/64" | 115,35 |
| 20 1020 024 | 24 | 15/16" | 13,75 | 20 1020 048 | 48 | 1.57/64" | 20,80 | 20 1020 072 | 72 | 2.53/64" | 33,15 | 20 1020 160 | 160 | 6.19/64" | 119,05 |
| 20 1020 025 | 25 | 63/64" | 13,75 | 20 1020 049 | 49 | 1.59/64" | 20,80 | 20 1020 073 | 73 | 2.7/8" | 33,15 | 20 1020 165 | 165 | 6.1/2" | 122,80 |
| 20 1020 026 | 26 | 1.1/32" | 14,50 | 20 1020 050 | 50 | 1.31/32" | 20,80 | 20 1020 074 | 74 | 2.29/32" | 33,15 | 20 1020 170 | 170 | 6.11/16" | 126,55 |
| 20 1020 027 | 27 | 1.1/16" | 14,50 | 20 1020 051 | 51 | 2.1/64" | 23,55 | 20 1020 075 | 75 | 2.61/64" | 33,15 | 20 1020 175 | 175 | 6.57/64" | 130,35 |
| 20 1020 028 | 28 | 1.7/64" | 14,50 | 20 1020 052 | 52 | 2.3/64" | 23,55 | 20 1020 076 | 76 | 2.63/64" | 34,90 | 20 1020 180 | 180 | 7.3/32" | 134,05 |
| 20 1020 029 | 29 | 1.9/64" | 14,50 | 20 1020 053 | 53 | 2.3/32" | 23,55 | 20 1020 077 | 77 | 3.1/32" | 34,90 | 20 1020 185 | 185 | 7.9/32" | 140,50 |
| 20 1020 030 | 30 | 1.3/16" | 14,50 | 20 1020 054 | 54 | 2.1/8" | 23,55 | 20 1020 078 | 78 | 3.5/64" | 34,90 | 20 1020 190 | 190 | 7.31/64" | 144,00 |
| 20 1020 031 | 31 | 1.7/32" | 16,40 | 20 1020 055 | 55 | 2.11/64" | 23,55 | 20 1020 079 | 79 | 3.7/64" | 34,90 | 20 1020 195 | 195 | 7.43/64" | 148,35 |
| 20 1020 032 | 32 | 1.17/64" | 16,40 | 20 1020 056 | 56 | 2.13/64" | 26,10 | 20 1020 080 | 80 | 3.5/32" | 34,90 | 20 1020 200 | 200 | 7.7/8" | 152,20 |
| 20 1020 033 | 33 | 1.19/64" | 16,40 | 20 1020 057 | 57 | 2.1/4" | 26,10 | 20 1020 085 | 85 | 3.11/32" | 37,60 | | | | |
| 20 1020 034 | 34 | 1.11/32" | 16,40 | 20 1020 058 | 58 | 2.9/32" | 26,10 | 20 1020 090 | 90 | 3.35/64" | 38,70 | | | | |
| 20 1020 035 | 35 | 1.3/8" | 16,40 | 20 1020 059 | 59 | 2.21/64" | 26,10 | 20 1020 095 | 95 | 3.47/64" | 42,15 | | | | |
| 20 1020 036 | 36 | 1.27/64" | 17,75 | 20 1020 060 | 60 | 2.23/64" | 26,10 | 20 1020 100 | 100 | 3.15/16" | 44,45 | | | | |
| 20 1020 037 | 37 | 1.29/64" | 17,75 | 20 1020 061 | 61 | 2.13/32" | 28,00 | 20 1020 105 | 105 | 4.9/64" | 47,60 | | | | |

Zähnezahl: Ø 14-16=3 / 17-21=4 / 22-32=6 / 33-42=8 / 43-54=10 / 55-69=12 / 70-80=14 / 85-90=16 / 95-100=18 / 105-110=20 / 115-120=22 / 125-130=24 / 135-140=26 / 145-150=28 / 155-180=30 / 185-200=32 · **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Number of teeth: Ø 14-16=3 / 17-21=4 / 22-32=6 / 33-42=8 / 43-54=10 / 55-69=12 / 70-80=14 / 85-90=16 / 95-100=18 / 105-110=20 / 115-120=22 / 125-130=24 / 135-140=26 / 145-150=28 / 155-180=30 / 185-200=32 · **Attention:** The inch sizes do not correspond exactly to the mm diameters.

SETS · SETS



Sie wünschen ein Set im Kunststoffkoffer?

Kein Problem. Nennen Sie uns einfach den gewünschten Inhalt. Preis auf Anfrage.

You require a set in a plastic case?

No problem. Just tell us the desired content. Price available on request.

Schnittdaten
Cutting data



1312

Film
Movie



587

587



Index

20 1025

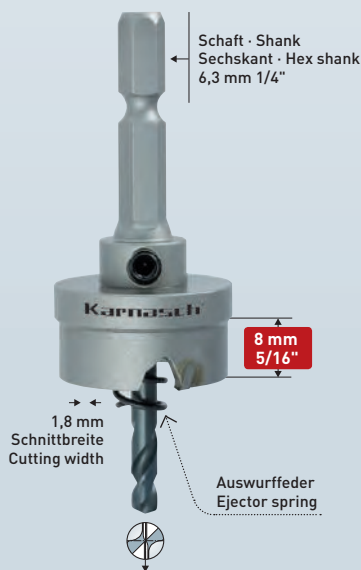
EXTRA EASY-CUT 3



Hartmetall-bestückte Lochsäge, Nutzlänge 8 mm.
Komplett mit Schaft, Zentrierbohrer und Auswurffeder
Carbide tipped hole saw, drill depth 8 mm | 5/16".
Completely with shank, center drill and ejector spring

ANWENDUNG · APPLICATION

| | | | | | | |
|----------------|------------------------|----------------------------|------------|---|---|--|
| | | | | | | |
| Stahl Steel | Edelstahl Stainless | Grauguss Grey cast iron | Alu Alu | Kupfer, Messing, Zinn Copper, brass, tin | Kunststoffe GFK/CFK Plastics GRP/CRP | Sandwich- Material Sandwich materials |
| < 1400 N | > 900 N | | > 10% Si | | | |



Verjüngter Zentrierbohrer zum Anbohren ohne Verlauf. Ankörnen ist überflüssig.

Tapered center drill for centering without running off. Center punching not necessary.

EIGENSCHAFTEN · PROPERTIES

Handmaschinen · Handheld machines

| | | |
|---------------------------------|-------|-----------------------------------|
| Maximal empfohlener Ø | 38 mm | Maximum recommended Ø |
| Maximal empfohlene Schnitttiefe | 5 mm | Maximum recommended cutting depth |
| Maximal mögliche Schnitttiefe | 8 mm | Maximum possible cutting depth |



Extra Leichtlauf Ausführung speziell für Akku-Bohrmaschinen
(selbstverständlich auch für elektrisch betriebene Maschinen)

Durch dünne Schnittbreite von 1,8 mm und 3 Zahn Technologie:
→ sehr wenig Schnittdruck für lange Akku Lebensdauer
→ schnelles und leichtgängiges Bohren aller Durchmesser auch bei begrenzter Akkuleistung
→ exzellente Führung und Kontrolle während des Bohrvorgangs
→ Schnelle Bohrkernentfernung durch Auswurffeder bei allen Durchmessern.
(Bei maximalen Schnitttiefen ist die Auswurffeder zu entfernen)

Anwendungshinweis:
Bei größeren Materialstärken pro Arbeitsgang 2-3 mm bohren, danach jeweils Späne entfernen. Verwenden Sie bitte bei allen Metallen gutes Schneidöl (siehe ab Seite 1143)

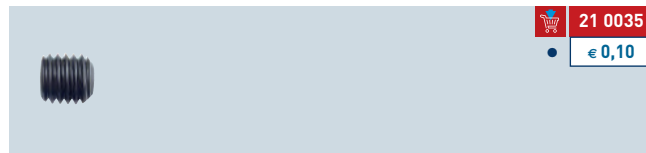
20 1025

EXTRA EASY-CUT 3

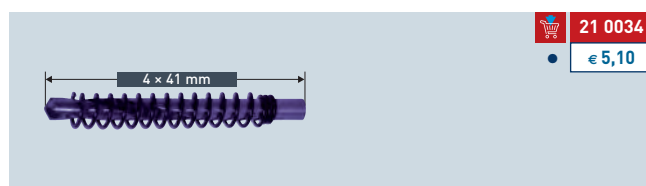


Ersatzteile für Hartmetall-bestückte Lochsäge, Nutzlänge 8 mm.
Spare parts for Carbide tipped hole saw, drill depth 8 mm | 5/16".

SECHSKANTSCHRAUBE ZUM BEFESTIGEN DES ZENTRIERBOHRERS M5 x 5
HEXAGON SCREW FOR FIXING THE CENTER DRILL M5 x 5



ZENTRIERBOHRER MIT FEDER
CENTER DRILL WITH SPRING



Hartmetall-bestückte Lochsäge, Nutzlänge 8 mm. Komplet mit Schaft, Zentrierbohrer und Auswurffeder
 Carbide tipped hole saw, drill depth 8 mm | 5/16". Completely with shank, center drill and ejector spring



EXTRA EASY-CUT 3

20 1025



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|------|-------------|------|-------------|------|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 20 1025 014 | 14 | 35/64" | 7,70 | 20 1025 022 | 22 | 55/64" | 8,70 | 20 1025 030 | 30 | 1.3/16" | 9,20 | 20 1025 038 | 38 | 1.1/2" | 11,20 |
| 20 1025 015 | 15 | 19/32" | 7,70 | 20 1025 023 | 23 | 29/32" | 8,70 | 20 1025 031 | 31 | 1.7/32" | 10,40 | | | | |
| 20 1025 016 | 16 | 5/8" | 7,70 | 20 1025 024 | 24 | 15/16" | 8,70 | 20 1025 032 | 32 | 1.17/64" | 10,40 | | | | |
| 20 1025 017 | 17 | 43/64" | 7,70 | 20 1025 025 | 25 | 63/64" | 8,70 | 20 1025 033 | 33 | 1.19/64" | 10,40 | | | | |
| 20 1025 018 | 18 | 45/64" | 7,70 | 20 1025 026 | 26 | 1.1/32" | 9,20 | 20 1025 034 | 34 | 1.11/32" | 10,40 | | | | |
| 20 1025 019 | 19 | 3/4" | 7,70 | 20 1025 027 | 27 | 1.1/16" | 9,20 | 20 1025 035 | 35 | 1.3/8" | 10,40 | | | | |
| 20 1025 020 | 20 | 25/32" | 7,70 | 20 1025 028 | 28 | 1.7/64" | 9,20 | 20 1025 036 | 36 | 1.27/64" | 11,20 | | | | |
| 20 1025 021 | 21 | 53/64" | 8,70 | 20 1025 029 | 29 | 1.9/64" | 9,20 | 20 1025 037 | 37 | 1.29/64" | 11,20 | | | | |

% Sonderpreis / Sale Artikel.
 Lieferbar solange Vorrat.
 Special price / sale article.
 While stocks last.

Zähnezahl: Alle Ø 3 Zähne - **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Number of teeth: All Ø 3 teeth - **Attention:** The inch sizes do not correspond exactly to the mm diameters.

SETS · SETS



Sie wünschen ein Set im Kunststoffkoffer?

Kein Problem. Nennen Sie uns einfach den gewünschten Inhalt.
 Preis auf Anfrage.

You require a set in a plastic case?

No problem. Just tell us the desired content.
 Price available on request.

Schnittdaten
 Cutting data



1312

Film
 Movie



589



Index

21 1000

MINI-CUT

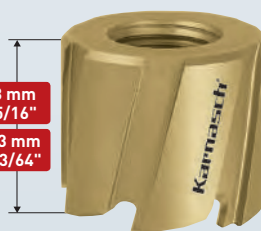
HSS-M2 + TIN beschichtete Lochsäge und Schweisspunktfräser, Nutzlänge 8 + 13 mm
HSS-M2 + TIN coated hole saws and spot weld cutter, drill depth 8 + 13 mm | 5/16" + 33/64"



ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|--------------------|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Sandwich-Material |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Sandwich materials |
| < 1100 N | > 900 N | | > 10% Si | | | |

Ø 6-20 mm = 8 mm
Ø 15/64"-25/32" = 5/16"
Ø 21-25 mm = 13 mm
Ø 53/64"-63/64" = 33/64"



TIN-GOLD Beschichtung für eine wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung).

TiN-GOLD coating for considerably longer service life also when machining dry (no/little) cooling.

EIGENSCHAFTEN · PROPERTIES

HSS-M2 MINI-CUT Lochsäge für handgeführte Maschinen, Akku-Bohrmaschinen.

Das ideale Bohrwerkzeug für:

- Elektriker
- Sanitär- und Heizungsbauer
- Blechbearbeitung
- Wartungsinstallationen
- Automobile Blechbearbeitung (Schweißpunkte aufbohren)
- Und vieles mehr

Durch dünne Schnittbreite von nur 2,3 mm

- Sehr wenig Schnittdruck für lange Lebensdauer bei Arbeiten mit Akku-Bohrmaschinen.
- Keine Verformung dünner Bleche

Produziert extrem schnelle, saubere und nahezu gratfreie Bohrungen.

Bohrt in dünnste Bleche sowie Platten mit bis zu 13 mm Stärke.

Bohrt in Flachmaterial und Rohre aus:

- Edelstahl
- Stahl
- Guss
- Bunt- und Leichtmetalle
- Kunststoffe

HSS-M2 MINI-CUT hole saw for portable machines, cordless drills.

The ideal drilling tool for:

- Electrical installations
- Piping
- Conduit work
- Sheet metal fabrication
- Maintenance installation
- HVAC & PHCC
- Automotive aftermarket (removing spot welds)
- And many other industries

Because of thin cutting width of only 2,3 mm:

- Very little cutting pressure for long battery life if using cordless drilling machines.
- No deforming of thin sheet metals

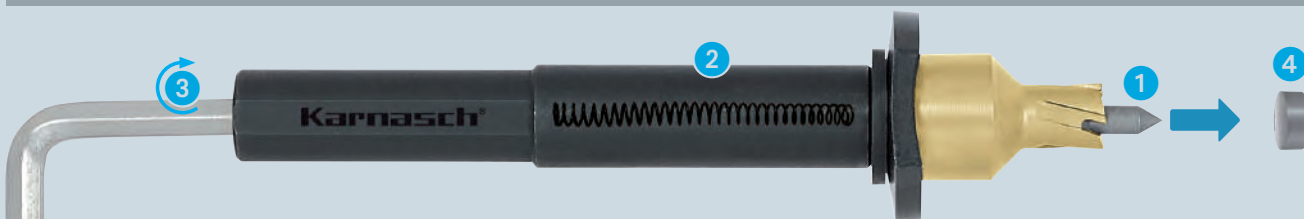
Drills clean, almost burr-free holes in seconds.

Drills in extremely thin sheet metals as well as in blocks up to 13 mm thickness.

Drills in flat material as well as in tubes made of:

- Stainless steel
- Steel
- Cast iron
- Non ferrous metals
- Plastics

FUNKTIONSWEISE · OPERATING MODE



- Das Werkstück ankören. Es ist wichtig mit dem Körner einen starken Körnerpunkt zu setzen (speziell bei Handmaschinen).
 - Setzen Sie den Auswerferstift 1 genau in die Mitte des starken Körnerpunktes an. Zu Beginn des Bohrprozesses wenig Druck (Vorschub) verwenden, bis die Lochsäge ca. 0,5 mm Schnitttiefe erreicht hat. Der Bohrer hat sich nun selbst zentriert. Der Vorschub kann erhöht werden.
 - Eine Auswurffeder 2 im Schaft erzeugt Druck auf dem Auswerferstift 1.
 - Zum Einstellen der Schnitttiefe und Federdruck auf dem Auswerferstift drehen Sie die Inbusschraube mit dem Inbusschlüssel 3 im Uhrzeigersinn. (Einstellen der Schnitttiefe zum Anbohren von punktgeschweißten Blechen ist nur mit Halter Art. 21 0002 möglich).
 - Der Auswerferstift 1 wirft den Kern 4 nach dem Durchbohren aus.
- Center punch the work piece. It is important to set a strong center mark (especially if using handheld machines).
 - Place the ejector pin 1 exactly in the middle of the strong center mark. Use little pressure (feed-rate) until you reach approximately 0,5 mm cutting depth. The drill is self-centered now. Feed rate can be increased.
 - An ejector spring 2 which is installed in the arbor puts pressure on the ejector pin 1.
 - To adjust the cutting depth and spring force turn the Allen screw with the Allen key 3 clockwise (adjusting the cutting depth for drilling of spot welded sheets is only possible with arbor Art. 21 0002).
 - The ejector pin ejects the core 4 after drilling process.

Schnittdaten
Cutting data

Film
Movie



1296

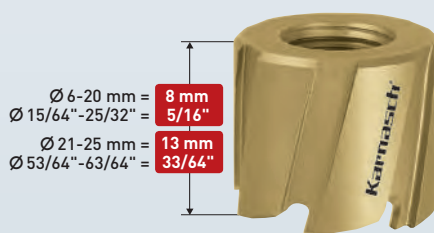


HSS-M2 + TIN beschichtete Lochsäge und Schweisspunktfräser, Nutzlänge 8 + 13 mm
HSS-M2 + TIN coated hole saws and spot weld cutter, drill depth 8 + 13 mm | 5/16" + 33/64"



MINI-CUT 7

21 1000



| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 21 1000 006 | 6 | 15/64" | 8,40 | 21 1000 012 | 12 | 15/32" | 11,10 | 21 1000 018 | 18 | 45/64" | 14,30 | 21 1000 024 | 24 | 15/16" | 19,75 |
| 21 1000 007 | 7 | 9/32" | 8,60 | 21 1000 013 | 13 | 33/64" | 11,90 | 21 1000 019 | 19 | 3/4" | 15,05 | 21 1000 025 | 25 | 63/64" | 20,30 |
| 21 1000 008 | 8 | 5/16" | 8,85 | 21 1000 014 | 14 | 35/64" | 12,10 | 21 1000 020 | 20 | 25/32" | 15,25 | | | | |
| 21 1000 009 | 9 | 23/64" | 9,75 | 21 1000 015 | 15 | 19/32" | 12,90 | 21 1000 021 | 21 | 53/64" | 18,25 | | | | |
| 21 1000 010 | 10 | 25/64" | 9,95 | 21 1000 016 | 16 | 5/8" | 13,10 | 21 1000 022 | 22 | 55/64" | 18,45 | | | | |
| 21 1000 011 | 11 | 7/16" | 10,90 | 21 1000 017 | 17 | 43/64" | 14,10 | 21 1000 023 | 23 | 29/32" | 19,55 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Attention: The inch sizes do not correspond exactly to the mm diameters.

ZUSAMMENBAU · ASSEMBLY

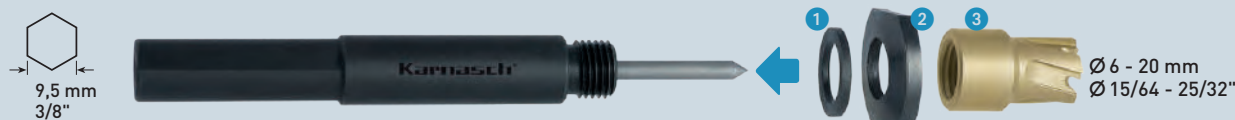
Halter Art. 21 0002 und Art. 21 0003 werden komplett mit allen Unterleg- und Distanzscheiben sowie passendem Inbusschlüssel geliefert
Arbor Art. 21 0002 and Art. 21 0003 are supplied with all washers, spacers and suitable allen key

21 0002
€ 13,20

Halter Arbor $\varnothing 6-20 \text{ mm}$

1 Flache Unterlegscheibe Flat washer
2 Konkave Distanzscheibe Concave spacer
3 Lochsäge Hole saw

Dieser Halter ist geeignet zum Lösen von punktgeschweißten Blechteilen. Die Frästiefe sowie Federdruck ist einstellbar.
This arbor is suitable for removing spot welds from sheet metal. Adjustable milling depth and spring force with setting screw.



Ersatzteile siehe Seite 531 · Spare parts see page 531

21 0003
€ 26,60

Halter Arbor $\varnothing 21-25 \text{ mm}$

1 Flache Unterlegscheibe Flat washer
2 Lochsäge Hole saw



Ersatzteile siehe Seite 531 · Spare parts see page 531

SET · SET

€ 305,55 21 2000



| Set Inhalt · Set content | Art. |
|---|--|
| 20 Stück · Pieces | |
| → $\varnothing 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25 \text{ mm}$ | |
| 1x Halter · Arbor $\varnothing 6-20 \text{ mm}$ | |
| 1x Halter · Arbor $\varnothing 21-25 \text{ mm}$ | |
| 1x Ersatz Auswerferstift für Halter 21 0002 Spare ejector pin for arbor 21 0002 | Auch separat erhältlich, siehe Seite 531 |
| 1x Ersatz Auswerferstift für Halter 21 0003 Spare ejector pin for arbor 21 0003 | |
| 1x Inbusschlüssel · Allen key | Also available separately, see page 531 |
| 1x Körner · Center punch | |

Anderer Inhalt auf Wunsch möglich · Other content possible

20 1481
€ 12,80

Leeres Set zum selbst bestücken.
Empty set to equip individually.



20 1500

BI-METALL COBALT

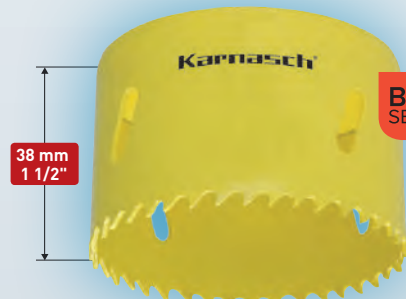
8%

Bi-Metall Cobalt 8% Lochsäge, Nutzlänge 38 mm
Bi-Metal Cobalt 8% hole saw, drill depth 38 mm | 1.1/2"



ANWENDUNG · APPLICATION

| | | | | | | | | | | |
|----------------|---|---|---|--|--|---|---|---|---|--|
| | | | | | | | | | | |
| Stahl Steel | Dünnebleche, Sandwich Material, Verbundstoffe Thin iron sheets, sandwich material, composites | Ne-Metall wie Alu, Mes- sing, Kupfer, Zinn Non ferrous metals like alu, copper, brass, tin | Weichholz, Hartholz, Exotenholz, Furniere Soft wood, hard wood, exotic wood, veneers | Leimholz, Tischler- und Furnier- sperrholz, Schichtholz- platten Bonded wood, blockboard and veneer plywood, laminated wood | Spanplatten, Hartfaser- platten, Pla- ten ohne Belag LDF, MDF, HDF Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Spanplatten, Hartfaser- platten, Kunststoff beschichtet/ furniert, MDF, HDF Chipboard, hard fibre board, plastic- coated/ veneered, MDF, HDF | Kunststoffe GFK/CFK Plastics GRP/CRP | Mineralwerk- stoff, Corian® Nobian® Hi-Macs® Staron® Rausolid® Mineral material Corian® Nobian® Hi-Macs® Staron® Rausolid® | HPL (Schicht- stoffplatten) Trespa® Resopal® HPL (High- Pressure- Laminat) Trespa® Resopal® | Faserzement- platte, Eternit® Stein-/Glas- wolle, Rockwool® Isover® Fibre cement panel, Eternit® mineral/ glass wool, Rockwool® Isover® |



BEST
SELLER

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|----------------|------|-------------|------|----------------|------|-------------|-------|----------------|-------|-------------|--------|----------------|-------|
| 20 1500 014 | • 14 | 9/16" | 3,25 | 20 1500 043 | • 43 | 1.11/16" | 6,25 | 20 1500 076 | • 76 | 3" | 9,80 | 20 1500 152 | • 152 | 6" | 20,25 |
| 20 1500 016 | • 16 | 5/8" | 3,25 | 20 1500 044 | • 44 | 1.3/4" | 6,40 | 20 1500 079 | • 79 | 3.1/8" | 10,00 | 20 1500 160 | • *160 | 6.5/16" | 23,50 |
| 20 1500 017 | • 17 | 43/64" | 3,35 | 20 1500 045 | • 45 | 1.49/64" | 6,50 | 20 1500 080 | • 80 | 3.1/8" | 9,85 | 20 1500 168 | • 168 | 6.5/8" | 24,65 |
| 20 1500 019 | • 19 | 3/4" | 3,45 | 20 1500 046 | • 46 | 1.13/16" | 6,55 | 20 1500 083 | • 83 | 3.1/4" | 10,60 | 20 1500 177 | • 177 | 6.31/32" | 26,80 |
| 20 1500 020 | • 20 | 25/32" | 3,60 | 20 1500 048 | • 48 | 1.7/8" | 6,60 | 20 1500 086 | • 86 | 3.3/8" | 10,90 | 20 1500 200 | • 200 | 7.7/8" | 28,90 |
| 20 1500 021 | • 21 | 53/64" | 3,65 | 20 1500 050 | • 50 | 1.31/32" | 6,80 | 20 1500 089 | • 89 | 3.1/2" | 11,25 | 20 1500 210 | • 210 | 8.17/64" | 34,70 |
| 20 1500 022 | • 22 | 7/8" | 3,80 | 20 1500 051 | • 51 | 2" | 6,95 | 20 1500 092 | • 92 | 3.5/8" | 11,65 | 20 1500 220 | • 220 | 8.21/32" | 40,85 |
| 20 1500 024 | • 24 | 15/16" | 3,85 | 20 1500 052 | • 52 | 2.3/64" | 7,10 | 20 1500 095 | • 95 | 3.3/4" | 12,20 | 20 1500 233 | • 233 | 9.11/64" | 50,70 |
| 20 1500 025 | • 25 | 1" | 4,00 | 20 1500 054 | • 54 | 2.1/8" | 7,40 | 20 1500 098 | • 98 | 3.7/8" | 12,70 | 20 1500 250 | • 250 | 9.27/32" | 55,05 |
| 20 1500 027 | • 27 | 1.1/16" | 4,15 | 20 1500 055 | • 55 | 2.11/16" | 7,50 | 20 1500 100 | • 100 | 3.15/16" | 13,05 | 20 1500 260 | • 260 | 10.15/64" | 61,70 |
| 20 1500 028 | • 28 | 1.7/64" | 4,35 | 20 1500 057 | • 57 | 2.1/4" | 7,60 | 20 1500 102 | • 102 | 4" | 13,30 | 20 1500 265 | • 265 | 10.7/16" | 63,95 |
| 20 1500 029 | • 29 | 1.9/64" | 4,50 | 20 1500 059 | • 59 | 2.21/64" | 7,75 | 20 1500 105 | • 105 | 4.9/64" | 13,60 | 20 1500 279 | • 279 | 11" | 69,90 |
| 20 1500 030 | • 30 | 1.3/16" | 4,75 | 20 1500 060 | • 60 | 2.3/8" | 7,80 | 20 1500 108 | • 108 | 4.1/4" | 14,15 | 20 1500 305 | • 305 | 12" | 77,30 |
| 20 1500 032 | • 32 | 1.1/4" | 4,95 | 20 1500 064 | • 64 | 2.1/2" | 7,95 | 20 1500 111 | • 111 | 4.3/8" | 14,70 | | | | |
| 20 1500 033 | • 33 | 1.19/64" | 5,10 | 20 1500 065 | • 65 | 2.9/16" | 8,05 | 20 1500 114 | • 114 | 4.1/2" | 14,95 | | | | |
| 20 1500 035 | • 35 | 1.3/8" | 5,35 | 20 1500 067 | • 67 | 2.5/8" | 8,70 | 20 1500 121 | • 121 | 4.3/4" | 15,70 | | | | |
| 20 1500 037 | • 37 | 1.29/64" | 5,60 | 20 1500 068 | • 68 | 2.43/64" | 8,80 | 20 1500 127 | • 127 | 5" | 17,05 | | | | |
| 20 1500 038 | • 38 | 1.1/2" | 5,70 | 20 1500 070 | • 70 | 2.3/4" | 9,05 | 20 1500 133 | • 133 | 5.15/64" | 17,80 | | | | |
| 20 1500 040 | • 40 | 1.37/64" | 5,95 | 20 1500 073 | • 73 | 2.7/8" | 9,50 | 20 1500 140 | • 140 | 5.1/2" | 18,50 | | | | |
| 20 1500 041 | • 41 | 1.5/8" | 6,05 | 20 1500 075 | • 75 | 2.61/64" | 9,75 | 20 1500 146 | • 146 | 5.3/4" | 19,30 | | | | |

* Ab Ø 160 mm nicht mehr empfohlen für Metalle · * From Ø 160 mm not recommended for metals

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.

Attention: The inch sizes do not correspond exactly to the mm diameters.

20 1500

BI-METALL COBALT

8%

ZUBEHÖR · ACCESSORIES

EIGENSCHAFTEN · PROPERTIES

BI-METALL Lochsägen sind die idealen Allround-Lochsägen für den Elektriker, Sanitär- und Heizungsbauer sowie Schlosser. Bohrt preiswert und schnell in Eisenbleche, NE-Metalle, Kunststoffe, Gipskarton und Hölzer. Halter mit Zentrierbohrer und Feder: Bei max. Schnitttiefe ist die Auswurfeder zu entfernen.

BI-METAL hole saws are the ideal all-round hole saws for electricians, plumbers, heating engineers and locksmiths. Drilling quickly and inexpensively in iron plates, non-ferrous metals, plastics, plasterboards and wood. Holder with center drill and spring: If drilling maximum cutting depth, please remove the ejector spring.

Für Durchmesser 35-305 mm mit neuem **Bohrkern-Schnellauswurfhalter**.

- Kein mühseliges entfernen des oftmals in der Lochsäge verbleibenden Bohrkerns.
- Zuverlässiger Auswurf aller Bohrkern **garantiert**.
- Selbst verklemmte/verkeilte Bohrkern werden zuverlässig ausgeworfen.
- Siehe Zubehör Halter Art. 20 1169 Seite 593

For diameter 35-305 mm with new **arbor for core quick-ejection**.

- No time-consuming removal of the core, which often remains in the hole saw.
- Reliable ejection of all cores **guaranteed**.
- Even jammed cores will be reliably ejected.
- See arbor art: 20 1169 page 593



Solide Grundplatte
Solid base plate

COBALT 8%

Verpackung + Anwendungsinformationen

Karnasch Bi-Metall-Lochsägen kommen in einer aufwendigen Hänge-Klarsichtverpackung. Alle Anwendungshinweise wie Schnittgeschwindigkeiten, Kühlung, Materialien, usw. sind auf der Verpackung klar ersichtlich.

Packaging + Application instructions

Karnasch bimetal hole saws are shipped in an elaborate see-through hanger package. All application instructions like cutting speeds, cooling, materials, etc., are clearly indicated on the packaging.



Zubehör für Bi-Metall Cobalt 8% Lochsäge, Nutzlänge 38 mm
 Accessories for Bi-Metal Cobalt 8% hole saw, drill depth 38 mm | 1.1/2"

BI-METALL COBALT 8% 20 1500

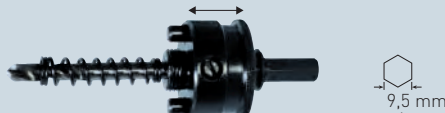
HALTER + PASSENDE HSS ZENTRIERBOHRER MIT AUSWURFFEDER
ARBOR + SUITABLE HSS CENTER DRILL WITH EJECTOR SPRING


Ø 14-30 mm 20 1509
€ 3,70

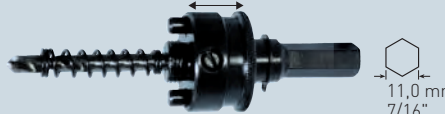
6,35 mm
1/4"


Ø 14-30 mm 20 1507
€ 4,05

9,5 mm
3/8"

Schnellwechsel · Quick-change 
Ø 32-210 mm 20 1503
€ 8,20

9,5 mm
3/8"


Schnellwechsel · Quick-change 
Ø 32-210 mm 20 1521
€ 8,30

11,0 mm
7/16"


Schwere Ausführung
 Heavy-duty model 
Ø 32-305 mm 20 1528
€ 19,85

Empfohlen ab Ø 100 mm
 Recommended from Ø 100 mm


11,0 mm
7/16"

Ohne Hammer-Funktion anwenden
 Do not use hammer-function 
Ø 14-30 mm 20 1510
€ 4,70


SDS PLUS

Ohne Hammer-Funktion anwenden
 Do not use hammer-function 
Ø 32-210 mm 20 1511
€ 9,10

SDS PLUS

HSS Ersatz-Zentrierbohrer · HSS spare center drill
 Passend für Halter Art. 20 1509 · Suitable for arbor Art. 20 1509 
20 1512
€ 2,40


6,35 × 105 mm

HSS Ersatz-Zentrierbohrer · HSS spare center drill
 Passend für Halter Art. 20 1503, 20 1507, 20 1521, 20 1528,
 20 1510, 20 1511 
20 1505
€ 1,55

Suitable for arbor Art. 20 1503, 20 1507, 20 1521, 20 1528, 20 1510, 20 1511

6,35 × 80 mm

Bohrer auch Hartmetall-bestückt erhältlich. Siehe Art. 21 0032, Seite 601
 Center drill also available in carbide-tipped. See Art. 21 0032, page 601

Ersatz-Auswurffeder für Zentrierbohrer 20 1512, 20 1505
 Spare ejector-spring for center drill 20 1512, 20 1505 
20 1506
€ 0,25

BOHRKERN-SCHNELLAUSWURF HALTER + PASSENDE HSS ZENTRIERBOHRER
HOLDER FOR CORE QUICK-EJECTION + SUITABLE HSS CENTER DRILL

Halter in Bohrfunktion · Arbor in drill function 
Ø 35-305 mm 20 1169
€ 20,85

9,5 mm
3/8"

Halter in Auswurfposition · Arbor in ejection-position 

HSS Ersatz-Zentrierbohrer · HSS spare center drill
 Passend für Halter Art. 20 1169 · Suitable for arbor Art. 20 1169 
20 1173
€ 1,55

6,35 × 80 mm

FUNKTIONSWEISE BOHRKERN-SCHNELL-AUSWURF HALTER · OPERATING MODE CORE QUICK-EJECTION HOLDER

20 1500

BI-METALL COBALT 8%

ZUBEHÖR · ACCESSORIES

Schnittdaten
Cutting data



1314

Film
Movie



593

1



2



3



4



5



6



7



8



9



Index

20 1500

BI-METALL COBALT 8%

Zubehör für Bi-Metall Cobalt 8% Lochsäge, Nutzlänge 38 mm
Accessories for Bi-Metal Cobalt 8% hole saw, drill depth 38 mm | 1.1/2"

FUNKTIONSWEISE BOHRKERN-SCHNELLAUSWURF HALTER · OPERATING MODE CORE QUICK-EJECTION HOLDER



- 1.) Aufnahmehalter in Ausgangsposition bringen (1)
 - 2.) Lochsäge auf Halter schrauben. Achtung! Lochsäge nur leicht anziehen. Der Gummiring schiebt sich sonst vor die Mitnehmerlöcher. Führungsstifte bis zur Nut (2) in Mitnehmerlöcher der Lochsäge drücken. Die Führungsstifte dürfen nicht in die Lochsäge hineinragen (3)
 - 3.) Bohren
 - 4.) Nach dem Bohrvorgang die Führungsstifte vorschieben um den Kern auszustößen (4)
- 1.) Bring the tool holder in the initial position (1)
 - 2.) Screw the hole saw onto the tool holder. Attention! Tight the hole saw just slightly. Otherwise the rubber ring gets into the ejector pin holes. Push the ejector pins until the groove (2), in the ejector pin holes of the hole saw. The ejector pins don't have to extend into the hole saw (3)
 - 3.) Drill
 - 4.) After drilling push the ejector pins forward to eject the core (4)

MORSEKONUSAUFNAHMEN + PASSENDE BOHRFUTTER MORSE TAPER + SUITABLE CHUCKS

MORSEKONUS · MORSE TAPER :2 20 1515
€ 17,00



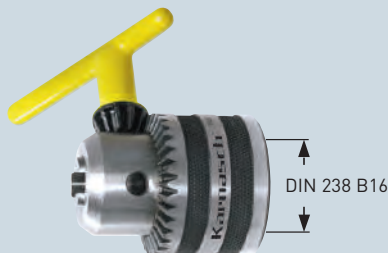
MORSEKONUS · MORSE TAPER :3 20 1524
€ 19,70



Schnellspannbohrfutter
Quick release chuck Ø 1-13 mm 20 1375
€ 53,30

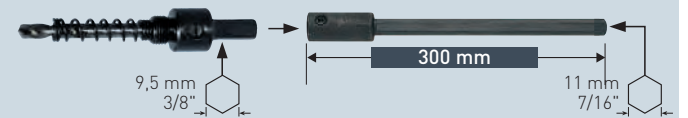


Spannfutter
Chuck Ø 1-13 mm 20 1525
€ 23,80

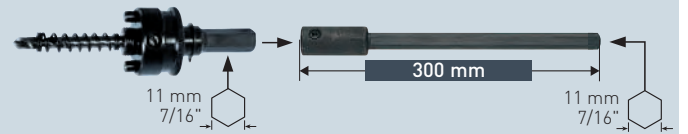


VERLÄNGERUNGEN EXTENSIONS 300 mm

Für Halter Art. 20 1507, 20 1503, 20 1169
For arbor Art. 20 1507, 20 1503, 20 1169 20 1522
€ 5,00



Für Halter Art. 20 1521 + 20 1528
For arbor Art. 20 1521 + 20 1528 20 1508
€ 4,85



RANDVERSENKER HARTMETALL-BESTÜCKT FÜR BI-METALL LOCHSÄGE 68 mm

RIM COUNTERSINK CARBIDE TIPPED FOR BI-METAL HOLE SAW 68 mm

Passend für Halter Art. 20 1503, 20 1521, 20 1528,
20 1169, 20 1511 20 1529
€ 19,25
Suitable for arbor Art. 20 1503, DIN 1521, 20 1528, 20 1169, 20 1511



Hartmetallzähne
Carbide teeth

Perfekt für den Einbau von
Gerätedosen in Holz, Gips-
karton und Ähnlichem.
Perfect assembly of sockets
in e.g. gypsum, plaster board,
wood and similar.

Ersatzschrauben zum Befestigen des Zentrierbohrers im Halter, siehe Seite 604 · Spare screws to fix the center drill into the arbor, see page 604

Zubehör für Bi-Metall Cobalt 8% Lochsäge, Nutzlänge 38 mm
Accessories for Bi-Metal Cobalt 8% hole saw, drill depth 38 mm | 1.1/2"

BI-METALL
COBALT

8%

20 1500

LOCHSÄGEN-SÄTZE • HOLE SAW SETS



20 1501
€ 63,30

Für Elektriker ·
For electricians
Ø 22, 29, 35, 44, 51, 64, 68 mm
Halter · Arbor
20 1507 / 20 1521

BEST
SELLER



20 1513
€ 67,40

Für Elektriker ·
For electricians
Ø 19, 22, 35, 68, 70, 76 mm
Halter · Arbor
20 1507 / 20 1521

BEST
SELLER



20 1514
€ 89,65

Für Elektriker ·
For electricians
Ø 16, 20, 22, 25, 29, 35, 44, 51,
64, 68, 76 mm
Halter · Arbor
20 1507 / 20 1521

BEST
SELLER



20 1502
€ 67,85

Sanitär-Satz ·
Plumbing set
Ø 19, 22, 29, 35, 38, 44, 51,
57, 64 mm
Halter · Arbor
20 1507 / 20 1521

BEST
SELLER



20 1516
€ 99,80

Sanitär + Elektro-Satz
Plumbing + electrical set
Ø 16, 19, 20, 22, 29, 35, 38, 40,
44, 51, 57, 65, 68 mm
Halter · Arbor
20 1507 / 20 1521

BEST
SELLER



20 1517
€ 72,85

Schlosser-Satz ·
Locksmith set
Ø 22, 24, 25, 27, 32, 35, 38, 44,
54, 60 mm
Halter · Arbor
20 1507 / 20 1521

BEST
SELLER



20 1504
€ 70,65

Universal-Standard
Ø 16, 19, 22, 29, 35, 44, 52, 57,
67 mm
Halter · Arbor
20 1507 / 20 1521

BEST
SELLER



20 1519
€ 86,15

Universal "Profi"
Ø 16, 19, 22, 25, 29, 32, 35, 38,
44, 51, 64, 76 mm
Halter · Arbor
20 1507 / 20 1521

BEST
SELLER



20 1520
€ 126,30

Universal "Royal"
Ø 16, 19, 20, 22, 24, 25, 27, 29,
30, 32, 35, 38, 40, 44, 51, 57, 60,
68, 76 mm
Halter · Arbor
20 1507 / 20 1521

BEST
SELLER

Weitere Sets auf Anfrage lieferbar. Alle Koffer auch ohne Inhalt lieferbar.
Preis auf Anfrage.

Other sets available on request. All sets also available without contents.
Price on request.

1



2



3



4



5



6



7



8



9



Index

20 1150

ALLROUND
ECO

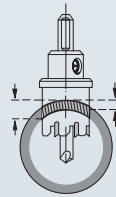
60

Hartmetall-bestückte Lochsäge, Nutzlänge 60 mm. Nur Lochsägekörper
Carbide tipped hole saw, drill depth 60 mm | 2.3/8". Hole saw body only



ANWENDUNG · APPLICATION

| | | | | | | | | |
|---|--|---|--|---|---|---|---|--|
| | | | | | | | | |
| Weichholz, Hartholz, Exotenh Holz, Furniere Soft wood, hard wood, exotic wood, veneers | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten Bonded wood, blockboard and veneer plywood, laminated wood | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Spanplatten, Hartfaserplatten, Kunststoff beschichtet/furniert, MDF, HDF Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF | Kunststoffe GFK/CFK Plastics GRP/CRP | Ne-Metall wie Alu, Messing, Kupfer, Zinn Non ferrous metals like alu, copper, brass, tin | Faserzementplatte, Eternit, Stein-/Glaswolle, Rockwool, Isover Fibre cement panel, Eternit, mineral glass wool, Rockwool, Isover | Mineralwerkstoff, Corian, Nobian, Hi-Macs, Staron, Rausolid Mineral material Corian, Nobian, Hi-Macs, Staron, Rausolid | HPL (Schichtstoffplatten) Trespa, Resopal HPL (High-Pressure-Laminat) Trespa, Resopal |



Ideal auch zum Bohren in Rohre
Also ideal for drilling into pipes



BEST SELLER

60 mm
2.3/8"

Schnittbreite
Cutting width
16-100 mm = 3,5 mm
102-127 mm = 4,0 mm

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|-------------|------|-------------|-------|
| 20 1150 019 | 19 | 3/4" | 7,30 | 20 1150 040 | 40 | 1.9/16" | 10,25 | 20 1150 070 | 70 | 2.3/4" | 16,60 | 20 1150 102 | 102 | 4" | 29,90 |
| 20 1150 022 | 22 | 7/8" | 7,40 | 20 1150 044 | 44 | 1.3/4" | 10,80 | 20 1150 073 | 73 | 2.7/8" | 16,90 | 20 1150 108 | 108 | 4.1/4" | 32,75 |
| 20 1150 025 | 25 | 1" | 7,65 | 20 1150 051 | 51 | 2" | 12,60 | 20 1150 076 | 76 | 3" | 18,85 | 20 1150 114 | 114 | 4.1/2" | 33,55 |
| 20 1150 027 | 27 | 1.1/16" | 7,90 | 20 1150 054 | 54 | 2.1/8" | 14,30 | 20 1150 079 | 79 | 3.1/8" | 19,95 | 20 1150 121 | 121 | 4.3/4" | 36,55 |
| 20 1150 030 | 30 | 1.3/16" | 8,05 | 20 1150 057 | 57 | 2.1/4" | 12,50 | 20 1150 083 | 83 | 3.1/4" | 20,85 | 20 1150 127 | 127 | 5" | 37,30 |
| 20 1150 032 | 32 | 1.1/4" | 9,60 | 20 1150 060 | 60 | 2.3/8" | 15,25 | 20 1150 089 | 89 | 3.1/2" | 21,65 | | | | |
| 20 1150 035 | 35 | 1.3/8" | 9,90 | 20 1150 064 | 64 | 2.1/2" | 15,60 | 20 1150 092 | 92 | 3.5/8" | 23,60 | | | | |
| 20 1150 038 | 38 | 1.1/2" | 10,15 | 20 1150 068 | 68 | 2.11/16" | 16,50 | 20 1150 095 | 95 | 3.3/4" | 24,25 | | | | |

Zähnezahl: Ø 19-30=1 / 32-50=2 / 51-74=3 / 76-98=4 / 102-114=5 / 121=6 · Weitere Abmessungen auf Anfrage
Number of teeth: Ø 19-30=1 / 32-50=2 / 51-74=3 / 76-98=4 / 102-114=5 / 121=6 · Further dimensions on request

20 1150

ALLROUND
ECO

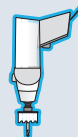
60

ZUBEHÖR · ACCESSORIES

EIGENSCHAFTEN · PROPERTIES

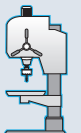
Handmaschinen · Handheld machines

| | | | |
|---------------------------------|--------|-----------------------------------|--|
| Maximal empfohlener Ø | 127 mm | Maximum recommended Ø | |
| Maximal empfohlene Schnitttiefe | 60 mm | Maximum recommended cutting depth | |
| Maximal mögliche Schnitttiefe | 60 mm | Maximum possible cutting depth | |



Stationäre Maschinen
Stationary machines

| | | | |
|---------------------------------|--------|-----------------------------------|--|
| Maximal empfohlener Ø | 127 mm | Maximum recommended Ø | |
| Maximal empfohlene Schnitttiefe | 60 mm | Maximum recommended cutting depth | |
| Maximal mögliche Schnitttiefe | 60 mm | Maximum possible cutting depth | |



ECO-Wenigzahn-Ausführung

(Vielzahn-Ausführung siehe Art. 20 1121 Seite 582-583)
Für Durchmesser 38-127 mm mit neuem **Bohrkern-Schnell-auswurfhalter**.
→ Kein mühseliges entfernen des oftmals in der Lochsäge verbleibenden Bohrkerns.
→ Zuverlässiger Auswurf aller Bohrkern **garantiert**.
→ Selbst verklemmte/verkeilte Bohrkern werden zuverlässig ausgeworfen.
→ Siehe Zubehör Halter Art. 20 1166 Seite 597

Für besonders schwere Arbeiten empfehlen wir ab 35 mm unseren HEAVY-DUTY Halter Art.: 20 1159
Bohrkern-Auswurf erfolgt über Feder am Zentrierbohrer.

Die ideale preiswerte „ALLROUND“ Lochsäge für:

- Elektriker
- Bauhandwerk
- Zimmereien
- Sanitär- und Heizungsbauer
- Möbeltischlereien
- Treppen- und Küchenstudios usw...

Anwendungshinweis:

Bei Vollmaterial, Ne-Metalle über 15 mm ist je nach Spanverlauf ggf. mehrfaches Absetzen und Entfernen der Späne notwendig. Bei maximalen Schnitttiefen ist die Auswurfeder zu entfernen. Verwenden Sie bei allen Metallen gutes Schneidöl (siehe ab Seite 1143).

Eco-low teeth model

(High teeth model see article 20 1121 page 582-583)
Für diameter 38-127 mm with new **arbor for core quick-ejection**.
→ No time-consuming removal of the core, which often remains in the hole saw.
→ Reliable ejection of all cores **guaranteed**.
→ Even jammed cores will be reliable ejected.
→ See arbor art: 20 1166 page 597

For heavy works we recommend up to 35 mm our HEAVY-DUTY arbor art: 20 1159
Core will be carried by a spring on the center drill.

The ideal "ALLROUND" hole saw for:

- Electrician
- Carpenters and cabinet makers
- Furniture makers
- Plumber and heating engineers
- Construction site applications
- Stairway and kitchen studios and similar...

For drilling almost all materials in coarse cut (see application)

Application note:

For solid non-ferrous metal over 15 mm it may be necessary (depending on the chip flow) to lift the drill and remove the chips several times. If drilling maximum cutting depth please remove the ejector spring. Use only good cutting oil. For metal (see from page 1143).

Schnittdaten
Cutting data

Film
Movie



1313

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index


Zubehör für Hartmetall-bestückte Lochsäge, Nutzlänge 60 mm
Accessories for carbide tipped hole saw, drill depth 60 mm | 2.3/8"


ALLROUND
ECO

60


20 1150


HALTER + PASSENDE HSS ZENTRIERBOHRER MIT AUSWURFFEDER
ARBOR + SUITABLE HSS CENTER DRILL WITH EJECTOR SPRING


Ø 19-37 mm 20 1167
€ 5,20


 9,5 mm
 3/8"


Schwere Ausführung
 Heavy-duty model


Ø 38-127 mm 20 1159
€ 21,20



 11,0 mm
 7/16"

HSS Ersatz-Zentrierbohrer ·
 HSS spare center drill 20 1171
€ 2,00

Passend für Halter Art. 20 1167, 20 1159 ·
 Suitable for Arbor Art. 20 1167, 20 1159



 6,35 × 95 mm

Ersatz-Auswurffeder
 Spare ejector-spring 20 1506
€ 0,25





BOHRKERN-SCHNELLAUSWURF HALTER + PASSENDE HSS ZENTRIERBOHRER
HOLDER FOR CORE QUICK-EJECTION + SUITABLE HSS CENTER DRILL

Halter in Bohrfunktion · Arbor in drill function Ø 38-127 mm 20 1166
€ 22,75




Halter in Auswurfposition · Arbor in ejection-position





 9,5 mm
 3/8"


HSS Ersatz-Zentrierbohrer · HSS spare center drill 20 1170
€ 1,80


Passend für Halter Art. 20 1166 ·
 Suitable for Arbor Art. 20 1166

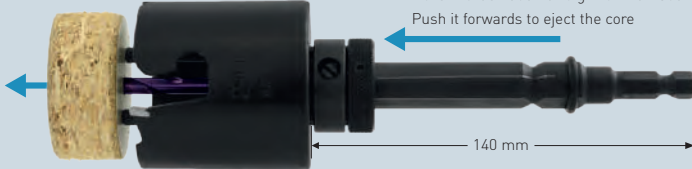

 6,35 × 95 mm

FUNKTIONSWEISE BOHRKERN-SCHNELLAUSWURF HALTER · OPERATING MODE CORE QUICK-EJECTION HOLDER

1. 

2. 
Nut / Groove

3. 

4. 
Durch vorschieben erfolgt Bohrkernauswurf
Push it forwards to eject the core
140 mm

- 1.) Aufnahmehalter in Ausgangsposition bringen (1)
- 2.) Lochsäge auf Halter schrauben. Achtung! Lochsäge nur leicht anziehen. Der Gummiring schiebt sich sonst vor die Mitnehmerlöcher. Führungsstifte bis zur Nut (2) in Mitnehmerlöcher der Lochsägekörpers schieben. Die Führungsstifte dürfen nicht in die Lochsäge hineinragen (3)
- 3.) Bohren
- 4.) Nach dem Bohrvorgang die Führungsstifte vorschieben um den Kern auszustoßen (4)

- 1.) Bring the tool holder in the initial position (1)
- 2.) Screw the hole saw onto the tool holder. Attention! Tight the hole saw just slightly. Otherwise the rubber ring gets into the ejector pin holes. Push the ejector pins until the groove (2), in the ejector pin holes of the hole saw. The ejector pins don't have to extend into the hole saw (3)
- 3.) Drill
- 4.) After drilling push the ejector pins forward to eject the core (4)

Schnittdaten
Cutting data



1313

Film
Movie



597

20 1150

ALLROUND
ECO 60

Zubehör für Hartmetall-bestückte Lochsäge, Nutzlänge 60 mm
Accessories for carbide tipped hole saw, drill depth 60 mm | 2.3/8"

MORSEKONUSAUFNAHMEN + PASSENDE BOHRFUTTER
MORSE TAPER + SUITABLE CHUCKS

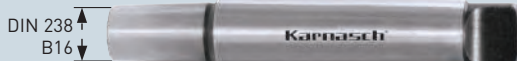
MORSEKONUS · MORSE TAPER :2

20 1515
€ 17,00



MORSEKONUS · MORSE TAPER :3

20 1524
€ 19,70



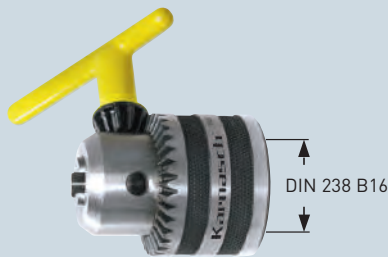
Schnellspannbohrfutter
Quick release chuck

Ø 1-13 mm 20 1375
€ 53,30



Spannfutter
Chuck

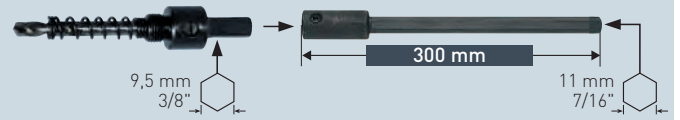
Ø 1-13 mm 20 1525
€ 23,80



VERLÄNGERUNGEN
EXTENSIONS 300 mm

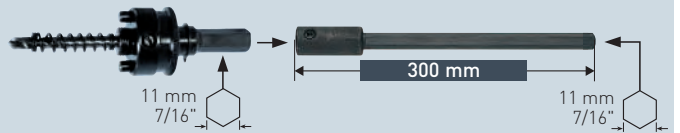
Für Halter Art. 20 1167, 20 1166
For arbor Art. 20 1167, 20 1166

20 1522
€ 5,00



Für Halter Art. 20 1159
For arbor Art. 20 1159

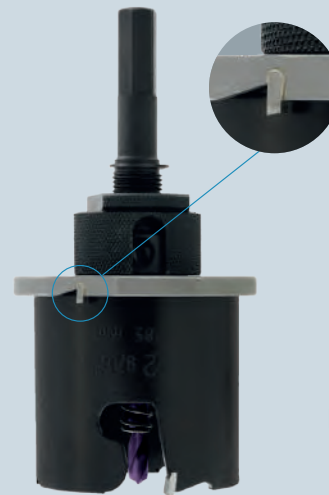
20 1508
€ 4,85



RANDVERSENKER HARTMETALL-BESTÜCKT FÜR
ALLROUND 60 ECO LOCHSÄGE 68 mm
RIM COUNTERSINK CARBIDE TIPPED FOR
ALLROUND 60 ECO HOLE SAW 68 mm

Passend für Halter Art. 20 1159, 20 1166
Suitable for arbor Art. 20 1159, 20 1166

20 1529
€ 19,25



Hartmetallzähne
Carbide teeth

Perfekt für den Einbau von
Gerätedosen in Holz, Gips-
karton und Ähnlichem.
Perfect assembly of sockets
in e.g. gypsum, plaster board,
wood and similar.



Ersatzschrauben zum Befestigen des Zentrierbohrers im Halter, siehe Seite 604 · Spare screws to fix the center drill into the arbor, see page 604

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

RANDVERSENKER
für Lochsägen 68 mm
siehe Seite 594 + 598

RIM COUNTERSINK
for hole saws 68 mm
see page 594 + 598



In nur einem Arbeitsgang bohren und senken.
Für den bündigen Einbau von Gerätedosen.

In just one operation drilling and sinking
for flush mounting sockets.



1



2



3



4



5



6



7



8



9

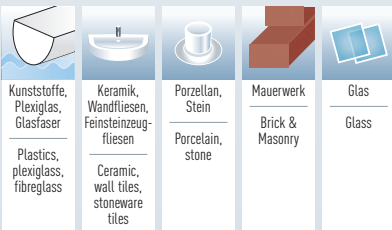
21 1500

DIAMOND GRIT

Diamant-bestreute Lochsäge, Nutzlänge 38 mm
Diamond-grit hole saw, drill depth 38 mm | 1.1/2"



ANWENDUNG · APPLICATION



| | | | | |
|---|---|---------------------|--------------------|-------|
| Kunststoffe, Plexiglas, Glasfaser | Keramik, Wandfliesen, Feinsteinzeug- fliesen | Porzellan, Stein | Mauerwerk | Glas |
| Plastics, plexiglass, fibreglass | Ceramic, wall tiles, stoneware tiles | Porcelain, stone | Brick & Masonry | Glass |



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € | Art. | Ø mm | Ø Zoll Inch | € |
|-----------------|------|----------------|-------|-----------------|------|----------------|-------|-----------------|------|----------------|-------|-----------------|------|----------------|--------|
| 21 1500 014 | 14 | 9/16" | 10,70 | 21 1500 035 | 35 | 1.3/8" | 26,05 | 21 1500 057 | 57 | 2.1/4" | 42,25 | 21 1500 095 | 95 | 3.3/4" | 79,25 |
| 21 1500 016 | 16 | 5/8" | 12,15 | 21 1500 037 NEW | 37 | 1.7/16" | 27,50 | 21 1500 059 NEW | 59 | 2.5/16" | 42,90 | 21 1500 098 NEW | 98 | 3.7/8" | 80,70 |
| 21 1500 018 NEW | 18 | 11/16" | 10,90 | 21 1500 038 | 38 | 1.1/2" | 28,30 | 21 1500 060 | 60 | 2.3/8" | 44,45 | 21 1500 102 | 102 | 4" | 85,05 |
| 21 1500 019 NEW | 19 | 3/4" | 11,90 | 21 1500 040 NEW | 40 | 1.9/16" | 29,30 | 21 1500 064 NEW | 64 | 2.1/2" | 46,50 | 21 1500 105 NEW | 105 | 4.1/8" | 86,60 |
| 21 1500 020 | 20 | 25/32" | 15,10 | 21 1500 041 | 41 | 1.5/8" | 30,50 | 21 1500 065 | 65 | 2.9/16" | 48,15 | 21 1500 108 NEW | 108 | 4.1/4" | 89,05 |
| 21 1500 021 NEW | 21 | 13/16" | 15,85 | 21 1500 043 NEW | 43 | 1.11/16" | 31,45 | 21 1500 067 NEW | 67 | 2.5/8" | 48,70 | 21 1500 111 NEW | 111 | 4.3/8" | 91,50 |
| 21 1500 022 | 22 | 7/8" | 16,55 | 21 1500 044 NEW | 44 | 1.3/4" | 32,20 | 21 1500 068 | 68 | 2.43/64" | 50,35 | 21 1500 114 | 114 | 4.1/4" | 95,05 |
| 21 1500 024 NEW | 24 | 15/16" | 18,00 | 21 1500 045 | 45 | 1.49/64" | 34,15 | 21 1500 070 | 70 | 2.3/4" | 53,50 | 21 1500 121 NEW | 121 | 4.3/4" | 99,65 |
| 21 1500 025 | 25 | 1" | 18,75 | 21 1500 046 NEW | 46 | 1.13/16" | 34,75 | 21 1500 073 | 73 | 2.7/8" | 55,75 | 21 1500 127 | 127 | 5" | 106,05 |
| 21 1500 027 NEW | 27 | 1.1/16" | 20,15 | 21 1500 048 | 48 | 1.7/8" | 35,60 | 21 1500 076 | 76 | 3" | 58,05 | 21 1500 133 | 133 | 5.15/64" | 112,25 |
| 21 1500 028 | 28 | 1.7/64" | 21,70 | 21 1500 050 | 50 | 1.31/32" | 37,85 | 21 1500 079 | 79 | 3.1/8" | 60,40 | 21 1500 140 | 140 | 5.1/2" | 116,80 |
| 21 1500 029 NEW | 29 | 1.9/64" | 22,35 | 21 1500 051 NEW | 51 | 2" | 38,50 | 21 1500 083 | 83 | 3.1/4" | 63,45 | 21 1500 146 | 146 | 5.3/4" | 121,75 |
| 21 1500 030 | 30 | 1.3/16" | 22,40 | 21 1500 052 NEW | 52 | 2.1/16" | 39,20 | 21 1500 086 | 86 | 3.3/8" | 65,70 | 21 1500 152 | 152 | 6" | 126,75 |
| 21 1500 032 | 32 | 1.1/4" | 23,90 | 21 1500 054 | 54 | 2.1/8" | 40,05 | 21 1500 089 | 89 | 3.1/2" | 67,95 | | | | |
| 21 1500 033 NEW | 33 | 1.5/16" | 24,50 | 21 1500 055 NEW | 55 | 2.3/16" | 40,80 | 21 1500 092 | 92 | 3.5/8" | 76,75 | | | | |

Achtung: Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern · Attention: The inch sizes do not correspond exactly to the mm diameters

21 1500

DIAMOND GRIT

ZUBEHÖR · ACCESSORIES

EIGENSCHAFTEN · PROPERTIES

Schwere Ausführung mit solider Grundplatte

(Für ein Mehr an Stabilität sowie größerer Rundlauf- und Seitenschlagsgenauigkeit)

Die ideale Lochsäge für Bohrungen in schwierigsten, harten sowie abrasiven Materialien wie:

- Glasfaserverstärkte / Kohlefaserverstärkte Kunststoffe (GFK /CFK)
- Härteste keramische Fliesen
- Alle Sorten von Stein
- Porzellan
- Alle Sorten von Mauerwerk
- Glas

Heavy construction with solid base plate

(Gives a higher stability as well as concentric running exactness)

The ultimate hole saw for hard-to-cut materials such as:

- Glass fiber reinforced plastics / carbon fiber reinforced plastics (GRP / CRP)
- Hardest-ceramic tiles
- All kinds of stones
- Porcelain
- All types of masonry
- Glass

Anwendungshinweis:

Aufnahmen Art. 21 0026 Ø 14-30 mm sowie Art. 21 0030 Ø 14-30 mm werden mit dem langen Zentrierbohrer 6,35 × 80 mm Art. 21 0032 geliefert.

Dieser 80 mm lange Zentrierbohrer überragt die Lochsagen mit den Durchmessern:

- Ø 14-16 mm ca. 5 mm
- Ø 20-30 mm ca. 14 mm

(siehe Bild 1)

Application note:

Arbor Art. 21 0026 Ø 14-30 mm and arbor Art. 21 0030 Ø 14-30 mm comes with the long center drill (6,35 × 80 mm) Art. 21 0032.

This 80 mm long center drill rises above the hole saws with diameters:

- Ø 14-16 mm approx. 5 mm
- Ø 20-30 mm approx. 14 mm

(see picture 1)

Bei harten Materialien wie Fliesen, Porzellan, Stein usw. empfehlen wir daher bei Lochsagen Ø 20-30 mm den **kürzeren** Zentrierbohrer zu verwenden. Artikel 21 0046, Länge 70 mm.

Unbedingt empfehlenswert bei Fußbodenfliesen um ggf. die Fußboden-Heizungsschleifen mit dem längeren Zentrierbohrer nicht zu beschädigen. Aufnahmen Ø 32-152 mm kommen bereits mit dem kürzeren Zentrierbohrer (Art. 21 0046)

(siehe Bild 2)

For hard materials such as ceramic, porcelain, tiles, stone etc. do we therefore recommend from hole saw Ø 20-30 mm the **shorter** center drill article 21 0046, length 70 mm.

Highly recommended for drilling in floor tiles with underneath floor heating loops. The longer center drill could damage the heating loops. Arbor Ø 32-152mm comes already with the shorter center drill (Art. 21 0046)

(see picture 2)

Die Zentrierbohrer müssen nur zu Beginn des Bohrvorgangs verwendet werden. Nachdem die Lochsäge ca. 1 mm in das Material vorgedrungen ist, kann der Zentrierbohrer entfernt werden. Um übermäßige Hitzeentwicklung zu vermeiden, sollte mit Wasser gekühlt werden.


The center drill must be used only at the start of the drilling operation. After the hole saw has cut about 1 mm into the material, the center drill can be removed. Use water as a coolant to prevent heat build up on the cutting surface.

Zubehör für Diamant-bestreute Lochsäge, Nutzlänge 38 mm
Accessories for Diamond-grit hole saw, drill depth 38 mm | 1.1/2"

DIAMOND GRIT 

21 1500

Halter + passende Hartmetall-bestückte Zentrierbohrer mit Auswurffeder
Arbor + suitable carbide tipped center drill with ejector spring

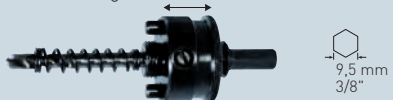
 **Ø 14-30 mm** **21 0026**
• € 5,70



9,5 mm
3/8"

Schnellwechsel · Quick-change

 **Ø 32-152 mm** **21 0027**
• € 10,35



9,5 mm
3/8"

Schnellwechsel · Quick-change

 **Ø 32-152 mm** **21 0028**
• € 10,00



11,0 mm
7/16"

Schwere Ausführung
Heavy-duty model

 **Ø 32-152 mm** **21 0029**
• € 18,40



11,0 mm
7/16"


Ohne Hammer-Funktion anwenden
Do not use hammer-function

 **Ø 14-30 mm** **21 0030**
• € 6,80



SDS PLUS

Ohne Hammer-Funktion anwenden
Do not use hammer-function

 **Ø 32-152 mm** **21 0031**
• € 10,80



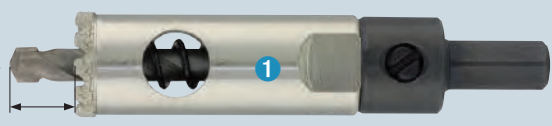
SDS PLUS

Ersatz-Zentrierbohrer Hartmetall-bestückt
Spare center drill carbide-tipped

 **21 0032**
• € 3,95



6,35 × 80 mm



Ø 14-16 ≈ 5 mm
Ø 20-30 ≈ 14 mm

Ersatz-Zentrierbohrer Hartmetall-bestückt
Spare center drill carbide-tipped

 **21 0046**
• € 4,45



6,35 × 70 mm

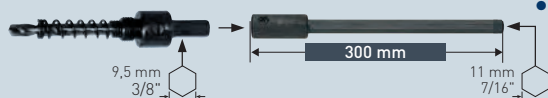


Ø 14-16 = Nicht möglich · Not possible
Ø 20-30 ≈ 5 mm
Ø 32-152 ≈ 9 mm

VERLÄNGERUNGEN
EXTENSIONS **300 mm**

Für Halter · For arbor: Art. 21 0026 + 21 0027

 **20 1522**
• € 5,00

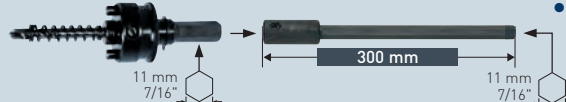


9,5 mm
3/8"

11 mm
7/16"

Für Halter · For arbor: Art. 21 0028 + 21 0029

 **20 1508**
• € 4,85



11 mm
7/16"

11 mm
7/16"

MORSEKONUSAUFNAHMEN + PASSENDE BOHRFUTTER
MORSE TAPER + SUITABLE CHUCKS

MORSEKONUS · MORSE TAPER :2

 **20 1515**
• € 17,00



DIN 238 B16

MORSEKONUS · MORSE TAPER :3

 **20 1524**
• € 19,70



DIN 238 B16

Schnellspannbohrfutter
Quick release chuck

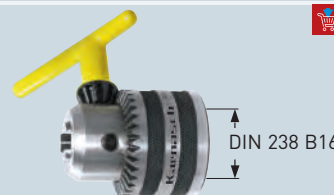
 **Ø 1-13 mm** **20 1375**
• € 53,30



DIN 238 B16

Spannfutter
Chuck

 **Ø 1-13 mm** **20 1525**
• € 23,80



DIN 238 B16

Ersatz-Auswurffeder
Spare ejector-spring

 **20 1506**
• € 0,25



Index

Schnittdaten
Cutting data



1316

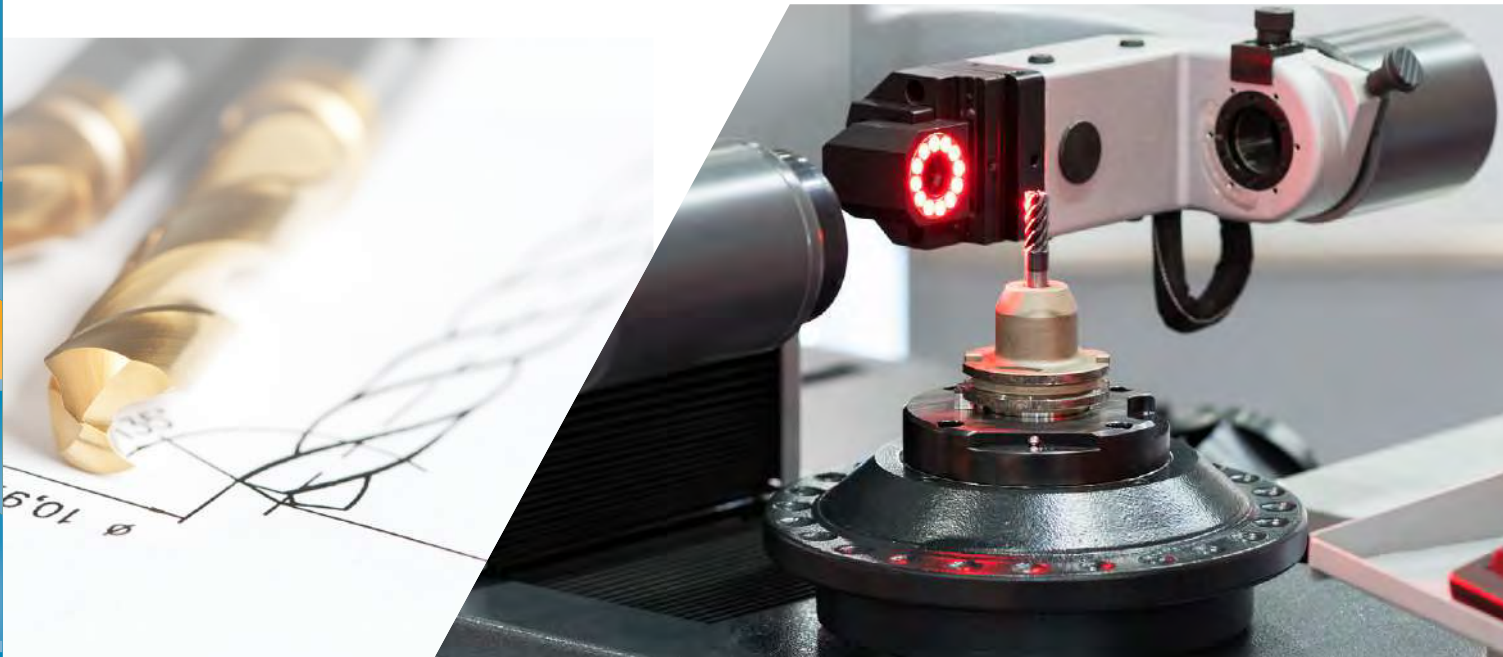
Film
Movie



601

Programmerweiterung im Online Blätterkatalog

New range in the online catalog



DIAMOND GRIT



Lochsägen Hole saws

ONLINE
KATALOG



Wir arbeiten aktuell an einer Programmerweiterung der Dia-Grit Lochsägen. In Kürze werden diese im Online Blätterkatalog verfügbar sein.

We are currently expanding our range of Dia-Grit hole saws. They will soon be available in our online catalogue.



1



2



3



4



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6



7



8



9



Programmerweiterung im Online Blätterkatalog

New range in the online catalog



DIAMOND GRIT



Lochsägen Hole saws

ONLINE
KATALOG

ONLINE
CATALOG



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We are currently expanding our range of Dia-Grit hole saws. They will soon be available in our online catalogue.



1



2



3



4



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6



7



8



9



Index

ERSATZSCHRAUBEN ZUM BEFESTIGEN DES ZENTRIERBOHRERS IM HALTER
SPARE SCREWS TO FIX THE CENTER DRILL INTO THE ARBOR

| Ø mm | Für Halter For Arbor | ART. | € |
|---------|-------------------------|---------|--------|
| M6 x 10 | 20 1503 | 20 1455 | • 0,10 |
| M8 x 6 | 20 1507 | 20 1340 | • 0,10 |
| M8 x 6 | 20 1509 | 20 1340 | • 0,10 |
| M8 x 6 | 20 1510 | 20 1340 | • 0,10 |
| M6 x 10 | 20 1511 | 20 1455 | • 0,10 |
| M6 x 10 | 20 1521 | 20 1455 | • 0,10 |
| M6 x 10 | 20 1528 | 20 1455 | • 0,10 |
| M8 x 6 | 21 0026 | 20 1340 | • 0,10 |
| M6 x 10 | 21 0027 | 20 1455 | • 0,10 |
| M6 x 10 | 21 0028 | 20 1455 | • 0,10 |
| M6 x 10 | 21 0029 | 20 1455 | • 0,10 |
| M8 x 6 | 21 0030 | 20 1340 | • 0,10 |
| M6 x 10 | 21 0031 | 20 1455 | • 0,10 |

ERSATZTEILE FÜR SCHAFTSYSTEM POWER-DRILL 4000
SPARE PARTS FOR SHANK SYSTEM POWER-DRILL 4000



Ersatz-Auswurffedern
Spare ejector springs

| Für Halter · For shank | Feder · Spring | € |
|-------------------------------|----------------|--------|
| Art. 20 1526 · Seite/Page 568 | 20 1464 | • 0,50 |
| Art. 20 1530 · Seite/Page 572 | 20 1467 | • 0,50 |
| Art. 20 1532 · Seite/Page 580 | 21 0041 | • 0,50 |

Film
Movie



STUFENBOHRER · BLECHSCHÄLBOHRER

STEP DRILLS · TUBE AND SHEET DRILLS



2.6

KONTAKT | CONTACT

KARNASCH PROFESSIONAL TOOLS[®]
INDUSTRIAL TOOLS DIVISION

Straße des Friedens 10
D-15848 Tauche/OT Görzdorf
mail@karnasch.tools

+49 (0) 33675 - 7265-0

KARNASCH ONLINESHOP

JETZT FÜR SIE ONLINE!
NOW ONLINE FOR YOU!

<http://shop.karnasch.tools>

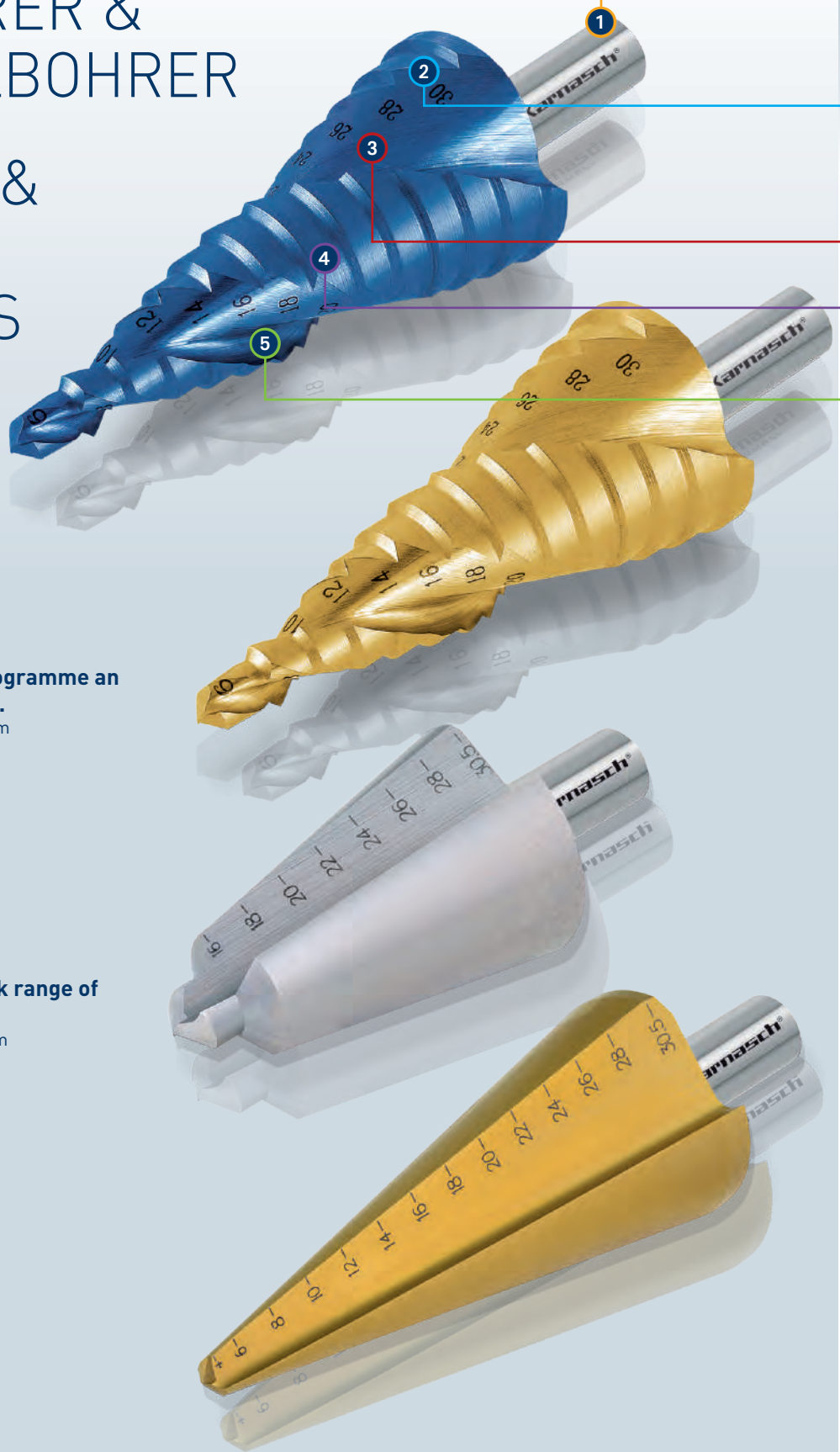


ONLINE



STUFENBOHRER & BLECHSCHÄLBOHRER

STEP DRILLS & TUBE AND SHEET DRILLS



Eines der umfangreichsten Lagerprogramme an Stufenbohrern & Blechschälbohrern.

- Erhältlich in den Durchmessern von 4-60 mm
- In 2 und 3 Schneiden
- Spiral genutet oder gerade genutet
- CBN-geschliffen
- BLUE-DUR oder TiN-GOLD-beschichtet

One of the most comprehensive stock range of step drills & tube and sheet drills.

- Available in diameters ranging from 4-60 mm
- In 2 and 3-cutting
- Spiral fluted or straight fluted
- CBN ground
- BLUE-DUR or TiN-GOLD-coated



EIGENSCHAFTEN · PROPERTIES

- 1** 3-Flächenschaft ergibt:
 - Hervorragende Drehmomentübertragung
 - Kein Durchrutschen im Bohrfutter
 - Somit deutlich höhere Schnittleistung
- 2** Alle Stufenbohrer & Blechschälbohrer erhältlich in der patentierten BLUE-DUR-Beschichtung oder in TiN-GOLD-Beschichtung. Beschichtungen erhöhen signifikant die Standzeiten. Unbedingt empfehlenswert bei schwierigen Materialien wie Edelstähle und bei Bohrungen ohne Kühlschmierstoffe.
- 3** Alle Stufenbohrer & Blechschälbohrer kommen mit eingelasierten Durchmessern in der Spirale.
- 4** Alle Stufenbohrer & Blechschälbohrer sind aus hochlegierten HSS-XE Stahl gefertigt für eine Härte bis zu 68 HRC. Dies ergibt höchste Verschleissfestigkeit und Standzeit.
- 5** Stufenbohrer & Blechschälbohrer sind auch Spiral-genutet lieferbar.
 - Ruhiges Schneidverhalten
 - Kein Verhaken im Material
 - Geringere Zerspanungskräfte
 - Weniger Gratbildung
 - Höhere Standzeiten

Selbstverständlich sind alle Stufenbohrer/Blechschälbohrer aus dem vollen Material CBN geschliffen.

- 1** 3-Flat shank for:
 - Excellent torque transmission
 - No slippage in the drill chuck
 - This results to superior cutting output
- 2** All step drills & sheets drills are available in the patented BLUE-DUR or TiN-GOLD-coating. Coatings significantly increase the service life. Strongly recommended for difficult materials such as stainless steels and if drilling without coolants.
- 3** All step drills & sheet drills comes lasered with diameters in the spiral.
- 4** All step drills & sheet drills are made of high-alloy steel HSS-XE for a hardness up to 68 HRC. This results in high wear resistance and service life.
- 5** Step drills & sheet drills are also available spiral-fluted for:
 - Smooth cutting behavior
 - No sticking in the material
 - Low cutting forces
 - less burrs on the work piece
 - longer service life

Of course, all step drills & sheet drills are CBN ground from solid material.

1



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ANWENDUNG · APPLICATION

| | | | | | | | | | | | |
|---------|----------|----------|-----------|-----------|----------|----------|-----------------------|---------------------|----------------|--|------------|
| | | | | | | | | | | | |
| Stahl | Stahl | Stahl | Edelstahl | Edelstahl | Alu | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Grauguss | Hastelloy, Inconel, Nimonic, Exotische Materialien | Hardox 400 |
| Steel | Steel | Steel | Stainless | Stainless | Alu | Alu | Copper, brass, tin | Plastics GRP/CRP | Grey cast iron | Hastelloy, Inconel, Nimonic, exotic materials | Hardox 400 |
| < 900 N | < 1100 N | < 1400 N | < 900 N | > 900 N | < 10% Si | > 10% Si | | | | | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL · OPTIMAL

✓ GUT · GOOD

✓ MÖGLICH · POSSIBLE

STUFENBOHRER · STEP DRILLS

2 SCHNEIDEN
2 CUTTING



SPIRAL-GENUTET
MIT KREUZANSCHLIFF
SPIRAL-FLUTED
WITH SPLIT POINT



3 SCHNEIDEN
3 CUTTING



SPIRAL-GENUTET
MIT KREUZANSCHLIFF
SPIRAL-FLUTED
WITH SPLIT POINT



2 SCHNEIDEN
2 CUTTING



GERADE GENUTET MIT
KREUZANSCHLIFF
STRAIGHT FLUTED
WITH SPLIT POINT



20 1447 | **20 1447U**



610

**BEST
SELLER**

21 3001 | **21 3004**



611

**BEST
SELLER**

21 3033 | **21 3030**



616

**BEST
SELLER**

20 1448 | **20 1448U**



610

**BEST
SELLER**

21 3002 | **21 3005**



611

**BEST
SELLER**

21 3034 | **21 3031**



616

**BEST
SELLER**

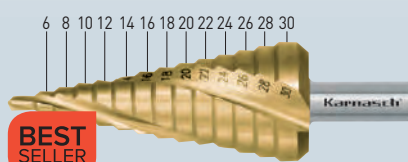
20 1449 | **20 1449U**



610

**BEST
SELLER**

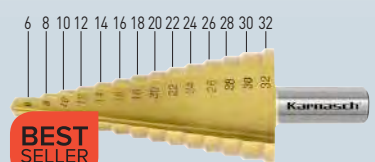
21 3003 | **21 3006**



611

**BEST
SELLER**

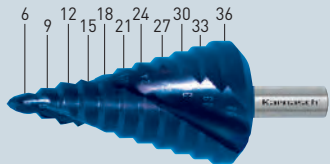
21 3035 | **21 3032**



616

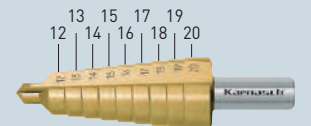
**BEST
SELLER**

20 1450 | **20 1450U**



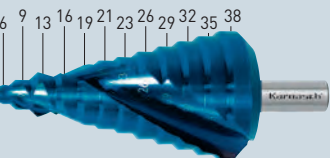
613

21 3009 | **21 3012**



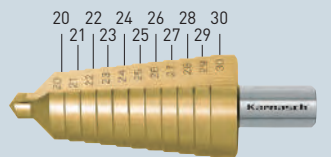
616

20 1470 | **20 1470U**



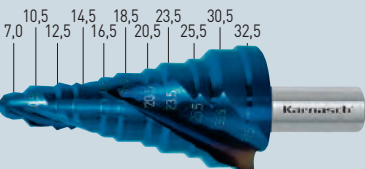
613

21 3010 | **21 3013**



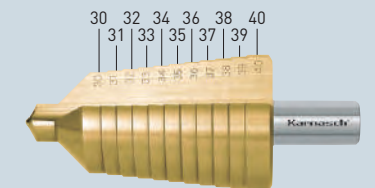
617

20 1471 | **20 1471U**



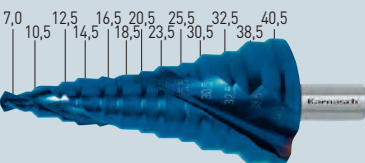
615

21 3011 | **21 3014**



617

20 1451 | **20 1451U**



615

Fortsetzung 2 Schneiden Ø 40-50 mm /
50-60 mm siehe nächste Seite
Continuation 2 cutting Ø 40-50 mm /
50-60 mm see next page

BLECHSCHÄLBOHRER · TUBE AND SHEET DRILLS

2 SCHNEIDEN
2 CUTTING



GERADE GENÜTET MIT
KREUZANSCHLIFF
STRAIGHT FLUTED WITH
SPLIT POINT



2 SCHNEIDEN
2 CUTTING



SPIRAL-GENÜTET MIT
KREUZANSCHLIFF
SPIRAL-FLUTED WITH
SPLIT POINT



2 SCHNEIDEN
2 CUTTING

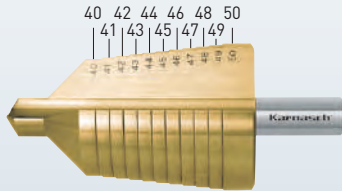


GERADE GENÜTET MIT
KREUZANSCHLIFF
STRAIGHT FLUTED WITH
SPLIT POINT



21 3020

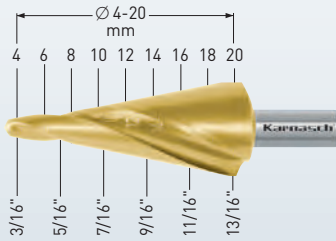
21 3023



617

20 1472

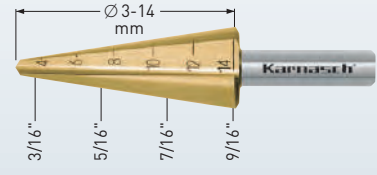
20 1472U



620

21 3019

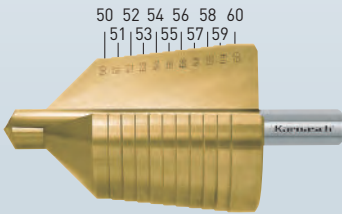
21 3022



618

21 3021

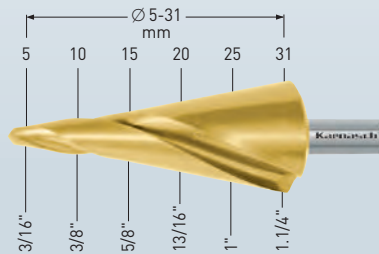
21 3024



617

20 1473

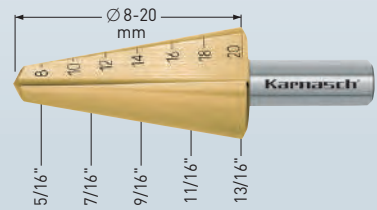
20 1473U



620

21 0037

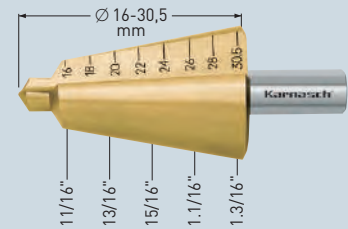
21 0040



618

21 0038

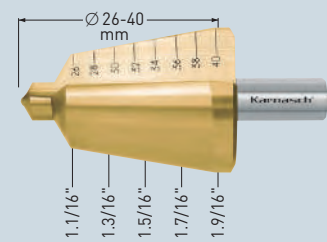
21 0039



618

21 3017

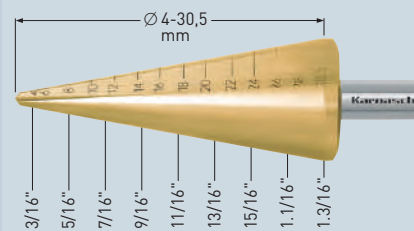
21 3018



619

21 3015

21 3016



619

1



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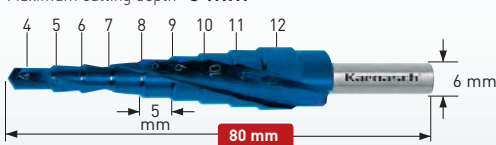


Index



Maximale Schnitttiefe
Maximum cutting depth

5 mm



20 1447

€ 17,50

BEST SELLER

Maximale Schnitttiefe
Maximum cutting depth

5 mm



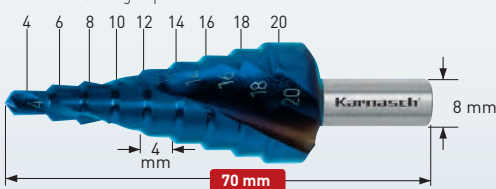
20 1447U

€ 11,75

BEST SELLER

Maximale Schnitttiefe
Maximum cutting depth

4 mm



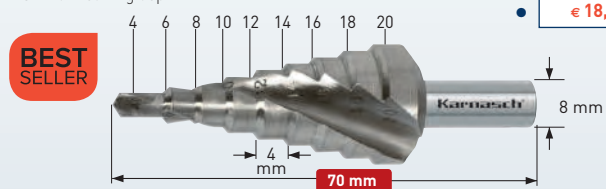
20 1448

€ 23,90

BEST SELLER

Maximale Schnitttiefe
Maximum cutting depth

4 mm



20 1448U

€ 18,00

BEST SELLER

Maximale Schnitttiefe
Maximum cutting depth

4 mm



20 1449

€ 44,55

BEST SELLER

Maximale Schnitttiefe
Maximum cutting depth

4 mm



20 1449U

€ 36,20

BEST SELLER

*Stufe 32 dient zum Entgraten der Stufe 30
*Step 32 is for deburring of step 30

ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|----------|-----------------------|-------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | GFK/CFK |
| | | | | | Plastics |
| | | | | | GRP/CRP |
| < 1100 N | < 900 N | | > 10% Si | | |

ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|-------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | GFK/CFK |
| | | | | | Plastics |
| | | | | | GRP/CRP |
| < 900 N | < 600 N | | > 10% Si | | |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + BLUE-DUR beschichtet

Gefertigt aus hochlegierten Spezialstahl "XE" für wesentlich höhere Standzeit gegenüber HSS-Stähle. BLUE-DUR Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung).

Die tiefgeschliffene spiralförmige Spannut bietet hohe Laufruhe und Schnittleistung. Die Späne werden wie bei einem Spiralbohrer sauber abtransportiert. Ideal für dickere Bleche ab 2 mm.

HSS-XE steel + BLUE-DUR coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-Steel. BLUE-DUR coating for a further substantial increase in service life also when machining dry (no/less cooling).

The CBN ground and spiral flutes guarantee smooth running and high cutting performance. The chip flow is optimized and removed easily as with a twist drill. Ideal for thicker sheets from 2 mm.

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegierten Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

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STUFENBOHRER SETS · STEP DRILL SETS

Inhalt · Content
Art.
20 1447
20 1448
20 1449

20 1466
€ 87,45

**LEERES SET
EMPTY SET**

BEST SELLER

20 1452
€ 6,55

BEST SELLER

Inhalt · Content
Art.
20 1447U
20 1448U
20 1449U

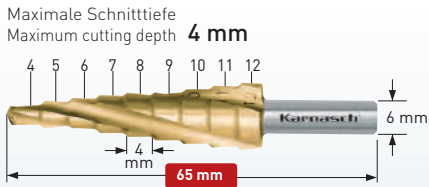
20 1492
€ 68,30

BEST SELLER

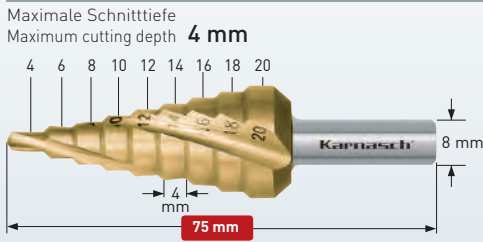
Schnittdaten
Cutting data

Film
Movie

1320



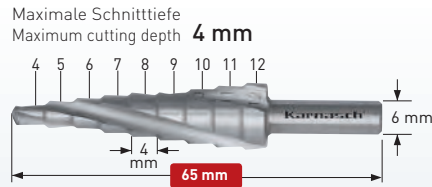
21 3001
€ 16,55
BEST SELLER



21 3002
€ 27,30
BEST SELLER



21 3003
€ 54,55
BEST SELLER



21 3004
€ 13,50
BEST SELLER



21 3005
€ 22,20
BEST SELLER



21 3006
€ 46,90
BEST SELLER

ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 1100 N | < 900 N | | > 10% Si | | |

ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 900 N | < 600 N | | > 10% Si | | |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + TiN-GOLD-beschichtet

Gefertigt aus hochlegierten Spezialstahl "XE" für wesentlich höhere Standzeit gegenüber HSS-Stähle. TiN-GOLD-Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung).

Die tiefgeschliffenen Spannuten mit 3 Schneiden bieten nochmals höhere Laufruhe bei fühlbar weicherem Schnitt und hoher Schnittleistung. Hervorragend bei dünnen Blechen.

HSS-XE steel + TiN-GOLD-coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-Steel. TiN-GOLD-coating for a further substantial increase in service life also when machining dry (no/less cooling).

The deep-ground flutes with 3 cutting edges guarantee extremely smooth running, noticeable softer cutting and high cutting performance. Excellent for thin sheet metal.

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegierten Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

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STUFENBOHRER SETS · STEP DRILL SETS

21 3007
€ 118,65
BEST SELLER

Inhalt · Content
Art.
21 3001
21 3002
21 3003

20 1452
€ 6,55

**LEERES SET
EMPTY SET**

21 3008
€ 100,55
BEST SELLER

Inhalt · Content
Art.
21 3004
21 3005
21 3006

Schnittdaten
Cutting data



1320

Film
Movie



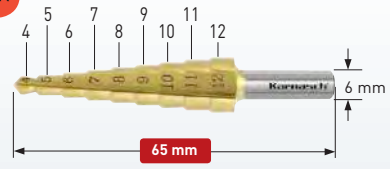
611





Index

BEST SELLER



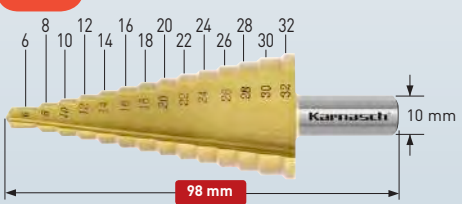
21 3033
• € 14,55
Maximale Schnitttiefe
Maximum cutting depth
4 mm

BEST SELLER



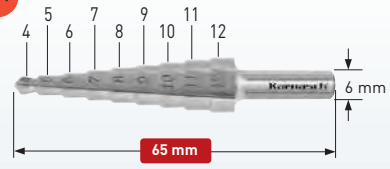
21 3034
• € 20,30
Maximale Schnitttiefe
Maximum cutting depth
4 mm

BEST SELLER



21 3035
• € 38,40
Maximale Schnitttiefe
Maximum cutting depth
4 mm

BEST SELLER



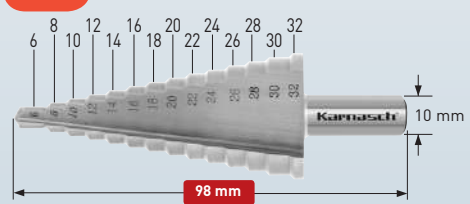
21 3030
• € 10,55
Maximale Schnitttiefe
Maximum cutting depth
4 mm

BEST SELLER



21 3031
• € 16,20
Maximale Schnitttiefe
Maximum cutting depth
4 mm

BEST SELLER



21 3032
• € 32,55
Maximale Schnitttiefe
Maximum cutting depth
4 mm

ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|----------|-----------------------|------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | GFK/CFK |
| < 1100 N | < 900 N | | > 10% Si | | Plastics GRP/CRP |

ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|------------------|
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| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | GFK/CFK |
| < 900 N | < 600 N | | > 10% Si | | Plastics GRP/CRP |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + TiN-GOLD-beschichtet

Gefertigt aus hochlegierten Spezialstahl "XE" für wesentlich höhere Standzeit gegenüber HSS-Stähle. TiN-GOLD-Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung).

Gerade Nut ist die beste Wahl bei Verwendung von Handbohrmaschinen. Ideal auch für dünne Bleche. Maximal empfohlener Durchmesser für Handbohrmaschinen 40 mm

HSS-XE steel + TiN-GOLD-coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-Steel. TiN-GOLD-coating for a further substantial increase in service life also when machining dry (no/less cooling).

Straight flute is the best choice when using handheld machines. Ideal also for thin sheets. Maximum recommended diameter for handheld machines is 40 mm

EIGENSCHAFTEN · PROPERTIES

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STUFENBOHRER SETS · STEP DRILL SETS

21 3092
• € 78,65

Inhalt · Content
Art.
21 3033
21 3034
21 3035

**LEERES SET
EMPTY SET**

BEST SELLER

20 1452
• € 6,55

Inhalt · Content
Art.
21 3030
21 3031
21 3032

BEST SELLER

21 3082
• € 64,65

Inhalt · Content
Art.
21 3030
21 3031
21 3032

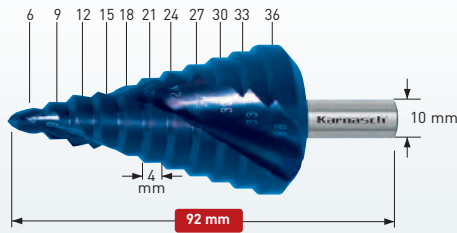
BEST SELLER

Schnittdaten
Cutting data

Film
Movie

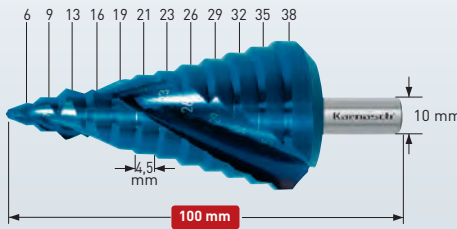


1320



20 1450
€ 69,05

Maximale Schnitttiefe
Maximum cutting depth
4 mm



20 1470
€ 90,25

Maximale Schnitttiefe
Maximum cutting depth
4,5 mm

ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 1100 N | < 900 N | | > 10% Si | | |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + BLUE-DUR beschichtet

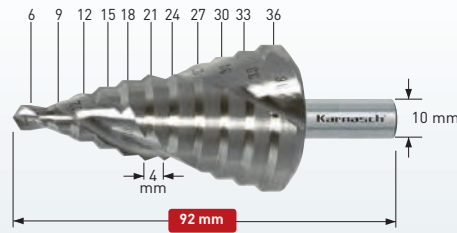
Gefertigt aus hochlegierten Spezialstahl "XE" für wesentlich höhere Standzeit gegenüber HSS-Stähle. BLUE-DUR Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung).

Die tiefgeschliffene spiralförmige Spannutt bietet hohe Laufruhe und Schnittleistung. Die Späne werden wie bei einem Spiralbohrer sauber abtransportiert. Ideal für dickere Bleche ab 2 mm.

HSS-XE steel + BLUE-DUR coated

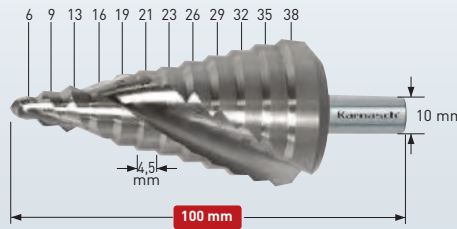
Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-Steel. BLUE-DUR coating for a further substantial increase in service life also when machining dry (no/less cooling).

The CBN ground and spiral flutes guarantee smooth running and high cutting performance. The chip flow is optimized and removed easily as with a twist drill. Ideal for thicker sheets from 2 mm.



20 1450U
€ 54,45

Maximale Schnitttiefe
Maximum cutting depth
4 mm



20 1470U
€ 69,85

Maximale Schnitttiefe
Maximum cutting depth
4,5 mm

ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
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Schnittdaten
Cutting data



1320

Film
Movie



613



Index

Stufenbohrer mit Spirale für Kabelverschraubungen

Step drills with spiral for cable connections



1



2



3



4



5



6



7



8



9

Index

Zum Bohren in Kabelabzweigkästen, Installationsdosen, Verteilergehäusen, Hausanschlusskästen, Klemmkästen, Schaltschränke, usw.

Wichtig: Das seit Jahrzehnten bekannte Pg-System (Pg 7 – Pg 48) wird auf das internationale metrische System umgestellt (M 12 – M 63).

Karnasch XE-Stahl Stufenbohrer mit Spirale und BLUE-DUR-Beschichtung decken das gesamte Spektrum der Gehäuseöffnungen nach der neuen Norm M 12 – M 40 ab. Die Stufenbohrer haben jeweils eine kurze (3 mm oder 4 mm) Bohrstufe für die Kabeldurchlässe in dünnwandige Gehäuse (Wandstärke max. 3 mm sowie 4 mm) sowie eine lange (6 mm) Bohrstufe für Gewindekernlöcher in Verteilerschränken (Wandstärke max. 5,5 mm).

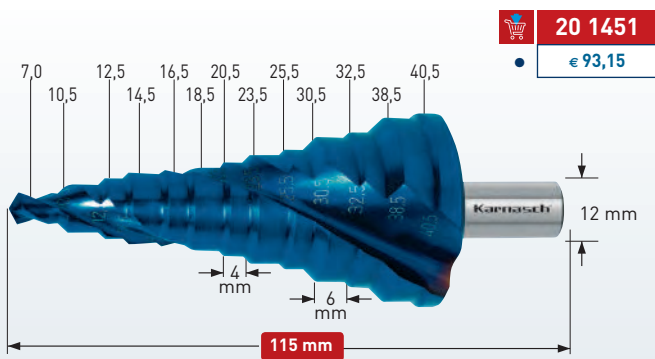
For drilling in junction boxes, installation sockets, distributor body, service entrance boxes, terminal boxes, electrical cabinets, etc.

Important: The PG system (Pg 7 – Pg 48) known for decades is converted to the international metric system (M 12 – M 63).

Karnasch XE steel step drills with spiral and BLUE-DUR coating cover the entire spectrum of body openings according to the new M 12 – M 40 standard. The step drills have a short drill step (3 mm or 4 mm) for cable outlets in thin-walled bodies (wall thickness max. 3 mm as well as 4 mm) and a long drill step (6 mm) for tapping drill holes in distribution boxes (wall thickness max. 5.5 mm).

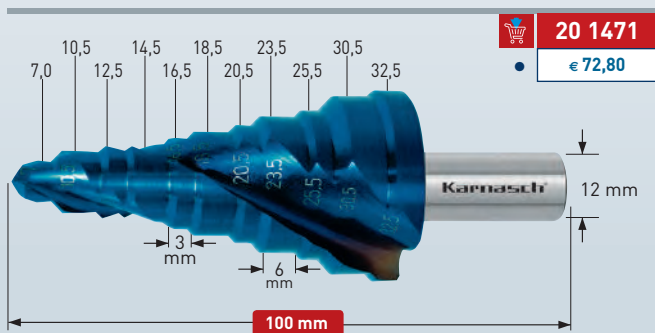


Stufenbohrer mit Spirale für Kabelverschraubungen · Step drills with spiral for cable connections



| | | | | | | | |
|------|---|---------|---------|---------|---------|---------|---------|
| Ø mm | 7 | 10,5 | 14,5 | 18,5 | 23,5 | 30,5 | 38,5 |
| | - | M12×1,5 | M16×1,5 | M20×1,5 | M25×1,5 | M32×1,5 | M40×1,5 |

| | | | | | | |
|------|---------|---------|---------|---------|---------|---------|
| Ø mm | 12,5 | 16,5 | 20,5 | 25,5 | 32,5 | 40,5 |
| | M12×1,5 | M16×1,5 | M20×1,5 | M25×1,5 | M32×1,5 | M40×1,5 |

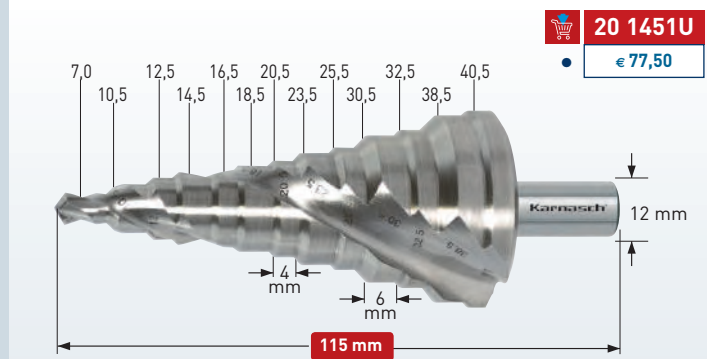


| | | | | | | |
|------|---|---------|---------|---------|---------|---------|
| Ø mm | 7 | 10,5 | 14,5 | 18,5 | 23,5 | 30,5 |
| | - | M12×1,5 | M16×1,5 | M20×1,5 | M25×1,5 | M32×1,5 |

| | | | | | | |
|------|---|---------|---------|---------|---------|---------|
| Ø mm | 7 | 12,5 | 16,5 | 20,5 | 25,5 | 32,5 |
| | - | M12×1,5 | M16×1,5 | M20×1,5 | M25×1,5 | M32×1,5 |

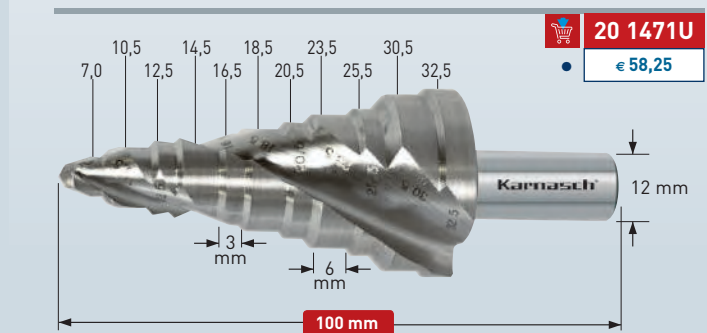
ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|----------|-----------------------|-------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | GFK/CFK |
| | | | | | Plastics |
| | | | | | GRP/CRP |
| < 1100 N | < 900 N | | > 10% Si | | |



Gewinde Kernloch Stufenhöhe
Thread core hole step height 6 mm

Durchgangslöcher Stufenhöhe
Through borings step height 4 mm



Gewinde Kernloch Stufenhöhe
Thread core hole step height 6 mm

Durchgangslöcher Stufenhöhe
Through borings step height 3 mm

ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|-------------|
| | | | | | |
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| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | GFK/CFK |
| | | | | | Plastics |
| | | | | | GRP/CRP |
| < 900 N | < 600 N | | > 10% Si | | |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + BLUE-DUR beschichtet

Gefertigt aus hochlegierten Spezialstahl "XE" für wesentlich höhere Standzeit gegenüber HSS-Stähle. BLUE-DUR Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung).

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Schnittdaten
Cutting data



1320

Film
Movie



615



Index



BEST SELLER



21 3033
€ 14,55

Maximale Schnitttiefe
Maximum cutting depth
4 mm

BEST SELLER



21 3030
€ 10,55

Maximale Schnitttiefe
Maximum cutting depth
4 mm

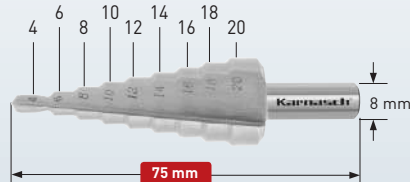
BEST SELLER



21 3034
€ 20,30

Maximale Schnitttiefe
Maximum cutting depth
4 mm

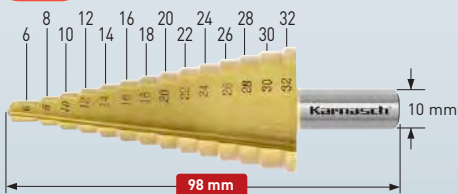
BEST SELLER



21 3031
€ 16,20

Maximale Schnitttiefe
Maximum cutting depth
4 mm

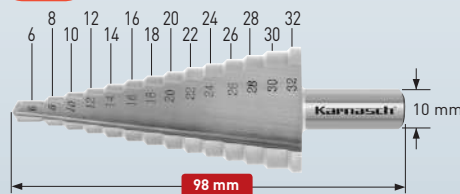
BEST SELLER



21 3035
€ 38,40

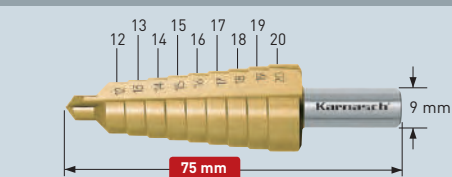
Maximale Schnitttiefe
Maximum cutting depth
4 mm

BEST SELLER



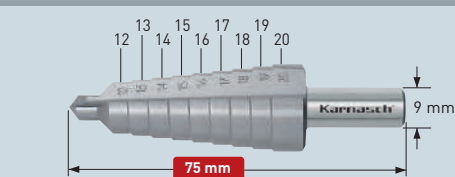
21 3032
€ 32,55

Maximale Schnitttiefe
Maximum cutting depth
4 mm



21 3009
€ 30,55

Maximale Schnitttiefe
Maximum cutting depth
4 mm



21 3012
€ 25,00

Maximale Schnitttiefe
Maximum cutting depth
4 mm

Fortsetzung nächste Seite · Continued next page

ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 1100 N | < 900 N | | > 10% Si | | |

ANWENDUNG · APPLICATION

| | | | | | |
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Gerade Nut ist die beste Wahl bei Verwendung von Handbohrmaschinen. Ideal auch für dünne Bleche. Maximal empfohlener Durchmesser für Handbohrmaschinen 40 mm

HSS-XE steel + TiN-GOLD-coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-Steel. TiN-GOLD-coating for a further substantial increase in service life also when machining dry (no/less cooling).

Straight flute is the best choice when using handheld machines. Ideal also for thin sheets. Maximum recommended diameter for handheld machines is 40 mm

EIGENSCHAFTEN · PROPERTIES

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HSS-XE steel

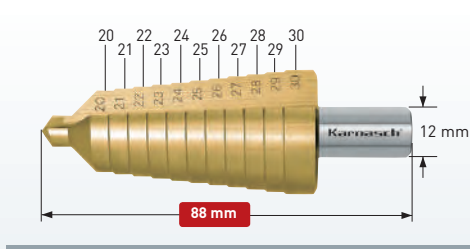
Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-Steel.

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Schnittdaten
Cutting data

Film
Movie

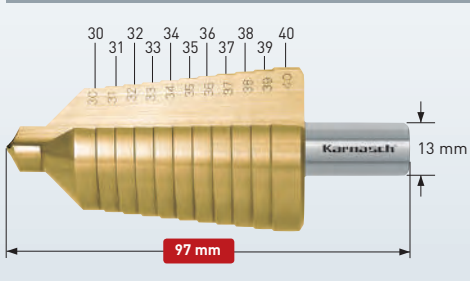


20 21 22 23 24 25 26 27 28 29 30
12 mm
88 mm

21 3010
• € 51,10

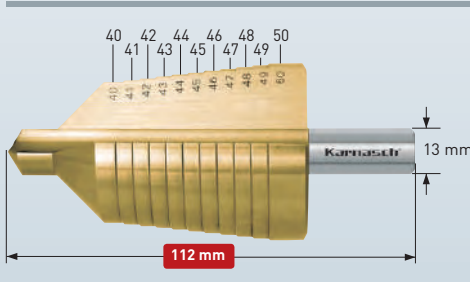
Maximale Schnitttiefe
Maximum cutting depth
4 mm



30 31 32 33 34 35 36 37 38 39 40
13 mm
97 mm

21 3011
• € 79,55

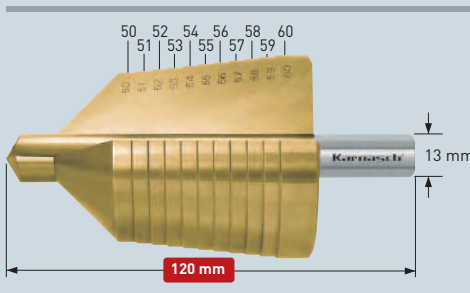
Maximale Schnitttiefe
Maximum cutting depth
4 mm



40 41 42 43 44 45 46 47 48 49 50
13 mm
112 mm

21 3020
• € 112,30

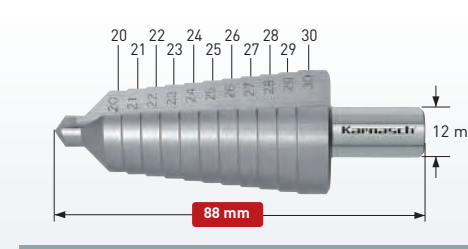
Maximale Schnitttiefe
Maximum cutting depth
4 mm



50 51 52 53 54 55 56 57 58 59 60
13 mm
120 mm

21 3021
• € 167,20

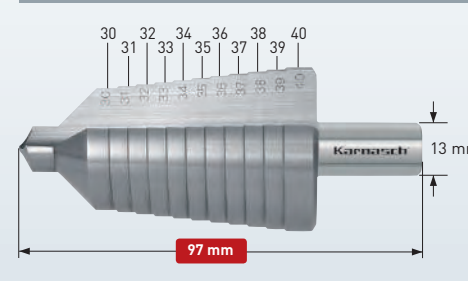
Maximale Schnitttiefe
Maximum cutting depth
4 mm



20 21 22 23 24 25 26 27 28 29 30
12 mm
88 mm

21 3013
• € 42,85

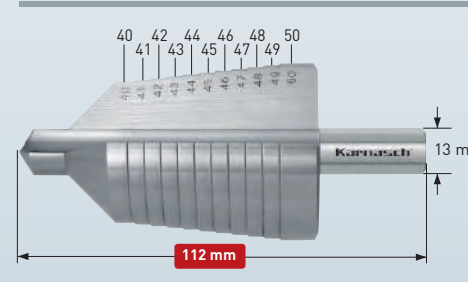
Maximale Schnitttiefe
Maximum cutting depth
4 mm



30 31 32 33 34 35 36 37 38 39 40
13 mm
97 mm

21 3014
• € 68,50

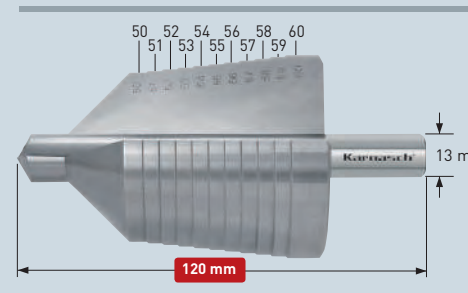
Maximale Schnitttiefe
Maximum cutting depth
4 mm



40 41 42 43 44 45 46 47 48 49 50
13 mm
112 mm

21 3023
• € 98,10

Maximale Schnitttiefe
Maximum cutting depth
4 mm



50 51 52 53 54 55 56 57 58 59 60
13 mm
120 mm

21 3024
• € 150,55

Maximale Schnitttiefe
Maximum cutting depth
4 mm

ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|----------|-----------------------|------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | GFK/CFK |
| < 1100 N | < 900 N | | > 10% Si | | Plastics GRP/CRP |

ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|------------------|
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EIGENSCHAFTEN · PROPERTIES

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Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-Steel. TiN-GOLD-coating for a further substantial increase in service life also when machining dry (no/less cooling).

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Schnittdaten
Cutting data



Film
Movie





21 3019
• € 19,20

Maximale Schnitttiefe
Maximum cutting depth
4 mm

21 3022
• € 14,60

Maximale Schnitttiefe
Maximum cutting depth
4 mm

21 0037
• € 25,40

Maximale Schnitttiefe
Maximum cutting depth
4 mm

21 0040
• € 19,35

Maximale Schnitttiefe
Maximum cutting depth
4 mm

21 0038
• € 39,65

Maximale Schnitttiefe
Maximum cutting depth
4 mm

21 0039
• € 30,65

Maximale Schnitttiefe
Maximum cutting depth
4 mm

ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|-----|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 1100 N | < 900 N | > 10% Si | | | |

ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|-----|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 900 N | < 600 N | > 10% Si | | | |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + TiN-GOLD-beschichtet

Gefertigt aus hochlegierten Spezialstahl "XE" für wesentlich höhere Standzeit gegenüber HSS-Stähle. TiN-GOLD-Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung).

Schneide 1 ist mit metrischen Durchmessern gekennzeichnet. Schneide 2 ist mit Zoll Durchmessern gekennzeichnet.

Achtung: In Umstellung mit Inch Markierung. Falls unbedingt benötigt bitte vorab anfragen ob bereits lieferbar.

HSS-XE steel + TiN-GOLD-coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-Steel. TiN-GOLD-coating for a further substantial increase in service life also when machining dry (no/less cooling).

Flute 1 is marked with metric diameters. Flute 2 is marked with inch diameters.

Note: In conversion with Inch marking. If absolutely needed please ask in advance if already available.

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegierten Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

Schneide 1 ist mit metrischen Durchmessern gekennzeichnet. Schneide 2 ist mit Zoll Durchmessern gekennzeichnet.

Achtung: In Umstellung mit Inch Markierung. Falls unbedingt benötigt bitte vorab anfragen ob bereits lieferbar.

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Flute 1 is marked with metric diameters. Flute 2 is marked with inch diameters.

Note: In conversion with Inch marking. If absolutely needed please ask in advance if already available.

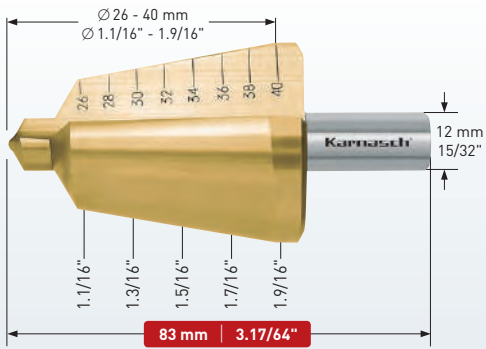
Schnittdaten
Cutting data

Film
Movie



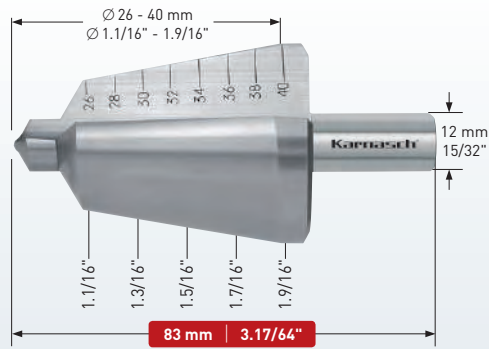
1320





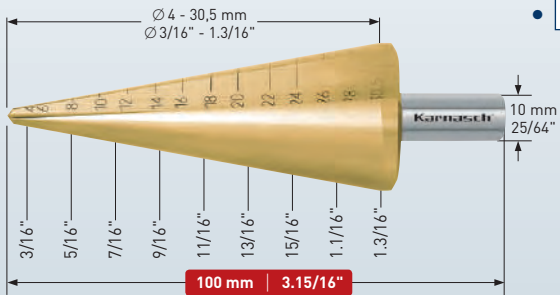
21 3017
€ 69,35

Maximale
Schnitttiefe
Maximum
cutting depth
4 mm



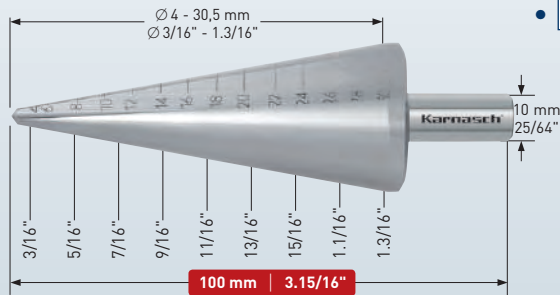
21 3018
€ 58,35

Maximale
Schnitttiefe
Maximum
cutting depth
4 mm



21 3015
€ 49,00

Maximale
Schnitttiefe
Maximum
cutting depth
4 mm



21 3016
€ 40,45

Maximale
Schnitttiefe
Maximum
cutting depth
4 mm

ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 1100 N | < 900 N | | > 10% Si | | |

ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 900 N | < 600 N | | > 10% Si | | |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + TiN-GOLD-beschichtet

Gefertigt aus hochlegierten Spezialstahl "XE" für wesentlich höhere Standzeit gegenüber HSS-Stähle. TiN-GOLD-Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung).

Die tiefgeschliffene spiralförmige Spannutt bietet hohe Laufruhe und Schnittleistung. Die Späne werden wie bei einem Spiralbohrer sauber abtransportiert.

Schneide 1 ist mit metrischen Durchmessern gekennzeichnet. Schneide 2 ist mit Zoll Durchmessern gekennzeichnet.

Achtung: In Umstellung mit Inch Markierung. Falls unbedingt benötigt bitte vorab anfragen ob bereits lieferbar.

HSS-XE steel + TiN-GOLD-coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-Steel. TiN-GOLD-coating for a further substantial increase in service life also when machining dry (no/less cooling).

The CBN ground and spiral flutes guarantee smooth running and high cutting performance. The chip flow is optimized and removed easily as with a twist drill.

Flute 1 is marked with metric diameters. Flute 2 is marked with inch diameters.

Note: In conversion with Inch marking. If absolutely needed please ask in advance if already available.

EIGENSCHAFTEN · PROPERTIES

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Gefertigt aus hochlegierten Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

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The CBN ground and spiral flutes guarantee smooth running and high cutting performance. The chip flow is optimized and removed easily as with a twist drill.

Schnittdaten
Cutting data



1320

Film
Movie



619

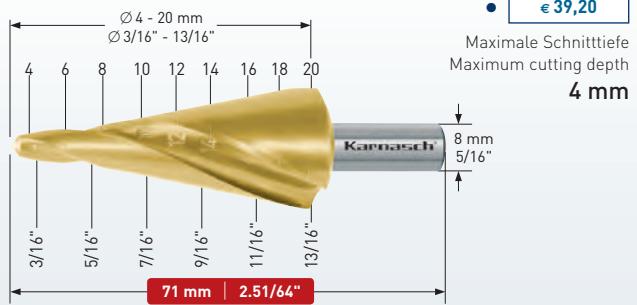


Index



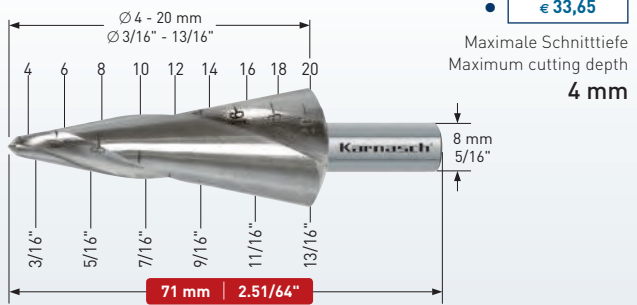
Index

20 1472
€ 39,20



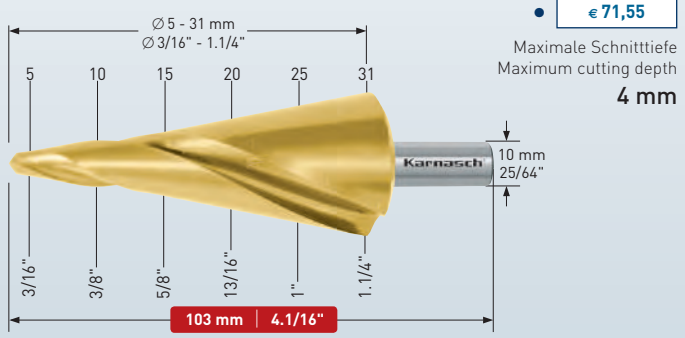
Maximale Schnitttiefe
Maximum cutting depth
4 mm

20 1472U
€ 33,65



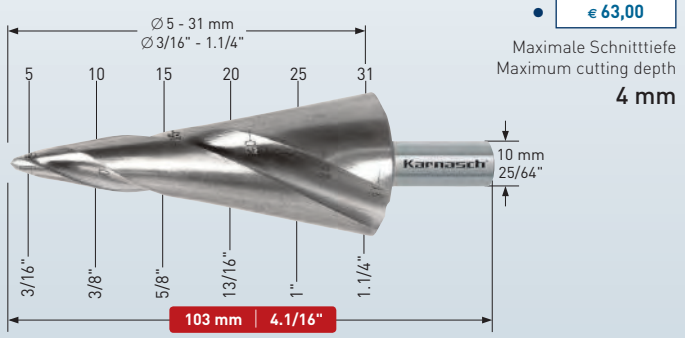
Maximale Schnitttiefe
Maximum cutting depth
4 mm

20 1473
€ 71,55



Maximale Schnitttiefe
Maximum cutting depth
4 mm

20 1473U
€ 63,00



Maximale Schnitttiefe
Maximum cutting depth
4 mm

ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|----------|-----------------------|------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | GFK/CFK |
| < 1100 N | < 900 N | | > 10% Si | | Plastics GRP/CRP |

ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | GFK/CFK |
| < 900 N | < 600 N | | > 10% Si | | Plastics GRP/CRP |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + TiN-GOLD-beschichtet

Gefertigt aus hochlegierten Spezialstahl "XE" für wesentlich höhere Standzeit gegenüber HSS-Stähle. TiN-GOLD-Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung).

Die tiefgeschliffene spiralförmige Spannnt bietet hohe Laufruhe und Schnittleistung. Die Späne werden wie bei einem Spiralbohrer sauber abtransportiert.

Achtung: In Umstellung mit Inch Markierung. Falls unbedingt benötigt bitte vorab anfragen ob bereits lieferbar.

HSS-XE steel + TiN-GOLD-coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-Steel. TiN-GOLD-coating for a further substantial increase in service life also when machining dry (no/less cooling).

The CBN ground and spiral flutes guarantee smooth running and high cutting performance. The chip flow is optimized and removed easily as with a twist drill.

Note: In conversion with Inch marking. If absolutely needed please ask in advance if already available.

EIGENSCHAFTEN · PROPERTIES

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Schnittdaten
Cutting data

Film
Movie



1320

SPIRALBOHRER · GEWINDEBOHRER

TWIST DRILLS · TAPS



2.7

KONTAKT | CONTACT

KARNASCH PROFESSIONAL TOOLS[®]
INDUSTRIAL TOOLS DIVISION

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D-15848 Tauche/OT Görzdorf
mail@karnasch.tools

+49 (0) 33675 - 7265-0

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




ONLINE



 **20 1830**

20 1840 

ANWENDUNG · APPLICATION

| | | | | | |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | GFK/CFK |
| | | | > 10% Si | | Plastics GRP/CRP |

Adapter Weldonschaft
 Adapter Weldon shank

HSS-CO Cobalt + TiN beschichteter Spiralbohrer, Nutzlänge 50 mm
 HSS-CO Cobalt + TiN coated twist drill, drill depth 50 mm | 2"



| Adapter · Adapter | | Spiralbohrer · Twist drill | | Bohrer · Drill | | Für Gewinde · For thread Size | |
|------------------------------|--|---|-----------------------|-------------------------------|--|-------------------------------|------|
| 20 1830 002 € 7,45 |  2,5 mm |  | Ø 2,5 mm Ø 3/32" | 20 1840 002 € 7,55 | | | M 3 |
| 20 1830 004 € 7,45 |  3 mm |  | Ø 3,4 mm Ø 9/64" | 20 1840 004 € 7,55 | | | M 4 |
| 20 1830 010 € 7,30 |  4 mm |  | Ø 4,3 mm Ø 11/64" | 20 1840 006 € 7,55 | | | M 5 |
| 20 1830 020 € 7,30 |  5 mm |  | Ø 4 mm Ø 5/32" | 20 1840 010 € 6,85 | | | - |
| 20 1830 030 € 7,30 |  6 mm |  | Ø 5 mm Ø 13/64" | 20 1840 020 € 7,65 | | | M 6 |
| 20 1830 040 € 7,30 |  7 mm |  | Ø 6 mm Ø 15/64" | 20 1840 030 € 8,95 | | | - |
| 20 1830 050 € 7,30 |  8 mm |  | Ø 6,8 mm Ø 17/64" | 20 1840 035 € 9,90 | | | M 8 |
| 20 1830 060 € 7,30 |  9 mm |  | Ø 7 mm Ø 9/32" | 20 1840 040 € 10,15 | | | - |
| 20 1830 070 € 7,30 |  10 mm |  | Ø 8 mm Ø 5/16" | 20 1840 050 € 11,95 | | | - |
| 20 1830 080 € 7,30 |  11 mm |  | Ø 8,5 mm Ø 21/64" | 20 1840 055 € 13,25 | | | M 10 |
| 20 1830 090 € 7,30 |  12 mm |  | Ø 9 mm Ø 23/64" | 20 1840 060 € 13,45 | | | - |
| | |  | Ø 10 mm Ø 25/64" | 20 1840 070 € 14,70 | | | - |
| | |  | Ø 10,3 mm Ø 13/32" | 20 1840 075 € 16,25 | | | M 12 |
| | |  | Ø 11 mm Ø 7/16" | 20 1840 080 € 16,15 | | | - |
| | |  | Ø 12 mm Ø 15/32" | 20 1840 090 € 17,80 | | | M 14 |

Gewindebohrer siehe nächste Seite · **Achtung:** Die Zollabmessungen entsprechen nicht exakt den mm Durchmessern.
 Taps see next page · **Attention:** The inch sizes do not correspond exactly to the mm diameters.

EIGENSCHAFTEN · PROPERTIES

Cobaltstahl + TiN-Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

Cobalt steel + TiN-coating for a further substantial increase in service life also when machining dry (no/less cooling)







Schnelle, preiswerte und präzise Bohrungen mit Karnasch Hochleistungs-spiralbohrer + Spiralbohradapter Weldon

Fast, inexpensive and accurate holes with Karnasch high-performance twist drills + twist drill adaptor Weldon

 **20 1800**

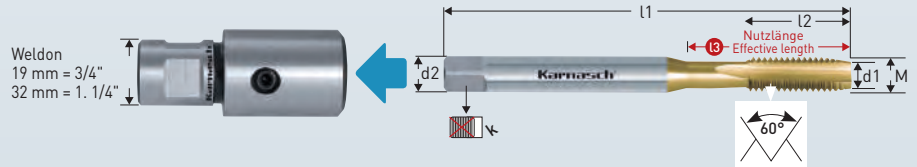
20 1820 **DRILL-LINE GOLD 750** 















ANWENDUNG · APPLICATION

| | | | | | |
|--|---|---|---|---|---|
|  |  |  |  |  |  |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 1400 N | > 900 N | | > 10% Si | | |

Gewindeadapter Weldonshank
Tapping adapter Weldon shank

HSS-Co Cobalt + TIN-beschichtete Gewindebohrer für Durchgangslöcher. M DIN 371/376. Metrisch DIN ISO 13.
HSS-Co Cobalt + TIN coated machine taps for through holes. M DIN 371/376. Metric DIN ISO 13.



| Weldon | Adapter · Adapter | Gewindebohrer · Taps | M | d1 Ø mm Kernloch Core hole | d2 Ø mm | l1 mm | l2 mm | l3 mm |  mm | Steigung Pitch mm |
|---------------|---|---|-----------------|----------------------------------|---------|-------|---------------|-------|--|----------------------|
| 19 mm 3/4" |  |  | M 3 DIN 371 | 2,5 | 3,5 | 56 | 9 | 18 | 2,7 | 0,5 |
| | | 20 1800 002 € 11,20 | | | | | | | | |
| | | 20 1820 002 € 9,15 | | | | | | | | |
| 19 mm 3/4" |  |  | M 4 DIN 371 | 3,4 | 4,5 | 63 | 11 | 21 | 3,4 | 0,7 |
| | | 20 1800 004 € 11,20 | | | | | | | | |
| | | 20 1820 004 € 9,45 | | | | | | | | |
| 19 mm 3/4" |  |  | M 5 DIN 371 | 4,3 | 6 | 70 | 13 | 25 | 4,9 | 0,8 |
| | | 20 1800 010 € 11,55 | | | | | | | | |
| | | 20 1820 010 € 9,20 | | | | | | | | |
| 19 mm 3/4" |  |  | M 6 DIN 371 | 5,0 | 6 | 80 | 15 L3 = 30 | 30 | 4,9 | 1,00 |
| | | 20 1800 020 € 11,55 | | | | | | | | |
| | | 20 1820 020 € 13,50 | | | | | | | | |
| 19 mm 3/4" |  |  | M 8 DIN 371 | 6,8 | 8 | 90 | 18 L3 = 36 | 35 | 6,2 | 1,25 |
| | | 20 1800 030 € 11,55 | | | | | | | | |
| | | 20 1820 030 € 17,15 | | | | | | | | |
| 19 mm 3/4" |  |  | M 10 DIN 376 | 8,5 | 7 | 100 | 20 | 63,5 | 5,5 | 1,50 |
| | | 20 1800 040 € 12,15 | | | | | | | | |
| | | 20 1820 040 € 20,65 | | | | | | | | |
| 19 mm 3/4" |  |  | M 12 DIN 376 | 10,3 | 9 | 110 | 23 | 73,5 | 7,0 | 1,75 |
| | | 20 1800 050 € 12,15 | | | | | | | | |
| | | 20 1820 050 € 26,35 | | | | | | | | |

Passende Bohrer Ø 2,5–12 mm siehe linke Seite Art. 20 1840. Größere Gewindebohrer siehe nächste Seite.
Suitable drills Ø 2,5–12 mm see previous page Art. 20 1840. Larger taps / drills see next page.

Zum Gewindebohren erzielen Sie hervorragende Standzeiten mit unserer universal Schneidpaste Art. 60 1159 / 60 1157, Seite 1146.
For best lifetime and performance during the tapping process, do we recommend our universal cutting paste Art. 60 1159 / 60 1157, page 1146.



Ihr Gewindebohrer ist abgebrochen und steckt im Bohrloch fest? Verwenden Sie in diesem Falle unsere Gewindebohrer-Ausbohrer.
Art. 20 1860 Seite 628
Your tap is broken and is stuck in the drill hole? In that case please use our drills to remove jammed taps. See art. 20 1860 page 628

EIGENSCHAFTEN · PROPERTIES






Cobaltstahl + TiN-Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

Cobalt steel + TiN-coating for a further substantial increase in service life also when machining dry (no/less cooling)

 **20 1800**

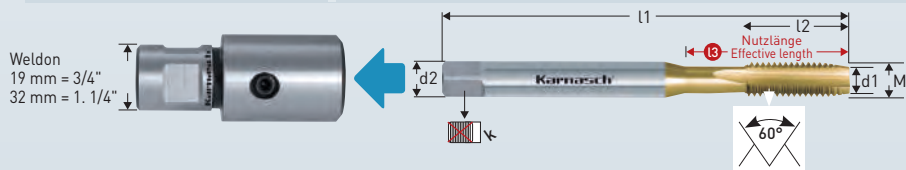
20 1820 
















ANWENDUNG · APPLICATION

| | | | | | |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| Stahl Steel | Edelstahl Stainless | Grauguss Grey cast iron | Alu Alu | Kupfer, Messing, Zinn Copper, brass, tin | Kunststoffe GFK/CFK Plastics GRP/CRP |
| < 1400 N | > 900 N | | > 10% Si | | |

Gewindeadapter Weldonshaft
Tapping adapter Weldon shank

HSS-Co Cobalt + TIN-beschichtete Gewindebohrer für Durchgangslöcher. M DIN 371/376. Metrisch DIN ISO 13.
HSS-Co Cobalt + TIN coated machine taps for through holes. M DIN 371/376. Metric DIN ISO 13.



| Weldon | Adapter · Adapter | Gewindebohrer · Taps | M | d1 Ø mm Kernloch Core hole | d2 Ø mm | l1 mm | l2 mm | l3 mm |  | Steigung Pitch mm |
|------------------|---|---|----------------------|----------------------------------|---------|-------|-------|-------|---|----------------------|
| 19 mm 3/4" |  20 1800 060 € 12,65 |  20 1820 060 € 35,75 | M 16 DIN 376 | 14,0 | 12 | 110 | 25 | 79 | 9,0 | 2,00 |
| 19 mm 3/4" |  20 1800 070 € 15,10 |  20 1820 070 € 45,90 | M 18 DIN 376 | 15,5 | 14 | 125 | 30 | 90 | 11,0 | 2,50 |
| | |  20 1820 075* € 43,95 | M 18 GB/ T3464 | 15,5 | 14 | 112 | 37 | 77 | 11,2 | 2,50 |
| | |  20 1820 078* € 57,80 | M 20 GB/ T3464 | 17,5 | 14 | 112 | 37 | 77 | 11,2 | 2,50 |
| 19 mm 3/4" |  20 1800 080 € 15,10 |  20 1820 080 € 60,40 | M 20 DIN 376 | 17,5 | 16 | 140 | 30 | 105 | 12,0 | 2,50 |
| 32 mm 1. 1/4" |  20 1800 090 € 16,85 |  20 1820 090 € 72,70 | M 22 DIN 376 | 19,5 | 18 | 140 | 30 | 95 | 14,5 | 2,50 |
| | |  20 1820 100 € 90,65 | M 24 DIN 376 | 21,0 | 18 | 160 | 45 | 115 | 14,5 | 3,00 |
| 32 mm 1.1/4" |  20 1800 110 € 19,00 |  20 1820 110 € 110,35 | M 27 DIN 376 | 24,0 | 20 | 160 | 36 | 115 | 16,0 | 3,00 |
| | |  20 1820 115* € 125,00 | M 30 GB/ T3464 | 26,5 | 20 | 138 | 48 | 93 | 16 | 3,50 |
| 32 mm 1.1/4" |  20 1800 120 € 19,00 |  20 1820 120 € 130,55 | M 30 DIN 376 | 26,5 | 22 | 180 | 40 | 135 | 18 | 3,50 |



Für das passende Kernloch (d1) steht Ihnen unser gesamtes Programm Kernbohrer zur Verfügung wie zum Beispiel: Art. 20 1316 Seite 368, Art. 20 1260U Seite 406, Art. 20 1270U Seite 408

For the matching core hole (d1), please use our range annular cutters for example: Art. 20 1316 page 368, Art. 20 1260U page 406, Art. 20 1270U page 408

Zum Gewindebohren erzielen Sie hervorragende Standzeiten mit unserer universal Schneidpaste Art. 60 1159 / 60 1157, Seite 1146.
For best lifetime and performance during the tapping process, do we recommend our universal cutting paste Art. 60 1159 / 60 1157, page 1146.

* Für Gewindeschneiden M 18 und M 20 mit unserer Kernbohrmaschine KATV 55 / KATSV 55 (Seite 1098/1099) verwenden Sie bitte die kürzeren Gewindebohrer Norm GB/T3464 (Gesamtlänge 112 mm).
Für Gewindeschneiden M 30 mit unserer Kernbohrmaschine KATV 100 / KATSV 100 (Seite 1102/1103) verwenden Sie bitte die kürzeren Gewindebohrer Norm GB/T3464 (Gesamtlänge 138 mm).

For thread cutting M 18 and M 20 with our core drilling machine KATV 55 / KATSV 55 (page 1098/1099) please use the shorter taps norm GB/T3464 (total length 112 mm).
For thread cutting M 30 with our core drilling machine KATV 100 / KATSV 100 (page 1102/1103) please use the shorter taps norm GB/T3464 (total length 138 mm).

EIGENSCHAFTEN · PROPERTIES

Cobaltstahl + TiN-Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

Cobalt steel + TiN-coating for a further substantial increase in service life also when machining dry (no/less cooling)

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

Programmerweiterung im Online Blätterkatalog

New range in the online catalogue



Gewindebohrer und Adapter

Taps and adapter

ONLINE
KATALOG



ONLINE
CATALOGUE



Wir arbeiten aktuell an einer Programmerweiterung der Gewindebohrer und Adapter. In Kürze werden diese im Online Blätterkatalog verfügbar sein.

We are currently expanding our range of taps and adapters. They will soon be available in our online catalogue.



1



2



3



4



5



6



7



8



9

Index

Ihre Notizen & Zeichnungen Your notices & drafts

1



2



3



4



5



6



7

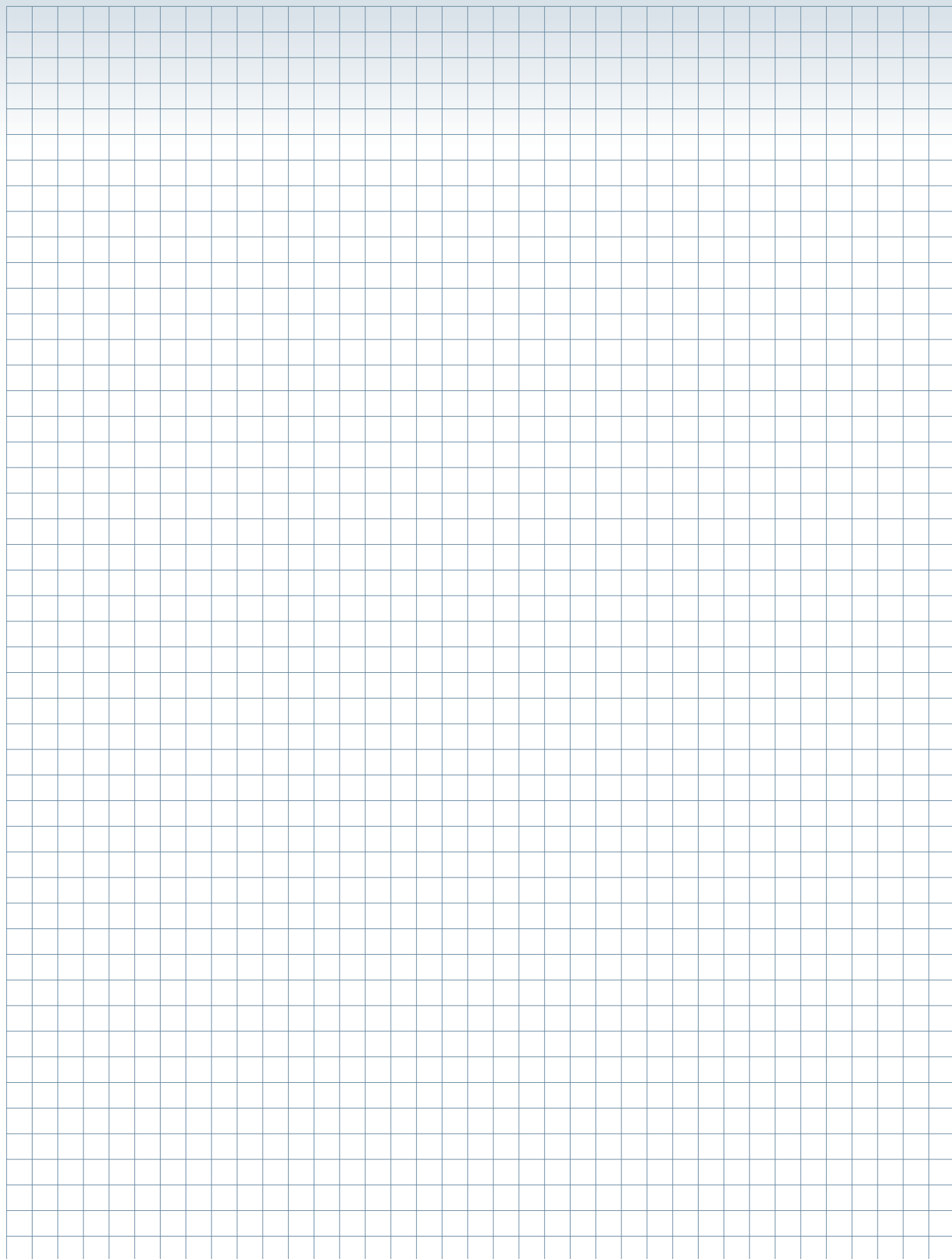


8



9

Index



VOLLHARTMETALL GEWINDEBOHRER-AUSBOHRER

SOLID CARBIDE DRILLS TO REMOVE JAMMED TAPS



1



2



3



4



5



6



7



8



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2.8

KONTAKT | CONTACT

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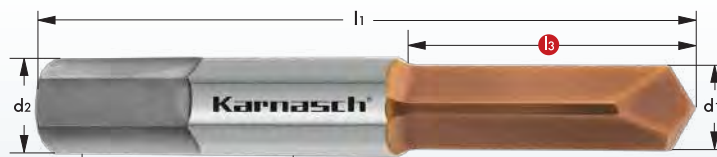


20 1860

Vollhartmetall Gewindebohrer-Ausbohrer
Solid carbide drills to remove jammed taps



HRC < 65



Sechskant Hexagon + zylindrisch cylindrical

MICRO GRAIN

KARNASCH NORM



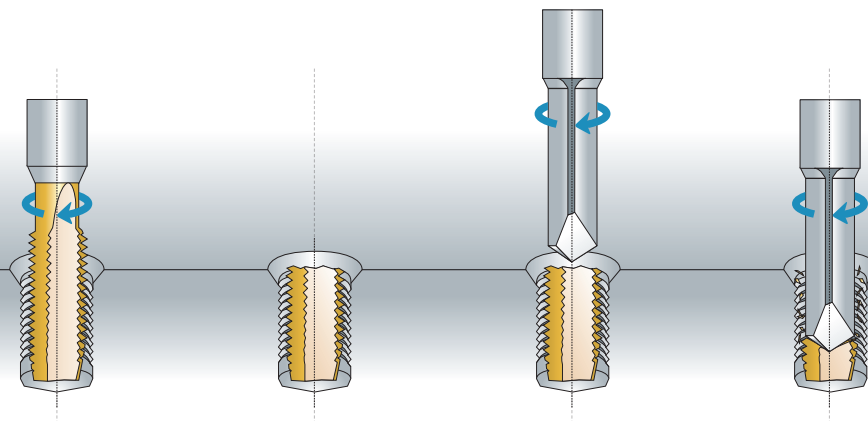
HART-BESCHICHTUNG
HARDCOAT

Durch sechskant **und** zylindrischen Schaft kann das Ausbohren auf NC Maschinen erfolgen sowie auf manuellen Maschinen mit Drei- oder Vierbackenfutter.
Because of hexagonal **and** cylindrical shank drilling can be performed on NC machines as well as on manual machines with three or four-jaw chucks.

| Art. | Für Gewinde For thread | d1 H7 | L3 | L1 | d2 H6 | € |
|-------------|---------------------------|-------|----|----|-------|-------|
| 20 1860 010 | • M 3 | 2,50 | 10 | 38 | 3 | 20,20 |
| 20 1860 020 | • M 4 | 3,30 | 14 | 46 | 4 | 22,05 |
| 20 1860 030 | • M 5 | 4,20 | 19 | 50 | 5 | 26,40 |
| 20 1860 040 | • M 6 | 5,00 | 23 | 50 | 6 | 30,95 |
| 20 1860 050 | • M 8 | 6,80 | 23 | 60 | 8 | 39,90 |
| 20 1860 060 | • M 10 | 8,50 | 25 | 80 | 10 | 53,00 |
| 20 1860 070 | • M 12 | 10,20 | 35 | 80 | 12 | 79,20 |

GEWINDEBOHRER BRUCH · TAP BREAKAGE

Ausbohren spart Zeit und Kosten!
Bore out saves time and money!



SET



20 1865
• € 284,60

Inhalt · Content

M 3, M 4, M 5, M 6, M 8, M 10, M 12

Schnittdaten
Cutting data

Film
Movie



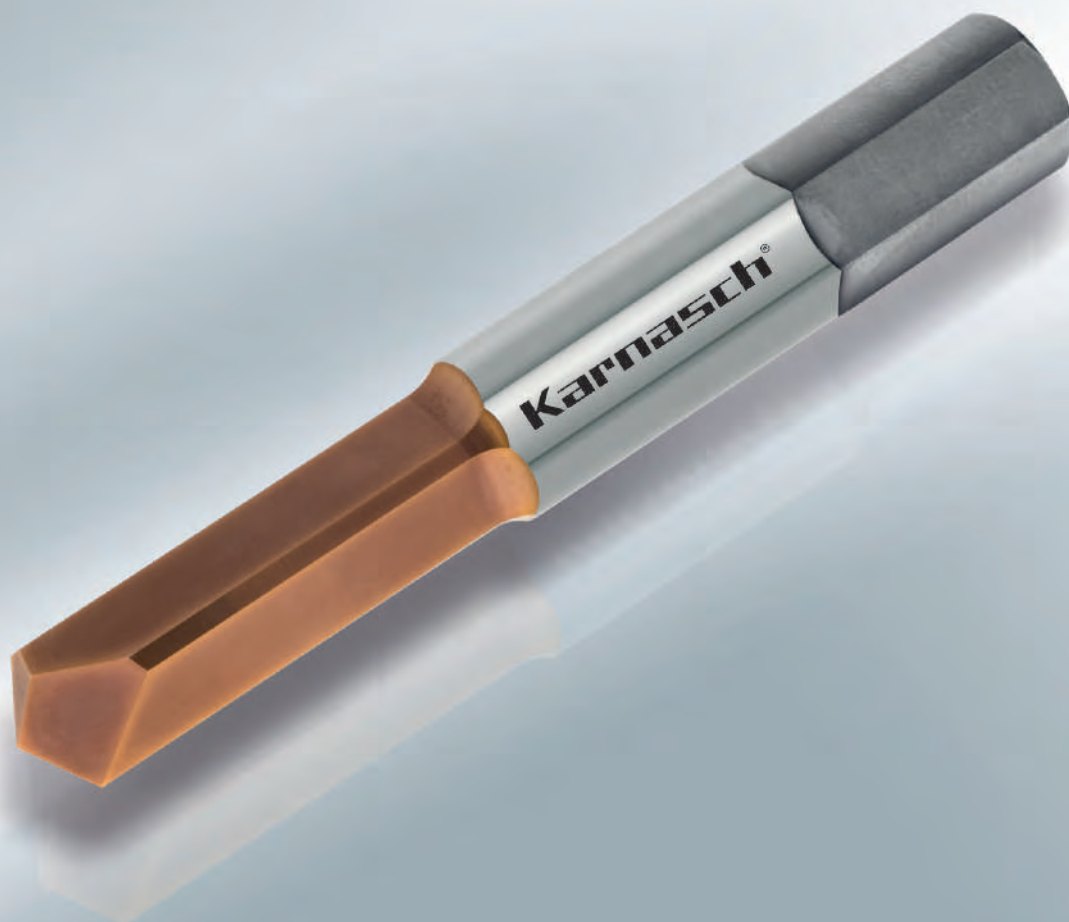
629



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Vollhartmetall Gewindebohrer-Ausbohrer

Solid carbide drills to remove jammed taps



Schnittwerte für Tisch- und Ständerbohrmaschinen

Schmierung: Trocken oder Nass.

Achtung: bei Bearbeitung mit Schmierung besteht Verklebungsgefahr

Drehzahl: 1000–1500 U/min

Bedienungsanleitung

1. Das Werkstück muss sehr stabil eingespannt werden
2. Den überstehenden Teil des Gewindebohrers mit dem Werkstück plan machen
3. Zentrieren des Gewindeausbruchbohrers durch mehrmaliges „An-tippen“. Beim Zentrieren auf einer CNC Maschine, einen geringen Vorschub wählen
4. Der Ausbohrvorgang kann auf einer NC-Maschine mit Schmierung (Achtung: verklebungsgefahr), sowie von Hand auf einer Tisch- oder Ständerbohrmaschine durchgeführt werden. Mehrmaliges entfernen der Späne ist bei allen Maschinen zwingend notwendig.
5. Verbleibende Späne nach dem Ausbohrvorgang mit Druckluft entfernen.
6. Mit einem neuen Gewindebohrer das Gewinde erneut schneiden.
7. Nach der Gewindefertigstellung mit einem Gewindelehrdorn die Maßhaltigkeit prüfen.

Mit einem Gewindeausbruchbohrer können ca. 1–5 Gewinde ausgebohrt werden.

Ein Nachschleifen von Gewindeausbruchbohrern ist nicht rentabel.

Durch den Sechskantschaft kann der Gewindeausbruchbohrer auch in normale Drei- oder Vierbackenfutter eingespannt werden.

Bei richtigem Einsatz wird bei allen Materialien, auch Cu und Al sowie gehärteten Materialien das Kernloch nicht beschädigt.

Cutting data for bench drilling and column drilling machine

Lubrication: Dry or wet (risk of stick together with lubrication)

Speed: 1000–1500 r/min

Operation instruction

1. The workpiece has to be clamped very solid and safe.
2. The overlapping part on the tap has to be made plane with the workpiece.
3. Centering of the drill by multiple tip-centering. In case of tip-centering with NC machine please choose a lower cutting speed.
4. The remove of tap can be made with an NC machine with lubrication (Attention: risk of stick together) also by hand with a bench drilling or column
5. Remove of remaining chippings with compressed air or with a scriber.
6. New thread cutting with a new tap.
7. After finishing the new thread please test the size accuracy.

1–5 taps can be remove with one drill to remove jammed taps. Regrinding of drills to remove jammed taps is not economical. Due to the hexagon this drill can also be clamped in normal three-or-four-jaw chucks.

In case of correct use the core hole will not be damaged in all materials, also in Cu or Al and hardened materials.

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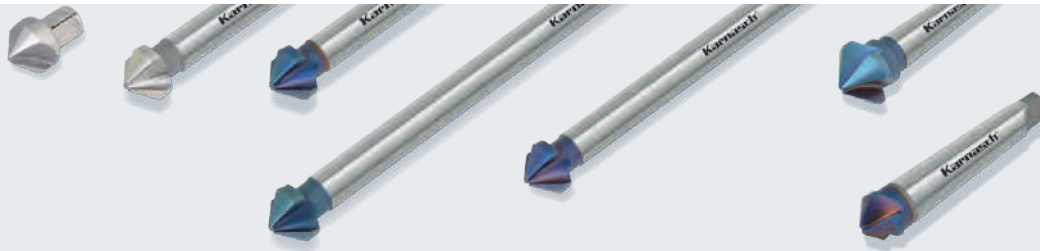


9



3 SENKEN SINKING

KEGELSENKER COUNTERSINKS



3.1

☎ 633-664

FLACHSENKER COUNTERBORES



3.2

☎ 665-668

MEHRFASEN-STUFENBOHRER / KURZSTUFENBOHRER SUBLAND DRILLS / STUB SUBLAND DRILLS



3.3

☎ 669-676

1



2



3



4



5



6



7



8



9

Ihre Notizen & Zeichnungen Your notices & drafts

1



2



3



4



5



6



7

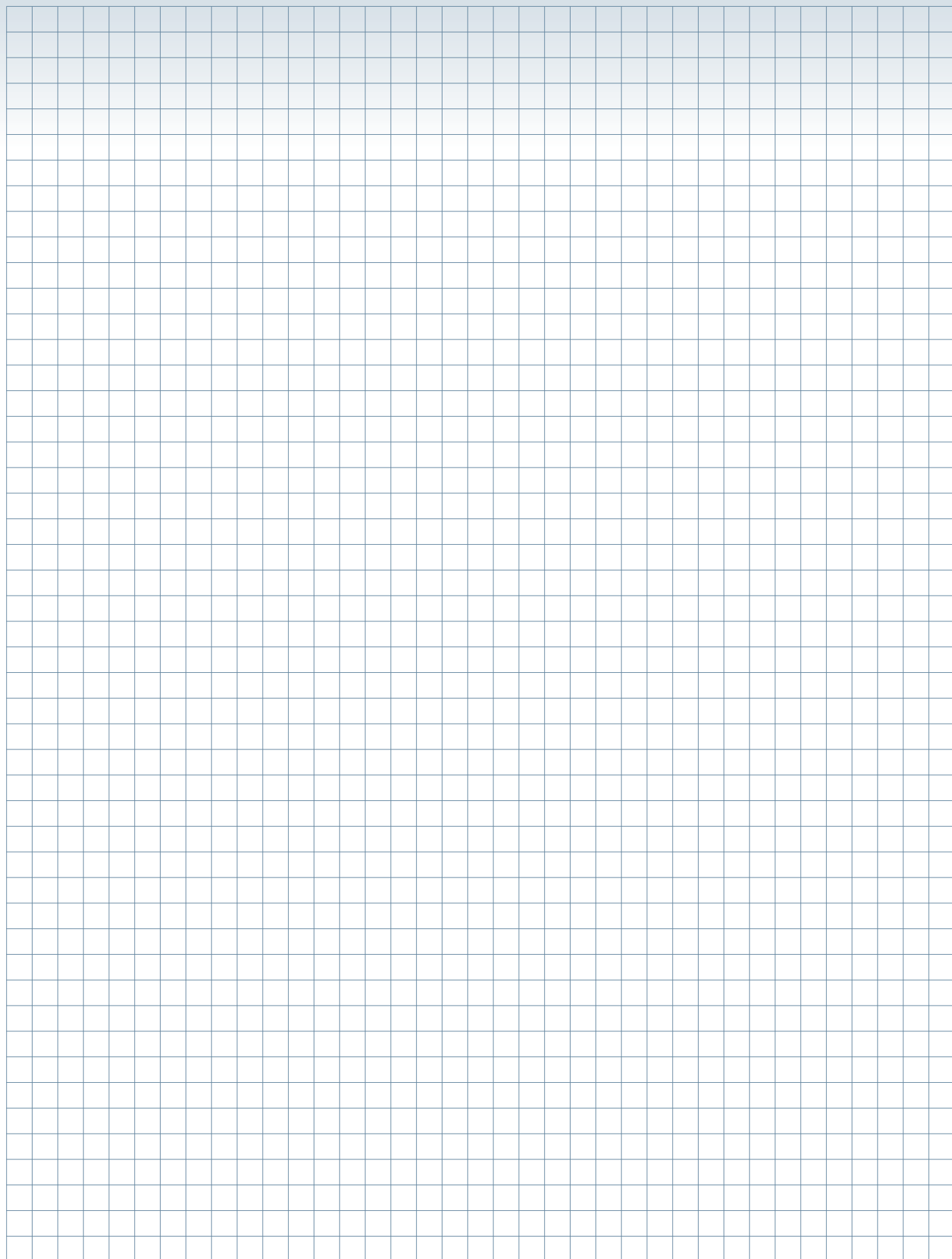


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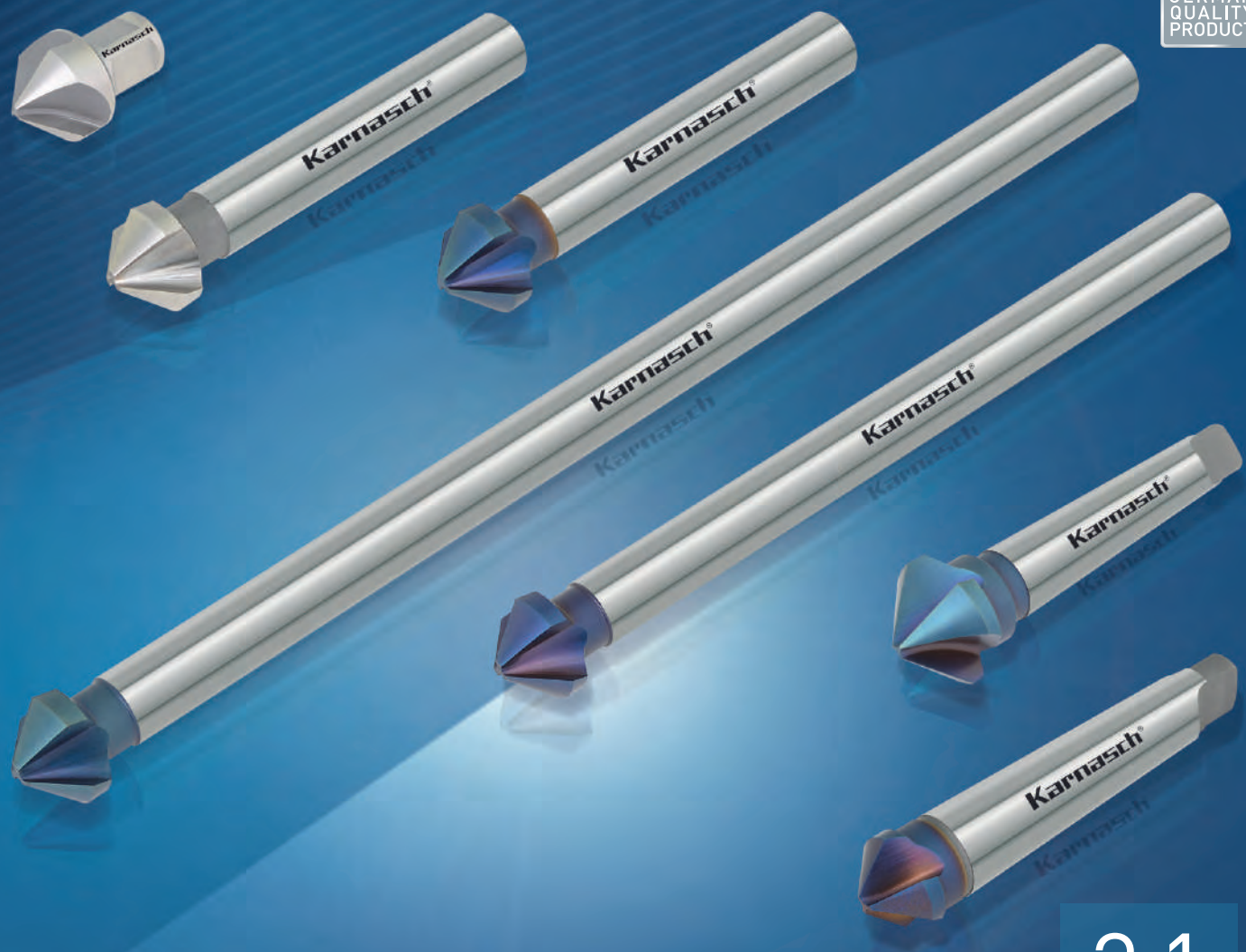
9

Index



KEGELSENKER 60° · 82° · 90° · 120°

COUNTERSINKS 60° · 82° · 90° · 120°



3.1

KONTAKT | CONTACT

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KEGELSENKER COUNTERSINKS



Bei Karnasch Hochleistungs-Kegelsenkern werden die Spannuten prinzipiell CBN-geschliffen. **Dies garantiert:** Hervorragende Spanabfuhr / ratterfreies Arbeiten / riefenfreie Oberfläche / beste Zentriereigenschaften.

The flutes of Karnasch high-performance countersinkers are always CBN ground. **This guarantees:** Excellent chip clearance / chatter-free working / scratch-free surface / best centering.

EIGENSCHAFTEN · PROPERTIES

Schafttoleranz h8
Shank tolerance h8



3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

*** ACHTUNG:** In Umstellung. Noch nicht bei allen Artikeln lieferbar. Falls unbedingt benötigt, bitte vorab anfragen ob bereits lieferbar.

RAPID-CUT Kegelsenker Art. 20 1760 / 20 1765 Seite 652-653 bereits komplett mit 3-Flächenschaft.

Hartmetall-Kegelsenker Art. 20 1755 werden mit zylindrischen Schaft geliefert. Diese Senker werden hauptsächlich in der HIGH-TECH Zerspanung auf CNC-Maschinen mit Schrumpffutter eingesetzt. Hierfür eignet sich nur der zylindrische Schaft.

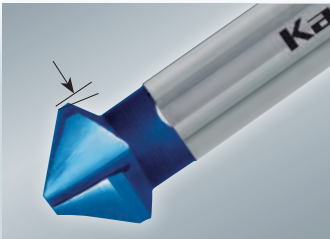
3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output

*** Note:** In conversion. Not yet available for all countersinks. If absolutely needed, please ask in advance if already available.

RAPID-CUT countersinks Art. 20 1760 / 20 1765 page 652-653 already completely with 3-flat shank.

Tungsten carbide countersinks Art. 20 1755 comes with cylindrical shank. This countersink type is used mostly on CNC-machines with shrinking chucks. Shrinking chucks works only with cylindrical shank.



Jeder Durchmesser erhält an seinem Umfang einen Freiwinkel.

Ergebnis:

Der größte Schneidendurchmesser ist somit ebenfalls immer der höchste Punkt.

Each diameter receives its own relief angle.

Result:

The cutting edge is also always the highest point.

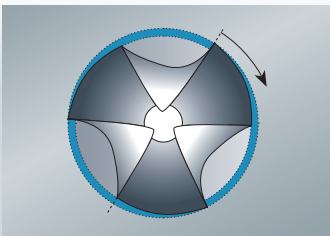


Axialer CBN Hinterschliff.

Ergebnis:

Sauberer Schnitt bei geringer Wärmeentwicklung.

Axial relief produces by CBN grinding leads to a smooth and low-heat cut.



Entsprechend des Durchmessers radial angepasster CBN-Hinterschliff.

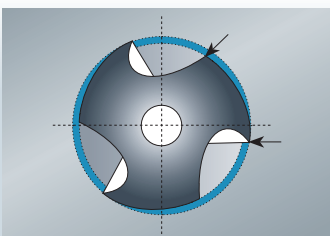
Ergebnis:

Die Schneide ist immer der höchste Punkt im Durchmesser.

According to the diameter radially-adjusted CBN ground relief.

Result:

The cutting edge is always the highest point of the diameter.









CBN-tiefgeschliffene Spannuten ergeben im Gegensatz zu gefrästen Spannuten wesentlich höhere Gratfreiheit und Schärfe. Daraus resultiert eine deutlich höhere Schnittleistung und Standzeit.

CBN deep-ground flutes leads (unlike milled grooves) to significantly smoother and sharper cutting edges. This result is: Higher cutting performance and tool life.

| Ausführung - Model | Eigenschaften | Properties | |
|---|--|--|-----|
| <p>40 4030 </p> <p>Ø 6,3 - 31,5 mm</p>  | <p>HSS-XE Stahl Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Edeltähle (V2A) • Stahl • Guss • Bunt- und Leichtmetalle | <p>HSS-XE steel Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • High-alloyed chromium steel such as stainless (V2A) • Steel • Cast iron • Non ferrous metals | 638 |
| <p>40 3030 </p> <p>Ø 6,3 - 31,5 mm</p>  | <p>HSS-XE Stahl + BLUE-TEC beschichtet Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle. BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Edeltähle (V2A / V4A) • Stahl • Guss • Bunt- und Leichtmetalle | <p>HSS-XE steel + BLUE-TEC coated Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel. BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • High-alloyed chromium steel such as stainless (V2A / V4A) • Acid resistant steel • Steel • Cast iron • Non ferrous metals | 639 |
| <p>40 4035 </p> <p>Ø 25,0 - 80,0 mm</p>  | <p>Kegelsenker mit Morsekonus HSS-XE Stahl Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Edeltähle (V2A) • Stahl • Guss • Bunt- und Leichtmetalle | <p>Countersinks with morse taper HSS-XE steel Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • High-alloyed chromium steel such as stainless (V2A) • Steel • Cast iron • Non ferrous metals | 640 |
| <p>40 3035 </p> <p>Ø 25,0 - 80,0 mm</p>  | <p>Kegelsenker mit Morsekonus HSS-XE Stahl + BLUE-TEC beschichtet Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle. BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Edeltähle (V2A / V4A) • Stahl • Guss • Bunt- und Leichtmetalle | <p>Countersinks with morse taper HSS-XE steel + BLUE-TEC coated Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel. BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • High-alloyed chromium steel such as stainless (V2A / V4A) • Acid resistant steel • Steel • Cast iron • Non ferrous metals | 641 |

HOCHLEISTUNGS-KEGELSENKER
HIGH-PERFORMANCE COUNTERSINKS

| | | | |
|--|---|--|-----|
| <p>20 1780 </p> <p>Ø 1/4 - 1"</p>  | <p>HSS-XE Stahl Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Edeltähle (V2A) • Stahl • Guss • Bunt- und Leichtmetalle | <p>HSS-XE steel Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • High-alloyed chromium steel such as stainless (V2A) • Steel • Cast iron • Non ferrous metals | 642 |
| <p>20 1785 </p> <p>Ø 1/4 - 1"</p>  | <p>HSS-XE Stahl + BLUE-TEC beschichtet Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle. BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Edeltähle (V2A / V4A) • Stahl • Guss • Bunt- und Leichtmetalle | <p>HSS-XE steel + BLUE-TEC coated Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel. BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • High-alloyed chromium steel such as stainless (V2A / V4A) • Acid resistant steel • Steel • Cast iron • Non ferrous metals | 643 |
| <p>20 1776 045 </p> <p>Ø 1.49/64"</p>  | <p>Hartmetall-bestückt für höchste Standzeiten</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Abrasive & harte Stähle über 1000 N/mm² • Grauguss (GG) über 240 HB • Rost- und säurebeständige Stähle • Titan- und Titanlegierungen • Alle weiteren Stähle, Guss und Leichtmetalle | <p>Tungsten Carbide tipped for maximum tool life</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • Abrasive & hard steel with a strength of over 1000 N/mm² • Grey cast iron over 240 HB • High-alloyed chromium steel such as stainless (V2A/V4A) • Acid resistant steel • Titanium and titanium alloys • All further steel sorts, cast iron, non ferrous metals | 644 |

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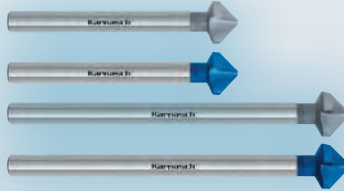













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| Ausführung · Model | Eigenschaften | Properties | |
|---|--|---|-----|
| <p>20 1740 </p> <p>Ø 4,3 - 40,0 mm</p>  <p>BEST SELLER</p> | <p>HSS-XE Stahl Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Edelstähle (V2A) • Stahl • Guss • Bunt- und Leichtmetalle | <p>HSS-XE steel Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • High-alloyed chromium steel such as stainless (V2A) • Steel • Cast iron • Non ferrous metals | 646 |
| <p>20 1745 </p> <p>Ø 4,3 - 40,0 mm</p>  | <p>HSS-XE Stahl + BLUE-TEC beschichtet Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle. BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Edelstähle (V2A / V4A) • Stahl • Guss • Bunt- und Leichtmetalle | <p>HSS-XE steel + BLUE-TEC coated Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel. BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • High-alloyed chromium steel such as stainless (V2A / V4A) • Acid resistant steel • Steel • Cast iron • Non ferrous metals | 647 |
| <p>20 1750 </p> <p>Ø 6,3 - 31,0 mm</p>  | <p>ASP-Pulverstahl + BLUE-TEC beschichtet Gefertigt aus pulvermetallurgischen Schnellarbeitsstahl. Für wesentlich höhere Standzeiten gegenüber HSS-XE Stahl. BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Edelstähle (V2A / V4A) • Rost- und säurebeständige Stähle • Titan und Titanlegierungen • Alle weiteren Stähle, Guss und Leichtmetalle ... wenn hohe Standzeiten erforderlich sind. | <p>ASP-Powder steel + BLUE-TEC coated Made of powder metallurgy High speed steel. For considerably longer service life than HSS-XE steel. BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • High-alloyed chromium steel such as stainless (V2A / V4A) • Acid resistant steel • Titanium and titanium alloys • All further steel sorts, cast iron, ... non ferrous metals where high tool life are desired. | 648 |
| <p>20 1755 </p> <p>Ø 6,3 - 31,0 mm</p>  | <p>Vollhartmetall + BLUE-TEC beschichtet Gefertigt aus Vollhartmetall für höchste Standzeiten auch bei schwierigsten Materialien. BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung) Ø 4,3-11,5 mm komplett aus Vollhartmetall Ø 12,4-31 mm Schaft gelötet</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Abrasive und harte Stähle über 1000 N/mm² • Grauguss (GG) über 240 HB • Rost- und säurebeständige Stähle • Titan und Titanlegierungen • Alle weiteren Stähle, Guss und Leichtmetalle ... wenn höchste Standzeiten erforderlich sind. | <p>Solid carbide + BLUE-TEC coated Made of solid carbide for maximum tool life, even in most difficult materials. BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling) Ø 4,3-11,5 mm solid carbide Ø 12,4-31 mm brazed shank</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • Abrasive and hard steel with a strength of over 1000 N/mm² • Grey cast iron over 240 HB • High-alloyed chromium steel such as stainless (V2A / V4A) • Acid resistant steel • Titanium and titanium alloys • All further steel sorts, cast iron, non ferrous metals ... where maximum tool life are desired. | 649 |
| <p>40 3045   </p> <p>Ø 10,4 - 31,0 mm</p>  | <p>Vollhartmetall + BLUE-TEC beschichtet, 4 + 5 Schneiden, für schwerste zerspanbare Materialien BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung) Ø 10,4 mm komplett aus Vollhartmetall Ø 12,4-31,0 mm Schaft gelötet</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Gehärtete Stähle bis 1400 N/mm² • Stähle bis zu 60 HRC • Rost- und Säurebeständige Stähle über 900 N/mm² • Alle Gussarten • Graphit, Kohle- und Glasfaserverbundstoffe • Exotische Materialien über 850 N/mm² wie Nimonic, Inconel, Hastelloy • Hervorragend auch für Hardox 500 geeignet | <p>Solid carbide + BLUE-TEC coated, 4 + 5 cuts for difficult machine materials BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling) Ø 10,4 mm solid carbide Ø 12,4-31,0 mm brazed shank</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • Hardened steel up to 1400 N/mm² • Steel up to 60 HRC • Acid resistant steel • All cast iron types • Graphite, carbon- and glass fibre reinforced plastics • Exotic materials over 850 N/mm² such as nimonic, Inconel, hastelloy • Excellent also for hardox 500 | 651 |

| Ausführung - Model | Eigenschaften | Properties | |
|---|--|---|---|
| <p>20 1760 20 1765</p> <p>Ø 6,3 - 25,0 mm</p>  | <p>Spezielle Kegelsenker RAPID-CUT für automatischen und schnellen Vorschub entwickelt in HSS-XE + BLUE-TEC Qualität.</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Edeltähle (V2A / V4A) • Stahl • Guss • Bunt- und Leichtmetalle | <p>Specially developed countersinks RAPID-CUT for automatic and quick feed in quality HSS-XE + BLUE-TEC coated</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • High-alloyed chromium steel such as stainless (V2A / V4A) • Acid resistant steel • Steel • Cast iron • Non ferrous metals | <p>652-653</p>   |
| <p>20 1720 20 1770</p> <p>20 1725 20 1775</p> <p>Ø 6,3 - 25,0 mm</p>  | <p>Lange und extra lange Kegelsenker in Qualität HSS-XE + BLUE-TEC beschichtet</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Edeltähle (V2A / V4A) • Stahl • Guss • Bunt- und Leichtmetalle | <p>Long and extra long countersinks in quality HSS-XE + BLUE-TEC coated</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • High-alloyed chromium steel such as stainless (V2A / V4A) • Acid resistant steel • Steel • Cast iron • Non ferrous metals | <p>654-657</p>   |
| <p>20 1790 20 1795</p> <p>Ø 20,5 - 80,0 mm</p>  | <p>Kegelsenker mit Morsekonus in Qualität HSS-XE + BLUE-TEC beschichtet</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Edeltähle (V2A / V4A) • Stahl • Guss • Bunt- und Leichtmetalle | <p>Countersinks with morse taper in quality HSS-XE + BLUE-TEC coated</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • High-alloyed chromium steel such as stainless (V2A / V4A) • Acid resistant steel • Steel • Cast iron • Non ferrous metals | <p>658-659</p>     |
| <p>20 1295 20 1195</p> <p>20 1796 040</p>  | <p>HSS Kegelsenker mit Weldonschaft · 19 mm · 3/4" · Hartmetall-bestückt + Führungsstifte</p> | <p>HSS Countersinks with Weldon shank · 19 mm · 3/4" · carbide-tipped + pilots</p> | <p>660</p>   |
| <p>20 1786 045</p> <p>Ø 45 mm</p>  | <p>Hartmetall-bestückt für höchste Standzeiten</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Abrasive und harte Stähle über 1000 N/mm² • Grauguss (GG) über 240 HB • Rost- und säurebeständige Stähle • Titan- und Titanlegierungen • Alle weiteren Stähle, Guss und Leichtmetalle | <p>Tungsten Carbide tipped for maximum tool life</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • Abrasive & hard steel with a strength of over 1000 N/mm² • Grey cast iron over 240 HB • High-alloyed chromium steel such as stainless (V2A/V4A) • Acid resistant steel • Titanium and titanium alloys • All further steel sorts, cast iron, non ferrous metals | <p>661</p>   |

HOCHLEISTUNGS-KEGELSENKER
HIGH-PERFORMANCE COUNTERSINKS

| | | | |
|---|--|---|--|
| <p>40 4040</p> <p>Ø 6,3 - 25,0 mm</p>  | <p>HSS-XE Stahl</p> <p>Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Edeltähle (V2A) • Stahl • Guss • Bunt- und Leichtmetalle | <p>HSS-XE steel</p> <p>Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • High-alloyed chromium steel such as stainless (V2A) • Steel • Cast iron • Non ferrous metals | <p>662</p>   |
| <p>40 3040</p> <p>Ø 6,3 - 25,0 mm</p>  | <p>HSS-XE Stahl + BLUE-TEC beschichtet</p> <p>Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle. BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)</p> <p>Zum Senken in folgende Materialien:</p> <ul style="list-style-type: none"> • Edeltähle (V2A / V4A) • Stahl • Guss • Bunt- und Leichtmetalle | <p>HSS-XE steel + BLUE-TEC coated</p> <p>Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel. BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)</p> <p>For countersinking in materials:</p> <ul style="list-style-type: none"> • High-alloyed chromium steel such as stainless (V2A / V4A) • Acid resistant steel • Steel • Cast iron • Non ferrous metals | <p>663</p>    |

40 4030

HSS-XE Kegel- und Entgratsenker DIN 334 Form C 60°, 3-Flächen-Schaft
HSS-XE taper and deburring countersink DIN 334 type C 60°, 3-flat-shank



ANWENDUNG · APPLICATION

| | | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 900 N | < 900 N | | > 10% Si | | | | |



| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | € |
|--------------|---------|---------|-------|---------|---|-------|
| 40 4030 0063 | 6,3 | 1,6 | 45,0 | 5,0 | 3 | 8,60 |
| 40 4030 0080 | 8,0 | 2,0 | 50,0 | 6,0 | 3 | 9,10 |
| 40 4030 0100 | 10,0 | 2,5 | 53,0 | 6,0 | 3 | 9,50 |
| 40 4030 0125 | 12,5 | 3,2 | 56,0 | 8,0 | 3 | 11,30 |

| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | € |
|--------------|---------|---------|-------|---------|---|-------|
| 40 4030 0160 | 16,0 | 4,0 | 63,0 | 10,0 | 3 | 14,35 |
| 40 4030 0200 | 20,0 | 5,0 | 67,0 | 10,0 | 3 | 16,35 |
| 40 4030 0250 | 25,0 | 6,3 | 71,0 | 10,0 | 3 | 20,60 |
| 40 4030 0315 | 31,5 | 10,0 | 76,0 | 12,0 | 3 | 28,30 |

SETS · SETS

| | | | |
|--|-------------------------------|--|-------------------------------|
| Inhalt Content | 40 4090 030 € 69,50 | Inhalt Content | 40 4090 040 € 69,70 |
| Ø 6,3 · 8,0 · 10,0 · 12,5 · 16,0 · 20,0 mm (40 4030) | | Ø 6,3 · 10,0 · 16,0 · 20,0 · 25 mm (40 4030) | |

LEERE SETS ZUM SELBST BESTÜCKEN EMPTY SETS FOR SELF EQUIPMENT

| | | | |
|--|--------------------------|------------------------------------|--------------------------|
| Inhalt Content | 21 0042 € 6,55 | Inhalt Content | 21 0043 € 6,55 |
| Ø 6,3 · 8,3 · 10,4 · 12,4 · 16,5 · 20,5 mm | | Ø 6,3 · 10,4 · 16,5 · 20,5 · 25 mm | |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

60° Kegelsenker sind besonders geeignet zum Ansenken von Gewindekernlöchern und für Ansenkungen im Werkzeug- und Vorrichtungsbau.

Zum Senken in folgende Materialien:

- Edelstähle (V2A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

HSS-XE steel

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

60° countersinks are particularly suitable for countersinking in threaded core holes and countersinking in the tool making / jig making industry.

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A)
- Steel
- Cast iron
- Non ferrous metals

3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output

Schnittdaten
Cutting data

Film
Movie



1317



Index

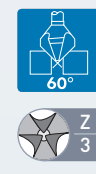
HSS-XE + BLUE-TEC beschichteter Kegel- und Entgratsenker DIN 334 Form C 60°, 3-Flächen-Schaft
 HSS-XE + BLUE-TEC coated taper and deburring countersink DIN 334 type C 60°, 3-flat-shank



40 3030

ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|-----|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 1100 N | < 900 N | > 10% Si | | | | | |



| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | € |
|--------------|---------|---------|-------|---------|---|-------|
| 40 3030 0063 | 6,3 | 1,6 | 45,0 | 5,0 | 3 | 15,20 |
| 40 3030 0080 | 8,0 | 2,0 | 50,0 | 6,0 | 3 | 15,70 |
| 40 3030 0100 | 10,0 | 2,5 | 53,0 | 6,0 | 3 | 16,10 |
| 40 3030 0125 | 12,5 | 3,2 | 56,0 | 8,0 | 3 | 18,65 |

| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | € |
|--------------|---------|---------|-------|---------|---|-------|
| 40 3030 0160 | 16,0 | 4,0 | 63,0 | 10,0 | 3 | 21,70 |
| 40 3030 0200 | 20,0 | 5,0 | 67,0 | 10,0 | 3 | 23,70 |
| 40 3030 0250 | 25,0 | 6,3 | 71,0 | 10,0 | 3 | 28,80 |
| 40 3030 0315 | 31,5 | 10,0 | 76,0 | 12,0 | 3 | 36,50 |

SETS · SETS

40 3090 030
 Inhalt Content
 € 110,00
 Ø 6,3 · 8,0 · 10,0 · 12,5 · 16,0 · 20,0 mm (40 3030)

40 3090 040
 Inhalt Content
 € 104,65
 Ø 6,3 · 10,0 · 16,0 · 20,0 · 25 mm (40 3030)

**LEERE SETS ZUM SELBST BESTÜCKEN
 EMPTY SETS FOR SELF EQUIPMENT**

21 0042
 Inhalt Content
 € 6,55
 Ø 6,3 · 8,3 · 10,4 · 12,4 · 16,5 · 20,5 mm

21 0043
 Inhalt Content
 € 6,55
 Ø 6,3 · 10,4 · 16,5 · 20,5 · 25 mm

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + BLUE-TEC beschichtet

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.
 BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (lohne/wenig Kühlung)

60° Kegelsenker sind besonders geeignet zum Ansenken von Gewindekernlöchern und für Ansenkungen im Werkzeug- und Vorrichtungsbau.

Zum Senken in folgende Materialien:

- Edelstähle (V2A / V4A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

HSS-XE steel + BLUE-TEC coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

60° countersinks are particularly suitable for countersinking in threaded core holes and countersinking in the tool making / jig making industry.

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Steel
- Cast iron
- Non ferrous metals

3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output

Schnittdaten
Cutting data



1317

Film
Movie



639



40 4035

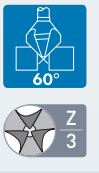
HSS-XE Kegel- und Entgratsenker DIN 334 Form D 60°, Morsekonus
HSS-XE taper and deburring countersink DIN 334 type D 60°, morse taper



ANWENDUNG · APPLICATION

| | | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 900 N | < 900 N | | > 10% Si | | | | |

Morsekonus Morse taper 2 / 3 / 4



| Art. | d1 Ø mm | d3 Ø mm | L1 mm | Z | Schaft · Shank Morsekonus MK Morse taper MT | € |
|--------------|---------|---------|-------|---|---|-------|
| 40 4035 0200 | 20,0 | 5,0 | 106,0 | 3 | MK / MT 2 | 13,85 |
| 40 4035 0250 | 25,0 | 6,3 | 112,0 | 3 | MK / MT 2 | 15,50 |
| 40 4035 0315 | 31,5 | 10,0 | 118,0 | 3 | MK / MT 2 | 38,05 |
| 40 4035 0400 | 40,0 | 12,5 | 150,0 | 3 | MK / MT 3 | 56,80 |

| Art. | d1 Ø mm | d3 Ø mm | L1 mm | Z | Schaft · Shank Morsekonus MK Morse taper MT | € |
|--------------|---------|---------|-------|---|---|--------|
| 40 4035 0500 | 50,0 | 16,0 | 160,0 | 3 | MK / MT 3 | 83,05 |
| 40 4035 0630 | 63,0 | 20,0 | 190,0 | 3 | MK / MT 4 | 133,20 |
| 40 4035 0800 | 80,0 | 25,0 | 200,0 | 3 | MK / MT 4 | 224,55 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

60° Kegelsenker sind besonders geeignet zum Ansenken von Gewindekernlöchern und für Ansenkungen im Werkzeug- und Vorrichtungsbau.

Zum Senken in folgende Materialien:

- Edelstähle (V2A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

HSS-XE steel

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

60° countersinks are particularly suitable for countersinking in threaded core holes and countersinking in the tool making / jig making industry.

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A)
- Steel
- Cast iron
- Non ferrous metals

Schnittdaten
Cutting data

Film
Movie



1317



HSS-XE + BLUE-TEC beschichteter Kegel- und Entgratsenker DIN 334 Form D 60°, Morsekonus
 HSS-XE + BLUE-TEC coated taper and deburring countersink DIN 334 type D 60°, morse taper

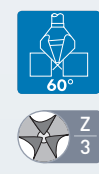


40 3035

ANWENDUNG · APPLICATION

| | | | | | | | |
|----------------|------------------------|----------------------------|------------|---|---|---------------|---------------|
| | | | | | | | |
| Stahl Steel | Edelstahl Stainless | Grauguss Grey cast iron | Alu Alu | Kupfer, Messing, Zinn Copper, brass, tin | Kunststoffe GFK/CFK Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 1100 N | < 900 N | | > 10% Si | | | | |

Morsekonus
Morse taper
2 / 3 / 4



| Art. | d1 Ø mm | d3 Ø mm | l1 mm | Z | Schaft · Shank Morsekonus MK Morse taper MT | € |
|--------------|------------|------------|----------|---|---|-------|
| 40 3035 0200 | 20,0 | 5,0 | 106,0 | 3 | MK / MT 2 | 17,50 |
| 40 3035 0250 | 25,0 | 6,3 | 112,0 | 3 | MK / MT 2 | 19,60 |
| 40 3035 0315 | 31,5 | 10,0 | 118,0 | 3 | MK / MT 2 | 46,30 |
| 40 3035 0400 | 40,0 | 12,5 | 150,0 | 3 | MK / MT 3 | 77,50 |

| Art. | d1 Ø mm | d3 Ø mm | l1 mm | Z | Schaft · Shank Morsekonus MK Morse taper MT | € |
|--------------|------------|------------|----------|---|---|--------|
| 40 3035 0500 | 50,0 | 16,0 | 160,0 | 3 | MK / MT 3 | 106,65 |
| 40 3035 0630 | 63,0 | 20,0 | 190,0 | 3 | MK / MT 4 | 172,50 |
| 40 3035 0800 | 80,0 | 25,0 | 200,0 | 3 | MK / MT 4 | 293,35 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + BLUE-TEC beschichtet

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

60° Kegelsenker sind besonders geeignet zum Ansenken von Gewindekernlöchern und für Ansenkungen im Werkzeug- und Vorrichtungsbau.

Zum Senken in folgende Materialien:

- Edelstähle (V2A / V4A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

HSS-XE steel + BLUE-TEC coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

60° countersinks are particularly suitable for countersinking in threaded core holes and countersinking in the tool making / jig making industry.

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Steel
- Cast iron
- Non ferrous metals

Schnittdaten
Cutting data



1317

Film
Movie



641



Index

20 1780

HSS-XE Kegelsenker Form C 82°, 3-Flächen-Schaft
HSS-XE countersink type C 82°, 3-flat-shank



ANWENDUNG · APPLICATION

| | | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 900 N | < 900 N | | > 10% Si | | | | |



| Art. | d1 Ø Zoll/inch | d1 Ø mm | d3 Ø Zoll/inch | d3 Ø mm | l1 Zoll/inch | l1 mm | d2 Ø Zoll/inch | d2 Ø mm | Z | € |
|-------------|-------------------|------------|-------------------|------------|-----------------|----------|-------------------|------------|---|-------|
| 20 1780 010 | • 1/4" | 6,3 | 0,059" | 1,5 | 1.49/64" | 45 | 3/16" | 5 | 3 | 8,60 |
| 20 1780 020 | • 5/16" | 8,0 | 0,078" | 2 | 1.31/32" | 50 | 1/4" | 6 | 3 | 9,10 |
| 20 1780 030 | • 3/8" | 9,4 | 0,087" | 2,2 | 1.31/32" | 50 | 1/4" | 6 | 3 | 9,50 |
| 20 1780 040 | • 1/2" | 12,4 | 0,11" | 2,8 | 2.13/64" | 56 | 5/16" | 8 | 3 | 11,30 |
| 20 1780 050 | • 5/8" | 16,0 | 0,126" | 3,2 | 2.23/64" | 60 | 3/8" | 10 | 3 | 14,35 |
| 20 1780 060 | • 3/4" | 19,0 | 0,138" | 3,5 | 2.31/64" | 63 | 3/8" | 10 | 3 | 16,35 |
| 20 1780 070 | • 7/8" | 22,0 | 0,15" | 3,8 | 2.41/64" | 67 | 3/8" | 10 | 3 | 20,60 |
| 20 1780 080 | • 1" | 25,0 | 0,15" | 3,8 | 2.41/64" | 67 | 3/8" | 10 | 3 | 20,60 |

SETS · SETS

Inhalt
Content

20 1695
• € 69,50

Ø 1/4", 5/16", 3/8",
1/2", 5/8", 3/4"



Inhalt
Content

20 1696
• € 69,70

Ø 1/4", 3/8", 5/8",
3/4", 1"



LEERE SETS ZUM SELBST BESTÜCKEN EMPTY SETS FOR SELF EQUIPMENT

Inhalt
Content

21 0042
• € 6,55

Ø 1/4", 5/16", 3/8",
1/2", 5/8", 3/4"



Inhalt
Content

21 0043
• € 6,55

Ø 1/4", 3/8", 5/8",
3/4", 1"



EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

Zum Senken in folgende Materialien:

- Edelstähle (V2A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

HSS-XE steel

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A)
- Steel
- Cast iron
- Non ferrous metals

3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output

Schnittdaten
Cutting data

Film
Movie



1317



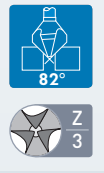
HSS-XE + BLUE-TEC beschichteter Kegelsenker Form C 82°, 3-Flächen-Schaft
 HSS-XE + BLUE-TEC coated countersink type C 82°, 3-flat-shank



20 1785

ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 1100 N | < 900 N | | > 10% Si | | | | |



| Art. | d1 Ø Zoll/Inch | d1 Ø mm | d3 Ø Zoll/Inch | d3 Ø mm | l1 Zoll/Inch | l1 mm | d2 Ø Zoll/Inch | d2 Ø mm | Z | € |
|-------------|-------------------|------------|-------------------|------------|-----------------|----------|-------------------|------------|---|-------|
| 20 1785 010 | • 1/4" | 6,3 | 0,059" | 1,5 | 1.49/64" | 45 | 3/16" | 5 | 3 | 15,20 |
| 20 1785 020 | • 5/16" | 8,0 | 0,078" | 2 | 1.31/32" | 50 | 1/4" | 6 | 3 | 15,70 |
| 20 1785 030 | • 3/8" | 9,4 | 0,087" | 2,2 | 1.31/32" | 50 | 1/4" | 6 | 3 | 16,10 |
| 20 1785 040 | • 1/2" | 12,4 | 0,11" | 2,8 | 2.13/64" | 56 | 5/16" | 8 | 3 | 18,65 |
| 20 1785 050 | • 5/8" | 16,0 | 0,126" | 3,2 | 2.23/64" | 60 | 3/8" | 10 | 3 | 21,70 |
| 20 1785 060 | • 3/4" | 19,0 | 0,138" | 3,5 | 2.31/64" | 63 | 3/8" | 10 | 3 | 23,70 |
| 20 1785 070 | • 7/8" | 22,0 | 0,15" | 3,8 | 2.41/64" | 67 | 3/8" | 10 | 3 | 28,00 |
| 20 1785 080 | • 1" | 25,0 | 0,15" | 3,8 | 2.41/64" | 67 | 3/8" | 10 | 3 | 28,80 |

SETS · SETS

20 1697
 Inhalt Content
 € 110,00
 Ø 1/4", 5/16", 3/8", 1/2", 5/8", 3/4"

20 1698
 Inhalt Content
 € 104,65
 Ø 1/4", 3/8", 5/8", 3/4", 1"

**LEERE SETS ZUM SELBST BESTÜCKEN
 EMPTY SETS FOR SELF EQUIPMENT**

21 0042
 Inhalt Content
 € 6,55
 Ø 1/4", 5/16", 3/8", 1/2", 5/8", 3/4"

21 0043
 Inhalt Content
 € 6,55
 Ø 1/4", 3/8", 5/8", 3/4", 1"

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + BLUE-TEC beschichtet

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.
 BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

Zum Senken in folgende Materialien:

- Edelstähle (V2A / V4A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

HSS-XE steel + BLUE-TEC coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

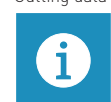
For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Steel
- Cast iron
- Non ferrous metals

3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output

Schnittdaten
Cutting data



1317

Film
Movie



643





20 1776 045 • € 126,05



ANWENDUNG · APPLICATION

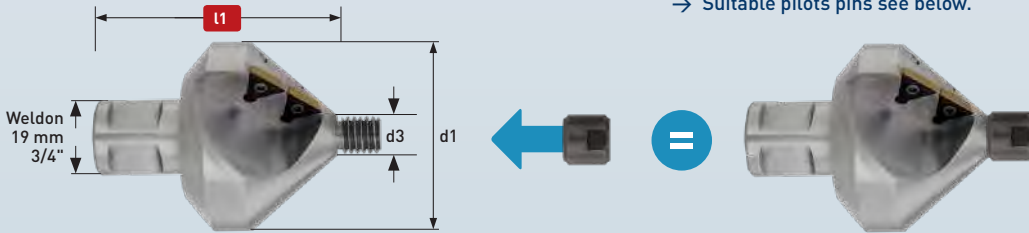
| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, exotische Materialien | Hardox 400 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials | Hardox 400 |
| < 1400 N | < 900 N | | > 10% Si | | | | |

Der Kegelsenker wird geliefert mit:

- 4 Stück Hartmetall-Einsätze beschichtet inkl. 4 TORX Befestigungsschrauben sowie 1 TORX Befestigungsschlüssel komplett montiert.
- Die dreieckigen Einsätze sind drehbar. Somit sind alle 3 Schneidflächen einsetzbar für 3-fache Standzeit.
- **Passende Führungsstifte siehe unten.**

The countersinks comes inclusive:

- 4 pieces carbide inserts coated incl. 4 TORX mounting screws and 1 TORX wrench. Fully assembled.
- The triangular inserts are rotatable. This means that all 3 cutting surfaces can be used for 3 times more lifetime.
- **Suitable pilots pins see below.**

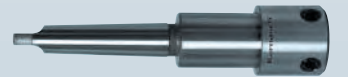


| d1 | d1 | d3 | d3 | Gesamtlänge L1 | |
|-------------|------|-------------|------|----------------|----|
| Ø Zoll/Inch | Ø mm | Ø Zoll/Inch | Ø mm | Zoll/Inch | mm |
| 1.49/64" | 45 | 3/8" | 10 | 2.53/64" | 72 |

Passende Morsekonusaufnahmen

siehe Seite 521-523

Suitable morse taper see page 521-523



Schnittdaten
Cutting data



EIGENSCHAFTEN · PROPERTIES

Hartmetall-bestückt für höchste Standzeiten auch bei schwierigsten Materialien.

Ideal zum Senken in:

- Abrasive und harte Stähle über 1000 N/mm²
- Grauguss (GG) über 240 HB
- Rost- und säurebeständige Stähle
- Titan- und Titanlegierungen
- Alle weiteren Stähle, Guss und Leichtmetalle wo höchste Standzeiten erwünscht sind.

Tungsten Carbide tipped for maximum tool life, even in most difficult materials.

For countersinking in:

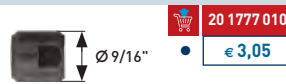
- Abrasive and hard steel with a strength of over 1000 N/mm²
- Grey cast iron over 240 HB
- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Titanium and titanium alloys
- All further steel sorts, cast iron, non ferrous metals where maximum tool life are desired.

Die Führungsstifte ergeben hervorragende Stabilität und Genauigkeit. Sollte ohne Führungsbohrer gearbeitet werden, bitte den Kegelsenker 100% mittig zur Bohrung ausrichten.

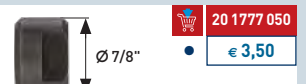
The pilots gives great stability and accuracy. If drilling without pilots, please take care, that the countersink is adjusted absolutely centrally to the drilled hole.



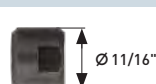
FÜHRUNGSSTIFTE · PILOTS



20 1777 010
• € 3,05



20 1777 050
• € 3,50



20 1777 020
• € 3,05



20 1777 060
• € 4,20



20 1777 030
• € 3,05



20 1777 070
• € 4,20

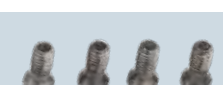


20 1777 040
• € 3,05

ERSATZTEILE · SPARE PARTS



Auswechselbare Platten
Packnorm 4 Stück
Carbide inserts
Packing unit 4 pcs.
20 1787 110
• € 41,55

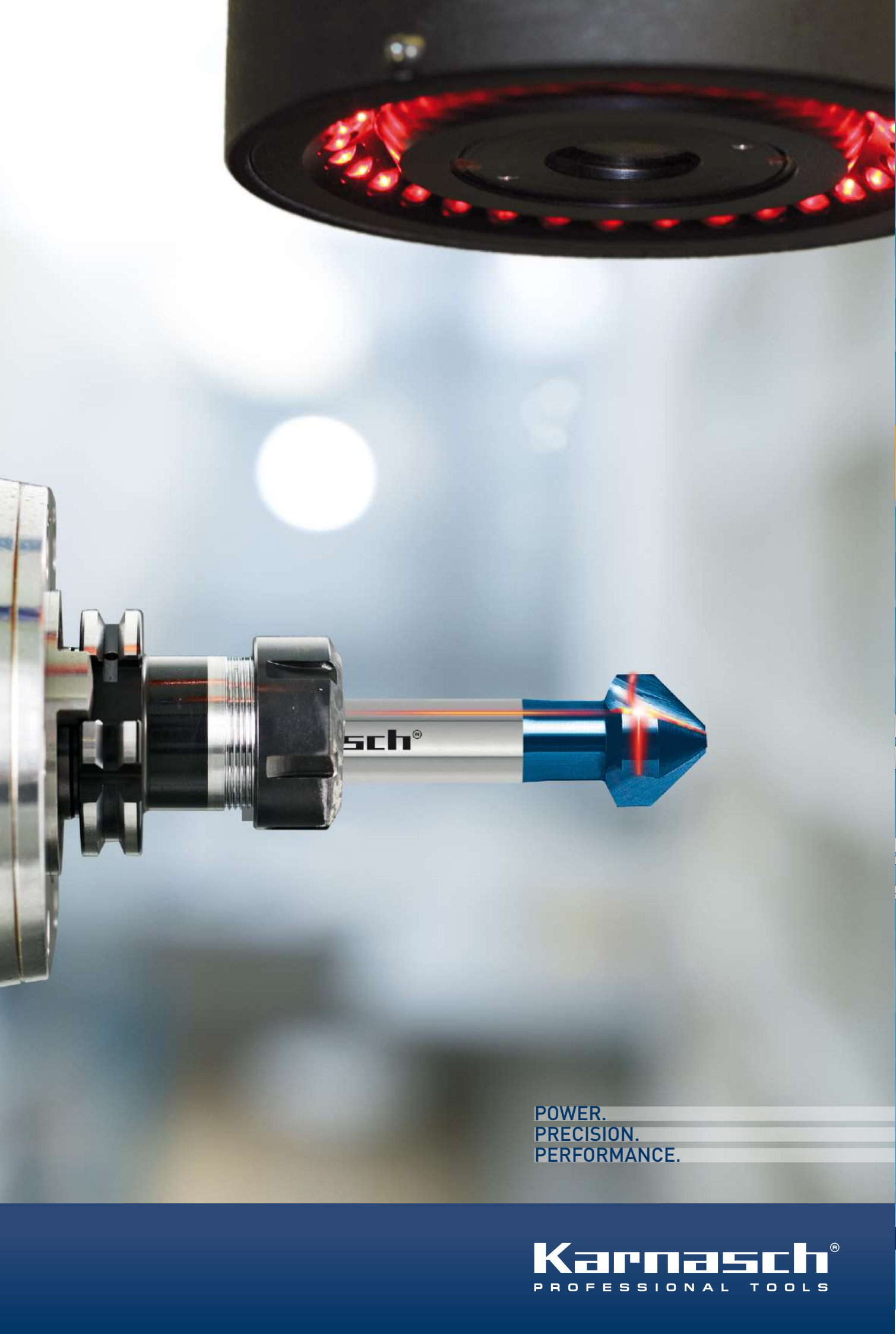


4x TORX Befestigungsschrauben
Packnorm 4 Stück
4x TORX mounting screw
Packing unit 4 pcs.
20 1787 120
• € 14,90



1x Befestigungsschlüssel
1x TORX wrench
22 9011 0175
• € 9,90





POWER.
PRECISION.
PERFORMANCE.

Karnasch[®]
PROFESSIONAL TOOLS

20 1740

HSS-XE Kegelsenker DIN 335 Form C 90°, 3-Flächen-Schaft
HSS-XE countersink DIN 335 type C 90°, 3-flat-shank



ANWENDUNG · APPLICATION

| | | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 900 N | < 900 N | | > 10% Si | | | | |



Bestseller – preisreduziert
Bestseller – price reduced

| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|-----|------|
| | | | | | | AF | BF | |
| 20 1740 010 | 4,3 | 1,3 | 40,0 | 4,0 | 3 | - | - | 6,45 |
| 20 1740 020 | 5,0 | 1,5 | 40,0 | 4,0 | 3 | M 2,5 | - | 3,70 |
| 20 1740 030 | 5,3 | 1,5 | 40,0 | 4,0 | 3 | - | - | 3,70 |
| 20 1740 040 | 6,0 | 1,5 | 45,0 | 5,0 | 3 | M 3 | - | 3,85 |
| 20 1740 050 | 6,3 | 1,5 | 45,0 | 5,0 | 3 | - | M 3 | 6,70 |
| 20 1740 060 | 7,0 | 1,8 | 50,0 | 6,0 | 3 | M 3,5 | - | 4,00 |
| 20 1740 070 | 7,3 | 1,8 | 50,0 | 6,0 | 3 | - | - | 4,00 |
| 20 1740 090 | 8,3 | 2,0 | 50,0 | 6,0 | 3 | - | M 4 | 7,05 |
| 20 1740 100 | 9,4 | 2,2 | 50,0 | 6,0 | 3 | - | - | 4,30 |
| 20 1740 110 | 10,0 | 2,5 | 50,0 | 6,0 | 3 | M 5 | - | 7,40 |
| 20 1740 120 | 10,4 | 2,5 | 50,0 | 6,0 | 3 | - | M 5 | 7,85 |
| 20 1740 130 | 11,5 | 2,8 | 56,0 | 8,0 | 3 | M 6 | - | 4,30 |
| 20 1740 140 | 12,4 | 2,8 | 56,0 | 8,0 | 3 | - | M 6 | 8,75 |
| 20 1740 150 | 13,4 | 2,9 | 56,0 | 8,0 | 3 | - | - | 8,75 |

| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|------|-------|
| | | | | | | AF | BF | |
| 20 1740 160 | 15,0 | 3,2 | 60,0 | 10,0 | 3 | M 8 | - | 11,15 |
| 20 1740 170 | 16,5 | 3,2 | 60,0 | 10,0 | 3 | - | M 8 | 11,15 |
| 20 1740 180 | 19,0 | 3,5 | 63,0 | 10,0 | 3 | M 10 | - | 12,70 |
| 20 1740 190 | 20,5 | 3,5 | 63,0 | 10,0 | 3 | - | M 10 | 12,70 |
| 20 1740 200 | 23,0 | 3,8 | 67,0 | 10,0 | 3 | M 12 | - | 16,00 |
| 20 1740 210 | 25,0 | 3,8 | 67,0 | 10,0 | 3 | - | M 12 | 16,00 |
| 20 1740 220 | 26,0 | 3,9 | 71,0 | 12,0 | 3 | M 14 | - | 19,45 |
| 20 1740 230 | 28,0 | 4,0 | 71,0 | 12,0 | 3 | - | M 14 | 19,45 |
| 20 1740 240 | 30,0 | 4,1 | 71,0 | 12,0 | 3 | M 16 | - | 21,95 |
| 20 1740 250 | 31,0 | 4,2 | 71,0 | 12,0 | 3 | - | M 16 | 21,95 |
| 20 1740 260 | 40,0 | 10,0 | 80,0 | 15,0 | 3 | - | - | 31,20 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

SETS · SETS

20 1641

Inhalt
Content

• € 53,60

Ø 6,3 · 8,3 · 10,4 · 12,4 ·
16,5 · 20,5 mm (20 1740)

BEST SELLER

20 1642

Inhalt
Content

• € 54,15

Ø 6,3 · 10,4 · 16,5 ·
20,5 · 25 mm (20 1740)

BEST SELLER

LEERE SETS ZUM SELBST BESTÜCKEN EMPTY SETS FOR SELF EQUIPMENT

21 0042

Inhalt
Content

• € 6,55

Ø 6,3 · 8,3 · 10,4 · 12,4 ·
16,5 · 20,5 mm

21 0043

Inhalt
Content

• € 6,55

Ø 6,3 · 10,4 · 16,5 ·
20,5 · 25 mm

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

Zum Senken in folgende Materialien:

- Edelstähle (V2A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

HSS-XE steel

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A)
- Steel
- Cast iron
- Non ferrous metals

3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output

Schnittdaten
Cutting data

Film
Movie



1317



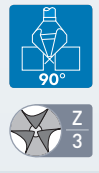
HSS-XE + BLUE-TEC beschichteter Kegelsenker DIN 335 Form C 90°, 3-Flächen-Schaft
 HSS-XE + BLUE-TEC coated countersink DIN 335 type C 90°, 3-flat-shank



20 1745

ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 1100 N | < 900 N | | > 10% Si | | | | |



| Art. | d1 Ø mm | d3 Ø mm | l1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|-----|-------|
| | | | | | | AF | BF | |
| 20 1745 010 | 4,3 | 1,3 | 40,0 | 4,0 | 3 | - | - | 14,65 |
| 20 1745 020 | 5,0 | 1,5 | 40,0 | 4,0 | 3 | M 2,5 | - | 7,00 |
| 20 1745 030 | 5,3 | 1,5 | 40,0 | 4,0 | 3 | - | - | 7,00 |
| 20 1745 040 | 6,0 | 1,5 | 45,0 | 5,0 | 3 | M 3 | - | 7,15 |
| 20 1745 050 | 6,3 | 1,5 | 45,0 | 5,0 | 3 | - | M 3 | 14,95 |
| 20 1745 060 | 7,0 | 1,8 | 50,0 | 6,0 | 3 | M 3,5 | - | 7,30 |
| 20 1745 070 | 7,3 | 1,8 | 50,0 | 6,0 | 3 | - | - | 7,30 |
| 20 1745 090 | 8,3 | 2,0 | 50,0 | 6,0 | 3 | - | M 4 | 15,40 |
| 20 1745 100 | 9,4 | 2,2 | 50,0 | 6,0 | 3 | - | - | 7,60 |
| 20 1745 110 | 10,0 | 2,5 | 50,0 | 6,0 | 3 | M 5 | - | 15,85 |
| 20 1745 120 | 10,4 | 2,5 | 50,0 | 6,0 | 3 | - | M 5 | 16,40 |
| 20 1745 140 | 12,4 | 2,8 | 56,0 | 8,0 | 3 | - | M 6 | 18,30 |
| 20 1745 150 | 13,4 | 2,9 | 56,0 | 8,0 | 3 | - | - | 18,30 |
| 20 1745 160 | 15,0 | 3,2 | 60,0 | 10,0 | 3 | M 8 | - | 21,30 |

| Art. | d1 Ø mm | d3 Ø mm | l1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|------|-------|
| | | | | | | AF | BF | |
| 20 1745 170 | 16,5 | 3,2 | 60,0 | 10,0 | 3 | - | M 8 | 21,30 |
| 20 1745 180 | 19,0 | 3,5 | 63,0 | 10,0 | 3 | M 10 | - | 23,20 |
| 20 1745 190 | 20,5 | 3,5 | 63,0 | 10,0 | 3 | - | M 10 | 23,20 |
| 20 1745 200 | 23,0 | 3,8 | 67,0 | 10,0 | 3 | M 12 | - | 28,15 |
| 20 1745 210 | 25,0 | 3,8 | 67,0 | 10,0 | 3 | - | M 12 | 28,15 |
| 20 1745 220 | 26,0 | 3,9 | 71,0 | 12,0 | 3 | M 14 | - | 32,50 |
| 20 1745 230 | 28,0 | 4,0 | 71,0 | 12,0 | 3 | - | M 14 | 32,50 |
| 20 1745 240 | 30,0 | 4,1 | 71,0 | 12,0 | 3 | M 16 | - | 35,65 |
| 20 1745 250 | 31,0 | 4,2 | 71,0 | 12,0 | 3 | - | M 16 | 35,65 |
| 20 1745 260 | 40,0 | 10,0 | 80,0 | 15,0 | 3 | - | - | 48,95 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
 Special price / sale article. While stocks last.

SETS · SETS

20 1643
 Inhalt
 Content
 € 105,30

Ø 6,3 · 8,3 · 10,4 · 12,4 · 16,5 · 20,5 mm (20 1745)

20 1644
 Inhalt
 Content
 € 100,30

Ø 6,3 · 10,4 · 16,5 · 20,5 · 25 mm (20 1745)

**LEERE SETS ZUM SELBST BESTÜCKEN
 EMPTY SETS FOR SELF EQUIPMENT**

21 0042
 Inhalt
 Content
 € 6,55

Ø 6,3 · 8,3 · 10,4 · 12,4 · 16,5 · 20,5 mm

21 0043
 Inhalt
 Content
 € 6,55

Ø 6,3 · 10,4 · 16,5 · 20,5 · 25 mm

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + BLUE-TEC beschichtet

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.
 BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

Zum Senken in folgende Materialien:

- Edelstähle (V2A / V4A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

HSS-XE steel + BLUE-TEC coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.
 BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Steel
- Cast iron
- Non ferrous metals

3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output

Schnittdaten
 Cutting data



1317

Film
 Movie



647



Index

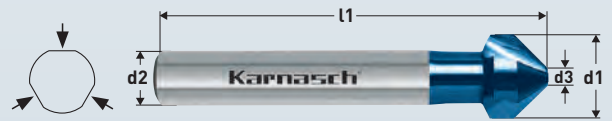
20 1750

ASP-Pulverstahl BLUE-TEC beschichteter Kegelsenker DIN 335 Form C 90°, 3-Flächen-Schaft
ASP-powder steel BLUE-TEC coated countersink DIN 335 type C 90°, 3-flat-shank



ANWENDUNG · APPLICATION

| | | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|------------|------------|
| | | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, exotische Materialien | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials | Hardox 400 | Hardox 450 |
| < 1400 N | < 900 N | | > 10% Si | | | | | |



| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|-----|-------|
| | | | | | | AF | BF | |
| 20 1750 010 | 4,3 | 1,3 | 40,0 | 4,0 | 3 | - | - | - |
| 20 1750 020 | 5,0 | 1,5 | 40,0 | 4,0 | 3 | M 2,5 | - | - |
| 20 1750 030 | 5,3 | 1,5 | 40,0 | 4,0 | 3 | - | - | - |
| 20 1750 040 | 6,0 | 1,5 | 45,0 | 5,0 | 3 | M 3 | - | - |
| 20 1750 050 | 6,3 | 1,5 | 45,0 | 5,0 | 3 | - | M 3 | 28,50 |
| 20 1750 060 | 7,0 | 1,8 | 50,0 | 6,0 | 3 | M 3,5 | - | - |
| 20 1750 070 | 7,3 | 1,8 | 50,0 | 6,0 | 3 | - | - | - |
| 20 1750 080 | 8,0 | 2,0 | 50,0 | 6,0 | 3 | M 4 | - | - |
| 20 1750 090 | 8,3 | 2,0 | 50,0 | 6,0 | 3 | - | M 4 | 30,55 |
| 20 1750 100 | 9,4 | 2,2 | 50,0 | 6,0 | 3 | - | - | - |
| 20 1750 110 | 10,0 | 2,5 | 50,0 | 6,0 | 3 | M 5 | - | - |
| 20 1750 120 | 10,4 | 2,5 | 50,0 | 6,0 | 3 | - | M 5 | 33,90 |
| 20 1750 130 | 11,5 | 2,8 | 56,0 | 8,0 | 3 | M 6 | - | - |
| 20 1750 140 | 12,4 | 2,8 | 56,0 | 8,0 | 3 | - | M 6 | 40,60 |

| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|------|--------|
| | | | | | | AF | BF | |
| 20 1750 150 | 13,4 | 2,9 | 56,0 | 8,0 | 3 | - | - | - |
| 20 1750 160 | 15,0 | 3,2 | 60,0 | 10,0 | 3 | M 8 | - | - |
| 20 1750 170 | 16,5 | 3,2 | 60,0 | 10,0 | 3 | - | M 8 | 51,10 |
| 20 1750 180 | 19,0 | 3,5 | 63,0 | 10,0 | 3 | M 10 | - | - |
| 20 1750 190 | 20,5 | 3,5 | 63,0 | 10,0 | 3 | - | M 10 | 55,75 |
| 20 1750 200 | 23,0 | 3,8 | 67,0 | 10,0 | 3 | M 12 | - | - |
| 20 1750 210 | 25,0 | 3,8 | 67,0 | 10,0 | 3 | - | M 12 | 83,40 |
| 20 1750 220 | 26,0 | 3,9 | 71,0 | 12,0 | 3 | M 14 | - | - |
| 20 1750 230 | 28,0 | 4,0 | 71,0 | 12,0 | 3 | - | M 14 | - |
| 20 1750 240 | 30,0 | 4,1 | 71,0 | 12,0 | 3 | M 16 | - | - |
| 20 1750 250 | 31,0 | 4,2 | 71,0 | 12,0 | 3 | - | M 16 | 105,55 |

○ Preise und Lieferzeit auf Anfrage
Prices and time of delivery on request

SETS · SETS

20 1645

Inhalt
Content

• € 223,20

Ø 6,3 · 8,3 · 10,4 · 12,4 ·
16,5 · 20,5 mm (20 1750)

20 1646

Inhalt
Content

• € 234,55

Ø 6,3 · 10,4 · 16,5 ·
20,5 · 25 mm (20 1750)

LEERE SETS ZUM SELBST BESTÜCKEN EMPTY SETS FOR SELF EQUIPMENT

21 0042

Inhalt
Content

• € 6,55

Ø 6,3 · 8,3 · 10,4 · 12,4 ·
16,5 · 20,5 mm

21 0043

Inhalt
Content

• € 6,55

Ø 6,3 · 10,4 · 16,5 ·
20,5 · 25 mm

EIGENSCHAFTEN · PROPERTIES

ASP-Pulverstahl + BLUE-TEC beschichtet

Gefertigt aus pulvermetallurgischen Schnellarbeitsstahl. Für wesentlich höhere Standzeiten gegenüber HSS-XE Stahl.
BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

Zum Senken in folgende Materialien:

- Edelstähle (V2A / V4A)
- Rost- und säurebeständige Stähle
- Titan und Titanlegierungen
- Alle weiteren Stähle, Guss und Leichtmetalle
... wenn hohe Standzeiten erforderlich sind.

3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

ASP-Powder steel + BLUE-TEC coated

Made of powder metallurgy high speed steel. For considerably longer service life than HSS-XE steel.
BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Titanium and titanium alloys
- All further steel sorts, cast iron,
... non ferrous metals where high tool life are desired.

3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output

Schnittdaten
Cutting data

Film
Movie



1317

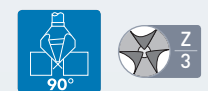
Vollhartmetall + BLUE-TEC beschichteter Kegelsenker DIN 335 Form C 90°
Solid carbide + BLUE-TEC coated countersink DIN 335 type C 90°



20 1755

ANWENDUNG · APPLICATION

| | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|
| | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, exotische Materialien |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials |
| < 1400 N | < 900 N | | > 10% Si | | | |



| Art. | d1 Ø mm | d3 Ø mm | l1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|-----|-------|
| | | | | | | AF | BF | |
| 20 1755 010 | 4,3 | 1,3 | 40,0 | 4,0 | 3 | - | - | - |
| 20 1755 020 | 5,0 | 1,5 | 40,0 | 4,0 | 3 | M 2,5 | - | - |
| 20 1755 030 | 5,3 | 1,5 | 40,0 | 4,0 | 3 | - | - | - |
| 20 1755 040 | 6,0 | 1,5 | 45,0 | 5,0 | 3 | M 3 | - | - |
| 20 1755 050 | 6,3 | 1,5 | 45,0 | 5,0 | 3 | - | M 3 | 48,15 |
| 20 1755 060 | 7,0 | 1,8 | 50,0 | 6,0 | 3 | M 3,5 | - | - |
| 20 1755 070 | 7,3 | 1,8 | 50,0 | 6,0 | 3 | - | - | - |
| 20 1755 080 | 8,0 | 2,0 | 50,0 | 6,0 | 3 | M 4 | - | - |
| 20 1755 090 | 8,3 | 2,0 | 50,0 | 6,0 | 3 | - | M 4 | 53,25 |
| 20 1755 100 | 9,4 | 2,2 | 50,0 | 6,0 | 3 | - | - | - |
| 20 1755 110 | 10,0 | 2,5 | 50,0 | 6,0 | 3 | M 5 | - | - |
| 20 1755 120 | 10,4 | 2,5 | 50,0 | 6,0 | 3 | - | M 5 | 58,85 |
| 20 1755 130 | 11,5 | 2,8 | 56,0 | 8,0 | 3 | M 6 | - | - |
| 20 1755 140 | 12,4 | 2,8 | 56,0 | 8,0 | 3 | - | M 6 | 69,50 |

| Art. | d1 Ø mm | d3 Ø mm | l1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|------|--------|
| | | | | | | AF | BF | |
| 20 1755 150 | 13,4 | 2,9 | 56,0 | 8,0 | 3 | - | - | - |
| 20 1755 160 | 15,0 | 3,2 | 60,0 | 10,0 | 3 | M 8 | - | - |
| 20 1755 170 | 16,5 | 3,2 | 60,0 | 10,0 | 3 | - | M 8 | 92,00 |
| 20 1755 180 | 19,0 | 3,5 | 63,0 | 10,0 | 3 | M 10 | - | - |
| 20 1755 190 | 20,5 | 3,5 | 63,0 | 10,0 | 3 | - | M 10 | 106,10 |
| 20 1755 200 | 23,0 | 3,8 | 67,0 | 10,0 | 3 | M 12 | - | - |
| 20 1755 210 | 25,0 | 3,8 | 67,0 | 10,0 | 3 | - | M 12 | 144,70 |
| 20 1755 220 | 26,0 | 3,9 | 71,0 | 12,0 | 3 | M 14 | - | - |
| 20 1755 230 | 28,0 | 4,0 | 71,0 | 12,0 | 3 | - | M 14 | - |
| 20 1755 240 | 30,0 | 4,1 | 71,0 | 12,0 | 3 | M 16 | - | - |
| 20 1755 250 | 31,0 | 4,2 | 71,0 | 12,0 | 3 | - | M 16 | 185,05 |

○ Preise und Lieferzeit auf Anfrage
Prices and time of delivery on request

SETS · SETS

20 1647
€ 419,95

Inhalt
Content

Ø 6,3 · 8,3 · 10,4 · 12,4 · 16,5 · 20,5 mm (20 1755)

20 1648
€ 441,25

Inhalt
Content

Ø 6,3 · 10,4 · 16,5 · 20,5 · 25 mm (20 1755)

LEERE SETS ZUM SELBST BESTÜCKEN
EMPTY SETS FOR SELF EQUIPMENT

21 0042
€ 6,55

Inhalt
Content

Ø 6,3 · 8,3 · 10,4 · 12,4 · 16,5 · 20,5 mm

21 0043
€ 6,55

Inhalt
Content

Ø 6,3 · 10,4 · 16,5 · 20,5 · 25 mm

EIGENSCHAFTEN · PROPERTIES

Vollhartmetall + BLUE-TEC beschichtet

Gefertigt aus Vollhartmetall für höchste Standzeiten auch bei schwierigsten Materialien.
BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)
Ø 4,3-11,5 mm komplett aus Vollhartmetall
Ø 12,4-31 mm Schaft gelötet

Zum Senken in folgende Materialien:

- Abrasive und harte Stähle über 1000 N/mm²
- Grauguss (GG) über 240 HB
- Rost- und säurebeständige Stähle
- Titan und Titanlegierungen
- Alle weiteren Stähle, Guss und Leichtmetalle ... wenn höchste Standzeiten erforderlich sind.

Vollhartmetall-Kegelsenker Art. 20 1755 werden mit zylindrischem Schaft geliefert. Diese Senker werden hauptsächlich in der HIGH-TECH Zerspantung auf CNC-Maschinen mit Schrumpffutter eingesetzt. Hierfür eignet sich nur der zylindrische Schaft.

Achtung:

Vollhartmetallkegelsenker sollten nur auf CNC Maschinen verwendet werden.

Solid carbide + BLUE-TEC coated

Made of solid carbide for maximum tool life, even in most difficult materials. BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)
Ø 4,3-11,5 mm solid carbide
Ø 12,4-31 mm brazed shank

For countersinking in materials:

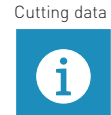
- Abrasive and hard steel with a strength of over 1000 N/mm²
- Grey cast iron over 240 HB
- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Titanium and titanium alloys
- All further steel sorts, cast iron, non ferrous metals ... where maximum tool life are desired.

Solid carbide countersinks Art. 20 1755 comes with cylindrical shank. This countersink type is used mostly on CNC-machines with shrinking chucks. Shrinking chucks works only with cylindrical shank.

Attention:

Solid carbide countersinks should be only used on CNC machines.

Schnittdaten
Cutting data



Film
Movie



1203

649

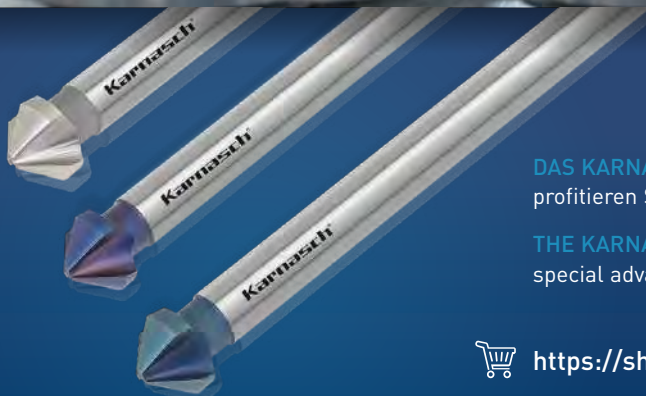


Index

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Vollhartmetall + BLUE-TEC beschichteter Kegelsenker Karnasch Norm Typ H, 4 + 5 Schneiden 90°
Solid carbide + BLUE-TEC coated countersink Karnasch Norm type H, 4 + 5 cuts 90°



40 3045

ANWENDUNG · APPLICATION

| | | | | | | | | |
|----------------------|----------------------|-----------|----------------|---------------------|---|----------|------------|------------|
| | | | | | | | | |
| Hardox 400, 450, 500 | Gehärteter Stahl | Edelstahl | Grauguss | Kunststoffe GFK/CFK | Hastelloy, Inconel, exotische Materialien | Graphit | Hardox 400 | Hardox 450 |
| Hardox 400, 450, 500 | Hardened steel | Stainless | Grey cast iron | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials | Graphite | Hardox 400 | Hardox 450 |
| | < 60 HRC < 1400 N | > 900 N | | | | | | |



| Art. | d1 Ø mm | d3 Ø mm | l1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|--------------|------------|------------|----------|------------|---|--|-----|--------|
| | | | | | | AF | BF | |
| 40 3045 0104 | 10,4 | 4,0 | 50,0 | 8,0 | 4 | - | M5 | 71,20 |
| 40 3045 0124 | 12,4 | 4,0 | 57,0 | 8,0 | 5 | - | M6 | 76,75 |
| 40 3045 0165 | 16,5 | 4,5 | 60,0 | 10,0 | 5 | - | M8 | 101,90 |
| 40 3045 0205 | 20,5 | 5,0 | 64,0 | 10,0 | 5 | - | M10 | 117,65 |
| 40 3045 0250 | 25,0 | 5,5 | 68,0 | 10,0 | 5 | - | M12 | 160,70 |
| 40 3045 0310 | 31,0 | 6,0 | 72,0 | 12,0 | 5 | - | M16 | 205,75 |

SETS · SETS

Inhalt
Content

• **€ 517,00**

Ø 10,4 · 12,4 · 16,5 · 20,5 mm · 25,0 mm (40 3045)

EIGENSCHAFTEN · PROPERTIES

Vollhartmetall + BLUE-TEC beschichtet, 4 + 5 Schneiden, für schwerste zerspanbare Materialien

BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)
Ø 10,4 mm komplett aus Vollhartmetall
Ø 12,4-31,0 mm Schaft gelötet

Zum Senken in folgende Materialien:

- Gehärtete Stähle bis 1400 N/mm²
- Stähle bis zu 60 HRC
- Rost- und Säurebeständige Stähle über 900 N/mm²
- Alle Gussarten
- Graphit, Kohle- und Glasfaserverbundstoffe
- Exotische Materialien über 850 N/mm² wie Nimonic, Inconel, Hastelloy
- Hervorragend auch für Hardox 500 geeignet

Vollhartmetall-Kegelsenker Art. 40 3045 werden mit zylindrischem Schaft geliefert. Diese Senker werden hauptsächlich in der HIGH-TECH Zerspanung auf CNC-Maschinen mit Schrumpffutter eingesetzt. Hierfür eignet sich nur der zylindrische Schaft.

Achtung:

Vollhartmetall-Kegelsenker sollten nur auf CNC Maschinen verwendet werden.

Solid carbide + BLUE-TEC coated, 4 + 5 cuts for difficult machine materials

BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)
Ø 10,4 mm solid carbide
Ø 12,4-31,0 mm brazed shank

For countersinking in materials:

- Hardened steel up to 1400 N/mm²
- Steel up to 60 HRC
- Acid resistant steel
- All cast iron types
- Graphite, carbon- and glass fibre reinforced plastics
- Exotic materials over 850 N/mm² such as nimonic, Inconel, hastelloy
- Excellent also for hardox 500

Solid carbide countersinks Art. 40 3045 comes with cylindrical shank.

This countersink type is used mostly on CNC-machines with shrinking chucks. Shrinking chucks works only with cylindrical shank.

Attention:

Solid carbide countersinks should be only used on CNC machines.

Schnittdaten
Cutting data



1203

Film
Movie



651



Index

20 1760

RAPID CUT

HSS-XE Kegelsenker DIN 335 Form C 90°, 3-Flächen-Schaft
HSS-XE countersink DIN 335 type C 90°, 3-flat-shank



ANWENDUNG · APPLICATION

| | | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 900 N | < 900 N | | > 10% Si | | | | |



| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|-----|-------|
| | | | | | | AF | BF | |
| 20 1760 010 | 6,3 | 1,5 | 45,0 | 5,0 | 3 | - | M 3 | 8,65 |
| 20 1760 020 | 8,3 | 2,0 | 50,0 | 6,0 | 3 | - | M 4 | 9,15 |
| 20 1760 030 | 10,4 | 2,5 | 50,0 | 6,0 | 3 | - | M 5 | 10,25 |
| 20 1760 040 | 12,4 | 2,8 | 56,0 | 8,0 | 3 | - | M 6 | 11,50 |
| 20 1760 050 | 15,0 | 3,2 | 60,0 | 10,0 | 3 | - | M 8 | 14,70 |
| 20 1760 060 | 16,5 | 3,2 | 60,0 | 10,0 | 3 | - | M 8 | 14,70 |

| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|------|-------|
| | | | | | | AF | BF | |
| 20 1760 070 | 19,0 | 3,5 | 63,0 | 10,0 | 3 | - | M 10 | 16,80 |
| 20 1760 080 | 20,5 | 3,5 | 63,0 | 10,0 | 3 | - | M 10 | 16,80 |
| 20 1760 090 | 23,0 | 3,8 | 67,0 | 10,0 | 3 | - | M 12 | 21,35 |
| 20 1760 100 | 25,0 | 3,8 | 67,0 | 10,0 | 3 | - | M 12 | 21,35 |
| 20 1760 110 | 31,0 | 4,2 | 71,0 | 12,0 | 3 | - | M 16 | 29,60 |

SETS · SETS

20 1651
Inhalt
Content

• €70,75

Ø 6,3 · 8,3 · 10,4 · 12,4 ·
16,5 · 20,5 mm (20 1760)

20 1652
Inhalt
Content

• €71,35

Ø 6,3 · 10,4 · 16,5 ·
20,5 · 25 mm (20 1760)

LEERE SETS ZUM SELBST BESTÜCKEN EMPTY SETS FOR SELF EQUIPMENT

21 0042
Inhalt
Content

• €6,55

Ø 6,3 · 8,3 · 10,4 · 12,4 ·
16,5 · 20,5 mm

21 0043
Inhalt
Content

• €6,55

Ø 6,3 · 10,4 · 16,5 ·
20,5 · 25 mm

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

RAPID-CUT speziell entwickelt für automatischen und schnellen Vorschub. Optimierte Zerspanungsgeometrie + 3 Flächen-schliff des Schaftes führen zu:

- bis zu 30% schnelleres Senken
- bis zu 40% höhere Standzeiten

Ideal zum Senken in:

- Edelstähle V2A
- Stahl
- Guss
- Bunt- und Leichtmetalle

3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

HSS-XE steel

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

RAPID-CUT specially developed for automatic and quick feed. Optimized cutting geometry + 3 flat sections of the shank leads to:

- up to 30% faster sinking than conventional countersinks
- up to 40% higher service life

Excellent for countersinking in:

- Stainless steel V2A
- Steel
- Cast iron
- Non ferrous metals

3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output

Schnittdaten
Cutting data

Film
Movie



1317

HSS-XE + BLUE-TEC beschichteter Kegelsenker DIN 335 Form C 90°, 3-Flächen-Schaft
 HSS-XE + BLUE-TEC coated countersink DIN 335 type C 90°, 3-flat-shank

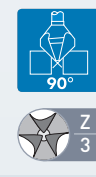


RAPID CUT

20 1765

ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 1100 N | < 900 N | | > 10% Si | | | | |



| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|-----|-------|
| | | | | | | AF | BF | |
| 20 1765 010 | 6,3 | 1,5 | 45,0 | 5,0 | 3 | - | M 3 | 15,25 |
| 20 1765 020 | 8,3 | 2,0 | 50,0 | 6,0 | 3 | - | M 4 | 15,75 |
| 20 1765 030 | 10,4 | 2,5 | 50,0 | 6,0 | 3 | - | M 5 | 16,85 |
| 20 1765 040 | 12,4 | 2,8 | 56,0 | 8,0 | 3 | - | M 6 | 18,90 |
| 20 1765 050 | 15,0 | 3,2 | 60,0 | 10,0 | 3 | - | M 8 | 22,05 |
| 20 1765 060 | 16,5 | 3,2 | 60,0 | 10,0 | 3 | - | M 8 | 22,05 |

| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|------|-------|
| | | | | | | AF | BF | |
| 20 1765 070 | 19,0 | 3,5 | 63,0 | 10,0 | 3 | - | M 10 | 24,20 |
| 20 1765 080 | 20,5 | 3,5 | 63,0 | 10,0 | 3 | - | M 10 | 24,20 |
| 20 1765 090 | 23,0 | 3,8 | 67,0 | 10,0 | 3 | - | M 12 | 29,55 |
| 20 1765 100 | 25,0 | 3,8 | 67,0 | 10,0 | 3 | - | M 12 | 29,55 |
| 20 1765 110 | 31,0 | 4,2 | 71,0 | 12,0 | 3 | - | M 16 | 37,75 |

SETS · SETS

20 1653
€ 111,70

Inhalt
Content

Ø 6,3 · 8,3 · 10,4 · 12,4 ·
16,5 · 20,5 mm (20 1765)

20 1654
€ 106,75

Inhalt
Content

Ø 6,3 · 10,4 · 16,5 ·
20,5 · 25 mm (20 1765)

LEERE SETS ZUM SELBST BESTÜCKEN
 EMPTY SETS FOR SELF EQUIPMENT

21 0042
€ 6,55

Inhalt
Content

Ø 6,3 · 8,3 · 10,4 · 12,4 ·
16,5 · 20,5 mm

21 0043
€ 6,55

Inhalt
Content

Ø 6,3 · 10,4 · 16,5 ·
20,5 · 25 mm

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + BLUE-TEC beschichtet

Gefertigt aus hochlegiertem Spezialstahl „XE“ für wesentlich höhere Standzeit gegenüber HSS-Stähle. BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

RAPID-CUT speziell entwickelt für automatischen und schnellen Vorschub. Optimierte Zerspanungsgeometrie + 3 Flächenschliff des Schaftes führen zu:

- bis zu 30% schnelleres Senken
- bis zu 40% höhere Standzeiten

Zum Senken in:

- Edelstähle (V2A / V4A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

HSS-XE steel + BLUE-TEC coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS steel. BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

RAPID-CUT specially developed for automatic and quick feed. Optimized cutting geometry + 3 flat sections of the shank leads to:

- up to 30% faster sinking than conventional countersinks
- up to 40% higher service life

Excellent for countersinking in:

- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Steel
- Cast iron
- Non ferrous metals

3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output

Schnittdaten
Cutting data



1317

Film
Movie



653



20 1720

HSS-XE Kegelsenker DIN 335 Form C 90°, 3-Flächen-Schaft, langer Schaft
HSS-XE countersink DIN 335 type C 90°, 3-flat-shank, long shank



ANWENDUNG · APPLICATION

| | | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 900 N | < 900 N | | > 10% Si | | | | |



| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|-----|-------|
| | | | | | | AF | BF | |
| 20 1720 010 | 6,3 | 1,5 | 85,0 | 5,0 | 3 | - | M 3 | 13,55 |
| 20 1720 020 | 8,3 | 2,0 | 85,0 | 6,0 | 3 | - | M 4 | 14,25 |
| 20 1720 030 | 10,4 | 2,5 | 88,0 | 6,0 | 3 | - | M 5 | 16,30 |
| 20 1720 040 | 12,4 | 2,8 | 108,0 | 8,0 | 3 | - | M 6 | 18,20 |

| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|------|-------|
| | | | | | | AF | BF | |
| 20 1720 050 | 15,0 | 3,2 | 110,0 | 10,0 | 3 | M 8 | - | 23,10 |
| 20 1720 060 | 16,5 | 3,2 | 112,0 | 10,0 | 3 | - | M 8 | 23,10 |
| 20 1720 070 | 20,5 | 3,5 | 115,0 | 10,0 | 3 | - | M 10 | 27,55 |
| 20 1720 080 | 25,0 | 3,8 | 118,0 | 10,0 | 3 | - | M 12 | 34,00 |

SETS · SETS



LEERE SETS ZUM SELBST BESTÜCKEN EMPTY SETS FOR SELF EQUIPMENT



EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

Zum Senken in folgende Materialien:

- Edelstähle (V2A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

HSS-XE steel

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A)
- Steel
- Cast iron
- Non ferrous metals

3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output

Schnittdaten
Cutting data

Film
Movie



1317



HSS-XE + BLUE-TEC beschichteter Kegelsenker DIN 335 Form C 90°, 3-Flächen-Schaft, langer Schaft
 HSS-XE + BLUE-TEC coated countersink DIN 335 type C 90°, 3-flat-shank, long shank



20 1770

ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 1100 N | < 900 N | | > 10% Si | | | | |



| Art. | d1 Ø mm | d3 Ø mm | l1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|-----|-------|
| | | | | | | AF | BF | |
| 20 1770 010 | 6,3 | 1,5 | 85,0 | 5,0 | 3 | - | M 3 | 20,15 |
| 20 1770 020 | 8,3 | 2,0 | 85,0 | 6,0 | 3 | - | M 4 | 20,85 |
| 20 1770 030 | 10,4 | 2,5 | 88,0 | 6,0 | 3 | - | M 5 | 22,90 |
| 20 1770 040 | 12,4 | 2,8 | 108,0 | 8,0 | 3 | - | M 6 | 25,55 |

| Art. | d1 Ø mm | d3 Ø mm | l1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|------|-------|
| | | | | | | AF | BF | |
| 20 1770 050 | 15,0 | 3,2 | 110,0 | 10,0 | 3 | M 8 | - | 30,50 |
| 20 1770 060 | 16,5 | 3,2 | 112,0 | 10,0 | 3 | - | M 8 | 30,50 |
| 20 1770 070 | 20,5 | 3,5 | 115,0 | 10,0 | 3 | - | M 10 | 34,90 |
| 20 1770 080 | 25,0 | 3,8 | 118,0 | 10,0 | 3 | - | M 12 | 44,05 |

SETS · SETS

Inhalt
Content

40 3090 010
€ 144,25

Ø 6,3 · 8,3 · 10,4 · 12,4 ·
16,5 · 20,5 mm (20 1770)

**LEERE SETS ZUM SELBST BESTÜCKEN
EMPTY SETS FOR SELF EQUIPMENT**

Inhalt
Content

21 0042
€ 6,55

Ø 6,3 · 8,3 · 10,4 · 12,4 ·
16,5 · 20,5 mm

Inhalt
Content

21 0043
€ 6,55

Ø 6,3 · 10,4 · 16,5 ·
20,5 · 25 mm

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + BLUE-TEC beschichtet

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.
 BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

Zum Senken in folgende Materialien:

- Edelstähle (V2A / V4A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

HSS-XE steel + BLUE-TEC coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.
 BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Steel
- Cast iron
- Non ferrous metals

3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output

Schnittdaten
Cutting data



1317

Film
Movie



655



Index

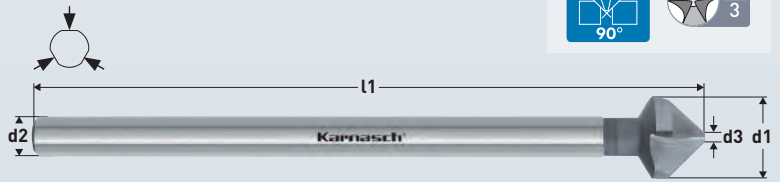
20 1725

HSS-XE Kegelsenker DIN 335 Form C 90°, 3-Flächen-Schaft, extra langer Schaft
HSS-XE countersink DIN 335 type C 90°, 3-flat-shank, extra long shank



ANWENDUNG · APPLICATION

| | | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 900 N | < 900 N | | > 10% Si | | | | |



| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|-----|-------|
| | | | | | | AF | BF | |
| 20 1725 010 | 6,3 | 1,5 | 154,0 | 5,0 | 3 | - | M 3 | 19,00 |
| 20 1725 020 | 8,3 | 2,0 | 155,0 | 6,0 | 3 | - | M 4 | 20,05 |
| 20 1725 030 | 10,4 | 2,5 | 157,0 | 6,0 | 3 | - | M 5 | 22,90 |
| 20 1725 040 | 12,4 | 2,8 | 158,0 | 8,0 | 3 | - | M 6 | 25,50 |

| Art. | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|------|-------|
| | | | | | | AF | BF | |
| 20 1725 050 | 15,0 | 3,2 | 158,0 | 10,0 | 3 | M 8 | - | 32,45 |
| 20 1725 060 | 16,5 | 3,2 | 161,0 | 10,0 | 3 | - | M 8 | 32,45 |
| 20 1725 070 | 20,5 | 3,5 | 164,0 | 10,0 | 3 | - | M 10 | 38,65 |
| 20 1725 080 | 25,0 | 3,8 | 164,0 | 10,0 | 3 | - | M 12 | 47,75 |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl „XE“ für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

Zum Senken in folgende Materialien:

- Edelstähle (V2A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

HSS-XE steel

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A)
- Steel
- Cast iron
- Non ferrous metals

3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output

Schnittdaten
Cutting data

Film
Movie



1317



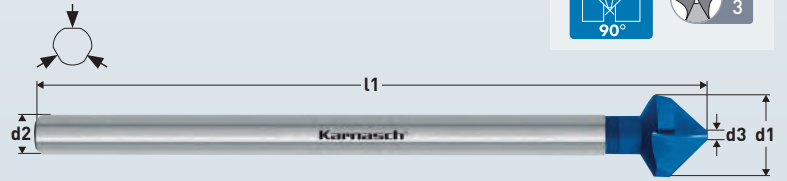
HSS-XE + BLUE-TEC beschichteter Kegelsenker DIN 335 Form C 90°, 3-Flächen-Schaft, extra langer Schaft
 HSS-XE + BLUE-TEC coated countersink DIN 335 type C 90°, 3-flat-shank, extra long shank



20 1775

ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 1100 N | < 900 N | | > 10% Si | | | | |



| Art. | d1 Ø mm | d3 Ø mm | l1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|-----|-------|
| | | | | | | AF | BF | |
| 20 1775 010 | 6,3 | 1,5 | 154,0 | 5,0 | 3 | - | M 3 | 26,75 |
| 20 1775 020 | 8,3 | 2,0 | 155,0 | 6,0 | 3 | - | M 4 | 27,80 |
| 20 1775 030 | 10,4 | 2,5 | 157,0 | 6,0 | 3 | - | M 5 | 31,10 |
| 20 1775 040 | 12,4 | 2,8 | 158,0 | 8,0 | 3 | - | M 6 | 33,65 |

| Art. | d1 Ø mm | d3 Ø mm | l1 mm | d2 Ø mm | Z | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|------------|---|--|------|-------|
| | | | | | | AF | BF | |
| 20 1775 050 | 15,0 | 3,2 | 158,0 | 10,0 | 3 | M 8 | - | 40,60 |
| 20 1775 060 | 16,5 | 3,2 | 161,0 | 10,0 | 3 | - | M 8 | 40,60 |
| 20 1775 070 | 20,5 | 3,5 | 164,0 | 10,0 | 3 | - | M 10 | 46,80 |
| 20 1775 080 | 25,0 | 3,8 | 164,0 | 10,0 | 3 | - | M 12 | 62,50 |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + BLUE-TEC beschichtet

Gefertigt aus hochlegiertem Spezialstahl „XE“ für wesentlich höhere Standzeiten gegenüber HSS-Stähle.
 BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

Zum Senken in folgende Materialien:

- Edelstähle (V2A / V4A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

HSS-XE steel + BLUE-TEC coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.
 BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Steel
- Cast iron
- Non ferrous metals

3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output



Schnittdaten
Cutting data



1317

Film
Movie



657

Index

20 1790

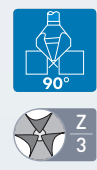
HSS-XE Kegelsenker DIN 335 Form D 90°, Morsekonus
HSS-XE countersink DIN 335 type D 90°, morse taper



ANWENDUNG · APPLICATION

| | | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 900 N | < 900 N | | > 10% Si | | | | |

Morsekonus Morse taper
2 / 3 / 4



| Art. | d1 Ø mm | d3 Ø mm | L1 mm | Z | Schaft · Shank Morsekonus MK Morse taper MT | Senkung nach DIN 74 Countersinking per DIN 74 | | € | Art. | d1 Ø mm | d3 Ø mm | L1 mm | Z | Schaft · Shank Morsekonus MK Morse taper MT | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|---|---|--|------|-------|-------------|------------|------------|----------|---|---|--|----|--------|
| | | | | | | AF | BF | | | | | | | | AF | BF | |
| 20 1790 010 | 20,5 | 3,5 | 100,0 | 3 | MK / MT 2 | - | M 10 | 27,50 | 20 1790 050 | 40,0 | 10,0 | 140,0 | 3 | MK / MT 3 | - | - | 55,10 |
| 20 1790 020 | 25,0 | 3,8 | 106,0 | 3 | MK / MT 2 | - | M 12 | 30,80 | 20 1790 060 | 50,0 | 14,0 | 150,0 | 3 | MK / MT 3 | - | - | 80,55 |
| 20 1790 030 | 31,0 | 4,2 | 112,0 | 3 | MK / MT 2 | - | M 16 | 36,90 | 20 1790 070 | 63,0 | 16,0 | 180,0 | 3 | MK / MT 4 | - | - | 129,20 |
| 20 1790 040 | 37,0 | 4,8 | 118,0 | 3 | MK / MT 2 | M 20 | M 20 | 48,05 | 20 1790 080 | 80,0 | 22,0 | 190,0 | 3 | MK / MT 4 | - | - | 217,80 |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

Zum Senken in folgende Materialien:

- Edelstähle (V2A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

HSS-XE steel

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

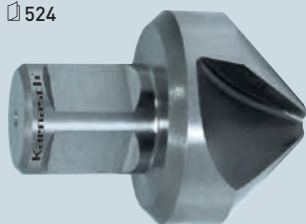
For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A)
- Steel
- Cast iron
- Non ferrous metals

Weitere Optionen Kegelsenker mit Morsekonus siehe:
Further options countersink with morse taper see:

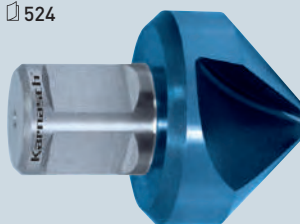
20 1295 HSS-XE Stahl
HSS-XE steel

524



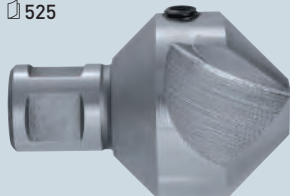
20 1195 HSS-XE Stahl + BLUE-TEC beschichtet
HSS-XE steel + BLUE-TEC coated

524



20 1796 040 Hartmetall-bestückt
Carbide-tipped

525

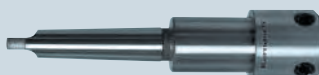


20 1786 045 Mit auswechselbaren Hartmetallplatten
With replaceable carbide inserts

661



Passende Morsekonusaufnahmen siehe Seite 521-523
Suitable morse taper see page 521-523



Schnittdaten
Cutting data

Film
Movie



1317



HSS-XE + BLUE-TEC beschichteter Kegelsenker DIN 335 Form D 90°, Morsekonus
 HSS-XE + BLUE-TEC coated countersink DIN 335 type D 90°, morse taper

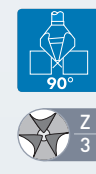


20 1795

ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 1100 N | < 900 N | | > 10% Si | | | | |

Morsekonus Morse taper 2 / 3 / 4



| Art. | d1 Ø mm | d3 Ø mm | l1 mm | Z | Schaft · Shank Morsekonus MK Morse taper MT | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|---|---|--|------|-------|
| | | | | | | AF | BF | |
| 20 1795 010 | ● 20,5 | 3,5 | 100,0 | 3 | MK / MT 2 | - | M 10 | 34,85 |
| 20 1795 020 | ● 25,0 | 3,8 | 106,0 | 3 | MK / MT 2 | - | M 12 | 38,95 |
| 20 1795 030 | ● 31,0 | 4,2 | 112,0 | 3 | MK / MT 2 | - | M 16 | 45,10 |
| 20 1795 040 | ● 37,0 | 4,8 | 118,0 | 3 | MK / MT 2 | M 20 | M 20 | 68,70 |

| Art. | d1 Ø mm | d3 Ø mm | l1 mm | Z | Schaft · Shank Morsekonus MK Morse taper MT | Senkung nach DIN 74 Countersinking per DIN 74 | | € |
|-------------|------------|------------|----------|---|---|--|----|--------|
| | | | | | | AF | BF | |
| 20 1795 050 | ● 40,0 | 10,0 | 140,0 | 3 | MK / MT 3 | - | - | 75,80 |
| 20 1795 060 | ● 50,0 | 14,0 | 150,0 | 3 | MK / MT 3 | - | - | 101,25 |
| 20 1795 070 | ● 63,0 | 16,0 | 180,0 | 3 | MK / MT 4 | - | - | 168,50 |
| 20 1795 080 | ● 80,0 | 22,0 | 190,0 | 3 | MK / MT 4 | - | - | 286,60 |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + BLUE-TEC beschichtet

Gefertigt aus hochlegiertem Spezialstahl „XE“ für wesentlich höhere Standzeiten gegenüber HSS-Stähle.
 BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

Zum Senken in folgende Materialien:

- Edelstähle (V2A / V4A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

HSS-XE steel + BLUE-TEC coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.
 BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

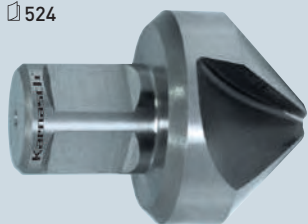
For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Steel
- Cast iron
- Non ferrous metals

Weitere Optionen Kegelsenker mit Morsekonus siehe:
 Further options countersink with morse taper see:

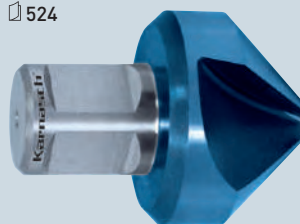
20 1295 HSS-XE Stahl
 HSS-XE steel

524



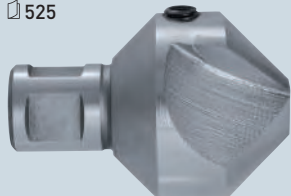
20 1195 HSS-XE Stahl + BLUE-TEC beschichtet
 HSS-XE steel + BLUE-TEC coated

524



20 1796 040 Hartmetall-bestückt
 Carbide-tipped

525

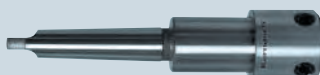


20 1786 045 Mit auswechselbaren Hartmetallplatten
 With replaceable carbide inserts

661



Passende Morsekonusaufnahmen siehe Seite 521-523
 Suitable morse taper see page 521-523



Schnittdaten
 Cutting data



1317

Film
 Movie



659



Index



Siehe Seite 524 · See page 524

20 1295



ANWENDUNG · APPLICATION

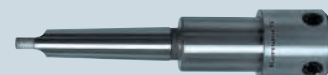
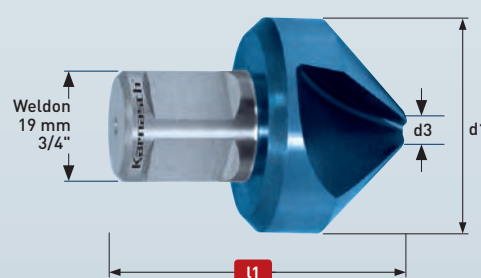
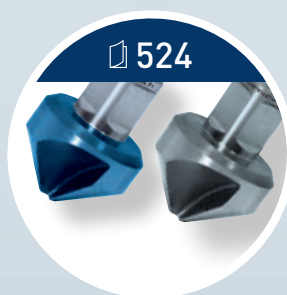
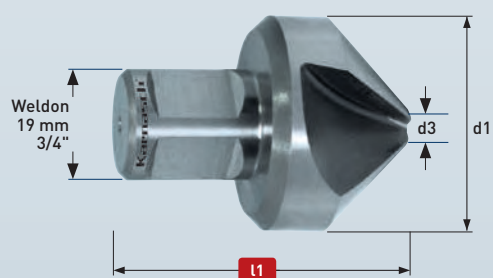
| | | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 900 N | < 900 N | | > 10% Si | | | | |

20 1195



ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 1100 N | < 900 N | | > 10% Si | | | | |



Passende Morsekonusaufnahmen siehe Seite 521-523 · Suitable morse taper see page 521-523

KEGELSENSKER 90° MIT WELDONSCHAFT
COUNTERSINKS 90° WITH WELDON SHANK

HARTMETALL-BESTÜCKT
CARBIDE-TIPPED

+ FÜHRUNGSSTIFTE
+ PILOTS

· 3-SCHNEIDEN
· 3-CUTTING



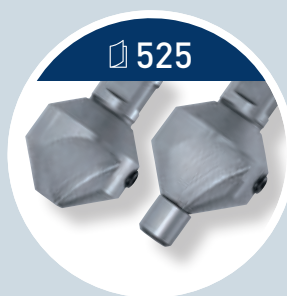
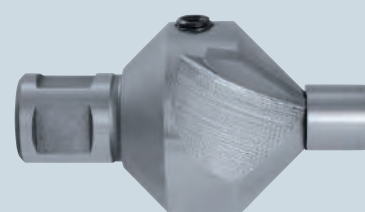
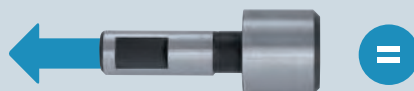
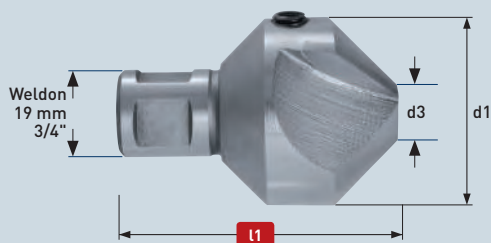
Siehe Seite 525 · See page 525

20 1796 040



ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, exotische Materialien | Hardox 400 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials | Hardox 400 |
| < 1400 N | < 900 N | | > 10% Si | | | | |



Passende Morsekonusaufnahmen siehe Seite 521-523 · Suitable morse taper see page 521-523

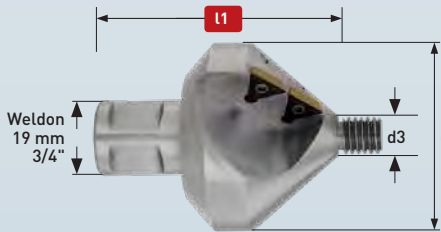


20 1786 045 • € 126,05



ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|---|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hastelloy, Inconel, exotische Materialien | Hardox 400 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hastelloy, Inconel, exotic materials | Hardox 400 |
| < 1400 N | < 900 N | | > 10% Si | | | | |



| d1 mm | d3 mm | Gesamtlänge Total length L1 mm |
|-------|-------|--------------------------------|
| 45 | 10 | 72 |

Der Kegelsenker wird geliefert mit:

- 4 Stück Hartmetall-Einsätze beschichtet inkl. 4 TORX Befestigungsschrauben sowie 1 TORX Befestigungsschlüssel komplett montiert.
- Die dreieckigen Einsätze sind drehbar. Somit sind alle 3 Schneidflächen einsetzbar für 3-fache Standzeit.
- **Passende Führungsstifte siehe unten.**

The countersinks comes inclusive:

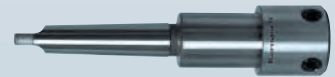
- 4 pieces carbide inserts coated incl. 4 TORX mounting screws and 1 TORX wrench. Fully assembled.
- The triangular inserts are rotatable. This means that all 3 cutting surfaces can be used for 3 times more lifetime.
- **Suitable pilots pins see below.**



Schnittdaten
Cutting data



Passende Morsekonusaufnahmen
siehe Seite 521-523
Suitable morse taper see page 521-523



EIGENSCHAFTEN · PROPERTIES

Hartmetall-bestückt für höchste Standzeiten auch bei schwierigsten Materialien.

Ideal zum Senken in:

- Abrasive und harte Stähle über 1000 N/mm²
- Grauguss (GG) über 240 HB
- Rost- und säurebeständige Stähle
- Titan- und Titanlegierungen
- Alle weiteren Stähle, Guss und Leichtmetalle wo höchste Standzeiten erwünscht sind.

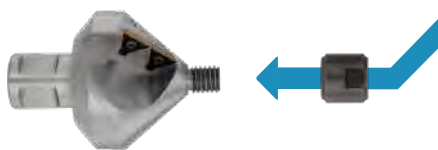
Tungsten carbide tipped for maximum tool life, even in most difficult materials.

For countersinking in:

- Abrasive and hard steel with a strength of over 1000 N/mm²
- Grey cast iron over 240 HB
- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Titanium and titanium alloys
- All further steel sorts, cast iron, non ferrous metals where maximum tool life are desired.

Die Führungsstifte ergeben hervorragende Stabilität und Genauigkeit. Sollte ohne Führungsbohrer gearbeitet werden, bitte den Kegelsenker 100% mittig zur Bohrung ausrichten.

The pilots gives great stability and accuracy. If drilling without pilots, please take care, that the countersink is adjusted absolutely centrally to the drilled hole.



ERSATZTEILE · SPARE PARTS

Auswechselbare Platten Packnorm 4 Stück
Carbide inserts Packing unit 4 pcs. **20 1787 110** € 41,55

4x TORX Befestigungsschrauben Packnorm 4 Stück
4x TORX mounting screw Packing unit 4 pcs. **20 1787 120** € 14,90

1x Befestigungsschlüssel
1x TORX wrench **22 9011 0175** € 9,90

FÜHRUNGSSTIFTE · PILOTS

| | |
|--------------------------------|--------------------------------|
| Ø 14 20 1787 010 € 3,05 | Ø 20 20 1787 060 € 3,50 |
| Ø 15 20 1787 020 € 3,05 | Ø 21 20 1787 070 € 3,70 |
| Ø 16 20 1787 030 € 3,25 | Ø 22 20 1787 075 € 3,70 |
| Ø 17 20 1787 040 € 3,25 | Ø 23 20 1787 080 € 3,70 |
| Ø 18 20 1787 045 € 3,50 | Ø 24 20 1787 090 € 4,20 |
| Ø 19 20 1787 050 € 3,50 | Ø 25 20 1787 100 € 4,20 |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

40 4040

HSS-XE Kegel- und Entgratsenker Werksnorm Form C 120°, 3-Flächen-Schaft
HSS-XE taper and deburring countersink work standard type C 120°, 3-flat-shank



ANWENDUNG · APPLICATION

| | | | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 900 N | < 900 N | | > 10% Si | | | | |



| Art. | d1 Ø mm | d3 Ø mm | l1 mm | d2 Ø mm | Z | € |
|--------------|------------|------------|----------|------------|---|-------|
| 40 4040 0063 | 6,3 | 1,5 | 45,0 | 5,0 | 3 | 8,60 |
| 40 4040 0083 | 8,3 | 2,0 | 50,0 | 6,0 | 3 | 9,10 |
| 40 4040 0104 | 10,4 | 2,5 | 50,0 | 6,0 | 3 | 10,10 |
| 40 4040 0124 | 12,4 | 3,0 | 56,0 | 8,0 | 3 | 11,30 |

| Art. | d1 Ø mm | d3 Ø mm | l1 mm | d2 Ø mm | Z | € |
|--------------|------------|------------|----------|------------|---|-------|
| 40 4040 0165 | 16,5 | 3,5 | 60,0 | 10,0 | 3 | 14,35 |
| 40 4040 0205 | 20,5 | 4,0 | 60,0 | 10,0 | 3 | 16,35 |
| 40 4040 0250 | 25,0 | 5,0 | 63,0 | 10,0 | 3 | 20,60 |

SETS · SETS

| | | | |
|--|-------------------------------|--|-------------------------------|
| Inhalt Content | 40 4090 050 € 70,05 | Inhalt Content | 40 4090 060 € 70,25 |
| Ø 6,3 · 8,3 · 10,4 · 12,4 · 16,5 · 20,5 mm (40 4040) | | Ø 6,3 · 10,4 · 16,5 · 20,5 · 25 mm (40 4040) | |

LEERE SETS ZUM SELBST BESTÜCKEN EMPTY SETS FOR SELF EQUIPMENT

| | | | |
|--|--------------------------|------------------------------------|--------------------------|
| Inhalt Content | 21 0042 € 6,55 | Inhalt Content | 21 0043 € 6,55 |
| Ø 6,3 · 8,3 · 10,4 · 12,4 · 16,5 · 20,5 mm | | Ø 6,3 · 10,4 · 16,5 · 20,5 · 25 mm | |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

Zum Senken in folgende Materialien:

- Edelstähle (V2A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

HSS-XE steel

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A)
- Steel
- Cast iron
- Non ferrous metals

3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output

Schnittdaten
Cutting data

Film
Movie



1317



1



2



3



4



5



6



7



8



9



HSS-XE + BLUE-TEC beschichteter Kegel- und Entgratsenker Werksnorm Form C 120°, 3-Flächen-Schaft
 HSS-XE + BLUE-TEC coated taper and deburring countersink work standard type C 120°, 3-flat-shank



40 3040

ANWENDUNG · APPLICATION

| | | | | | | | |
|----------|-----------|----------------|-----|-----------------------|---------------------|------------|------------|
| | | | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK | Hardox 400 | Hardox 450 |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP | Hardox 400 | Hardox 450 |
| < 1100 N | < 900 N | > 10% Si | | | | | |



| Art. | d1 Ø mm | d3 Ø mm | l1 mm | d2 mm | Z | € |
|--------------|---------|---------|-------|-------|---|-------|
| 40 3040 0063 | 6,3 | 1,5 | 45,0 | 5,0 | 3 | 15,20 |
| 40 3040 0083 | 8,3 | 2,0 | 50,0 | 6,0 | 3 | 15,70 |
| 40 3040 0104 | 10,4 | 2,5 | 50,0 | 6,0 | 3 | 16,70 |
| 40 3040 0124 | 12,4 | 3,0 | 56,0 | 8,0 | 3 | 18,65 |

| Art. | d1 Ø mm | d3 Ø mm | l1 mm | d2 mm | Z | € |
|--------------|---------|---------|-------|-------|---|-------|
| 40 3040 0165 | 16,5 | 3,5 | 60,0 | 10,0 | 3 | 21,70 |
| 40 3040 0205 | 20,5 | 4,0 | 60,0 | 10,0 | 3 | 23,70 |
| 40 3040 0250 | 25,0 | 5,0 | 63,0 | 10,0 | 3 | 28,80 |

SETS · SETS

40 3090 050
 Inhalt Content • € 110,55
 Ø 6,3 · 8,3 · 10,4 · 12,4 · 16,5 · 20,5 mm (40 3040)

40 3090 060
 Inhalt Content • € 105,20
 Ø 6,3 · 10,4 · 16,5 · 20,5 · 25 mm (40 3040)

**LEERE SETS ZUM SELBST BESTÜCKEN
 EMPTY SETS FOR SELF EQUIPMENT**

21 0042
 Inhalt Content • € 6,55
 Ø 6,3 · 8,3 · 10,4 · 12,4 · 16,5 · 20,5 mm

21 0043
 Inhalt Content • € 6,55
 Ø 6,3 · 10,4 · 16,5 · 20,5 · 25 mm

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + BLUE-TEC beschichtet

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.
 BLUE-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

Zum Senken in folgende Materialien:

- Edelstähle (V2A / V4A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

3-Flächenschaft ergibt:

- Hervorragende Drehmomentübertragung
- Kein Durchrutschen im Bohrfutter
- Somit deutlich höhere Schnittleistung

HSS-XE steel + BLUE-TEC coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.
 BLUE-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Steel
- Cast iron
- Non ferrous metals

3-flat shank for:

- Excellent torque transmission
- No slippage in the drill chuck
- This results to superior cutting output

Schnittdaten
Cutting data



1317

Film
Movie



663



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FLACHSENKER

COUNTERBORES



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

3.2

KONTAKT | CONTACT

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+49 (0) 33675 - 7265-0

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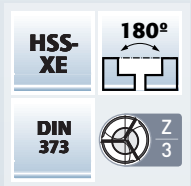
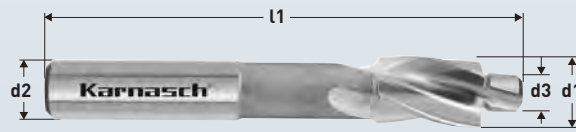
ONLINE



HSS-XE Flachsenker 180°, DIN 373 mit Zylinderschaft und festem Führungszapfen
 HSS-XE counterbores 180°, DIN 373 with cylindrical shaft and fixed guide

ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | GFK/CFK |
| < 900 N | < 900 N | | > 10% Si | | Plastics GRP/CRP |



Gütegrad fein für Durchgangsloch Fine grade for through hole

20 1791

| Art. | Für Gewinde Ø For thread Ø | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | € |
|-------------|-------------------------------|------------|------------|----------|------------|---|-------|
| 20 1791 020 | M 2 | • 4,3 | 2,2 | 56,0 | 4,3 | 3 | 12,35 |
| 20 1791 025 | M 2,5 | • 5,0 | 2,7 | 56,0 | 5,0 | 3 | 12,35 |
| 20 1791 030 | M 3 | • 6,0 | 3,2 | 71,0 | 5,0 | 3 | 11,30 |
| 20 1791 040 | M 4 | • 8,0 | 4,3 | 71,0 | 5,0 | 3 | 11,00 |
| 20 1791 050 | M 5 | • 10,0 | 5,3 | 80,0 | 8,0 | 3 | 12,50 |
| 20 1791 060 | M 6 | • 11,0 | 6,4 | 80,0 | 8,0 | 3 | 14,75 |
| 20 1791 080 | M 8 | • 15,0 | 8,4 | 100,0 | 12,5 | 3 | 20,70 |
| 20 1791 100 | M 10 | • 18,0 | 10,5 | 100,0 | 12,5 | 3 | 25,25 |
| 20 1791 120 | M 12 | • 20,0 | 13,0 | 100,0 | 12,5 | 3 | 28,40 |

SET GÜTEGRAD FEIN SET FINE GRADE M3, M4, M5, M6, M8, M10

40 1794
 • € 96,10



Gütegrad mittel für Durchgangsloch Medium grade for through hole

20 1792

| Art. | Für Gewinde Ø For thread Ø | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | € |
|-------------|-------------------------------|------------|------------|----------|------------|---|-------|
| 20 1792 030 | M 3 | • 6,0 | 3,4 | 71,0 | 5,0 | 3 | 11,30 |
| 20 1792 040 | M 4 | • 8,0 | 4,5 | 71,0 | 5,0 | 3 | 11,00 |
| 20 1792 050 | M 5 | • 10,0 | 5,5 | 80,0 | 8,0 | 3 | 12,50 |
| 20 1792 060 | M 6 | • 11,0 | 6,6 | 80,0 | 8,0 | 3 | 14,75 |
| 20 1792 080 | M 8 | • 15,0 | 9,0 | 100,0 | 12,5 | 3 | 20,70 |
| 20 1792 100 | M 10 | • 18,0 | 11,0 | 100,0 | 12,5 | 3 | 25,25 |
| 20 1792 120 | M 12 | • 20,0 | 13,5 | 100,0 | 12,5 | 3 | 28,40 |

SET GÜTEGRAD MITTEL SET MEDIUM GRADE M3, M4, M5, M6, M8, M10

40 1797
 • € 96,10



Für Gewindekernloch For thread core hole

20 1793

| Art. | Für Gewinde Ø For thread Ø | d1 Ø mm | d3 Ø mm | L1 mm | d2 Ø mm | Z | € |
|-------------|-------------------------------|------------|------------|----------|------------|---|-------|
| 20 1793 030 | M 3 | • 6,0 | 2,5 | 71,0 | 5,0 | 3 | 11,30 |
| 20 1793 040 | M 4 | • 8,0 | 3,3 | 71,0 | 5,0 | 3 | 11,00 |
| 20 1793 050 | M 5 | • 10,0 | 4,2 | 80,0 | 8,0 | 3 | 12,50 |
| 20 1793 060 | M 6 | • 11,0 | 5,0 | 80,0 | 8,0 | 3 | 14,75 |
| 20 1793 080 | M 8 | • 15,0 | 6,8 | 100,0 | 12,5 | 3 | 20,70 |
| 20 1793 100 | M 10 | • 18,0 | 8,5 | 100,0 | 12,5 | 3 | 25,25 |
| 20 1793 120 | M 12 | • 20,0 | 10,2 | 100,0 | 12,5 | 3 | 28,40 |

SET FÜR GEWINDEKERNLOCH SET FOR CORE HOLES M3, M4, M5, M6, M8, M10

40 1798
 • € 96,10



EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

Zum Senken in folgende Materialien:

- Edelstähle (V2A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

Verwendung: Zum Versenken von Innensechskant-Schrauben DIN 912, 6912, 7984 und Zylinderschrauben ISO 1207 (DIN 84)

HSS-XE steel

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A)
- Steel
- Cast iron
- Non ferrous metals

Application: For countersinking allen screws DIN 912, 6912, 7984 and cylindrical head screws ISO 1207 (DIN 84)

Schnittdaten
Cutting data



Film
Movie



1318



HSS-XE + TITAN-TEC Flachsenker 180°, DIN 373 mit Zylinderschaft und festem Führungszapfen
 HSS-XE + TITAN-TEC counterbores 180°, DIN 373 with cylindrical shaft and fixed guide

ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 1100 N | < 900 N | | > 10% Si | | |



| | | |
|----------------|-------------|--|
| HSS-XE | 180° | TITAN-TEC beschichtet / coated |
| DIN 373 | | Z 3 |

Gütegrad fein für Durchgangsloch
 Fine grade for through hole **20 1891**

| Art. | Für Gewinde Ø For thread Ø | d1 Ø mm | d3 Ø mm | l1 mm | d2 Ø mm | Z | € |
|-------------|-------------------------------|------------|------------|----------|------------|---|-------|
| 20 1891 020 | M 2 | • 4,3 | 2,2 | 56,0 | 4,3 | 3 | 13,80 |
| 20 1891 025 | M 2,5 | • 5,0 | 2,7 | 56,0 | 5,0 | 3 | 13,80 |
| 20 1891 030 | M 3 | • 6,0 | 3,2 | 71,0 | 5,0 | 3 | 13,25 |
| 20 1891 040 | M 4 | • 8,0 | 4,3 | 71,0 | 5,0 | 3 | 13,30 |
| 20 1891 050 | M 5 | • 10,0 | 5,3 | 80,0 | 8,0 | 3 | 15,40 |
| 20 1891 060 | M 6 | • 11,0 | 6,4 | 80,0 | 8,0 | 3 | 17,95 |
| 20 1891 080 | M 8 | • 15,0 | 8,4 | 100,0 | 12,5 | 3 | 25,00 |
| 20 1891 100 | M 10 | • 18,0 | 10,5 | 100,0 | 12,5 | 3 | 30,45 |
| 20 1891 120 | M 12 | • 20,0 | 13,0 | 100,0 | 12,5 | 3 | 34,15 |

SET GÜTEGRAD FEIN
 SET FINE GRADE **M3, M4, M5, M6, M8, M10** **40 1791**



Gütegrad mittel für Durchgangsloch
 Medium grade for through hole **20 1892**

| Art. | Für Gewinde Ø For thread Ø | d1 Ø mm | d3 Ø mm | l1 mm | d2 Ø mm | Z | € |
|-------------|-------------------------------|------------|------------|----------|------------|---|-------|
| 20 1892 030 | M 3 | • 6,0 | 3,4 | 71,0 | 5,0 | 3 | 13,25 |
| 20 1892 040 | M 4 | • 8,0 | 4,5 | 71,0 | 5,0 | 3 | 13,30 |
| 20 1892 050 | M 5 | • 10,0 | 5,5 | 80,0 | 8,0 | 3 | 15,40 |
| 20 1892 060 | M 6 | • 11,0 | 6,6 | 80,0 | 8,0 | 3 | 17,95 |
| 20 1892 080 | M 8 | • 15,0 | 9,0 | 100,0 | 12,5 | 3 | 25,00 |
| 20 1892 100 | M 10 | • 18,0 | 11,0 | 100,0 | 12,5 | 3 | 30,45 |
| 20 1892 120 | M 12 | • 20,0 | 13,5 | 100,0 | 12,5 | 3 | 34,15 |

SET GÜTEGRAD MITTEL
 SET MEDIUM GRADE **M3, M4, M5, M6, M8, M10** **40 1792**



Für Gewindekernloch
 For thread core hole **20 1893**

| Art. | Für Gewinde Ø For thread Ø | d1 Ø mm | d3 Ø mm | l1 mm | d2 Ø mm | Z | € |
|-------------|-------------------------------|------------|------------|----------|------------|---|-------|
| 20 1893 030 | M 3 | • 6,0 | 2,5 | 71,0 | 5,0 | 3 | 13,25 |
| 20 1893 040 | M 4 | • 8,0 | 3,3 | 71,0 | 5,0 | 3 | 13,30 |
| 20 1893 050 | M 5 | • 10,0 | 4,2 | 80,0 | 8,0 | 3 | 15,40 |
| 20 1893 060 | M 6 | • 11,0 | 5,0 | 80,0 | 8,0 | 3 | 17,95 |
| 20 1893 080 | M 8 | • 15,0 | 6,8 | 100,0 | 12,5 | 3 | 25,00 |
| 20 1893 100 | M 10 | • 18,0 | 8,5 | 100,0 | 12,5 | 3 | 30,45 |
| 20 1893 120 | M 12 | • 20,0 | 10,2 | 100,0 | 12,5 | 3 | 34,15 |

SET FÜR GEWINDEKERNLOCH
 SET FOR CORE HOLES **M3, M4, M5, M6, M8, M10** **40 1793**



EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + TITAN-TEC beschichtet

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.
 TITAN-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

Zum Senken in folgende Materialien:

- Edelstähle (V2A / V4A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

Verwendung: Zum Versenken von Innensechskant-Schrauben DIN 912, 6912, 7984 und Zylinderschrauben ISO 1207 (DIN 84)

HSS-XE steel + TITAN-TEC coated

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.
 TITAN-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A / V4A)
- Acid resistant steel
- Steel
- Cast iron
- Non ferrous metals

Application: For countersinking allen screws DIN 912, 6912, 7984 and cylindrical head screws ISO 1207 (DIN 84)

Schnittdaten
Cutting data



1318

Film
Movie



667



Ihre Notizen & Zeichnungen Your notices & drafts

1



2



3



4



5



6



7

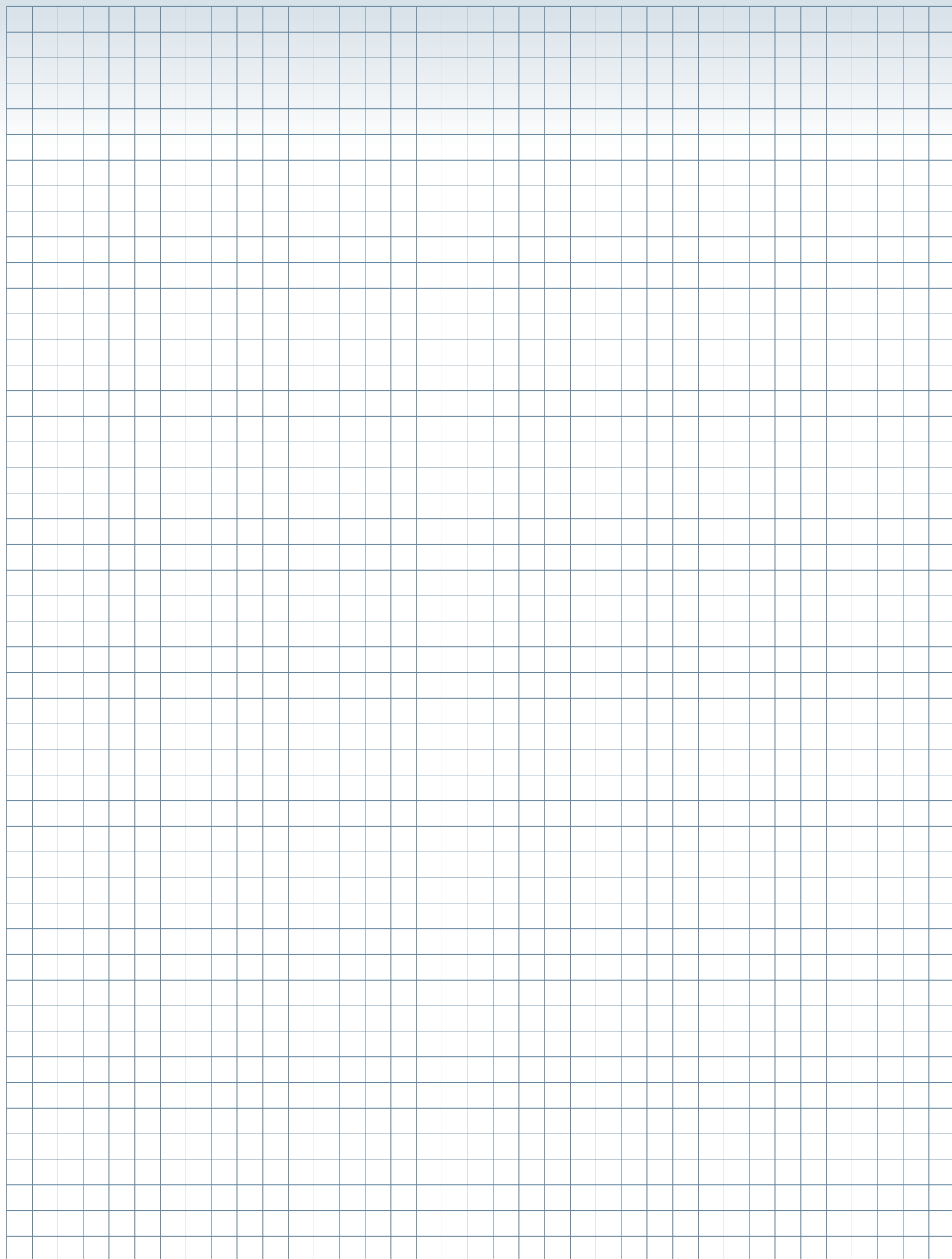


8



9

Index



MEHRFASEN-STUFENBOHRER / KURZSTUFENBOHRER

SUBLAND DRILLS / STUB SUBLAND DRILLS



3.3

KONTAKT | CONTACT

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INDUSTRIAL TOOLS DIVISION

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ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | GFK/CFK |
| < 900 N | < 900 N | | > 10% Si | | Plastics GRP/CRP |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

Zum Senken in folgende Materialien:

- Edelstähle (V2A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

Bohr- und Senkstufe sind jeweils mit eigenen Span-Nuten und Führungsfasen gefertigt. Dadurch mehrmaliges Nachschleifen möglich.

HSS-XE steel

Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

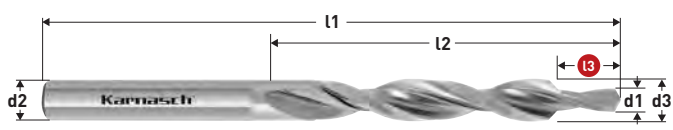
For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A)
- Steel
- Cast iron
- Non ferrous metals

Drill and counterbore each with its own chip flutes and guide chamfers. This means it can be reground many times.

40 1010

HSS-XE Mehrfasen-Stufenbohrer, DIN 8374, 90°, Gütegrad fein für Durchgangsloch
HSS-XE subland drill, DIN 8374, 90°, fine grade for through holes



| Art. | Für Gewinde For thread Ø | d1 h9 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|--------------------------|----------|----------|----------|-------|-------|-------|-------|
| 40 1010 030 | M 3 | • 3,2 | 6,0 | 6,0 | 9,0 | 57,0 | 93,0 | 23,45 |
| 40 1010 040 | M 4 | • 4,3 | 8,0 | 8,0 | 11,0 | 75,0 | 117,0 | 26,70 |
| 40 1010 050 | M 5 | • 5,3 | 10,0 | 10,0 | 13,0 | 87,0 | 133,0 | 33,80 |
| 40 1010 060 | M 6 | • 6,4 | 11,5 | 11,5 | 15,0 | 94,0 | 142,0 | 37,80 |
| 40 1010 080 | M 8 | • 8,4 | 15,0 | 15,0 | 19,0 | 114,0 | 169,0 | 62,85 |
| 40 1010 100 | M 10 | • 10,5 | 19,0 | 19,0 | 23,0 | 135,0 | 198,0 | 96,45 |

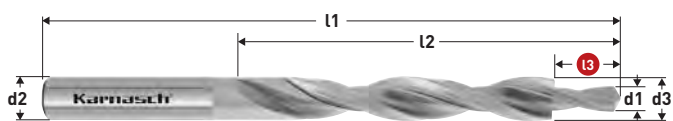


Verwendung: Für Schrauben- und Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74 Blatt 1, Form A, Gütegrad fein. Für Senkschrauben nach ISO 2009, 2010, 7046 / DIN 963, 964, 965, 966.

Use: For through holes for screws DIN-ISO 273 and countersinks to DIN 74 sheet 1, form A, fine grade. For countersunk screws to ISO 2009, 2010, 7046 / DIN 963, 964, 965, 966.

40 1020

HSS-XE Mehrfasen-Stufenbohrer, DIN 8376, 180°, Gütegrad mittel für Durchgangsloch
HSS-XE subland drill, DIN 8376, 180°, medium grade for through holes



| Art. | Für Gewinde For thread Ø | d1 h9 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|--------------------------|----------|----------|----------|-------|-------|-------|-------|
| 40 1020 030 | M 3 | • 3,4 | 6,5 | 6,5 | 9,0 | 63,0 | 101,0 | 24,85 |
| 40 1020 040 | M 4 | • 4,5 | 8,0 | 8,0 | 11,0 | 75,0 | 117,0 | 26,50 |
| 40 1020 050 | M 5 | • 5,5 | 10,0 | 10,0 | 13,0 | 87,0 | 133,0 | 31,85 |
| 40 1020 060 | M 6 | • 6,6 | 11,0 | 11,0 | 15,0 | 94,0 | 142,0 | 36,75 |
| 40 1020 080 | M 8 | • 9,0 | 15,0 | 15,0 | 19,0 | 114,0 | 169,0 | 46,70 |
| 40 1020 100 | M 10 | • 11,0 | 18,0 | 18,0 | 23,0 | 130,0 | 191,0 | 96,05 |

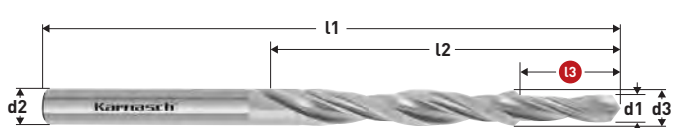


Verwendung: Für Schrauben- und Durchgangslöcher nach DIN-ISO 273 und Schraubenkopfsenkungen Form H, J, K. Gütegrad mittel nach DIN 74 Blatt 2.

Use: For screw through holes to DIN-ISO 273 and screw head counterbores shape H, J, K. Medium grade to DIN 74 sheet 2.

40 1030

HSS-XE Mehrfasen-Stufenbohrer, DIN 8378, für Kernloch, 90° Ansenkung
HSS-XE subland drill, DIN 8378, for tapping holes, 90° countersink



| Art. | Für Gewinde For thread Ø | d1 h9 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|--------------------------|----------|----------|----------|-------|-------|-------|-------|
| 40 1030 030 | M 3 | • 2,5 | 3,4 | 3,4 | 8,8 | 39,0 | 70,0 | 19,45 |
| 40 1030 040 | M 4 | • 3,3 | 4,5 | 4,5 | 11,4 | 47,0 | 80,0 | 21,10 |
| 40 1030 050 | M 5 | • 4,2 | 5,5 | 5,5 | 13,6 | 57,0 | 93,0 | 21,65 |
| 40 1030 060 | M 6 | • 5,0 | 6,6 | 6,6 | 16,5 | 63,0 | 101,0 | 24,60 |
| 40 1030 080 | M 8 | • 6,8 | 9,0 | 9,0 | 21,0 | 81,0 | 125,0 | 28,15 |
| 40 1030 100 | M 10 | • 8,5 | 11,0 | 11,0 | 25,5 | 94,0 | 142,0 | 36,10 |
| 40 1030 120 | M 12 | • 10,2 | 13,5 | 13,5 | 30,0 | 108,0 | 160,0 | 46,15 |



Verwendung: Gewindekernloch und Ansenkung werden genau fluchtend zueinander in einem Arbeitsgang gefertigt. Für Gewinde-Kernloch-Bohrungen nach DIN 336 Blatt 1 mit Ansenkungen 90° (ähnlich DIN 69, Gütegrad mittel).

Use: Tapping hole and countersink are produced in one operation. For drilling tapping holes to DIN 336 sheet 1 with 90° countersinking (similar DIN 69, medium grade).

Schnittdaten
Cutting data

Film
Movie



1319

ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 1100 N | < 900 N | | > 10% Si | | |

Bohr- und Senkstufe sind jeweils mit eigenen Span-Nuten und Führungsfasen gefertigt. Dadurch mehrmaliges Nachschleifen möglich.
 Drill and counterbore each with its own chip flutes and guide chamfers. This means it can be reground many times.

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + TITAN-TEC beschichtet
 Gefertigt aus hochlegiertem Spezialstahl „XE“ für wesentlich höhere Standzeiten gegenüber HSS-Stähle.
 TITAN-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

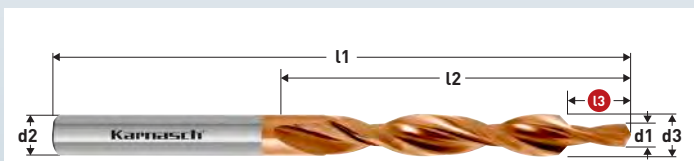
- Zum Senken in folgende Materialien:**
- Edelstähle (V2A / V4A)
 - Stahl
 - Guss
 - Bunt- und Leichtmetalle

HSS-XE steel + TITAN-TEC coated
 Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.
 TITAN-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

- For countersinking in materials:**
- High-alloyed chromium steel such as stainless (V2A / V4A)
 - Acid resistant steel
 - Steel
 - Cast iron
 - Non ferrous metals

HSS-XE + TITAN-TEC Mehrfasen-Stufenbohrer, DIN 8374, 90°, Gütegrad fein für Durchgangsloch
HSS-XE + TITAN-TEC subland drill, DIN 8374, 90°, fine grade for through holes

40 2010



| Art. | Für Gewinde Ø For thread Ø | d1 h9 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-------------------------------|-------------|-------------|-------------|----------|----------|----------|--------|
| 40 2010 030 | M 3 | • 3,2 | 6,0 | 6,0 | 9,0 | 57,0 | 93,0 | 29,30 |
| 40 2010 040 | M 4 | • 4,3 | 8,0 | 8,0 | 11,0 | 75,0 | 117,0 | 33,35 |
| 40 2010 050 | M 5 | • 5,3 | 10,0 | 10,0 | 13,0 | 87,0 | 133,0 | 42,25 |
| 40 2010 060 | M 6 | • 6,4 | 11,5 | 11,5 | 15,0 | 94,0 | 142,0 | 47,20 |
| 40 2010 080 | M 8 | • 8,4 | 15,0 | 15,0 | 19,0 | 114,0 | 169,0 | 78,55 |
| 40 2010 100 | M 10 | • 10,5 | 19,0 | 19,0 | 23,0 | 135,0 | 198,0 | 120,55 |

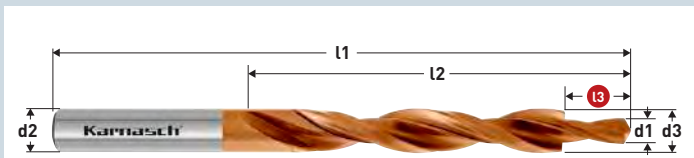
HSS-XE **90°** **TITAN-TEC** beschichtet / coated **DIN 8374** **118°** **20-30°** **Z 2**

Verwendung: Für Schrauben- und Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74 Blatt 1, Form A, Gütegrad fein. Für Senkschrauben nach ISO 2009, 2010, 7046 / DIN 963, 964, 965, 966.

Use: For through holes for screws DIN-ISO 273 and countersinks to DIN 74 sheet 1, form A, fine grade. For countersunk screws to ISO 2009, 2010, 7046 / DIN 963, 964, 965, 966.

HSS-XE + TITAN-TEC Mehrfasen-Stufenbohrer, DIN 8376, 180°, Gütegrad mittel für Durchgangsloch
HSS-XE + TITAN-TEC subland drill, DIN 8376, 180°, medium grade for through holes

40 2020



| Art. | Für Gewinde Ø For thread Ø | d1 h9 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-------------------------------|-------------|-------------|-------------|----------|----------|----------|--------|
| 40 2020 030 | M 3 | • 3,4 | 6,5 | 6,5 | 9,0 | 63,0 | 101,0 | 31,05 |
| 40 2020 040 | M 4 | • 4,5 | 8,0 | 8,0 | 11,0 | 75,0 | 117,0 | 33,10 |
| 40 2020 050 | M 5 | • 5,5 | 10,0 | 10,0 | 13,0 | 87,0 | 133,0 | 39,80 |
| 40 2020 060 | M 6 | • 6,6 | 11,0 | 11,0 | 15,0 | 94,0 | 142,0 | 45,95 |
| 40 2020 080 | M 8 | • 9,0 | 15,0 | 15,0 | 19,0 | 114,0 | 169,0 | 58,40 |
| 40 2020 100 | M 10 | • 11,0 | 18,0 | 18,0 | 23,0 | 130,0 | 191,0 | 120,05 |

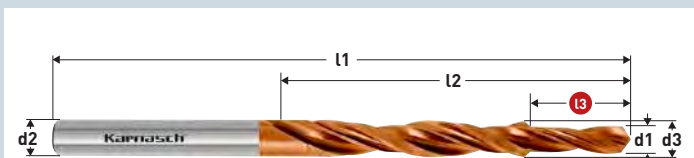
HSS-XE **180°** **TITAN-TEC** beschichtet / coated **DIN 8376** **118°** **20-30°** **Z 2**

Verwendung: Für Schrauben- und Durchgangslöcher nach DIN-ISO 273 und Schraubenkopfsenkungen Form H, J, K. Gütegrad mittel nach DIN 74 Blatt 2.

Use: For screw through holes to DIN-ISO 273 and screw head counterbores shape H, J, K. Medium grade to DIN 74 sheet 2.

HSS-XE + TITAN-TEC Mehrfasen-Stufenbohrer, DIN 8378, für Kernloch, 90° Ansenkung
HSS-XE + TITAN-TEC subland drill, DIN 8378, for tapping holes, 90° countersink

40 2030



| Art. | Für Gewinde Ø For thread Ø | d1 h9 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-------------------------------|-------------|-------------|-------------|----------|----------|----------|-------|
| 40 2030 030 | M 3 | • 2,5 | 3,4 | 3,4 | 8,8 | 39,0 | 70,0 | 24,35 |
| 40 2030 040 | M 4 | • 3,3 | 4,5 | 4,5 | 11,4 | 47,0 | 80,0 | 26,35 |
| 40 2030 050 | M 5 | • 4,2 | 5,5 | 5,5 | 13,6 | 57,0 | 93,0 | 27,05 |
| 40 2030 060 | M 6 | • 5,0 | 6,6 | 6,6 | 16,5 | 63,0 | 101,0 | 30,70 |
| 40 2030 080 | M 8 | • 6,8 | 9,0 | 9,0 | 21,0 | 81,0 | 125,0 | 35,15 |
| 40 2030 100 | M 10 | • 8,5 | 11,0 | 11,0 | 25,5 | 94,0 | 142,0 | 45,15 |
| 40 2030 120 | M 12 | • 10,2 | 13,5 | 13,5 | 30,0 | 108,0 | 160,0 | 57,70 |

HSS-XE **90°** **TITAN-TEC** beschichtet / coated **DIN 8378** **118°** **20-30°** **Z 2**

Verwendung: Gewindekernloch und Ansenkung werden genau fluchtend zueinander in einem Arbeitsgang gefertigt. Für Gewinde-Kernloch-Bohrungen nach DIN 336 Blatt 1 mit Ansenkungen 90° (ähnlich DIN 69, Gütegrad mittel).

Use: Tapping hole and countersink are produced in one operation. For drilling tapping holes to DIN 336 sheet 1 with 90° countersinking (similar DIN 69, medium grade).

Schnittdaten
Cutting data

Film
Movie








1319

671



Index

ANWENDUNG · APPLICATION

| | | | | | |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| Stahl Steel | Edelstahl Stainless | Grauguss Grey cast iron | Alu Alu | Kupfer, Messing, Zinn Copper, brass, tin | Kunststoffe GFK/CFK Plastics GRP/CRP |
| < 900 N | < 900 N | | > 10% Si | | |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stähle.

Zum Senken in folgende Materialien:

- Edelstähle (V2A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

HSS-XE steel

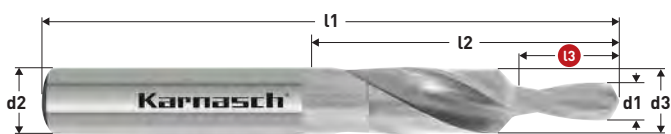
Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A)
- Steel
- Cast iron
- Non ferrous metals

40 1040

HSS-XE Kurzstufenbohrer für Durchgangsloch 90° (Senkschrauben)
HSS-XE stub subland drill for through holes 90° (countersunk screws)



| Art. | Für Gewinde Ø For thread Ø | d1 h8 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-------------------------------|-------------|-------------|-------------|----------|----------|----------|-------|
| 40 1040 030 | M 3 | • 3,2 | 6,0 | 6,0 | 9,0 | 28,0 | 66,0 | 15,45 |
| 40 1040 040 | M 4 | • 4,3 | 8,0 | 8,0 | 11,0 | 37,0 | 79,0 | 17,70 |
| 40 1040 050 | M 5 | • 5,3 | 10,0 | 10,0 | 13,0 | 43,0 | 89,0 | 22,05 |
| 40 1040 060 | M 6 | • 6,4 | 11,5 | 11,5 | 15,0 | 47,0 | 95,0 | 25,90 |
| 40 1040 080 | M 8 | • 8,4 | 15,0 | 15,0 | 19,0 | 56,0 | 111,0 | 30,25 |
| 40 1040 100 | M 10 | • 10,5 | 19,0 | 19,0 | 23,0 | 64,0 | 127,0 | 45,25 |

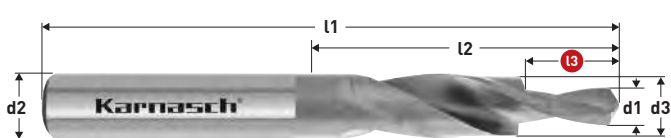


Verwendung: Besonders geeignet für NC-Maschinen, da hohe Positionsgenauigkeit, beste Zentriereigenschaft und sehr stabil. Das vorherige Zentrieren kann deshalb oft entfallen. Sehr stabile und enge Rundlauf-toleranzen zwischen Bohr- und Senkdurchmesser garantieren exakte Fluchtung. Für Schrauben-Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74, Blatt 1, Form A, Gütegrad fein. Für Schrauben nach ISO 2009, 2010, 7046, 7047 (DIN 963, 964, 965, 966).

Use: Particular suitable for NC machines due to high positional accuracy, excellent centering properties and great sturdiness. The preceding centering operation can thus often be omitted. Very sturdy and tight concentricity tolerances between drill Ø and counterbore Ø guarantee exact alignment. For through holes for screws to DIN-ISO 273 and countersinks to DIN 74, sheet 1 form A fine grade. For screws to ISO 2009, 2010, 7046, 7047 (DIN 963, 964, 965, 966)

40 1050

HSS-XE Kurzstufenbohrer für Durchgangsloch 180° (Zylinderkopf-Schrauben)
HSS-XE stub subland drill for through holes 180° (socket-head screws)



| Art. | Für Gewinde Ø For thread Ø | d1 h8 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-------------------------------|-------------|-------------|-------------|----------|----------|----------|-------|
| 40 1050 030 | M 3 | • 3,4 | 6,0 | 6,0 | 9,0 | 28,0 | 66,0 | 15,15 |
| 40 1050 040 | M 4 | • 4,5 | 8,0 | 8,0 | 11,0 | 37,0 | 79,0 | 17,20 |
| 40 1050 050 | M 5 | • 5,5 | 10,0 | 10,0 | 13,0 | 43,0 | 89,0 | 21,10 |
| 40 1050 060 | M 6 | • 6,6 | 11,0 | 11,0 | 15,0 | 47,0 | 95,0 | 24,55 |
| 40 1050 080 | M 8 | • 9,0 | 15,0 | 15,0 | 19,0 | 56,0 | 111,0 | 30,85 |
| 40 1050 100 | M 10 | • 11,0 | 18,0 | 18,0 | 23,0 | 62,0 | 123,0 | 47,05 |



Verwendung: Sehr stabile und enge Rundlauf-toleranzen zwischen Bohr- und Senkdurchmesser garantieren exakte Fluchtung. Für Schrauben-Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74, Blatt 2, Form H, J, K, Gütegrad mittel. Für Schrauben nach DIN 912, 6912, 7984, ISO 1207 (DIN 84).

Use: Very sturdy and tight concentricity tolerances between drill Ø and counterbore Ø guarantee exact alignment. For through holes for screws to DIN-ISO 273 and countersinking to DIN 74, sheet 2 form H, J, K, medium grade. For screws to DIN 912, 6912, 7984, ISO 1207 (DIN 84).

Schnittdaten
Cutting data

Film
Movie



1319



ANWENDUNG · APPLICATION

| | | | | | |
|----------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 1100 N | < 900 N | | > 10% Si | | |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + TITAN-TEC beschichtet
 Gefertigt aus hochlegiertem Spezialstahl „XE“ für wesentlich höhere Standzeiten gegenüber HSS-Stähle.
 TITAN-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

- Zum Senken in folgende Materialien:**
- Edelstahl (V2A / V4A)
 - Stahl
 - Guss
 - Bunt- und Leichtmetalle

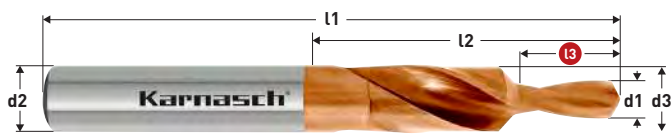
HSS-XE steel + TITAN-TEC coated
 Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel. TITAN-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

- For countersinking in materials:**
- High-alloyed chromium steel such as stainless (V2A / V4A)
 - Acid resistant steel
 - Steel
 - Cast iron
 - Non ferrous metals

HSS-XE + TITAN-TEC Kurzstufenbohrer für Durchgangsloch 90° (Senkschrauben)
HSS-XE + TITAN-TEC stub subland drill for through holes 90° (countersunk screws)



40 2040



| Art. | Für Gewinde Ø For thread Ø | d1 h8 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-------------------------------|-------------|-------------|-------------|----------|----------|----------|-------|
| 40 2040 030 | M 3 | • 3,2 | 6,0 | 6,0 | 9,0 | 28,0 | 66,0 | 19,30 |
| 40 2040 040 | M 4 | • 4,3 | 8,0 | 8,0 | 11,0 | 37,0 | 79,0 | 22,15 |
| 40 2040 050 | M 5 | • 5,3 | 10,0 | 10,0 | 13,0 | 43,0 | 89,0 | 27,55 |
| 40 2040 060 | M 6 | • 6,4 | 11,5 | 11,5 | 15,0 | 47,0 | 95,0 | 32,35 |
| 40 2040 080 | M 8 | • 8,4 | 15,0 | 15,0 | 19,0 | 56,0 | 111,0 | 37,80 |
| 40 2040 100 | M 10 | • 10,5 | 19,0 | 19,0 | 23,0 | 64,0 | 127,0 | 56,55 |



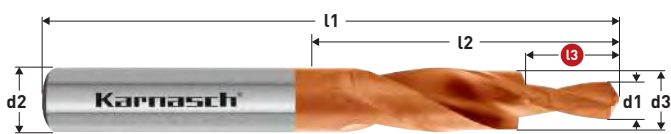
Verwendung: Besonders geeignet für NC-Maschinen, da hohe Positionsgenauigkeit, beste Zentriereigenschaft und sehr stabil. Das vorherige Zentrieren kann deshalb oft entfallen. Sehr stabile und enge Rundlauf-toleranzen zwischen Bohr- und Senkdurchmesser garantieren exakte Fluchtung. Für Schrauben-Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74, Blatt 1, Form A, Gütegrad fein. Für Schrauben nach ISO 2009, 2010, 7046, 7047 [DIN 963, 964, 965, 966].

Use: Particular suitable for NC machines due to high positional accuracy, excellent centering properties and great sturdiness. The preceding centering operation can thus often be omitted. Very sturdy and tight concentricity tolerances between drill Ø and counterbore Ø guarantee exact alignment. For through holes for screws to DIN-ISO 273 and countersinks to DIN 74, sheet 1 form A fine grade. For screws to ISO 2009, 2010, 7046, 7047 [DIN 963, 964, 965, 966].

HSS-XE + TITAN-TEC Kurzstufenbohrer für Durchgangsloch 180° (Zylinderkopf-Schrauben)
HSS-XE + TITAN-TEC stub subland drill for through holes 180° (socket-head screws)



40 2050



| Art. | Für Gewinde Ø For thread Ø | d1 h8 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-------------------------------|-------------|-------------|-------------|----------|----------|----------|-------|
| 40 2050 030 | M 3 | • 3,4 | 6,0 | 6,0 | 9,0 | 28,0 | 66,0 | 18,95 |
| 40 2050 040 | M 4 | • 4,5 | 8,0 | 8,0 | 11,0 | 37,0 | 79,0 | 21,50 |
| 40 2050 050 | M 5 | • 5,5 | 10,0 | 10,0 | 13,0 | 43,0 | 89,0 | 26,35 |
| 40 2050 060 | M 6 | • 6,6 | 11,0 | 11,0 | 15,0 | 47,0 | 95,0 | 30,70 |
| 40 2050 080 | M 8 | • 9,0 | 15,0 | 15,0 | 19,0 | 56,0 | 111,0 | 38,55 |
| 40 2050 100 | M 10 | • 11,0 | 18,0 | 18,0 | 23,0 | 62,0 | 123,0 | 58,80 |



Verwendung: Sehr stabile und enge Rundlauf-toleranzen zwischen Bohr- und Senkdurchmesser garantieren exakte Fluchtung. Für Schrauben-Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74, Blatt 2, Form H, J, K, Gütegrad mittel. Für Schrauben nach DIN 912, 6912, 7984, ISO 1207 (DIN 84).

Use: Very sturdy and tight concentricity tolerances between drill Ø and counterbore Ø guarantee exact alignment. For through holes for screws to DIN-ISO 273 and countersinking to DIN 74, sheet 2 form H, J, K, medium grade. For screws to DIN 912, 6912, 7984, ISO 1207 (DIN 84).

Schnittdaten
Cutting data



1319

Film
Movie



673



Index

ANWENDUNG · APPLICATION

| | | | | | |
|----------------|------------------------|----------------------------|------------|---|---|
| | | | | | |
| Stahl Steel | Edelstahl Stainless | Grauguss Grey cast iron | Alu Alu | Kupfer, Messing, Zinn Copper, brass, tin | Kunststoffe GFK/CFK Plastics GRP/CRP |
| < 900 N | < 900 N | | > 10% Si | | |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl

Gefertigt aus hochlegiertem Spezialstahl "XE" für wesentlich höhere Standzeiten gegenüber HSS-Stählen.

Zum Senken in folgende Materialien:

- Edelstähle (V2A)
- Stahl
- Guss
- Bunt- und Leichtmetalle

HSS-XE steel

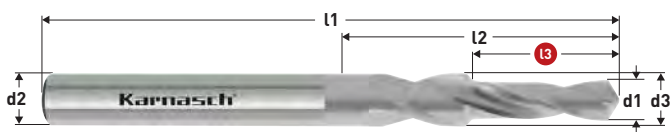
Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.

For countersinking in materials:

- High-alloyed chromium steel such as stainless (V2A)
- Steel
- Cast iron
- Non ferrous metals

40 1060

HSS-XE Kurzstufenbohrer für Kernloch, 90° Ansenkung
HSS-XE stub jobber drills for tapping holes, 90° countersink



| Art. | Für Gewinde Ø For thread Ø | d1 h8 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-------------------------------|-------------|-------------|-------------|----------|----------|----------|-------|
| 40 1060 030 | M 3 | • 2,5 | 3,4 | 3,4 | 8,8 | 20,0 | 52,0 | 13,65 |
| 40 1060 040 | M 4 | • 3,3 | 4,5 | 4,5 | 11,4 | 24,0 | 58,0 | 13,95 |
| 40 1060 050 | M 5 | • 4,2 | 5,5 | 5,5 | 13,6 | 28,0 | 66,0 | 14,90 |
| 40 1060 060 | M 6 | • 5,0 | 6,6 | 6,6 | 16,5 | 31,0 | 70,0 | 15,50 |
| 40 1060 080 | M 8 | • 6,8 | 9,0 | 9,0 | 21,0 | 40,0 | 84,0 | 18,30 |
| 40 1060 100 | M 10 | • 8,5 | 11,0 | 11,0 | 25,5 | 47,0 | 95,0 | 23,50 |
| 40 1060 120 | M 12 | • 10,2 | 13,5 | 13,5 | 30,0 | 54,0 | 107,0 | 30,20 |



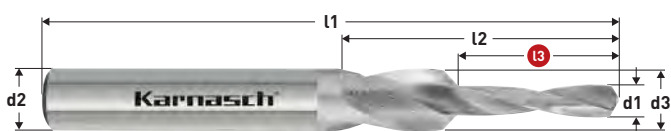
Verwendung: Bohrung und Senkung werden in einem Arbeitsgang genau fluchtend zueinander gefertigt. Daher sehr stabile und enge Rundlauf-toleranzen.

Besonders geeignet für NC-Maschinen, da hohe Positionsgenauigkeit, beste Zentriereigenschaft und sehr stabil. Das vorherige Zentrieren kann deshalb oft entfallen. Für Gewindekernlochbohrungen nach DIN 336 Blatt 1 mit Ansenkung 90°. Der nachfolgende Gewindebohrer schneidet dadurch nicht an der scharfen Bohrkante an.

Use: Hole and countersink are produced in one operation and precisely aligned. Therefore very sturdy and tight concentricity tolerances. Particular suitable for NC machines due to high positional accuracy, excellent centering properties and great sturdiness. The preceding centering operation can thus often be omitted. For thread tapping drill holes to DIN 336 sheet 1 with 90° countersink. In the following operation, the tap therefore does not have to cut into the sharp edge of the hole

40 1070

HSS-XE Kurzstufenbohrer mit langer Bohrstufe für Durchgangsloch 90°
HSS-XE stub subland drill with long drilling step for through holes

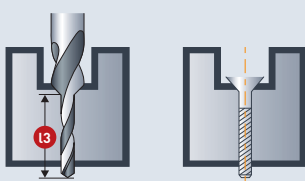


| Art. | Für Gewinde Ø For thread Ø | d1 ± 0,05 mm | d2 h8 mm | d3 h9 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|-------------------------------|-----------------|-------------|-------------|----------|----------|----------|-------|
| 40 1070 040 | M 4 | • 4,3 | 8,6 | 8,6 | 30,0 | 55,0 | 110,0 | 31,05 |
| 40 1070 050 | M 5 | • 5,3 | 10,4 | 10,4 | 30,0 | 55,0 | 110,0 | 33,40 |
| 40 1070 060 | M 6 | • 6,4 | 12,4 | 12,4 | 30,0 | 55,0 | 110,0 | 36,30 |
| 40 1070 080 | M 8 | • 8,4 | 12,5 | 16,4 | 30,0 | 70,0 | 110,0 | 56,40 |
| 40 1070 100 | M 10 | • 10,5 | 12,5 | 20,4 | 30,0 | 70,0 | 110,0 | 71,00 |



Verwendung: Für Schrauben- und Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74 Blatt 1 Form A, Ausführung mittel. Für Schrauben nach ISO 2009, 2010, 7046, 7047 (DIN 963, 964, 966). Besonders geeignet für Bohrungen mit gleichzeitiger Ansenkung in Profilmaterial.

Use: For through holes for screws DIN-ISO 273 and countersinks to DIN 74, sheet 1 form A, medium grade. For screws to ISO 2009, 2010, 7047 (DIN 963, 964, 966). Especially suitable for holes with simultaneous countersinking in profile material.



Durchgangsloch mit Senkung für Schraubenkopf in einem Arbeitsgang gebohrt.

Through hole with counterbore for screw head drilled in one operation.

Schnittdaten
Cutting data

Film
Movie



1319

ANWENDUNG · APPLICATION

| | | | | | |
|---------|-----------|----------------|----------|-----------------------|---------------------|
| | | | | | |
| Stahl | Edelstahl | Grauguss | Alu | Kupfer, Messing, Zinn | Kunststoffe GFK/CFK |
| Steel | Stainless | Grey cast iron | Alu | Copper, brass, tin | Plastics GRP/CRP |
| < 900 N | < 900 N | | > 10% Si | | |

EIGENSCHAFTEN · PROPERTIES

HSS-XE Stahl + TITAN-TEC beschichtet
 Gefertigt aus hochlegiertem Spezialstahl „XE“ für wesentlich höhere Standzeiten gegenüber HSS-Stähle.
 TITAN-TEC Beschichtung für eine nochmalige wesentliche Erhöhung der Standzeit auch bei Trockenbearbeitung (ohne/wenig Kühlung)

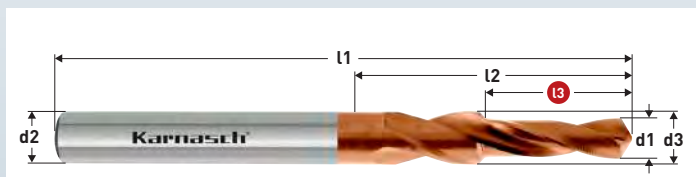
- Zum Senken in folgende Materialien:**
- Edelstahl (V2A / V4A)
 - Stahl
 - Guss
 - Bunt- und Leichtmetalle

HSS-XE steel + TITAN-TEC coated
 Made of high-alloyed special steel „XE“ for considerably longer service life than HSS-steel.
 TITAN-TEC coating for a further substantial increase in service life also when machining dry (no/less cooling)

- For countersinking in materials:**
- High-alloyed chromium steel such as stainless (V2A / V4A)
 - Acid resistant steel
 - Steel
 - Cast iron
 - Non ferrous metals

HSS-XE + TITAN-TEC Kurzstufenbohrer für Kernloch, 90° Ansenkung
HSS-XE + TITAN-TEC stub jobber drills for tapping holes, 90° countersink

40 2060



| Art. | Für Gewinde For thread Ø | d1 h8 mm | d2 h8 mm | d3 h8 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|--------------------------|----------|----------|----------|-------|-------|-------|-------|
| 40 2060 030 | M 3 | • 2,5 | 3,4 | 3,4 | 8,8 | 20,0 | 52,0 | 16,65 |
| 40 2060 040 | M 4 | • 3,3 | 4,5 | 4,5 | 11,4 | 24,0 | 58,0 | 17,05 |
| 40 2060 050 | M 5 | • 4,2 | 5,5 | 5,5 | 13,6 | 28,0 | 66,0 | 18,25 |
| 40 2060 060 | M 6 | • 5,0 | 6,6 | 6,6 | 16,5 | 31,0 | 70,0 | 18,95 |
| 40 2060 080 | M 8 | • 6,8 | 9,0 | 9,0 | 21,0 | 40,0 | 84,0 | 22,50 |
| 40 2060 100 | M 10 | • 8,5 | 11,0 | 11,0 | 25,5 | 47,0 | 95,0 | 28,95 |
| 40 2060 120 | M 12 | • 10,2 | 13,5 | 13,5 | 30,0 | 54,0 | 107,0 | 37,35 |



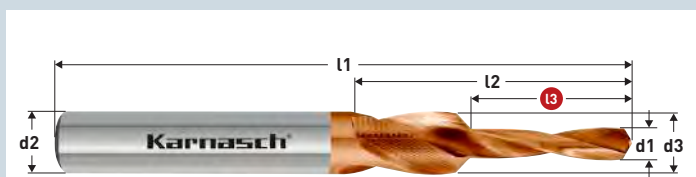
Verwendung: Bohrung und Senkung werden in einem Arbeitsgang genau fluchtend zueinander gefertigt. Daher sehr stabile und enge Rundlauf toleranzen.

Besonders geeignet für NC-Maschinen, da hohe Positionsgenauigkeit, beste Zentriereigenschaft und sehr stabil. Das vorherige Zentrieren kann deshalb oft entfallen. Für Gewindekernlochbohrungen nach DIN 336 Blatt 1 mit Ansenkung 90°. Der nachfolgende Gewindebohrer schneidet dadurch nicht an der scharfen Bohrkante an.

Use: Hole and countersink are produced in one operation and precisely aligned. Therefore very sturdy and tight concentricity tolerances. Particular suitable for NC machines due to high positional accuracy, excellent centering properties and great sturdiness. The preceding operation can thus often be omitted. For thread tapping drill holes to DIN 336 sheet 1 with 90° countersink. In the following operation, the tap therefore does not have to cut into the sharp edge of the hole

HSS-XE + TITAN-TEC Kurzstufenbohrer mit langer Bohrstufe für Durchgangsloch 90°
HSS-XE + TITAN-TEC stub subland drill with long drilling step for through holes

40 2070

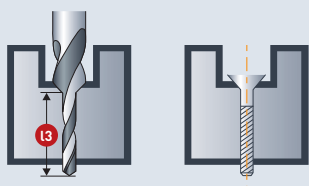


| Art. | Für Gewinde For thread Ø | d1 ± 0,05 mm | d2 h8 mm | d3 h9 mm | L3 mm | L2 mm | L1 mm | € |
|-------------|--------------------------|--------------|----------|----------|-------|-------|-------|-------|
| 40 2070 040 | M 4 | • 4,3 | 8,6 | 8,6 | 30,0 | 55,0 | 110,0 | 37,25 |
| 40 2070 050 | M 5 | • 5,3 | 10,4 | 10,4 | 30,0 | 55,0 | 110,0 | 40,05 |
| 40 2070 060 | M 6 | • 6,4 | 12,4 | 12,4 | 30,0 | 55,0 | 110,0 | 43,55 |
| 40 2070 080 | M 8 | • 8,4 | 12,5 | 16,4 | 30,0 | 70,0 | 110,0 | 67,65 |
| 40 2070 100 | M 10 | • 10,5 | 12,5 | 20,4 | 30,0 | 70,0 | 110,0 | 85,20 |



Verwendung: Für Schrauben- und Durchgangslöcher nach DIN-ISO 273 und Senkungen nach DIN 74 Blatt 1 Form A, Ausführung mittel. Für Schrauben nach ISO 2009, 2010, 7046, 7047 (DIN 963, 964, 966). Besonders geeignet für Bohrungen mit gleichzeitiger Ansenkung in Profilmaterial.

Use: For through holes for screws DIN-ISO 273 and countersinks to DIN 74, sheet 1 form A, medium grade. For screws to ISO 2009, 2010, 7047 (DIN 963, 964, 966). Especially suitable for holes with simultaneous countersinking in profile material.



Durchgangsloch mit Senkung für Schraubenkopf in einem Arbeitsgang gebohrt.

Through hole with counterbore for screw head drilled in one operation.

Schnittdaten
Cutting data



1319

Film
Movie



675

675



Index

Ihre Notizen & Zeichnungen Your notices & drafts

1



2



3



4



5



6



7

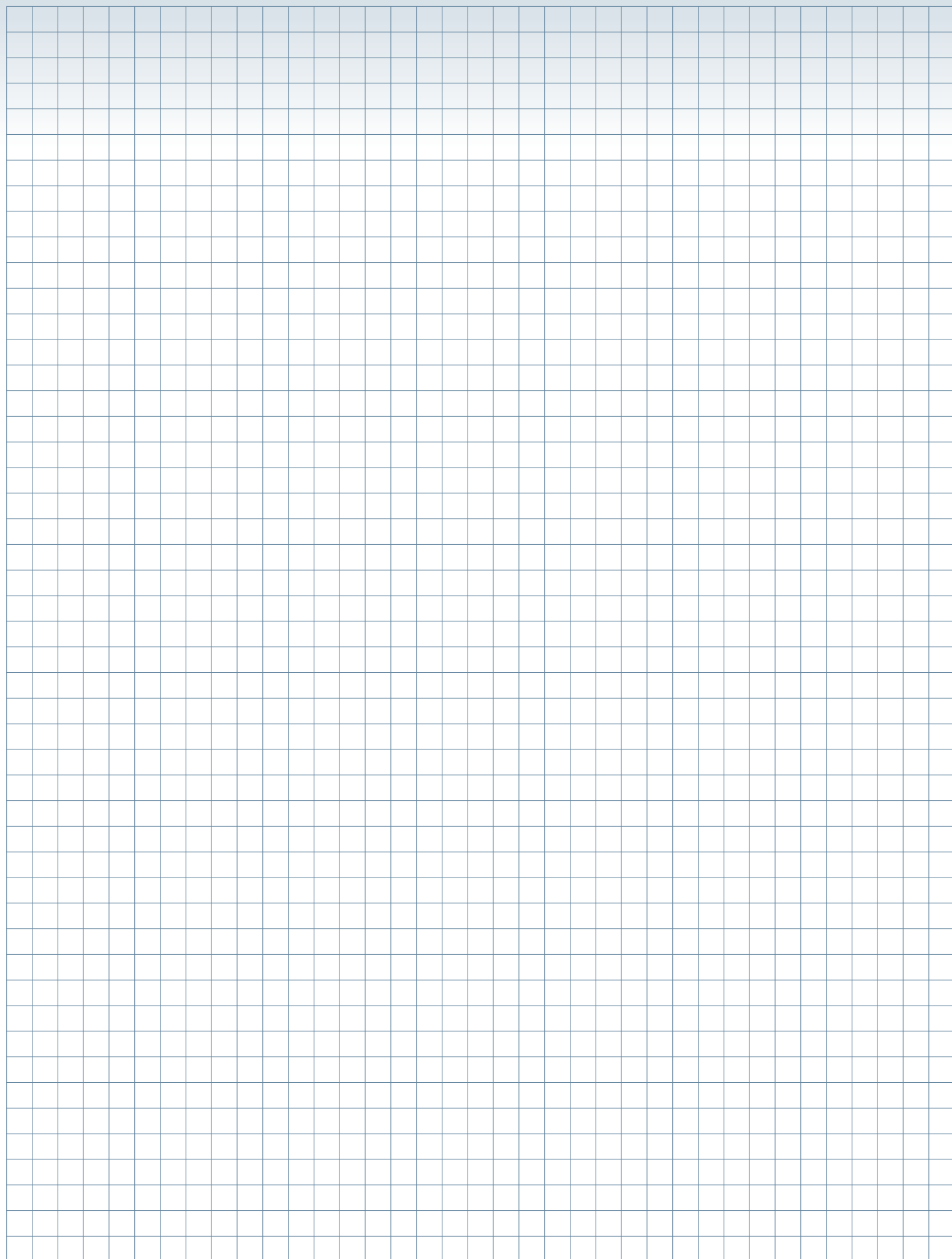


8



9

Index



4 SCHLEIFEN GRINDING

FRÄSSTIFTE
BURRS



4.1

☎ 679-768

FRÄSSTIFTE / LOCHSÄGEN FÜR SCHLÜSSELDIENTE
ROTARY BURRS / HOLE SAWS FOR LOCKSMITHS



4.2

☎ 775-778

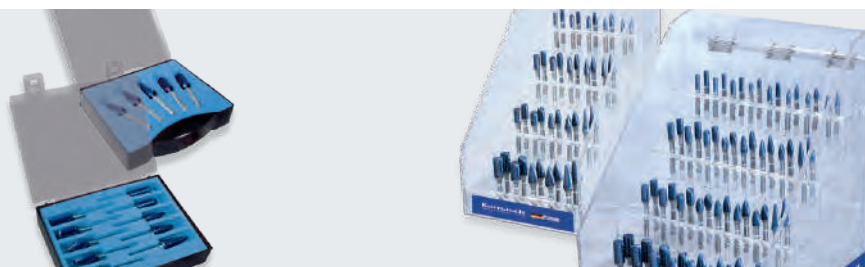
SPEZIAL FRÄSSTIFTE
SPECIAL BURRS



4.3

☎ 779-808

SETS · ZUBEHÖR
SETS · ACCESSORIES



4.4

☎ 809-822

1



2



3



4



5



6



7



8



9



Index

Ihre Notizen & Zeichnungen Your notices & drafts

1



2



3



4



5



6



7

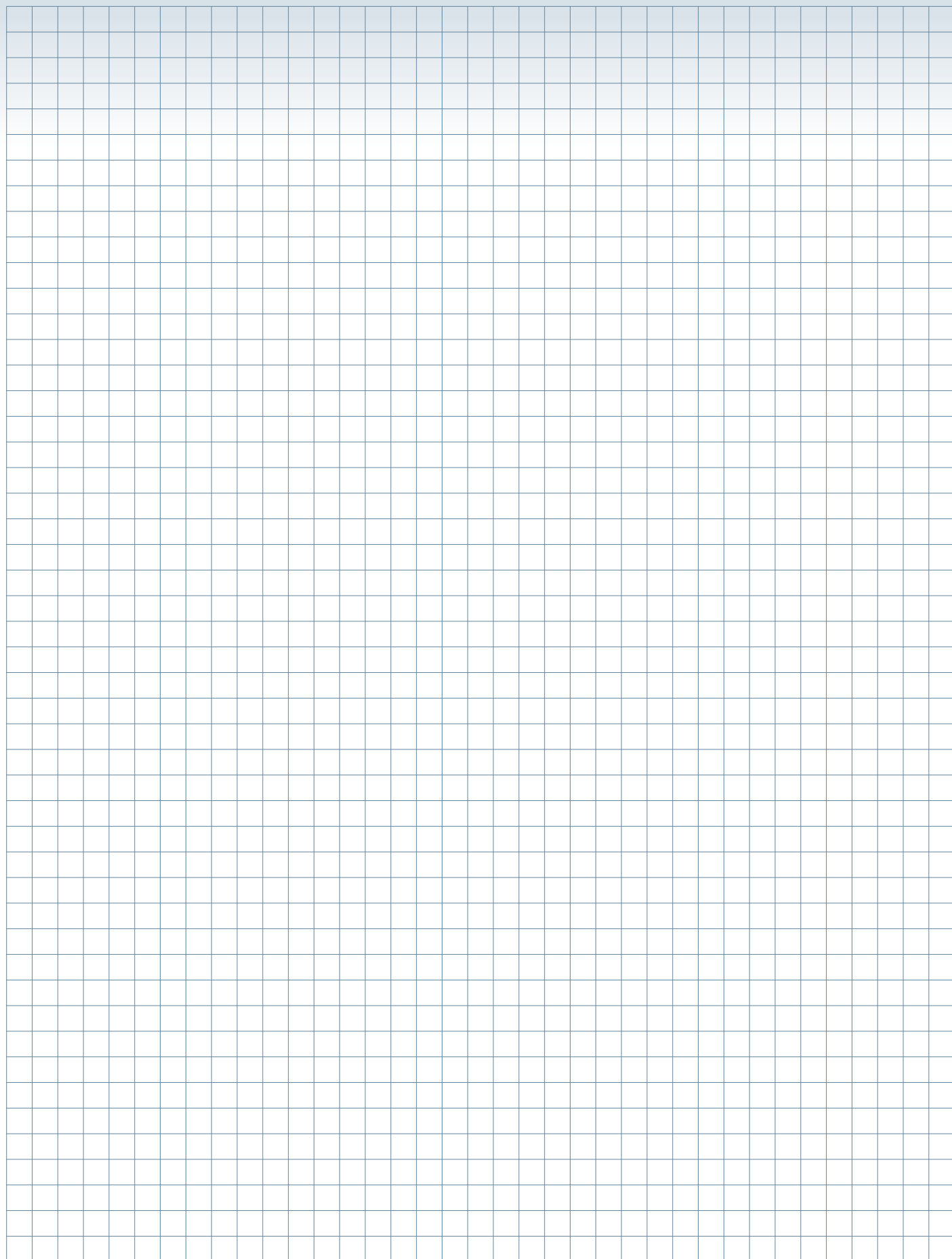


8



9

Index



HARTMETALL-FRÄSSTIFTE

Ähnlich DIN 8032

TUNGSTEN CARBIDE BURRS

Similar DIN 8032



1



2



3



4



5



6



7



8



9



4.1

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INDUSTRIAL TOOLS DIVISION

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mail@karnasch.tools

+49 (0) 33675 - 7265-0

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Index

HP-3 **BEST SELLER** VALUETOOL 690-703



Die am meisten verwendete Universalverzahnung

The most widely used universal cutting style

- Hohe Zerspanleistung durch Kreuzverzahnung:
 - Ruhiger Lauf
 - Kurze Späne
- Für alle Stahlsorten wie:
 - Gusseisen
 - Stahl < 60 HRC
 - Edelstahl (INOX)
 - Nickelbasis- und Titanlegierungen
- Auch Kupfer, Messing, Bronze
- High cutting action through cross cutting style
 - Smooth operation
 - Short chips
- For use on all ferrous metals such as:
 - Cast iron
 - Steel < 60 HRC
 - Stainless steel (INOX)
 - Nickel basis and titanium alloy
- Also copper, brass, bronze

HP-2 704-712

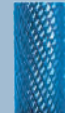


Die am meisten verwendete Einfachverzahnung

The most widely used single cutting style

- Hohe Zerspanleistung mit guter Oberflächengüte
- Für alle Stahlsorten wie:
 - Gusseisen
 - Stahl < 60 HRC
 - Edelstahl (INOX)
 - Nickelbasis- und Titanlegierungen
- Auch Kupfer, Messing, Bronze
- High cutting action with good surface finish
- For use on all ferrous metals such as:
 - Cast iron
 - Steel < 60 HRC
 - Stainless steel (INOX)
 - Nickel basis and titanium alloy
- Also copper, brass, bronze

HP-4 714-721

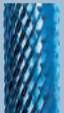


Feine Kreuzverzahnung

Fine cross cutting style

- Exzellente Kontrolle (auch an schwierig zugänglichen Stellen)
 - Ruhiger Lauf · Kurze Späne
 - Gute Oberflächengüte
- Mittlere Zerspanleistung
- Für alle Stahlsorten wie:
 - Bis zu extra harten Stählen ca. 70 HRC
 - Gusseisen · Edelstahl (INOX)
 - Hochwarmfeste Werkstoffe wie z.B. Nickel-Basis + Kobalt Basislegierungen
- Excellent control (also at difficult to reach positions)
 - Smooth operation · Short chips
 - Good surface finish
- Medium cutting action
- For all kinds of steel: Up to extra hard steel approx. 70 HRC · Cast iron · Stainless steel (INOX) · Heat-resistant substances, such as e.g. nickel based + cobalt based alloys

HP-6 746-752



Extrem grobe Kreuzverzahnung

Extremely rough cross cutting style

- Extrem hoher Materialabtrag (Schruppen)
- Für alle Stahlsorten wie:
 - Gusseisen
 - Stahl < 60 HRC
- Auch für Kupfer, Messing, Bronze
- Für den harten Schruppeinsatz wie z.B. auf Werften, Gießereien entwickelt.
- Extremely fast metal removal (roughing)
- For all ferrous metals, such as:
 - Cast iron
 - Steel < 60 HRC
- Also for copper, brass, bronze
- Developed for use in tough roughing conditions, such as, e.g., on shipyards, foundries.

HP-9 754-760



Speziell für Edelstahl. Extrem hohe Zerspanleistung

Epecially for stainless steel. Extremely high machining output.

- Extrem hohe Zerspanleistung und Standzeit für alle austenitischen, rost- und säurebeständigen Stähle.
- Nickelbasis und Titanlegierungen (Drehzahl reduzieren um Funkenbildung zu vermeiden)
- Hochwertige Oberflächengüte
- Keine Anlauffarben am Werkstück durch geringe Wärmeentwicklung
- Extremely high machining output and service life for all austenitic, rust- and acid-resilient steels.
- Nickel basis and titanium alloy (reduce speed to avoid sparking)
- High-quality surface.
- No annealing colours at the workpiece due to low heat development.

HP-8 762-768



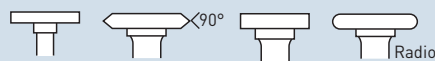
Speziell für Stahl und Stahlguss. Extrem hohe Zerspanleistung

Epecially for steel and cast steel. Extremely high machining output

- Bis zu 60% höhere Zerspanleistung im Vergleich zu herkömmlichen Kreuzverzahnungen.
- Hohe Aggressivität erzeugt große Späne mit hervorragender Spanabfuhr.
- Keine Anlauffarben am Werkstück durch geringe Wärmeentwicklung
- Up to 60% higher machining output as compared to conventional cross cut.
- High aggressiveness produces large chips with outstanding chip removal.
- No annealing colours at the workpiece due to low heat development.

Spezial-Frässtifte · Special burrs

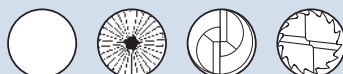
779-782



Scheibenform

780

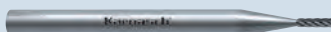
RIM shape



Frässtifte für GFK/CFK

781

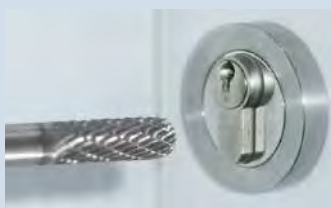
Fiberglass routers



Mini-Frässtifte Ø 1 + 1,5 mm

782

Mini-burrs Ø 1 + 1,5 mm



Frässtifte + Bohrer für Schlüsseldienste

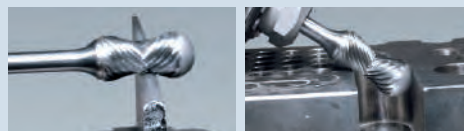
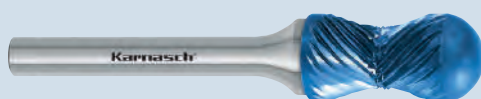
776-

Burrs + drills for locksmiths

778

Kombinations-Frässtifte · Combination-burrs

783-802



HP-7

722-729



Für grobe Zerspantung und höchsten Materialabtrag von:

For coarse cutting and highest material removal from:

- Alulegierungen
- Leichtmetalle
- Weiche Buntmetalle (NE-Metalle)
- Kunststoffe
- Faserverstärkte Kunststoffe GFK/CFK
- Aluminum alloy
- Light metals
- Soft copper and copper alloys (non-ferrous metals)
- Plastics
- Fibre-reinforced plastic (GFK/CFK)

HP-1

730-737



Für Superlegierungen. Extrem robuste Kreuzverzahnung

For super alloys. Extremely robust cross cutting style

- Schlagunempfindlichkeit (Zahnausbrüche, Abplatzungen, Kopfbrüche werden minimiert)
- Exzellente Kontrolle und Laufruhe
- Mittlere bis hohe Zerspantung
- Speziell für schwierigste Superlegierungen + Edelstähle wie: Titan, Inconel, Hastelloy, Waspaloy, Duplex, Amanox usw.
- Anwendungsbeispiel: Bearbeitung von Flugzeug Turbinenschaufeln, Gasturbinen
- Impact resistance (tooth breakages, chipping, head breakages are minimised)
- Excellent control and quiet running
- Medium to high cutting action
- Especially for the most difficult super alloys + stainless steel, such as: Titanium, Inconel, Hastelloy, Waspaloy, Duplex, Amanox, etc.
- Application example: Working aeroplane turbine blades, gas turbines

HP-5

738-744



Extrem feine Einfachverzahnung

Extremely fine single cutting style

- Exzellente Oberflächengüte
- Vorzugsweise für feines Entgraten von allen Stahlsorten wie:
 - Bis zu extra harten Stählen ca. 70 HRC
 - Gusseisen
 - Edelstahl (INOX)
 - Hochwärmefeste Werkstoffe wie z.B. Nickel-Basis + Kobalt-Basis + Kobalt-Basis Legierungen
- Exzellente surface finish
- Preferred for fine deburring all ferrous metals, such as:
 - Up to extra hard steel approx. 70 HRC
 - Cast iron
 - Stainless steel (INOX)
 - Heat resistant substances, such as, e.g. nickel based + cobalt based alloys

HP-7-Mini

729



Minifrässtifte in feiner Aluverzahnung

Mini-Burrs in fine Alu cutting style

- Einsatzgebiete:
 - Feinmechanik
 - Werkzeugbau
- Applications:
 - Precision engineering
 - Tool manufacture

HP-1-Mini Ø3 mm

737



Für Superlegierungen. Extrem robuste Kreuzverzahnung

For super alloys. Extremely robust cross cutting style

- Schlagunempfindlichkeit (Zahnausbrüche, Abplatzungen, Kopfbrüche werden minimiert)
- Exzellente Kontrolle und Laufruhe
- Mittlere bis hohe Zerspantung
- Speziell für schwierigste Superlegierungen + Edelstähle wie: Titan, Inconel, Hastelloy, Waspaloy, Duplex, Amanox usw.
- Anwendungsbeispiel: Bearbeitung von Flugzeug, Turbinenschaufeln, Gasturbinen
- Impact resistance (tooth breakages, chipping, head breakages are minimised)
- Excellent control and quiet running
- Medium to high cutting action
- Especially for the most difficult super alloys + stainless steel, such as: Titanium, Inconel, Hastelloy, Waspaloy, Duplex, Amanox, etc.
- Application example: Working aeroplane turbine loops, gas turbines

HP-11-Micro

770-774



Extrem feine Kreuzverzahnung

Extremely fine cross cutting style

- **Exzellent für die:** Feinbearbeitung · Extrem feine Putzarbeiten · Korrekturen im Werkzeug- und Formenbau · Schleifen/Schärfen von Schnittwerkzeugen
- **Eigenschaften:** Gutes Abtragverhalten · Vibrationsarm · Exzellente Kontrolle/Führung im Handeinsatz · Hohe Oberflächengüte
- **Vorteile:** Es können nahezu alle Werkstoffe bis zu einer Härte von 70 HRC bearbeitet werden. **In diesem Bereich werden üblicherweise Keramik-Schleifstifte verwendet.** Die neue Micro-Verzahnung garantiert:
 - Keine Geometrieänderung durch Abnutzung/Verschleiß gegenüber Schleifstifte.
 - Wesentlich höheren Materialabtrag sowie Standzeit gegenüber Schleifstifte

English text see page 770

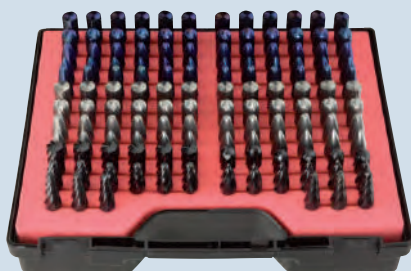
Druckluftgeradschleifer + Zubehör · Pneumatic straight grinder + accessories

1107-1139



Sets + Displays · Sets + Displays

809-821



Seite / Page 822



Seite / Page 810/811



Seite / Page 812-821

Technische Daten · Technical data

1321



1



2



3



4



5



6



7



8



9





HP-3

Die am meisten verwendete Universalverzahnung

The most widely used universal cutting style

Lagerartikel
Stockrange



BEST
SELLER

VALUETOOL

690-703

ANWENDUNG · APPLICATION

| | | | | | | | | | |
|--------------------|---|----------------------------|----------------------------|-----------------------|----------------------|----------------------|--|----------------|---|
| Stahl Steel | Gehärteter Stahl Hardened steel | Edelstahl Stainless | Gusseisen Cast iron | Titan Titanium | Cermet Cermet | Nickel Nickel | Kupfer, Kupfer- legierungen Copper, copper alloys | Alu Alu | Kunststoffe GFK/CFK Plastics GRP/CRP |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |

- Hohe Zerspanleistung durch Kreuzverzahnung:
 - Ruhiger Lauf
 - Kurze Späne
- Für alle Stahlsorten wie:
 - Gusseisen
 - Stahl < 60 HRC
 - Edelstahl (INOX)
 - Nickelbasis- und Titanlegierungen
- Auch Kupfer, Messing, Bronze
- High cutting action through cross cutting style
 - Smooth operation
 - Short chips
- For use on all ferrous metals such as:
 - Cast iron
 - Steel < 60 HRC
 - Stainless steel (INOX)
 - Nickel basis and titanium alloy
- Also copper, brass, bronze

✓ OPTIMAL
OPTIMAL
✓ GUT
GOOD



HP-2

Die am meisten verwendete Einfachverzahnung

The most widely used single cutting style

Lagerartikel
Stockrange



704-712

ANWENDUNG · APPLICATION

| | | | | | | | | | |
|--------------------|---|----------------------------|----------------------------|-----------------------|----------------------|----------------------|--|----------------|---|
| Stahl Steel | Gehärteter Stahl Hardened steel | Edelstahl Stainless | Gusseisen Cast iron | Titan Titanium | Cermet Cermet | Nickel Nickel | Kupfer, Kupfer- legierungen Copper, copper alloys | Alu Alu | Kunststoffe GFK/CFK Plastics GRP/CRP |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |

- Hohe Zerspanleistung mit guter Oberflächengüte
- Für alle Stahlsorten wie:
 - Gusseisen
 - Stahl < 60 HRC
 - Edelstahl (INOX)
 - Nickelbasis- und Titanlegierungen
- Auch Kupfer, Messing, Bronze
- High cutting action with good surface finish
- For use on all ferrous metals such as:
 - Cast iron
 - Steel < 60 HRC
 - Stainless steel (INOX)
 - Nickel basis and titanium alloy
- Also copper, brass, bronze

✓ OPTIMAL
OPTIMAL
✓ GUT
GOOD

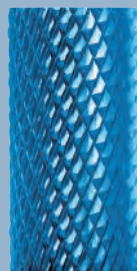


HP-4

Feine Kreuzverzahnung

Fine cross cutting style

Lagerartikel
Stockrange



714-721

ANWENDUNG · APPLICATION

| | | | | | | | | | |
|--------------------|---|----------------------------|----------------------------|-----------------------|----------------------|----------------------|--|----------------|---|
| Stahl Steel | Gehärteter Stahl Hardened steel | Edelstahl Stainless | Gusseisen Cast iron | Titan Titanium | Cermet Cermet | Nickel Nickel | Kupfer, Kupfer- legierungen Copper, copper alloys | Alu Alu | Kunststoffe GFK/CFK Plastics GRP/CRP |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |

- Exzellente Kontrolle (Auch an schwierig zugänglichen Stellen)
 - Ruhiger Lauf
 - Kurze Späne
 - Gute Oberflächengüte
- Mittlere Zerspanleistung
- Für alle Stahlsorten wie:
 - Bis zu extra harten Stählen ca. 70 HRC
 - Gusseisen
 - Edelstahl (INOX)
 - Hochwarmfeste Werkstoffe wie z.B. Nickel-Basis + Kobalt Basislegierungen
- Excellent control (also at difficult to reach positions)
 - Smooth operation
 - Short chips
 - Good surface finish
- Medium cutting action
- For all kinds of steel:
 - Up to extra hard steel approx. 70 HRC
 - Cast iron
 - Stainless steel (INOX)
 - Heat-resistant substances, such as e.g. nickel based + cobalt based alloys

✓ OPTIMAL
OPTIMAL
✓ GUT
GOOD



Index

HP-3

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | ZYA | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM | WKN | KSJ | KSK |
|------------------------------|--|--|---|------------------------------|------------------------------|---------------------------------|------------------------------|------------------------------|---------------------------------|------------------------------|------------------------------|---------------------------------|---------------------------------|
| A | B | | C | D | E | F | G | H | L | M | N | J | K |
| Art. 11 5001 Art. 11 3001 | Art. 11 5011 Art. 11 3011 | Art. 11 6010 Art. 11 4010 | Art. 11 5021 Art. 11 3021 | Art. 11 5031 Art. 11 3031 | Art. 11 5041 Art. 11 3041 | Art. 11 5051 Art. 11 3051 | Art. 11 5061 Art. 11 3061 | Art. 11 5071 Art. 11 3071 | Art. 11 5081 Art. 11 3081 | Art. 11 5091 Art. 11 3091 | Art. 11 5096 Art. 11 3096 | Art. 11 5101 Art. 11 3101 | Art. 11 5111 Art. 11 3111 |
| | | | | | | | | | | | | | |
| 706 | 706 | 707 | 707 | 707 | 708 | 708 | 709 | 709 | 710 | 710 | 711 | 711 | 712 |
| Zylinder Cylinder | Zylinder + Stirn- verzahnung Cylinder + end cut | Zylinder- Radius Cylinder- Radius | Walzenrund- form Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Winkel Inverted cone | Kegel 60° Countersink 60° | Kegel 90° Countersink 90° |

HP-2

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM | WKN | KSJ | KSK |
|------------------------------|--|---|------------------------------|------------------------------|---------------------------------|------------------------------|------------------------------|---------------------------------|------------------------------|------------------------------|---------------------------------|---------------------------------|
| A | B | C | D | E | F | G | H | L | M | N | J | K |
| Art. 11 5000 Art. 11 3000 | Art. 11 5010 Art. 11 3010 | Art. 11 5020 Art. 11 3020 | Art. 11 5030 Art. 11 3030 | Art. 11 5040 Art. 11 3040 | Art. 11 5050 Art. 11 3050 | Art. 11 5060 Art. 11 3060 | Art. 11 5070 Art. 11 3070 | Art. 11 5080 Art. 11 3080 | Art. 11 5090 Art. 11 3090 | Art. 11 5099 Art. 11 3099 | Art. 11 5100 Art. 11 3100 | Art. 11 5110 Art. 11 3110 |
| | | | | | | | | | | | | |
| 706 | 706 | 707 | 707 | 708 | 708 | 709 | 709 | 710 | 710 | 711 | 711 | 712 |
| Zylinder Cylinder | Zylinder + Stirn- verzahnung Cylinder + end cut | Walzenrund- form Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Winkel Inverted cone | Kegel 60° Countersink 60° | Kegel 90° Countersink 90° |

HP-4

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM | WKN |
|------------------------------|--|---|------------------------------|------------------------------|---------------------------------|------------------------------|------------------------------|---------------------------------|------------------------------|------------------------------|
| A | B | C | D | E | F | G | H | L | M | N |
| Art. 11 5002 Art. 11 3002 | Art. 11 5012 Art. 11 3012 | Art. 11 5022 Art. 11 3022 | Art. 11 5032 Art. 11 3032 | Art. 11 5042 Art. 11 3042 | Art. 11 5052 Art. 11 3052 | Art. 11 5062 Art. 11 3062 | Art. 11 5072 Art. 11 3072 | Art. 11 5082 Art. 11 3082 | Art. 11 5092 Art. 11 3092 | Art. 11 5098 Art. 11 3098 |
| | | | | | | | | | | |
| 716 | 716 | 717 | 718 | 718 | 719 | 719 | 720 | 720 | 721 | 721 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrund- form Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Winkel Inverted cone |

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Index

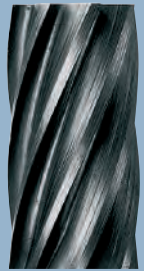


HP-7

Für grobe Zerspantung und höchsten Materialabtrag von:

For coarse cutting and highest material removal from:

Lagerartikel
Stockrange



ANWENDUNG · APPLICATION

| | | | | | | | | | |
|--------------------|--|----------------------------|----------------------------|-----------------------|----------------------|----------------------|--|----------------|---|
| Stahl Steel | Gehärteter Stahl Hardened steel | Edelstahl Stainless | Gusseisen Cast iron | Titan Titanium | Cermet Cermet | Nickel Nickel | Kupfer, Kupferlegierungen Copper, copper alloys | Alu Alu | Kunststoffe GFK/CFK Plastics GRP/CRP |
|--------------------|--|----------------------------|----------------------------|-----------------------|----------------------|----------------------|--|----------------|---|

- Alulegierungen
- Leichtmetalle
- Weiche Buntmetalle (NE-Metalle)
- Kunststoffe
- Faserverstärkte Kunststoffe GFK/CFK

- Aluminum alloy
- Light metals
- Soft copper and copper alloys (non-ferrous metals)
- Plastics
- Fibre-reinforced plastic (GFK/CFK)

722-729

✓ OPTIMAL
✓ GUT
GOOD



HP-1

Für Superlegierungen. Extrem robuste Kreuzverzahnung

For super alloys. Extremely robust cross cutting style

Lagerartikel
Stockrange



ANWENDUNG · APPLICATION

| | | | | | | | | | |
|--------------------|--|----------------------------|----------------------------|-----------------------|----------------------|----------------------|--|----------------|---|
| Stahl Steel | Gehärteter Stahl Hardened steel | Edelstahl Stainless | Gusseisen Cast iron | Titan Titanium | Cermet Cermet | Nickel Nickel | Kupfer, Kupferlegierungen Copper, copper alloys | Alu Alu | Kunststoffe GFK/CFK Plastics GRP/CRP |
|--------------------|--|----------------------------|----------------------------|-----------------------|----------------------|----------------------|--|----------------|---|

- Schlagunempfindlichkeit (Zahnausbrüche, Abplatzungen, Kopfbrüche werden minimiert)
- Exzellente Kontrolle und Laufruhe
- Mittlere bis hohe Zerspantungleistung
- Speziell für schwierigste Superlegierungen + Edelstähle wie: Titan, Inconel, Hastelloy, Waspaloy, Duplex, Amanox usw.
Anwendungsbeispiel: Bearbeitung von Flugzeug Turbinenschaufeln, Gasturbinen

- Impact resistance (tooth breakages, chipping, head breakages are minimised)
- Excellent control and quiet running
- Medium to high cutting action
- Especially for the most difficult super alloys + stainless steel, such as: Titanium, Inconel, Hastelloy, Waspaloy, Duplex, Amanox, etc.
Application example: Working aeroplane turbine blades, gas turbines

730-737

✓ OPTIMAL
✓ GUT
GOOD



HP-5

Extrem feine Einfachverzahnung

Extremely fine single cutting style

Lagerartikel
Stockrange



ANWENDUNG · APPLICATION

| | | | | | | | | | |
|--------------------|--|----------------------------|----------------------------|-----------------------|----------------------|----------------------|--|----------------|---|
| Stahl Steel | Gehärteter Stahl Hardened steel | Edelstahl Stainless | Gusseisen Cast iron | Titan Titanium | Cermet Cermet | Nickel Nickel | Kupfer, Kupferlegierungen Copper, copper alloys | Alu Alu | Kunststoffe GFK/CFK Plastics GRP/CRP |
|--------------------|--|----------------------------|----------------------------|-----------------------|----------------------|----------------------|--|----------------|---|

- Exzellente Oberflächengüte
- Vorzugsweise für feines Entgraten von allen Stahlsorten wie:
 - Bis zu extra harten Stählen ca. 70 HRC
 - Gusseisen
 - Edelstahl (INOX)
 - Hochwärmefeste Werkstoffe wie z.B. Nickel-Basis + Kobalt-Basis + Kobalt-Basis Legierungen

- Excellent surface finish
- Preferred for fine deburring all ferrous metals, such as:
 - Up to extra hard steel approx. 70 HRC
 - Cast iron
 - Stainless steel (INOX)
 - Heat resistant substances, such as, e.g. nickel based + cobalt based alloys













738-744

✓ OPTIMAL
✓ GUT
GOOD















HP-7

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM | MINI-ALU |
|---|--|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M | |
| Art. 11 5005 Art. 11 3005 | Art. 11 5015 Art. 11 3015 | Art. 11 5025 Art. 11 3025 | Art. 11 5035 Art. 11 3035 | Art. 11 5045 Art. 11 3045 | Art. 11 5055 Art. 11 3055 | Art. 11 5065 Art. 11 3065 | Art. 11 5075 Art. 11 3075 | Art. 11 5085 Art. 11 3085 | Art. 11 5095 Art. 11 3095 | |
|  |   |  |  |  |  |  |  |  |  |  |
| 724 | 724 | 725 | 725 | 726 | 726 | 727 | 727 | 728 | 728 | 729 |
| Zylinder Cylinder | Zylinder + Stirn- verzahnung Cylinder + end cut | Walzenrund- form Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Minifrässtifte in feiner Aluverzahnung Mini-burrs in Alu cutting style |












HP-1

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM | Ø 3 mm |
|---|--|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M | |
| Art. 11 5007 Art. 11 3007 | Art. 11 5017 Art. 11 3017 | Art. 11 5027 Art. 11 3027 | Art. 11 5037 Art. 11 3037 | Art. 11 5047 Art. 11 3047 | Art. 11 5057 Art. 11 3057 | Art. 11 5067 Art. 11 3067 | Art. 11 5077 Art. 11 3077 | Art. 11 5087 Art. 11 3087 | Art. 11 5097 Art. 11 3097 | |
|  |   |  |  |  |  |  |  |  |  |  |
| 732 | 732 | 733 | 733 | 734 | 734 | 735 | 735 | 736 | 736 | 737 |
| Zylinder Cylinder | Zylinder + Stirn- verzahnung Cylinder + end cut | Walzenrund- form Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Ø 3 mm, Schaft 3 mm, für Superlegierungen! Ø 3 mm, shank 3 mm, for super alloys! |

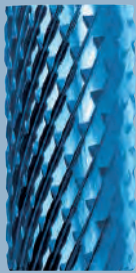
HP-5

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM |
|---|--|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 5003 Art. 11 3003 | Art. 11 5013 Art. 11 3013 | Art. 11 5023 Art. 11 3023 | Art. 11 5033 Art. 11 3033 | Art. 11 5043 Art. 11 3043 | Art. 11 5053 Art. 11 3053 | Art. 11 5063 Art. 11 3063 | Art. 11 5073 Art. 11 3073 | Art. 11 5083 Art. 11 3083 | Art. 11 5093 Art. 11 3093 |
|  |   |  |  |  |  |  |  |  |  |
| 740 | 740 | 741 | 741 | 742 | 742 | 743 | 743 | 744 | 744 |
| Zylinder Cylinder | Zylinder + Stirn- verzahnung Cylinder + end cut | Walzenrund- form Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

HP-6



746-752

Extrem grobe Kreuzverzahnung
Extremely rough cross cutting style

ANWENDUNG · APPLICATION

| | | | | | | | | | |
|--------------------|--|----------------------------|----------------------------|-----------------------|----------------------|----------------------|--|----------------|---|
| Stahl Steel | Gehärteter Stahl Hardened steel | Edelstahl Stainless | Gusseisen Cast iron | Titan Titanium | Cermet Cermet | Nickel Nickel | Kupfer, Kupferlegierungen Copper, copper alloys | Alu Alu | Kunststoffe GFK/CFK Plastics GRP/CRP |
| ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | | |

- Extrem hoher Materialabtrag (Schruppen)
 - Für alle Stahlsorten wie:
 - Gusseisen
 - Stahl < 60 HRC
 - Auch für Kupfer, Messing, Bronze
 - Für den harten Schruppeinsatz wie z.B. auf Werften, Gießereien entwickelt.
- Extremely fast metal removal (roughing)
 - For all ferrous metals, such as:
 - Cast iron
 - Steel < 60 HRC
 - Also for copper, brass, bronze
 - Developed for use in tough roughing conditions, such as, e.g., on shipyards, foundries.

Lagerartikel
Stockrange

- ✓ OPTIMAL OPTIMAL
- ✓ GUT GOOD

HP-9



754-760

Speziell für Edelstahl. Extrem hohe Zerspanleistung
Especially for stainless steel. Extremely high machining output.

ANWENDUNG · APPLICATION

| | | | | | | | | | |
|--------------------|--|----------------------------|----------------------------|-----------------------|----------------------|----------------------|--|----------------|---|
| Stahl Steel | Gehärteter Stahl Hardened steel | Edelstahl Stainless | Gusseisen Cast iron | Titan Titanium | Cermet Cermet | Nickel Nickel | Kupfer, Kupferlegierungen Copper, copper alloys | Alu Alu | Kunststoffe GFK/CFK Plastics GRP/CRP |
| | | ✓ | | ✓ | | | | | |

- Extrem hohe Zerspanleistung und Standzeit für alle austenitischen, rost- und säurebeständigen Stähle.
 - Nickelbasis und Titanlegierungen (Drehzahl reduzieren um Funkenbildung zu vermeiden)
 - Hochwertige Oberflächengüte
 - Keine Anlauffarben am Werkstück durch geringe Wärmeentwicklung
- Extremely high machining output and service life for all austenitic, rust- and acid-resilient steels.
 - Nickel basis and titanium alloy (reduce speed to avoid sparking)
 - High-quality surface.
 - No annealing colours at the workpiece due to low heat development.

Lagerartikel
Stockrange

- ✓ OPTIMAL OPTIMAL
- ✓ GUT GOOD

HP-8



762-768

Speziell für Stahl und Stahlguss. Extrem hohe Zerspanleistung
Especially for steel and cast steel. Extremely high machining output

ANWENDUNG · APPLICATION

| | | | | | | | | | |
|--------------------|--|----------------------------|----------------------------|-----------------------|----------------------|----------------------|--|----------------|---|
| Stahl Steel | Gehärteter Stahl Hardened steel | Edelstahl Stainless | Gusseisen Cast iron | Titan Titanium | Cermet Cermet | Nickel Nickel | Kupfer, Kupferlegierungen Copper, copper alloys | Alu Alu | Kunststoffe GFK/CFK Plastics GRP/CRP |
| ✓ | ✓ | | ✓ | | | | | | |











- Bis zu 60% höhere Zerspanleistung im Vergleich zu herkömmlichen Kreuzverzahnungen.
 - Hohe Aggressivität erzeugt große Späne mit hervorragender Spanabfuhr.
 - Keine Anlauffarben am Werkstück durch geringe Wärmeentwicklung
- Up to 60% higher machining output as compared to conventional cross cut.
 - High aggressiveness produces large chips with outstanding chip removal.
 - No annealing colours at the workpiece due to low heat development.

Lagerartikel
Stockrange

- ✓ OPTIMAL OPTIMAL
- ✓ GUT GOOD











HP-6

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 5004 Art. 11 5004 | Art. 11 5014 Art. 11 3014 | Art. 11 5024 Art. 11 3024 | Art. 11 5034 Art. 11 3034 | Art. 11 5044 Art. 11 3044 | Art. 11 5054 Art. 11 3054 | Art. 11 5064 Art. 11 3064 | Art. 11 5074 Art. 11 3074 | Art. 11 5084 Art. 11 3084 | Art. 11 5094 Art. 11 3094 |
|  |  |  |  |  |  |  |  |  |  |
| 748 | 748 | 749 | 749 | 750 | 750 | 751 | 751 | 752 | 752 |
| Zylinder Cylinder | Zylinder + Stirn- verzahnung Cylinder + end cut | Walzenrund- form Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone |











HP-9

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 6031 Art. 11 4031 | Art. 11 6032 Art. 11 4032 | Art. 11 6033 Art. 11 4033 | Art. 11 6034 Art. 11 4034 | Art. 11 6035 Art. 11 4035 | Art. 11 6036 Art. 11 4036 | Art. 11 6037 Art. 11 4037 | Art. 11 6038 Art. 11 4038 | Art. 11 6039 Art. 11 4039 | Art. 11 6040 Art. 11 4040 |
|  |  |  |  |  |  |  |  |  |  |
| 756 | 756 | 757 | 757 | 758 | 758 | 759 | 759 | 760 | 760 |
| Zylinder Cylinder | Zylinder + Stirn- verzahnung Cylinder + end cut | Walzenrund- form Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone |

HP-8

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 6041 Art. 11 4041 | Art. 11 6042 Art. 11 4042 | Art. 11 6043 Art. 11 4043 | Art. 11 6044 Art. 11 4044 | Art. 11 6045 Art. 11 4045 | Art. 11 6046 Art. 11 4046 | Art. 11 6047 Art. 11 4047 | Art. 11 6048 Art. 11 4048 | Art. 11 6049 Art. 11 4049 | Art. 11 6050 Art. 11 4050 |
|  |  |  |  |  |  |  |  |  |  |
| 764 | 764 | 765 | 765 | 766 | 766 | 767 | 767 | 768 | 768 |
| Zylinder Cylinder | Zylinder + Stirn- verzahnung Cylinder + end cut | Walzenrund- form Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone |

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Index

HP-11

Extrem feine Kreuzverzahnung
 Extremely fine cross cutting style

Lagerartikel
 Stockrange

ANWENDUNG · APPLICATION

| | | | | | | | | | |
|---|---|---|---|--|---|--|---|---|--|
|  Stahl Steel |  Gehärteter Stahl Hardened steel |  Edelstahl Stainless |  Gusseisen Cast iron |  Titan Titanium |  Cermet Cermet |  Nickel Nickel |  Kupfer, Kupferlegierungen Copper, copper alloys |  Alu Alu |  Kunststoffe GFK/CFK Plastics GRP/CRP |
|---|---|---|---|--|---|--|---|---|--|

✓ OPTIMAL
 OPTIMAL
 ✓ GUT
 GOOD

Exzellente für die:

- Feinbearbeitung
- Extrem feine Putzarbeiten
- Korrekturen im Werkzeug- und Formenbau
- Schleifen/Schärfen von Schnittwerkzeugen

Eigenschaften:

- Gutes Abtragverhalten
- Vibrationsarm
- Exzellente Kontrolle/Führung im Handeinsatz
- Hohe Oberflächengüte

Vorteile:

Es können nahezu alle Werkstoffe bis zu einer Härte von 70 HRC bearbeitet werden.

In diesem Bereich werden üblicherweise Keramik-Schleifstifte verwendet.

- Die neue Micro-Verzahnung garantiert:
 - Keine Geometrieänderung durch Abnutzung/ Verschleiß gegenüber Schleifstifte.
 - Wesentlich höheren Materialabtrag sowie Standzeit gegenüber Schleifstifte

Excellent for:

- Finishing
- Extremely fine cleaning work
- Corrections in tool and mould construction
- Grinding/sharpening of cutting tools

Characteristics:

- Good stock removal
- Low vibrations
- Excellent control and guidance under handheld conditions.
- High surface quality

Advantages:

Micro-cut can be used for work on almost all materials up to a hardness of 70 HRC.

In this area usually mounted points are used.

- Unlike with mounted points, there is no change in geometry due to wear and tear.
- Unlike with mounted points, there is much higher performance, surface quality and lifetime

770-774

Qualitätsprodukte für die Metallbearbeitung.
 Quality products for metalworking.

Karnasch®
 PROFESSIONAL TOOLS



VIELFALT

FÜR PERFEKTION IN JEDER GRÖSSENORDNUNG







Versatility for perfection on any scale

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 THE KARNASCH PRODUCT RANGE ONLINE!

 <https://shop.karnasch.tools>

HP-11

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | RBF | SPG |
|---|---|---|---|---|---|
| A | B | C | D | F | G |
| Art. 11 6080 Art. 11 4080 | Art. 11 6081 Art. 11 4081 | Art. 11 6082 Art. 11 4082 | Art. 11 6083 Art. 11 4083 | Art. 11 6084 Art. 11 4084 | Art. 11 6085 Art. 11 4085 |
|  |  |  |  |  |  |
| 772 | 772 | 773 | 773 | 774 | 774 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Rundbogen Ball nosed tree | Spitzbogen Tree |

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The Karnasch technology and training facility.

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PROFESSIONAL TOOLS

KOMPETENZ
FÜR EINE FUNDIERTE
KUNDENBETREUUNG

Expertise for dependable customer service

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8



9













Index

HP-3

Die am meisten verwendete Universalverzähnung The most widely used universal cutting style

ANWENDUNG · APPLICATION














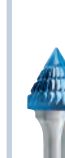
| | | | | | | | | | |
|---|---|---|---|--|---|--|---|---|--|
|  Stahl Steel |  Gehärteter Stahl Hardened steel |  Edelstahl Stainless |  Gusseisen Cast iron |  Titan Titanium |  Cermet Cermet |  Nickel Nickel |  Kupfer, Kupferlegierungen Copper, copper alloys |  Alu Alu |  Kunststoffe GFK/CFK Plastics GRP/CRP |
|---|---|---|---|--|---|--|---|---|--|

✓ OPTIMAL
OPTIMAL
✓ GUT
GOOD

- Hohe Zerspanleistung durch Kreuzverzähnung:
 - Ruhiger Lauf
 - Kurze Späne
- Für alle Stahlsorten wie:
 - Gusseisen
 - Stahl < 60 HRC
 - Edelstahl (INOX)
 - Nickelbasis- und Titanlegierungen
- Auch Kupfer, Messing, Bronze

- High cutting action through cross cutting style
 - Smooth operation
 - Short chips
- For use on all ferrous metals such as:
 - Cast iron
 - Steel < 60 HRC
 - Stainless steel (INOX)
 - Nickel basis and titanium alloy
- Also copper, brass, bronze

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | ZYA | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM | WKN | KSJ | KSK |
|---|---|---|---|---|---|---|---|---|--|---|---|---|---|
| A | B | | C | D | E | F | G | H | L | M | N | J | K |
| Art. 11 5001 Art. 11 3001 | Art. 11 5011 Art. 11 3011 | Art. 11 6010 Art. 11 4010 | Art. 11 5021 Art. 11 3021 | Art. 11 5031 Art. 11 3031 | Art. 11 5041 Art. 11 3041 | Art. 11 5051 Art. 11 3051 | Art. 11 5061 Art. 11 3061 | Art. 11 5071 Art. 11 3071 | Art. 11 5081 Art. 11 3081 | Art. 11 5091 Art. 11 3091 | Art. 11 5096 Art. 11 3096 | Art. 11 5101 Art. 11 3101 | Art. 11 5111 Art. 11 3111 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 692 | 693 | 695 | 696 | 697 | 698 | 699 | 700 | 701 | 701 | 702 | 702 | 703 | 703 |
| Zylinder Cylinder | Zylinder + Stirnverzähnung Cylinder + end cut | Zylinder-Radius Cylinder-Radius | Walzenrundform Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Winkel Inverted cone | Kegel 60° Countersink 60° | Kegel 90° Countersink 90° |



BLUE-TEC-beschichtet
BLUE-TEC-coated



Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|------------------|---|---|--|--------------------------------|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm ² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Grobes Zerpanen mit hohem Materialabtrag | 450-600 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 250-350 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Grobes Zerpanen mit hohem Materialabtrag | 250-350 |
| NE-Metalle | Harte NE-Metalle | Bronze, Titan/Titanlegierungen, harte Alulegierungen (hoher Si-Anteil) | Grobes Zerpanen mit hohem Materialabtrag | 250-350 |
| | Hochwarmfeste Werkstoffe | Nickelbasis- und Kobaltbasislegierungen (Triebwerk- und Turbinenbau) | | 300-450 |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/Späroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | Grobes Zerpanen mit hohem Materialabtrag | 450-600 |

| Material groups | | | Application | Cutting speed m/min |
|------------------------|---|---|--|---------------------|
| Steel, cast steel | Non-hardened, non-heat treated steels up to 1200 N/mm ² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Coarse machining with high stock removal | 450-600 |
| | Hardened, heat-treated steels exceeding 1200 N/mm ² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 250-350 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Coarse machining with high stock removal | 250-350 |
| Non-ferrous metals | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard alu-alloys (high Si content) | Coarse machining with high stock removal | 250-350 |
| | High-temperature resistant materials | Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction) | | 300-450 |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Coarse machining with high stock removal | 450-600 |



| Schnittgeschwindigkeit • Cutting speed (m/min) | | | | | | | |
|--|--|--------|--------|--------|--------|--------|--------|
| | 250 | 300 | 350 | 400 | 450 | 500 | 600 |
| ∅ (mm) | Drehzahlen (min ⁻¹) • Rotational speed (rpm) | | | | | | |
| 2 | 40.000 | 48.000 | 56.000 | 64.000 | 72.000 | 80.000 | 95.000 |
| 3 | 27.000 | 32.000 | 37.000 | 42.000 | 48.000 | 53.000 | 64.000 |
| 4 | 20.000 | 24.000 | 28.000 | 32.000 | 36.000 | 40.000 | 48.000 |
| 6 | 13.000 | 16.000 | 19.000 | 21.000 | 24.000 | 27.000 | 32.000 |
| 8 | 10.000 | 12.000 | 14.000 | 16.000 | 18.000 | 20.000 | 24.000 |
| 10 | 8.000 | 10.000 | 11.000 | 13.000 | 14.000 | 16.000 | 19.000 |
| 12 | 7.000 | 8.000 | 9.000 | 11.000 | 12.000 | 13.000 | 16.000 |
| 16 | 5.000 | 6.000 | 7.000 | 8.000 | 9.000 | 10.000 | 12.000 |
| 20 | 4.000 | 5.000 | 6.000 | 6.000 | 7.000 | 8.000 | 10.000 |
| 25 | 3.000 | 4.000 | 4.000 | 5.000 | 6.000 | 6.000 | 8.000 |

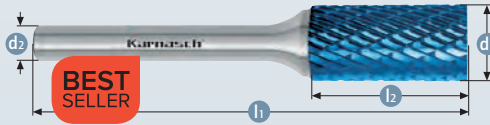


11 5001



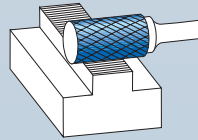
A FORM / SHAPE

ZYA



Zylinder ohne Stirnverzahnung

Cylinder without end cut



Schnittdaten
Cutting data

Film
Movie



11 3001



Bestseller – preisreduziert · Bestseller – price reduced

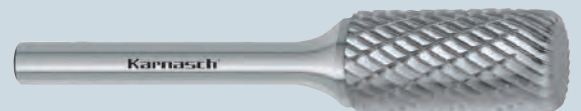
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|-----|-------------------|--------------|-------|
| 11 5001 015 | 1,5 | 6 | 3 | 38 | | ✓ | 7,40 |
| 11 5001 025 | 2 | 11 | 3 | 38 | | ✓ | 7,40 |
| 11 5001 027 | 2,5 | 11 | 3 | 38 | | ✓ | 7,40 |
| 11 5001 030 | 3 | 14 | 3 | 38 | | ✓ | 7,40 |
| 11 5001 035 | 3 | 14 | 3 | 50 | | ✓ | 8,75 |
| 11 5001 040 | 3 | 14 | 3 | 65 | | ✓ | 9,70 |
| 11 5001 045 | 3 | 14 | 3 | 75 | | ✓ | 10,70 |
| 11 5001 050 | 3 | 14 | 3 | 100 | | ✓ | 13,30 |
| 11 5001 052 | 3 | 12,7 | 6 | 50 | | ✓ | 9,85 |
| 11 5001 055 | 4 | 14 | 6 | 50 | | ✓ | 9,85 |
| 11 5001 057 | 5 | 12,7 | 3 | 38 | | ✓ | 15,40 |
| 11 5001 058 | 5 | 16 | 6 | 50 | | ✓ | 9,85 |
| 11 5001 059 | 6 | 5 | 3 | 37 | ✓ | | 9,45 |
| 11 5001 060 | 6 | 13 | 3 | 45 | ✓ | | 11,95 |
| 11 5001 065 | 6 | 18 | 6 | 50 | | ✓ | 9,85 |
| 11 5001 067 | 6 | 25 | 6 | 50 | | ✓ | 13,40 |
| 11 5001 070 | 6 | 18 | 6 | 100 | ✓ | | 17,50 |
| 11 5001 075 | 6 | 18 | 6 | 150 | ✓ | | 23,90 |
| 11 5001 080 | 8 | 20 | 6 | 65 | ✓ | | 12,30 |
| 11 5001 085 | 8 | 20 | 6 | 170 | ✓ | | 16,95 |
| 11 5001 087 | 10 | 13 | 6 | 58 | ✓ | | 15,20 |
| 11 5001 090 | 10 | 20 | 6 | 65 | ✓ | | 14,20 |
| 11 5001 095 | 10 | 20 | 6 | 172 | ✓ | | 21,50 |
| 11 5001 100 | 10 | 25 | 6 | 70 | ✓ | | 16,35 |
| 11 5001 103 | 12 | 20 | 6 | 64 | ✓ | | 23,30 |
| 11 5001 105 | 12 | 25 | 6 | 70 | ✓ | | 21,75 |
| 11 5001 107 | 12DIN | 25 | 6 | 70 | ✓ | | 20,10 |
| 11 5001 110 | 12 | 25 | 6 | 175 | ✓ | | 31,60 |
| 11 5001 115 | 12 | 25 | 8 | 70 | ✓ | | 23,70 |
| 11 5001 120 | 16 | 25 | 6 | 70 | ✓ | | 26,40 |
| 11 5001 125 | 16 | 25 | 8 | 70 | ✓ | | 28,35 |
| 11 5001 130 | 20 | 25 | 6 | 70 | ✓ | | 38,55 |
| 11 5001 140 | 25 | 25 | 6 | 70 | ✓ | | 51,75 |
| 11 5001 145 | 25 | 25 | 8 | 70 | ✓ | | 53,65 |

Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|-----|-------------------|--------------|-------|
| 11 3001 015 | 1,5 | 6 | 3 | 38 | | ✓ | 5,70 |
| 11 3001 025 | 2 | 11 | 3 | 38 | | ✓ | 5,70 |
| 11 3001 027 | 2,5 | 11 | 3 | 38 | | ✓ | 3,60 |
| 11 3001 030 | 3 | 14 | 3 | 38 | | ✓ | 5,70 |
| 11 3001 031 | 3 | 14 | 3 | 38 | | ✓ | 3,85 |
| 11 3001 035 | 3 | 14 | 3 | 50 | | ✓ | 7,05 |
| 11 3001 040 | 3 | 14 | 3 | 65 | | ✓ | 7,95 |
| 11 3001 045 | 3 | 14 | 3 | 75 | | ✓ | 8,95 |
| 11 3001 050 | 3 | 14 | 3 | 100 | | ✓ | 11,55 |
| 11 3001 052 | 3 | 12,7 | 6 | 50 | | ✓ | 8,15 |
| 11 3001 055 | 4 | 14 | 6 | 50 | | ✓ | 8,15 |
| 11 3001 057 | 5 | 12,7 | 3 | 38 | | ✓ | 13,65 |
| 11 3001 058 | 5 | 16 | 6 | 50 | | ✓ | 8,15 |
| 11 3001 059 | 6 | 5 | 3 | 37 | ✓ | | 7,70 |
| 11 3001 060 | 6 | 13 | 3 | 45 | ✓ | | 10,25 |
| 11 3001 065 | 6 | 18 | 6 | 50 | | ✓ | 8,15 |
| 11 3001 066 | 6 | 18 | 6 | 50 | | ✓ | 6,05 |
| 11 3001 067 | 6 | 25 | 6 | 50 | | ✓ | 11,70 |
| 11 3001 070 | 6 | 18 | 6 | 100 | ✓ | | 15,75 |
| 11 3001 075 | 6 | 18 | 6 | 150 | ✓ | | 22,15 |
| 11 3001 080 | 8 | 20 | 6 | 65 | ✓ | | 10,60 |
| 11 3001 081 | 8 | 20 | 6 | 65 | ✓ | | 7,95 |
| 11 3001 085 | 8 | 20 | 6 | 170 | ✓ | | 15,20 |
| 11 3001 087 | 10 | 13 | 6 | 58 | ✓ | | 12,40 |
| 11 3001 090 | 10 | 20 | 6 | 65 | ✓ | | 11,40 |
| 11 3001 091 | 10 | 20 | 6 | 65 | ✓ | | 8,55 |
| 11 3001 095 | 10 | 20 | 6 | 172 | ✓ | | 15,85 |
| 11 3001 100 | 10 | 25 | 6 | 70 | ✓ | | 13,55 |
| 11 3001 103 | 12 | 20 | 6 | 64 | ✓ | | 19,20 |
| 11 3001 105 | 12 | 25 | 6 | 70 | ✓ | | 17,65 |
| 11 3001 107 | 12DIN | 25 | 6 | 70 | ✓ | | 16,00 |
| 11 3001 108 | 12DIN | 25 | 6 | 70 | ✓ | | 12,15 |
| 11 3001 110 | 12 | 25 | 6 | 175 | ✓ | | 24,75 |
| 11 3001 115 | 12 | 25 | 8 | 70 | ✓ | | 19,60 |
| 11 3001 120 | 16 | 25 | 6 | 70 | ✓ | | 22,30 |
| 11 3001 121 | 16 | 25 | 6 | 70 | ✓ | | 16,75 |
| 11 3001 125 | 16 | 25 | 8 | 70 | ✓ | | 24,25 |
| 11 3001 130 | 20 | 25 | 6 | 70 | ✓ | | 33,15 |
| 11 3001 140 | 25 | 25 | 6 | 70 | ✓ | | 46,40 |
| 11 3001 145 | 25 | 25 | 8 | 70 | ✓ | | 30,60 |

Der revolutionäre Zylinder-Radius Frässtift siehe Seite 694/695
The revolutionary cylinder-radius burr see page 694/695



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

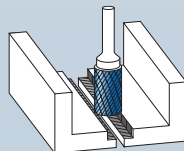
11 5011



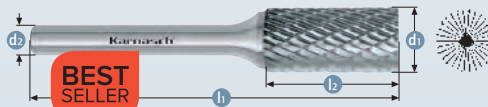
B FORM / SHAPE ZYB

Zylinder mit Stirnverzahnung

Cylinder with end cut



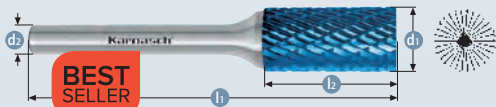
11 3011



NEW VALUETOOL

Schnittdaten Cutting data [i](#) 691

Film Movie [▶](#)



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|-----|----------------|-----------|-------|
| 11 5011 005 | 1,5 | 6 | 3 | 38 | | ✓ | 7,40 |
| 11 5011 010 | 2 | 11 | 3 | 38 | | ✓ | 8,05 |
| 11 5011 012 | 2,5 | 11 | 3 | 38 | | ✓ | 7,40 |
| 11 5011 015 | 3 | 14 | 3 | 38 | | ✓ | 7,30 |
| 11 5011 020 | 3 | 14 | 3 | 50 | | ✓ | 9,40 |
| 11 5011 025 | 3 | 14 | 3 | 65 | | ✓ | 10,45 |
| 11 5011 030 | 3 | 14 | 3 | 75 | | ✓ | 11,55 |
| 11 5011 035 | 3 | 14 | 3 | 100 | | ✓ | 14,50 |
| 11 5011 037 | 3 | 12,7 | 6 | 50 | | ✓ | 10,50 |
| 11 5011 040 | 4 | 14 | 6 | 50 | | ✓ | 10,50 |
| 11 5011 042 | 5 | 16 | 6 | 50 | | ✓ | 10,50 |
| 11 5011 043 | 6 | 5 | 3 | 37 | ✓ | | 11,05 |
| 11 5011 045 | 6 | 13 | 3 | 45 | ✓ | | 13,00 |
| 11 5011 050 | 6 | 18 | 6 | 50 | | ✓ | 10,50 |
| 11 5011 055 | 6 | 18 | 6 | 75 | | ✓ | 13,15 |
| 11 5011 060 | 6 | 18 | 6 | 100 | ✓ | | 19,05 |
| 11 5011 065 | 6 | 18 | 6 | 150 | ✓ | | 26,10 |
| 11 5011 070 | 6 | 25 | 6 | 50 | | ✓ | 14,60 |
| 11 5011 075 | 8 | 20 | 6 | 65 | ✓ | | 13,35 |
| 11 5011 080 | 8 | 20 | 6 | 170 | ✓ | | 19,40 |
| 11 5011 082 | 10 | 13 | 6 | 58 | ✓ | | 16,45 |
| 11 5011 085 | 10 | 20 | 6 | 65 | ✓ | | 15,30 |
| 11 5011 090 | 10 | 20 | 6 | 172 | ✓ | | 23,55 |
| 11 5011 095 | 10 | 25 | 6 | 70 | ✓ | | 17,60 |
| 11 5011 097 | 11 | 25 | 6 | 70 | ✓ | | 13,25 |
| 11 5011 099 | 12 | 20 | 6 | 64 | ✓ | | 25,25 |
| 11 5011 100 | 12 | 25 | 6 | 70 | ✓ | | 23,55 |
| 11 5011 103 | 12DIN | 25 | 6 | 70 | ✓ | | 21,65 |
| 11 5011 105 | 12 | 25 | 6 | 175 | ✓ | | 34,95 |
| 11 5011 110 | 12 | 25 | 8 | 70 | ✓ | | 25,60 |
| 11 5011 115 | 16 | 25 | 6 | 70 | ✓ | | 28,60 |
| 11 5011 120 | 16 | 25 | 8 | 70 | ✓ | | 30,55 |
| 11 5011 125 | 20 | 25 | 6 | 70 | ✓ | | 41,85 |
| 11 5011 130 | 20 | 25 | 8 | 70 | ✓ | | 44,00 |
| 11 5011 135 | 25 | 25 | 6 | 70 | ✓ | | 56,40 |
| 11 5011 140 | 25 | 25 | 8 | 70 | ✓ | | 58,35 |

Bestseller – preisreduziert · Bestseller – price reduced

Valuetoool – hervorragendes Preis-Leistungs-Verhältnis
Valuetoool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|-----|----------------|-----------|-------|
| 11 3011 005 | 1,5 | 6 | 3 | 38 | | ✓ | 5,65 |
| 11 3011 010 | 2 | 11 | 3 | 38 | | ✓ | 6,30 |
| 11 3011 012 | 2,5 | 11 | 3 | 38 | | ✓ | 5,65 |
| 11 3011 015 | 3 | 14 | 3 | 38 | | ✓ | 5,55 |
| 11 3011 016 | 3 | 14 | 3 | 38 | | ✓ | 4,25 |
| 11 3011 020 | 3 | 14 | 3 | 50 | | ✓ | 7,70 |
| 11 3011 025 | 3 | 14 | 3 | 65 | | ✓ | 8,75 |
| 11 3011 030 | 3 | 14 | 3 | 75 | | ✓ | 9,80 |
| 11 3011 035 | 3 | 14 | 3 | 100 | | ✓ | 12,75 |
| 11 3011 037 | 3 | 12,7 | 6 | 50 | | ✓ | 8,75 |
| 11 3011 040 | 4 | 14 | 6 | 50 | | ✓ | 8,75 |
| 11 3011 042 | 5 | 16 | 6 | 50 | | ✓ | 8,75 |
| 11 3011 043 | 6 | 5 | 3 | 37 | ✓ | | 9,30 |
| 11 3011 045 | 6 | 13 | 3 | 45 | ✓ | | 11,30 |
| 11 3011 050 | 6 | 18 | 6 | 50 | | ✓ | 8,75 |
| 11 3011 051 | 6 | 18 | 6 | 50 | | ✓ | 6,70 |
| 11 3011 055 | 6 | 18 | 6 | 75 | | ✓ | 11,45 |
| 11 3011 060 | 6 | 18 | 6 | 100 | ✓ | | 17,35 |
| 11 3011 065 | 6 | 18 | 6 | 150 | ✓ | | 24,40 |
| 11 3011 070 | 6 | 25 | 6 | 50 | | ✓ | 12,85 |
| 11 3011 075 | 8 | 20 | 6 | 65 | ✓ | | 11,60 |
| 11 3011 076 | 8 | 20 | 6 | 65 | ✓ | | 8,75 |
| 11 3011 080 | 8 | 20 | 6 | 170 | ✓ | | 16,70 |
| 11 3011 082 | 10 | 13 | 6 | 58 | ✓ | | 8,65 |
| 11 3011 085 | 10 | 20 | 6 | 65 | ✓ | | 12,50 |
| 11 3011 086 | 10 | 20 | 6 | 65 | ✓ | | 9,40 |
| 11 3011 090 | 10 | 20 | 6 | 172 | ✓ | | 17,90 |
| 11 3011 095 | 10 | 25 | 6 | 70 | ✓ | | 14,80 |
| 11 3011 097 | 11 | 25 | 6 | 70 | ✓ | | 18,15 |
| 11 3011 099 | 12 | 20 | 6 | 64 | ✓ | | 21,15 |
| 11 3011 100 | 12 | 25 | 6 | 70 | ✓ | | 19,45 |
| 11 3011 103 | 12DIN | 25 | 6 | 70 | ✓ | | 17,55 |
| 11 3011 104 | 12DIN | 25 | 6 | 70 | ✓ | | 13,35 |
| 11 3011 105 | 12 | 25 | 6 | 175 | ✓ | | 28,05 |
| 11 3011 110 | 12 | 25 | 8 | 70 | ✓ | | 21,50 |
| 11 3011 115 | 16 | 25 | 6 | 70 | ✓ | | 24,50 |
| 11 3011 116 | 16 | 25 | 6 | 70 | ✓ | | 18,45 |
| 11 3011 120 | 16 | 25 | 8 | 70 | ✓ | | 26,45 |
| 11 3011 125 | 20 | 25 | 6 | 70 | ✓ | | 36,50 |
| 11 3011 130 | 20 | 25 | 8 | 70 | ✓ | | 38,65 |
| 11 3011 135 | 25 | 25 | 6 | 70 | ✓ | | 51,05 |
| 11 3011 140 | 25 | 25 | 8 | 70 | ✓ | | 52,95 |

Der revolutionäre Zylinder-Radius Frässtift siehe Seite 694/695
The revolutionary cylinder-radius burr see page 694/695





Das einzigartige **CYLINDER+RADIUS** Design verwandelt den herkömmlichen Zylinder Frässtift in ein Hightech Werkzeug.

Diese neue Entwicklung erfüllt die höchsten Herstellungsstandards für alle Arten der Anwendung in der Industrie, darunter speziell auch für die Luft- und Raumfahrtindustrie.

Das spezielle Radius-Design an der Spitze des Zylinders vermeidet Zahnbruch und erhöht wesentlich die Standzeit.

Durch Radiusdesign:

- kein Verkanten / Abrutschen in das Werkstück.
- Beschädigungen von teuren Werkzeugen werden vermieden.

Durch Kreuzverzahnung:

- exzellente Kontrolle und Führung beim Entgratvorgang.

Eigenschaften und Vorteile:

Der Radius an der Spitze des Fräasers ergibt:

- verbesserte Nutzenstabilität durch verrundete Kanten.
- Der Radius ermöglicht eine bessere Kontrolle während des Schleifvorgangs.
- Die Rundung verhindert das Verkanten / Abrutschen in das Werkstück.
- Erzeugung eines Radius' auf dem Werkstück
- Rundung reduziert Bruch an der Schnittkante des Fräasers.

The **CYLINDER+RADIUS** unique design transforms the conventional cylinder burr into a hightech tool.

The new development meets the highest manufacturing standards for all kind of industries, especially the aerospace industry.

The radius design at the top of the cylinder provides an extended tool life avoiding teeth breakage.

This unique design with its **double cut** will improve operator control, reduce the size of chips and prevent damage to expensive parts.

Features and benefits:

Radius at the top of the cylinder results:

- Offers improved flute strength at the start of the burr.
- The radius provides better control of the burr.
- Prevents digging into work piece at the intersecting point.
- Produces a cylinder radius on the work piece.
- Reduces flute chipping at the intersecting point.



11 6010



HP-3

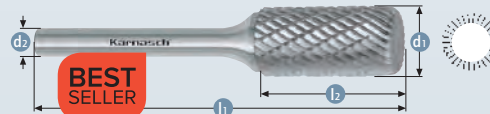
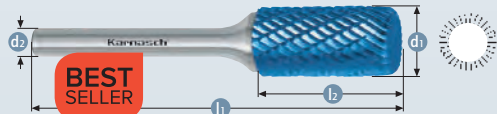


11 4010

A FORM / SHAPE **ZYA**

Zylinder-Radius

Cylinder-Radius



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 691 | |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6010 005 | • 3 | 14 | 3 | 38 | | ✓ | 8,25 |
| 11 6010 010 | • 6 | 18 | 6 | 50 | | ✓ | 11,05 |
| 11 6010 015 | • 8 | 19 | 6 | 64 | ✓ | | 13,90 |
| 11 6010 020 | • 10 | 19 | 6 | 64 | ✓ | | 15,90 |
| 11 6010 025 | • 12 | 25 | 6 | 70 | ✓ | | 24,45 |
| 11 6010 030 | • 16 | 25 | 6 | 70 | ✓ | | 29,75 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4010 005 | • 3 | 14 | 3 | 38 | | ✓ | 6,55 |
| 11 4010 010 | • 6 | 18 | 6 | 50 | | ✓ | 9,35 |
| 11 4010 015 | • 8 | 19 | 6 | 64 | ✓ | | 12,15 |
| 11 4010 020 | • 10 | 19 | 6 | 64 | ✓ | | 13,10 |
| 11 4010 025 | • 12 | 25 | 6 | 70 | ✓ | | 20,35 |
| 11 4010 030 | • 16 | 25 | 6 | 70 | ✓ | | 25,65 |

Anwendungsbeispiele / Application examples



11 5021

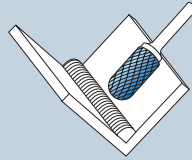


C FORM / SHAPE

WRC

Walzenrundform

Ball nosed cylinder



11 3021



BEST SELLER



BEST SELLER

NEW VALUETOOL

Schnittdaten
Cutting data

Film
Movie



Bestseller – preisreduziert · Bestseller – price reduced

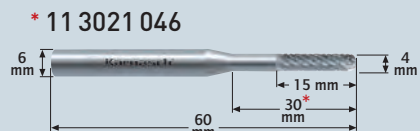
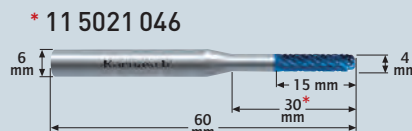
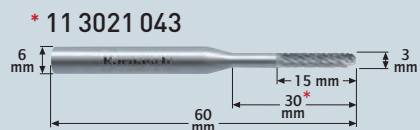
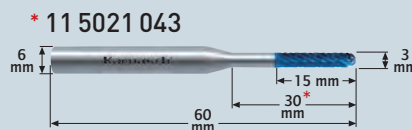
Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|---------|----|-----|-------------------|--------------|-------|
| 11 5021 020 | 2 | 11 | 3 | 38 | | ✓ | 7,40 |
| 11 5021 022 | 2,5 | 11 | 3 | 38 | | ✓ | 7,30 |
| 11 5021 025 | 3 | 14 | 3 | 38 | | ✓ | 7,40 |
| 11 5021 030 | 3 | 14 | 3 | 50 | | ✓ | 9,70 |
| 11 5021 032 | 3 | 14 | 3 | 60 | | ✓ | 10,20 |
| 11 5021 035 | 3 | 14 | 3 | 75 | | ✓ | 10,70 |
| 11 5021 040 | 3 | 14 | 3 | 100 | | ✓ | 13,40 |
| 11 5021 042 | 3 | 12,7 | 6 | 50 | | ✓ | 11,50 |
| 11 5021 043 | 3 | 30*[15] | 6 | 60 | | ✓ | 21,30 |
| 11 5021 045 | 4 | 16 | 6 | 50 | | ✓ | 11,10 |
| 11 5021 046 | 4 | 30*[15] | 6 | 60 | | ✓ | 21,80 |
| 11 5021 047 | 5 | 12,7 | 3 | 38 | | ✓ | 15,40 |
| 11 5021 049 | 5 | 16 | 6 | 50 | | ✓ | 11,10 |
| 11 5021 050 | 6 | 12,7 | 3 | 44 | ✓ | | 11,05 |
| 11 5021 055 | 6 | 18 | 6 | 50 | | ✓ | 11,10 |
| 11 5021 056 | 6 | 18 | 6 | 60 | | ✓ | 14,90 |
| 11 5021 058 | 6 | 18 | 6 | 80 | | ✓ | 17,70 |
| 11 5021 060 | 6 | 18 | 6 | 100 | ✓ | | 20,00 |
| 11 5021 065 | 6 | 18 | 6 | 150 | ✓ | | 28,45 |
| 11 5021 070 | 6 | 25 | 6 | 50 | | ✓ | 14,60 |
| 11 5021 075 | 8 | 20 | 6 | 65 | ✓ | | 13,25 |
| 11 5021 080 | 8 | 20 | 6 | 170 | ✓ | | 19,30 |
| 11 5021 085 | 10 | 20 | 6 | 65 | ✓ | | 15,45 |
| 11 5021 090 | 10 | 20 | 6 | 170 | ✓ | | 23,30 |
| 11 5021 095 | 10 | 25 | 6 | 70 | ✓ | | 17,60 |
| 11 5021 097 | 11 | 25 | 6 | 70 | ✓ | | 22,20 |
| 11 5021 099 | 12 | 10 | 6 | 54 | ✓ | | 25,70 |
| 11 5021 100 | 12 | 20 | 6 | 65 | ✓ | | 25,25 |
| 11 5021 105 | 12 | 25 | 6 | 70 | ✓ | | 23,95 |
| 11 5021 107 | 12DIN | 25 | 6 | 70 | ✓ | | 22,05 |
| 11 5021 110 | 12 | 25 | 6 | 175 | ✓ | | 34,65 |
| 11 5021 115 | 12 | 25 | 8 | 70 | ✓ | | 26,05 |
| 11 5021 120 | 16 | 25 | 6 | 70 | ✓ | | 29,15 |
| 11 5021 125 | 16 | 25 | 8 | 70 | ✓ | | 31,95 |
| 11 5021 130 | 20 | 25 | 6 | 70 | ✓ | | 41,25 |
| 11 5021 135 | 20 | 25 | 8 | 70 | ✓ | | 43,15 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|---------|----|-----|-------------------|--------------|-------|
| 11 3021 020 | 2 | 11 | 3 | 38 | | ✓ | 5,70 |
| 11 3021 022 | 2,5 | 11 | 3 | 38 | | ✓ | 5,55 |
| 11 3021 025 | 3 | 14 | 3 | 38 | | ✓ | 5,70 |
| 11 3021 026 | 3 | 14 | 3 | 38 | | ✓ | 3,85 |
| 11 3021 030 | 3 | 14 | 3 | 50 | | ✓ | 7,95 |
| 11 3021 032 | 3 | 14 | 3 | 60 | | ✓ | 8,45 |
| 11 3021 035 | 3 | 14 | 3 | 75 | | ✓ | 8,95 |
| 11 3021 040 | 3 | 14 | 3 | 100 | | ✓ | 11,65 |
| 11 3021 042 | 3 | 12,7 | 6 | 50 | | ✓ | 9,75 |
| 11 3021 043 | 3 | 30*[15] | 6 | 60 | | ✓ | 19,55 |
| 11 3021 045 | 4 | 16 | 6 | 50 | | ✓ | 9,40 |
| 11 3021 046 | 4 | 30*[15] | 6 | 60 | | ✓ | 20,10 |
| 11 3021 047 | 5 | 12,7 | 3 | 38 | | ✓ | 13,65 |
| 11 3021 049 | 5 | 16 | 6 | 50 | | ✓ | 9,40 |
| 11 3021 050 | 6 | 12,7 | 3 | 44 | ✓ | | 9,30 |
| 11 3021 054 | 6 | 18 | 6 | 50 | | ✓ | 7,05 |
| 11 3021 055 | 6 | 18 | 6 | 50 | | ✓ | 9,40 |
| 11 3021 056 | 6 | 18 | 6 | 60 | | ✓ | 13,15 |
| 11 3021 058 | 6 | 18 | 6 | 80 | | ✓ | 16,00 |
| 11 3021 060 | 6 | 18 | 6 | 100 | ✓ | | 18,25 |
| 11 3021 065 | 6 | 18 | 6 | 150 | ✓ | | 25,70 |
| 11 3021 070 | 6 | 25 | 6 | 50 | | ✓ | 12,85 |
| 11 3021 075 | 8 | 20 | 6 | 65 | ✓ | | 11,50 |
| 11 3021 076 | 8 | 20 | 6 | 65 | ✓ | | 8,65 |
| 11 3021 080 | 8 | 20 | 6 | 170 | ✓ | | 16,55 |
| 11 3021 085 | 10 | 20 | 6 | 65 | ✓ | | 12,65 |
| 11 3021 086 | 10 | 20 | 6 | 65 | ✓ | | 9,50 |
| 11 3021 090 | 10 | 20 | 6 | 170 | ✓ | | 17,65 |
| 11 3021 095 | 10 | 25 | 6 | 70 | ✓ | | 14,80 |
| 11 3021 097 | 11 | 25 | 6 | 70 | ✓ | | 18,10 |
| 11 3021 099 | 12 | 10 | 6 | 54 | ✓ | | 13,65 |
| 11 3021 100 | 12 | 20 | 6 | 65 | ✓ | | 21,15 |
| 11 3021 105 | 12 | 25 | 6 | 70 | ✓ | | 19,85 |
| 11 3021 107 | 12DIN | 25 | 6 | 70 | ✓ | | 17,95 |
| 11 3021 108 | 12DIN | 25 | 6 | 70 | ✓ | | 13,65 |
| 11 3021 110 | 12 | 25 | 6 | 175 | ✓ | | 27,75 |
| 11 3021 115 | 12 | 25 | 8 | 70 | ✓ | | 21,95 |
| 11 3021 120 | 16 | 25 | 6 | 70 | ✓ | | 25,05 |
| 11 3021 121 | 16 | 25 | 6 | 70 | ✓ | | 18,75 |
| 11 3021 125 | 16 | 25 | 8 | 70 | ✓ | | 27,80 |
| 11 3021 130 | 20 | 25 | 6 | 70 | ✓ | | 35,90 |
| 11 3021 135 | 20 | 25 | 8 | 70 | ✓ | | 37,80 |

- Frässtifte speziell für Schlüsseldienste siehe Seite 776/777
Burs specially for locksmiths see page 776/777



* Von 30 mm sind 15 mm verzahnt
15 mm by 30 mm are not machined

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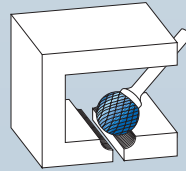
11 5031



D FORM / SHAPE KUD

Kugel

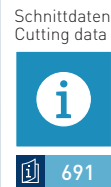
Ball



11 3031



NEW VALUETOOL



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|------|----|-----|-------------------|--------------|-------|
| 11 5031 020 | • 2 | 1,8 | 3 | 38 | | ✓ | 7,40 |
| 11 5031 022 | • 2,5 | 2,3 | 3 | 38 | | ✓ | 7,40 |
| 11 5031 025 | • 3 | 2,5 | 3 | 38 | | ✓ | 7,40 |
| 11 5031 030 | • 3 | 2,5 | 3 | 50 | | ✓ | 9,10 |
| 11 5031 035 | • 3 | 2,5 | 3 | 75 | | ✓ | 10,10 |
| 11 5031 040 | • 3 | 2,5 | 6 | 50 | | ✓ | 10,35 |
| 11 5031 045 | • 4 | 3,4 | 3 | 38 | | ✓ | 15,40 |
| 11 5031 046 | • 4 | 3,4 | 6 | 50 | | ✓ | 10,75 |
| 11 5031 047 | • 5 | 4,7 | 3 | 38 | | ✓ | 15,25 |
| 11 5031 048 | • 5 | 5,0 | 6 | 50 | | ✓ | 10,35 |
| 11 5031 050 | • 6 | 5,0 | 3 | 38 | ✓ | | 10,75 |
| 11 5031 055 | • 6 | 4,7 | 6 | 50 | | ✓ | 10,35 |
| 11 5031 060 | • 8 | 6,0 | 6 | 52 | ✓ | | 11,00 |
| 11 5031 065 | • 8 | 6,0 | 6 | 180 | ✓ | | 15,05 |
| 11 5031 070 | • 10 | 8,0 | 6 | 54 | ✓ | | 13,20 |
| 11 5031 075 | • 10 | 8,0 | 6 | 185 | ✓ | | 20,20 |
| 11 5031 077 | • 11 | 9,5 | 6 | 55 | ✓ | | 14,80 |
| 11 5031 080 | • 12 | 11,4 | 6 | 56 | ✓ | | 18,05 |
| 11 5031 083 | • 12DIN | 11,0 | 6 | 56 | ✓ | | 16,70 |
| 11 5031 085 | • 12 | 11,0 | 8 | 56 | ✓ | | 18,90 |
| 11 5031 090 | • 12 | 11,0 | 6 | 162 | ✓ | | 26,45 |
| 11 5031 095 | • 16 | 14,0 | 6 | 60 | ✓ | | 21,45 |
| 11 5031 100 | • 16 | 14,0 | 8 | 60 | ✓ | | 23,45 |
| 11 5031 105 | • 20 | 16,5 | 6 | 62 | ✓ | | 29,25 |
| 11 5031 110 | • 20 | 16,5 | 8 | 62 | ✓ | | 31,25 |
| 11 5031 115 | • 25 | 22,0 | 6 | 68 | ✓ | | 46,45 |
| 11 5031 120 | • 25 | 22,0 | 8 | 68 | ✓ | | 48,30 |

Bestseller – preisreduziert · Bestseller – price reduced

Valuetoool – hervorragendes Preis-Leistungs-Verhältnis
Valuetoool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|------|----|-----|-------------------|--------------|------------------|
| 11 3031 020 | • 2 | 1,8 | 3 | 38 | | ✓ | 5,70 |
| 11 3031 022 | • 2,5 | 2,3 | 3 | 38 | | ✓ | 5,70 |
| 11 3031 025 | • 3 | 2,5 | 3 | 38 | | ✓ | 5,70 |
| 11 3031 026 | • 3 | 2,5 | 3 | 38 | | ✓ | 3,85 NEW |
| 11 3031 030 | • 3 | 2,5 | 3 | 50 | | ✓ | 7,35 |
| 11 3031 035 | • 3 | 2,5 | 3 | 75 | | ✓ | 8,40 |
| 11 3031 040 | • 3 | 2,5 | 6 | 50 | | ✓ | 8,60 |
| 11 3031 045 | • 4 | 3,4 | 3 | 38 | | ✓ | 13,65 |
| 11 3031 046 | • 4 | 3,4 | 6 | 50 | | ✓ | 9,00 |
| 11 3031 047 | • 5 | 4,7 | 3 | 38 | | ✓ | 13,65 |
| 11 3031 048 | • 5 | 5,0 | 6 | 50 | | ✓ | 8,60 |
| 11 3031 050 | • 6 | 5,0 | 3 | 38 | ✓ | | 9,00 |
| 11 3031 055 | • 6 | 4,7 | 6 | 50 | | ✓ | 8,60 |
| 11 3031 056 | • 6 | 4,7 | 6 | 50 | | ✓ | 6,50 NEW |
| 11 3031 060 | • 8 | 6,0 | 6 | 52 | ✓ | | 9,25 |
| 11 3031 061 | • 8 | 7,0 | 6 | 52 | ✓ | | 7,00 NEW |
| 11 3031 065 | • 8 | 6,0 | 6 | 180 | ✓ | | 13,30 |
| 11 3031 070 | • 10 | 8,0 | 6 | 54 | ✓ | | 10,40 |
| 11 3031 071 | • 10 | 9,0 | 6 | 54 | ✓ | | 7,80 NEW |
| 11 3031 075 | • 10 | 8,0 | 6 | 185 | ✓ | | 14,55 |
| 11 3031 077 | • 11 | 9,5 | 6 | 55 | ✓ | | 12,00 |
| 11 3031 080 | • 12 | 11,4 | 6 | 56 | ✓ | | 13,95 |
| 11 3031 083 | • 12DIN | 11,0 | 6 | 56 | ✓ | | 12,60 |
| 11 3031 084 | • 12DIN | 11,0 | 6 | 56 | ✓ | | 9,60 NEW |
| 11 3031 085 | • 12 | 11,0 | 8 | 56 | ✓ | | 14,80 |
| 11 3031 090 | • 12 | 11,0 | 6 | 162 | ✓ | | 19,60 |
| 11 3031 095 | • 16 | 14,0 | 6 | 60 | ✓ | | 17,35 |
| 11 3031 096 | • 16 | 14,0 | 6 | 60 | ✓ | | 13,05 NEW |
| 11 3031 100 | • 16 | 14,0 | 8 | 60 | ✓ | | 19,35 |
| 11 3031 105 | • 20 | 16,5 | 6 | 62 | ✓ | | 23,90 |
| 11 3031 110 | • 20 | 16,5 | 8 | 62 | ✓ | | 25,90 |
| 11 3031 115 | • 25 | 22,0 | 6 | 68 | ✓ | | 41,10 |
| 11 3031 120 | • 25 | 22,0 | 8 | 68 | ✓ | | 42,95 |



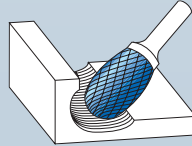
11 5041



E FORM / SHAPE TRE

Tropfen

Oval



11 3041



NEW VALUETOOL

Schnittdaten
Cutting data

Film
Movie



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|-----|----|-----|-------------------|--------------|-------|
| 11 5041 010 | • 3 | 6 | 3 | 38 | | ✓ | 7,40 |
| 11 5041 011 | • 3 | 6 | 3 | 75 | | ✓ | 10,90 |
| 11 5041 012 | • 5 | 7,1 | 3 | 38 | | ✓ | 15,40 |
| 11 5041 015 | • 6 | 10 | 3 | 42 | ✓ | | 11,05 |
| 11 5041 020 | • 6 | 10 | 6 | 50 | | ✓ | 12,30 |
| 11 5041 025 | • 8 | 15 | 6 | 60 | ✓ | | 14,50 |
| 11 5041 030 | • 10 | 16 | 6 | 60 | ✓ | | 15,45 |
| 11 5041 032 | • 10 | 16 | 6 | 170 | ✓ | | 28,70 |
| 11 5041 035 | • 12 | 22 | 6 | 67 | ✓ | | 22,55 |
| 11 5041 037 | • 12DIN | 21 | 6 | 66 | ✓ | | 20,80 |
| 11 5041 038 | % 12 | 22 | 6 | 175 | ✓ | | 22,45 |
| 11 5041 040 | • 12 | 22 | 8 | 67 | ✓ | | 24,55 |
| 11 5041 045 | • 16 | 25 | 6 | 70 | ✓ | | 29,75 |
| 11 5041 050 | • 16 | 25 | 8 | 70 | ✓ | | 32,65 |
| 11 5041 055 | • 20 | 25 | 6 | 70 | ✓ | | 39,85 |
| 11 5041 060 | • 20 | 25 | 8 | 70 | ✓ | | 41,80 |

Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|-----|----|-----|-------------------|--------------|-----------|
| 11 3041 005 | • 3 | 6 | 3 | 50 | | ✓ | 7,45 |
| 11 3041 009 | • 3 | 6 | 3 | 38 | | ✓ | 3,85 NEW |
| 11 3041 010 | • 3 | 6 | 3 | 38 | | ✓ | 5,70 |
| 11 3041 011 | • 3 | 6 | 3 | 75 | | ✓ | 9,15 |
| 11 3041 012 | • 5 | 7,1 | 3 | 38 | | ✓ | 13,65 |
| 11 3041 015 | • 6 | 10 | 3 | 42 | ✓ | | 9,30 |
| 11 3041 020 | • 6 | 10 | 6 | 50 | | ✓ | 10,60 |
| 11 3041 021 | • 6 | 10 | 6 | 50 | | ✓ | 7,95 NEW |
| 11 3041 025 | • 8 | 15 | 6 | 60 | ✓ | | 12,75 |
| 11 3041 026 | • 8 | 15 | 6 | 60 | ✓ | | 8,70 NEW |
| 11 3041 030 | • 10 | 16 | 6 | 60 | ✓ | | 12,65 |
| 11 3041 031 | • 10 | 16 | 6 | 60 | ✓ | | 9,50 NEW |
| 11 3041 032 | % 10 | 16 | 6 | 170 | ✓ | | 14,60 |
| 11 3041 035 | • 12 | 22 | 6 | 67 | ✓ | | 18,45 |
| 11 3041 036 | • 12DIN | 21 | 6 | 66 | ✓ | | 12,70 NEW |
| 11 3041 037 | • 12DIN | 21 | 6 | 66 | ✓ | | 16,70 |
| 11 3041 038 | • 12 | 22 | 6 | 175 | ✓ | | 28,65 |
| 11 3041 040 | • 12 | 22 | 8 | 67 | ✓ | | 20,45 |
| 11 3041 045 | • 16 | 25 | 6 | 70 | ✓ | | 25,65 |
| 11 3041 046 | • 16 | 25 | 6 | 70 | ✓ | | 19,30 NEW |
| 11 3041 050 | • 16 | 25 | 8 | 70 | ✓ | | 28,55 |
| 11 3041 055 | % 20 | 25 | 6 | 70 | ✓ | | 21,85 |
| 11 3041 060 | • 20 | 25 | 8 | 70 | ✓ | | 36,45 |

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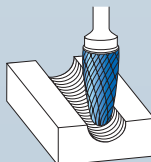
11 5051



F FORM / SHAPE **RBF**

Rundbogen

Ball nosed tree



11 3051



NEW VALUETOOL

| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 691 | |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|------|----|-----|-------------------|--------------|-------|
| 11 5051 007 | • 3 | 6 | 3 | 38 | ✓ | | 7,40 |
| 11 5051 010 | • 3 | 8 | 3 | 38 | | ✓ | 7,40 |
| 11 5051 015 | • 3 | 14 | 3 | 38 | | ✓ | 7,40 |
| 11 5051 020 | • 3 | 14 | 3 | 50 | | ✓ | 9,70 |
| 11 5051 021 | • 3 | 14 | 3 | 75 | | ✓ | 10,70 |
| 11 5051 022 | • 5 | 12,7 | 3 | 38 | | ✓ | 15,40 |
| 11 5051 025 | • 6 | 12 | 3 | 44 | ✓ | | 11,05 |
| 11 5051 030 | • 6 | 18 | 6 | 50 | | ✓ | 11,55 |
| 11 5051 033 | • 6 | 18 | 6 | 168 | ✓ | | 28,05 |
| 11 5051 035 | • 8 | 20 | 6 | 65 | ✓ | | 15,40 |
| 11 5051 040 | • 10 | 20 | 6 | 65 | ✓ | | 15,15 |
| 11 5051 045 | • 10 | 20 | 6 | 170 | ✓ | | 22,95 |
| 11 5051 047 | • 11 | 25 | 6 | 70 | ✓ | | 21,25 |
| 11 5051 048 | • 12 | 20 | 6 | 65 | ✓ | | 22,35 |
| 11 5051 050 | • 12 | 25 | 6 | 70 | ✓ | | 21,10 |
| 11 5051 053 | • 12DIN | 25 | 6 | 70 | ✓ | | 19,45 |
| 11 5051 055 | • 12 | 25 | 8 | 70 | ✓ | | 21,10 |
| 11 5051 060 | • 12 | 25 | 6 | 175 | ✓ | | 32,35 |
| 11 5051 065 | • 16 | 25 | 6 | 70 | ✓ | | 29,35 |
| 11 5051 070 | • 16 | 25 | 8 | 70 | ✓ | | 31,70 |
| 11 5051 075 | • 20 | 25 | 6 | 70 | ✓ | | 38,55 |
| 11 5051 080 | • 20 | 25 | 8 | 70 | ✓ | | 41,55 |
| 11 5051 082 | • 20 | 32 | 6 | 77 | ✓ | | 47,05 |
| 11 5051 085 | • 20 | 38 | 6 | 83 | ✓ | | 54,40 |
| 11 5051 090 | • 20 | 38 | 8 | 83 | ✓ | | 58,80 |

Bestseller – preisreduziert · Bestseller – price reduced

Valuetooll – hervorragendes Preis-Leistungs-Verhältnis
Valuetooll – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|------|----|-----|-------------------|--------------|------------------|
| 11 3051 007 | • 3 | 6 | 3 | 38 | ✓ | | 5,70 |
| 11 3051 010 | • 3 | 8 | 3 | 38 | | ✓ | 5,70 |
| 11 3051 015 | • 3 | 14 | 3 | 38 | | ✓ | 5,70 |
| 11 3051 016 | • 3 | 14 | 3 | 38 | | ✓ | 3,85 NEW |
| 11 3051 020 | • 3 | 14 | 3 | 50 | | ✓ | 7,95 |
| 11 3051 022 | • 5 | 12,7 | 3 | 38 | | ✓ | 13,65 |
| 11 3051 025 | • 6 | 12 | 3 | 44 | ✓ | | 9,30 |
| 11 3051 030 | • 6 | 18 | 6 | 50 | | ✓ | 9,80 |
| 11 3051 031 | • 6 | 18 | 6 | 50 | | ✓ | 7,40 NEW |
| 11 3051 033 | • 6 | 18 | 6 | 168 | ✓ | | 25,35 |
| 11 3051 035 | • 8 | 20 | 6 | 65 | ✓ | | 13,65 |
| 11 3051 036 | • 8 | 20 | 6 | 65 | ✓ | | 9,45 NEW |
| 11 3051 040 | • 10 | 20 | 6 | 65 | ✓ | | 12,30 |
| 11 3051 041 | • 10 | 20 | 6 | 65 | ✓ | | 9,30 NEW |
| 11 3051 045 | • 10 | 20 | 6 | 170 | ✓ | | 17,35 |
| 11 3051 047 | • 11 | 25 | 6 | 70 | ✓ | | 17,15 |
| 11 3051 048 | • 12 | 20 | 6 | 65 | ✓ | | 18,25 |
| 11 3051 050 | • 12 | 25 | 6 | 70 | ✓ | | 16,95 |
| 11 3051 053 | • 12DIN | 25 | 6 | 70 | ✓ | | 15,35 |
| 11 3051 054 | • 12DIN | 25 | 6 | 70 | ✓ | | 12,55 NEW |
| 11 3051 055 | • 12 | 25 | 8 | 70 | ✓ | | 16,95 |
| 11 3051 060 | • 12 | 25 | 6 | 175 | ✓ | | 25,50 |
| 11 3051 065 | • 16 | 25 | 6 | 70 | ✓ | | 25,25 |
| 11 3051 066 | • 16 | 25 | 6 | 70 | ✓ | | 18,95 NEW |
| 11 3051 070 | • 16 | 25 | 8 | 70 | ✓ | | 27,60 |
| 11 3051 075 | • 20 | 25 | 6 | 70 | ✓ | | 33,15 |
| 11 3051 080 | • 20 | 25 | 8 | 70 | ✓ | | 36,20 |
| 11 3051 082 | • 20 | 32 | 6 | 77 | ✓ | | 41,70 |
| 11 3051 085 | • 20 | 38 | 6 | 83 | ✓ | | 49,05 |
| 11 3051 090 | • 20 | 38 | 8 | 83 | ✓ | | 53,45 |

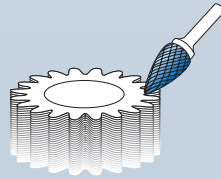
11 5061



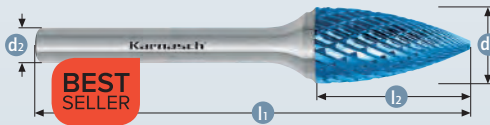
G FORM / SHAPE SPG

Spitzbogen

Tree



11 3061



Schnittdaten Cutting data [i](#) 691

Film Movie [▶](#)

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|------|----|-----|----------------|-----------|-------|
| 11 5061 010 | • 3 | 6 | 3 | 38 | | ✓ | 7,40 |
| 11 5061 012 | • 3 | 10 | 3 | 38 | | ✓ | 7,40 |
| 11 5061 015 | • 3 | 14 | 3 | 38 | | ✓ | 7,40 |
| 11 5061 020 | • 3 | 14 | 3 | 50 | | ✓ | 8,90 |
| 11 5061 025 | • 3 | 14 | 3 | 75 | | ✓ | 10,45 |
| 11 5061 028 | • 5 | 12,7 | 3 | 38 | | ✓ | 15,40 |
| 11 5061 030 | • 6 | 12 | 3 | 44 | ✓ | | 11,05 |
| 11 5061 035 | • 6 | 18 | 6 | 50 | | ✓ | 11,55 |
| 11 5061 040 | • 8 | 20 | 6 | 65 | ✓ | | 13,60 |
| 11 5061 045 | • 10 | 20 | 6 | 65 | ✓ | | 15,95 |
| 11 5061 050 | • 10 | 20 | 6 | 170 | ✓ | | 24,05 |
| 11 5061 055 | • 12 | 20 | 6 | 65 | ✓ | | 22,05 |
| 11 5061 060 | • 12 | 25 | 6 | 70 | ✓ | | 22,05 |
| 11 5061 063 | • 12DIN | 25 | 6 | 70 | ✓ | | 20,25 |
| 11 5061 065 | • 12 | 25 | 8 | 70 | ✓ | | 23,65 |
| 11 5061 070 | • 12 | 25 | 6 | 175 | ✓ | | 32,05 |
| 11 5061 075 | • 12 | 30 | 6 | 75 | ✓ | | 25,75 |
| 11 5061 080 | • 12 | 30 | 8 | 75 | ✓ | | 25,75 |
| 11 5061 085 | • 16 | 25 | 6 | 70 | ✓ | | 28,95 |
| 11 5061 090 | • 16 | 25 | 8 | 70 | ✓ | | 30,95 |
| 11 5061 095 | • 16 | 30 | 6 | 75 | ✓ | | 38,10 |
| 11 5061 100 | • 16 | 30 | 8 | 75 | ✓ | | 38,10 |
| 11 5061 105 | • 20 | 25 | 6 | 70 | ✓ | | 38,55 |
| 11 5061 110 | • 20 | 25 | 8 | 70 | ✓ | | 40,45 |
| 11 5061 115 | • 20 | 38 | 6 | 83 | ✓ | | 54,40 |
| 11 5061 120 | • 20 | 38 | 8 | 83 | ✓ | | 35,80 |

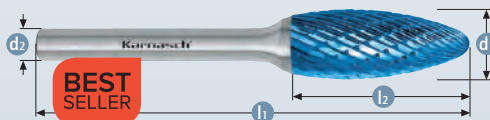
Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|------|----|-----|----------------|-----------|-------|
| 11 3061 010 | • 3 | 6 | 3 | 38 | | ✓ | 5,70 |
| 11 3061 012 | • 3 | 10 | 3 | 38 | | ✓ | 5,70 |
| 11 3061 015 | • 3 | 14 | 3 | 38 | | ✓ | 5,70 |
| 11 3061 016 | • 3 | 14 | 3 | 38 | | ✓ | 3,85 |
| 11 3061 020 | • 3 | 14 | 3 | 50 | | ✓ | 7,15 |
| 11 3061 028 | • 5 | 12,7 | 3 | 38 | | ✓ | 13,65 |
| 11 3061 030 | • 6 | 12 | 3 | 44 | ✓ | | 9,30 |
| 11 3061 035 | • 6 | 18 | 6 | 50 | | ✓ | 9,80 |
| 11 3061 036 | • 6 | 18 | 6 | 50 | | ✓ | 7,40 |
| 11 3061 040 | • 8 | 20 | 6 | 65 | ✓ | | 11,85 |
| 11 3061 041 | • 8 | 20 | 6 | 65 | ✓ | | 8,95 |
| 11 3061 045 | • 10 | 20 | 6 | 65 | ✓ | | 13,15 |
| 11 3061 046 | • 10 | 20 | 6 | 65 | ✓ | | 9,90 |
| 11 3061 050 | • 10 | 20 | 6 | 170 | ✓ | | 18,40 |
| 11 3061 055 | • 12 | 20 | 6 | 65 | ✓ | | 17,95 |
| 11 3061 060 | • 12 | 25 | 6 | 70 | ✓ | | 17,95 |
| 11 3061 063 | • 12DIN | 25 | 6 | 70 | ✓ | | 16,15 |
| 11 3061 064 | • 12DIN | 25 | 6 | 70 | ✓ | | 12,30 |
| 11 3061 065 | • 12 | 25 | 8 | 70 | ✓ | | 19,55 |
| 11 3061 070 | • 12 | 25 | 6 | 175 | ✓ | | 25,20 |
| 11 3061 075 | • 12 | 30 | 6 | 75 | ✓ | | 21,65 |
| 11 3061 080 | • 12 | 30 | 8 | 75 | ✓ | | 21,65 |
| 11 3061 085 | • 16 | 25 | 6 | 70 | ✓ | | 24,85 |
| 11 3061 086 | • 16 | 25 | 6 | 70 | ✓ | | 18,75 |
| 11 3061 090 | • 16 | 25 | 8 | 70 | ✓ | | 26,85 |
| 11 3061 095 | • 16 | 30 | 6 | 75 | ✓ | | 34,00 |
| 11 3061 100 | • 16 | 30 | 8 | 75 | ✓ | | 34,00 |
| 11 3061 105 | • 20 | 25 | 6 | 70 | ✓ | | 33,15 |
| 11 3061 110 | • 20 | 25 | 8 | 70 | ✓ | | 22,25 |
| 11 3061 115 | • 20 | 38 | 6 | 83 | ✓ | | 49,05 |
| 11 3061 120 | • 20 | 38 | 8 | 83 | ✓ | | 32,45 |



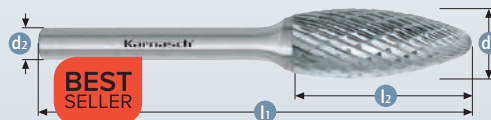
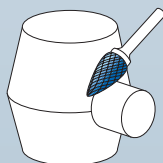
11 5071



H FORM / SHAPE

Flamme

Flame



11 3071



NEW VALUETOOL

Schnittdaten Cutting data

Film Movie

i

▶

691

Bestseller – preisreduziert · Bestseller – price reduced

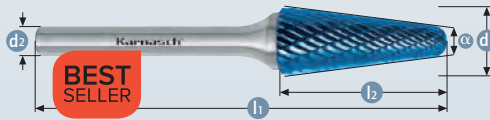
Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|-----|----|-----|-------------------|--------------|-------|
| 11 5071 003 | 3 | 6 | 3 | 50 | ✓ | ✓ | 9,15 |
| 11 5071 005 | 3 | 6 | 3 | 38 | ✓ | ✓ | 7,40 |
| 11 5071 006 | 3 | 6 | 3 | 75 | ✓ | ✓ | 10,90 |
| 11 5071 007 | 5 | 9,5 | 3 | 38 | ✓ | ✓ | 15,40 |
| 11 5071 010 | 6 | 14 | 6 | 50 | ✓ | ✓ | 14,75 |
| 11 5071 015 | 8 | 20 | 6 | 65 | ✓ | ✓ | 14,70 |
| 11 5071 017 | 8 | 20 | 6 | 170 | ✓ | ✓ | 24,70 |
| 11 5071 020 | 10 | 20 | 6 | 65 | ✓ | ✓ | 26,90 |
| 11 5071 025 | 12 | 32 | 6 | 77 | ✓ | ✓ | 31,70 |
| 11 5071 027 | 12DIN | 30 | 6 | 75 | ✓ | ✓ | 28,95 |
| 11 5071 028 | 12 | 32 | 6 | 180 | ✓ | ✓ | 35,50 |
| 11 5071 030 | 12 | 32 | 8 | 77 | ✓ | ✓ | 31,70 |
| 11 5071 035 | 16 | 36 | 6 | 82 | ✓ | ✓ | 40,60 |
| 11 5071 040 | 16 | 36 | 8 | 82 | ✓ | ✓ | 42,55 |
| 11 5071 045 | 20 | 41 | 6 | 86 | ✓ | ✓ | 51,75 |
| 11 5071 050 | 20 | 41 | 8 | 86 | ✓ | ✓ | 53,65 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|-----|----|-----|-------------------|--------------|-------|
| 11 3071 003 | 3 | 6 | 3 | 50 | ✓ | ✓ | 7,45 |
| 11 3071 004 | 3 | 6 | 3 | 38 | ✓ | ✓ | 3,85 |
| 11 3071 005 | 3 | 6 | 3 | 38 | ✓ | ✓ | 5,70 |
| 11 3071 006 | 3 | 6 | 3 | 75 | ✓ | ✓ | 9,15 |
| 11 3071 007 | 5 | 9,5 | 3 | 38 | ✓ | ✓ | 13,65 |
| 11 3071 010 | 6 | 14 | 6 | 50 | ✓ | ✓ | 13,05 |
| 11 3071 011 | 6 | 14 | 6 | 50 | ✓ | ✓ | 8,00 |
| 11 3071 015 | 8 | 20 | 6 | 65 | ✓ | ✓ | 12,95 |
| 11 3071 016 | 8 | 20 | 6 | 65 | ✓ | ✓ | 9,75 |
| 11 3071 017 | 8 | 20 | 6 | 170 | ✓ | ✓ | 21,95 |
| 11 3071 020 | 10 | 20 | 6 | 65 | ✓ | ✓ | 24,10 |
| 11 3071 021 | 10 | 20 | 6 | 65 | ✓ | ✓ | 13,15 |
| 11 3071 025 | 12 | 32 | 6 | 77 | ✓ | ✓ | 27,60 |
| 11 3071 026 | 12DIN | 30 | 6 | 75 | ✓ | ✓ | 18,15 |
| 11 3071 027 | 12DIN | 30 | 6 | 75 | ✓ | ✓ | 24,85 |
| 11 3071 028 | 12 | 32 | 6 | 180 | ✓ | ✓ | 28,65 |
| 11 3071 030 | 12 | 32 | 8 | 77 | ✓ | ✓ | 27,60 |
| 11 3071 035 | 16 | 36 | 6 | 82 | ✓ | ✓ | 36,50 |
| 11 3071 036 | 16 | 36 | 6 | 82 | ✓ | ✓ | 27,45 |
| 11 3071 040 | 16 | 36 | 8 | 82 | ✓ | ✓ | 38,45 |
| 11 3071 045 | 20 | 41 | 6 | 86 | ✓ | ✓ | 46,40 |
| 11 3071 050 | 20 | 41 | 8 | 86 | ✓ | ✓ | 48,30 |

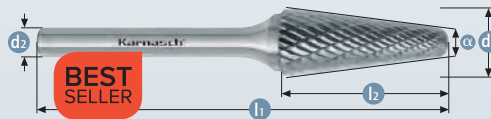
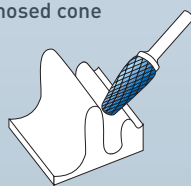
11 5081



L FORM / SHAPE KEL

Rundkegel

Ball nosed cone



11 3081



NEW VALUETOOL

Schnittdaten Cutting data

Film Movie

i

▶

691

Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

Bestseller – preisreduziert · Bestseller – price reduced

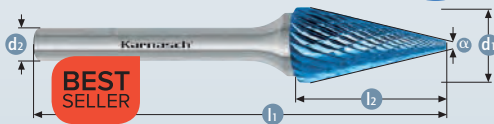
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|-------|------|----|-----|-------------------|--------------|-----|-------|
| 11 5081 005 | 3 | 10 | 3 | 38 | ✓ | ✓ | 10° | 7,40 |
| 11 5081 009 | 3 | 14 | 3 | 50 | ✓ | ✓ | 8° | 9,15 |
| 11 5081 010 | 3 | 14 | 3 | 38 | ✓ | ✓ | 8° | 7,40 |
| 11 5081 011 | 3 | 14 | 3 | 75 | ✓ | ✓ | 8° | 10,90 |
| 11 5081 012 | 5 | 12,7 | 3 | 38 | ✓ | ✓ | 14° | 15,40 |
| 11 5081 015 | 6 | 16 | 3 | 48 | ✓ | ✓ | 22° | 11,95 |
| 11 5081 020 | 6 | 18 | 6 | 50 | ✓ | ✓ | 14° | 11,75 |
| 11 5081 025 | 8 | 25 | 6 | 70 | ✓ | ✓ | 14° | 14,85 |
| 11 5081 030 | 10 | 20 | 6 | 65 | ✓ | ✓ | 14° | 20,25 |
| 11 5081 035 | 10 | 30 | 6 | 75 | ✓ | ✓ | 14° | 18,65 |
| 11 5081 040 | 10 | 30 | 6 | 176 | ✓ | ✓ | 14° | 27,75 |
| 11 5081 045 | 12 | 32 | 6 | 77 | ✓ | ✓ | 14° | 24,25 |
| 11 5081 047 | 12DIN | 25 | 6 | 70 | ✓ | ✓ | 14° | 22,30 |
| 11 5081 050 | 12 | 32 | 8 | 77 | ✓ | ✓ | 14° | 24,25 |
| 11 5081 055 | 12 | 32 | 6 | 182 | ✓ | ✓ | 14° | 36,10 |
| 11 5081 060 | 16 | 33 | 6 | 78 | ✓ | ✓ | 14° | 35,20 |
| 11 5081 065 | 16 | 33 | 8 | 78 | ✓ | ✓ | 14° | 35,20 |
| 11 5081 070 | 20 | 41 | 6 | 86 | ✓ | ✓ | 14° | 46,45 |
| 11 5081 075 | 20 | 41 | 8 | 86 | ✓ | ✓ | 14° | 46,45 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|-------|------|----|-----|-------------------|--------------|-----|-------|
| 11 3081 005 | 3 | 10 | 3 | 38 | ✓ | ✓ | 10° | 5,70 |
| 11 3081 008 | 3 | 14 | 3 | 38 | ✓ | ✓ | 10° | 3,85 |
| 11 3081 009 | 3 | 14 | 3 | 50 | ✓ | ✓ | 8° | 7,45 |
| 11 3081 010 | 3 | 14 | 3 | 38 | ✓ | ✓ | 8° | 5,70 |
| 11 3081 011 | 3 | 14 | 3 | 75 | ✓ | ✓ | 8° | 9,15 |
| 11 3081 012 | 5 | 12,7 | 3 | 38 | ✓ | ✓ | 14° | 13,65 |
| 11 3081 015 | 6 | 16 | 3 | 48 | ✓ | ✓ | 22° | 10,25 |
| 11 3081 020 | 6 | 18 | 6 | 50 | ✓ | ✓ | 14° | 10,00 |
| 11 3081 021 | 6 | 18 | 6 | 50 | ✓ | ✓ | 14° | 7,55 |
| 11 3081 025 | 8 | 25 | 6 | 70 | ✓ | ✓ | 14° | 13,10 |
| 11 3081 026 | 8 | 25 | 6 | 70 | ✓ | ✓ | 14° | 9,90 |
| 11 3081 030 | 10 | 20 | 6 | 65 | ✓ | ✓ | 14° | 17,45 |
| 11 3081 031 | 10 | 20 | 6 | 65 | ✓ | ✓ | 14° | 12,90 |
| 11 3081 035 | 10 | 30 | 6 | 75 | ✓ | ✓ | 14° | 15,80 |
| 11 3081 040 | 10 | 30 | 6 | 176 | ✓ | ✓ | 14° | 22,10 |
| 11 3081 045 | 12 | 32 | 6 | 77 | ✓ | ✓ | 14° | 20,15 |
| 11 3081 047 | 12DIN | 25 | 6 | 70 | ✓ | ✓ | 14° | 18,15 |
| 11 3081 048 | 12DIN | 25 | 6 | 70 | ✓ | ✓ | 14° | 13,25 |
| 11 3081 050 | 12 | 32 | 8 | 77 | ✓ | ✓ | 14° | 20,15 |
| 11 3081 055 | 12 | 32 | 6 | 182 | ✓ | ✓ | 14° | 29,20 |
| 11 3081 060 | 16 | 33 | 6 | 78 | ✓ | ✓ | 14° | 31,10 |
| 11 3081 061 | 16 | 33 | 6 | 78 | ✓ | ✓ | 14° | 23,95 |
| 11 3081 065 | 16 | 33 | 8 | 78 | ✓ | ✓ | 14° | 31,10 |
| 11 3081 070 | 20 | 41 | 6 | 86 | ✓ | ✓ | 14° | 41,10 |
| 11 3081 075 | 20 | 41 | 8 | 86 | ✓ | ✓ | 14° | 41,10 |

⊘ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



11 5091



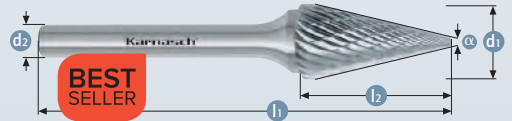
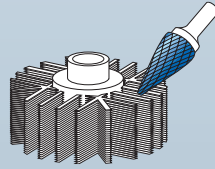
BEST SELLER

M FORM / SHAPE

SKM

Spitzkegel

Cone



BEST SELLER

NEW VALUETOOL

Schnittdaten
Cutting data

Film
Movie



11 3091



Bestseller – preisreduziert · Bestseller – price reduced

Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|-------|------|----|----|-------------------|--------------|-----|-------|
| 11 5091 010 | 3 | 8 | 3 | 38 | | ✓ | 18° | 7,40 |
| 11 5091 015 | 3 | 11 | 3 | 38 | | ✓ | 14° | 7,40 |
| 11 5091 020 | 3 | 15 | 3 | 38 | | ✓ | 10° | 7,40 |
| 11 5091 025 | 6 | 12 | 3 | 48 | ✓ | | 22° | 11,05 |
| 11 5091 027 | 6 | 12,7 | 6 | 50 | ✓ | ✓ | 14° | 11,25 |
| 11 5091 030 | 6 | 20 | 6 | 50 | ✓ | ✓ | 14° | 11,75 |
| 11 5091 032 | 6 | 25 | 6 | 50 | | ✓ | 11° | 12,45 |
| 11 5091 035 | 8 | 18 | 6 | 63 | ✓ | | 13° | 14,85 |
| 11 5091 040 | 10 | 20 | 6 | 65 | ✓ | | 28° | 19,05 |
| 11 5091 045 | 12 | 25 | 6 | 70 | ✓ | | 28° | 23,65 |
| 11 5091 047 | 12DIN | 25 | 6 | 70 | ✓ | | 28° | 21,75 |
| 11 5091 050 | 12 | 25 | 8 | 70 | ✓ | | 28° | 23,65 |
| 11 5091 055 | 16 | 26 | 6 | 74 | ✓ | | 33° | 30,50 |
| 11 5091 060 | 16 | 26 | 8 | 74 | ✓ | | 33° | 33,30 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|-------|------|----|----|-------------------|--------------|-----|-------|
| 11 3091 010 | 3 | 8 | 3 | 38 | | ✓ | 18° | 5,70 |
| 11 3091 015 | 3 | 11 | 3 | 38 | | ✓ | 14° | 5,70 |
| 11 3091 016 | 3 | 11 | 3 | 38 | | ✓ | 14° | 3,85 |
| 11 3091 020 | 3 | 15 | 3 | 38 | | ✓ | 10° | 5,70 |
| 11 3091 025 | 6 | 12 | 3 | 48 | ✓ | | 22° | 9,30 |
| 11 3091 027 | 6 | 12,7 | 6 | 50 | ✓ | ✓ | 14° | 9,50 |
| 11 3091 030 | 6 | 20 | 6 | 50 | ✓ | ✓ | 14° | 10,00 |
| 11 3091 031 | 6 | 20 | 6 | 50 | | ✓ | 14° | 7,55 |
| 11 3091 032 | 6 | 25 | 6 | 50 | | ✓ | 11° | 10,75 |
| 11 3091 035 | 8 | 18 | 6 | 63 | ✓ | | 13° | 13,10 |
| 11 3091 036 | 8 | 18 | 6 | 63 | ✓ | | 13° | 10,05 |
| 11 3091 040 | 10 | 20 | 6 | 65 | ✓ | | 28° | 16,25 |
| 11 3091 041 | 10 | 20 | 6 | 65 | ✓ | | 28° | 11,90 |
| 11 3091 045 | 12 | 25 | 6 | 70 | ✓ | | 28° | 19,55 |
| 11 3091 047 | 12DIN | 25 | 6 | 70 | ✓ | | 28° | 17,60 |
| 11 3091 048 | 12DIN | 25 | 6 | 70 | ✓ | | 28° | 13,60 |
| 11 3091 050 | 12 | 25 | 8 | 70 | ✓ | | 28° | 19,55 |
| 11 3091 055 | 16 | 26 | 6 | 74 | ✓ | | 33° | 26,40 |
| 11 3091 056 | 16 | 26 | 6 | 74 | ✓ | | 33° | 19,90 |
| 11 3091 060 | 16 | 26 | 8 | 74 | ✓ | | 33° | 29,20 |

11 5096



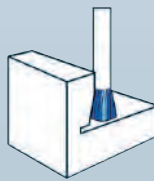
BEST SELLER

N FORM / SHAPE

WKN

Winkel

Inverted cone



BEST SELLER

Schnittdaten
Cutting data

Film
Movie



11 3096



Bestseller – preisreduziert · Bestseller – price reduced

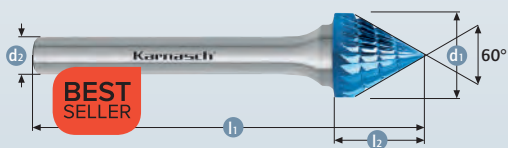
Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|----|----|----|----|-------------------|--------------|-----|-------|
| 11 5096 005 | 3 | 5 | 3 | 38 | | ✓ | 10° | 7,30 |
| 11 5096 010 | 6 | 7 | 3 | 39 | ✓ | | 10° | 11,05 |
| 11 5096 015 | 6 | 8 | 6 | 50 | ✓ | ✓ | 10° | 11,30 |
| 11 5096 020 | 10 | 10 | 6 | 55 | ✓ | | 13° | 16,75 |
| 11 5096 025 | 12 | 13 | 6 | 58 | ✓ | | 30° | 23,85 |
| 11 5096 030 | 12 | 13 | 8 | 58 | ✓ | | 30° | 25,90 |
| 11 5096 035 | 16 | 19 | 6 | 64 | ✓ | | 18° | 29,45 |
| 11 5096 040 | 16 | 19 | 8 | 64 | ✓ | | 18° | 31,40 |
| 11 5096 045 | 20 | 16 | 6 | 61 | ✓ | | 30° | 33,80 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|----|----|----|----|-------------------|--------------|-----|-------|
| 11 3096 005 | 3 | 5 | 3 | 38 | | ✓ | 10° | 5,55 |
| 11 3096 010 | 6 | 7 | 3 | 39 | ✓ | | 10° | 9,30 |
| 11 3096 015 | 6 | 8 | 6 | 50 | ✓ | ✓ | 10° | 9,55 |
| 11 3096 020 | 10 | 10 | 6 | 55 | ✓ | | 13° | 13,95 |
| 11 3096 025 | 12 | 13 | 6 | 58 | ✓ | | 30° | 19,75 |
| 11 3096 030 | 12 | 13 | 8 | 58 | ✓ | | 30° | 21,80 |
| 11 3096 035 | 16 | 19 | 6 | 64 | ✓ | | 18° | 25,35 |
| 11 3096 040 | 16 | 19 | 8 | 64 | ✓ | | 18° | 27,30 |
| 11 3096 045 | 20 | 16 | 6 | 61 | ✓ | | 30° | 28,45 |

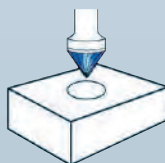
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

11 5101



J FORM / SHAPE KSJ

Kegel 60°
Countersink 60°



11 3101



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 691 | |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|-------------------|--------------|-------|
| 11 5101 005 | • 3 | 3 | 3 | 38 | | ✓ | 7,40 |
| 11 5101 010 | • 6 | 6 | 6 | 50 | | ✓ | 10,35 |
| 11 5101 015 | • 10 | 8 | 6 | 56 | ✓ | | 14,15 |
| 11 5101 020 | • 12 | 11 | 6 | 60 | ✓ | | 17,80 |
| 11 5101 025 | • 16 | 15 | 6 | 62 | ✓ | | 22,35 |
| 11 5101 030 | • 16 | 15 | 8 | 62 | ✓ | | 24,30 |
| 11 5101 035 | • 20 | 17 | 6 | 65 | ✓ | | 29,30 |
| 11 5101 040 | • 25 | 24,5 | 6 | 68 | ✓ | | 43,80 |

Bestseller – preisreduziert · Bestseller – price reduced

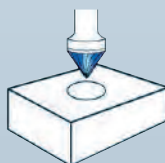
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|-------------------|--------------|-------|
| 11 3101 005 | • 3 | 3 | 3 | 38 | | ✓ | 5,70 |
| 11 3101 010 | • 6 | 6 | 6 | 50 | | ✓ | 8,60 |
| 11 3101 015 | • 10 | 8 | 6 | 56 | ✓ | | 11,35 |
| 11 3101 020 | • 12 | 11 | 6 | 60 | ✓ | | 13,70 |
| 11 3101 025 | • 16 | 15 | 6 | 62 | ✓ | | 18,25 |
| 11 3101 030 | • 16 | 15 | 8 | 62 | ✓ | | 10,75 |
| 11 3101 035 | • 20 | 17 | 6 | 65 | ✓ | | 12,75 |
| 11 3101 040 | • 25 | 24,5 | 6 | 68 | ✓ | | 38,45 |

11 5111



K FORM / SHAPE KSK

Kegel 90°
Countersink 90°



11 3111



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 691 | |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|-------------------|--------------|-------|
| 11 5111 005 | • 3 | 3 | 3 | 38 | | ✓ | 7,40 |
| 11 5111 010 | • 6 | 3 | 6 | 50 | | ✓ | 10,35 |
| 11 5111 015 | • 10 | 5 | 6 | 53 | ✓ | | 14,15 |
| 11 5111 020 | • 12 | 7 | 6 | 55 | ✓ | | 17,80 |
| 11 5111 025 | • 12 | 7 | 8 | 55 | ✓ | | 19,35 |
| 11 5111 030 | • 16 | 8 | 6 | 57 | ✓ | | 22,35 |
| 11 5111 035 | • 16 | 8 | 8 | 57 | ✓ | | 24,30 |
| 11 5111 040 | • 20 | 12 | 6 | 60 | ✓ | | 29,30 |
| 11 5111 045 | • 25 | 12,7 | 6 | 60 | ✓ | | 43,80 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|-------------------|--------------|-------|
| 11 3111 005 | • 3 | 3 | 3 | 38 | | ✓ | 5,70 |
| 11 3111 010 | • 6 | 3 | 6 | 50 | | ✓ | 8,60 |
| 11 3111 015 | • 10 | 5 | 6 | 53 | ✓ | | 11,35 |
| 11 3111 020 | • 12 | 7 | 6 | 55 | ✓ | | 13,70 |
| 11 3111 025 | • 12 | 7 | 8 | 55 | ✓ | | 15,20 |
| 11 3111 030 | • 16 | 8 | 6 | 57 | ✓ | | 18,25 |
| 11 3111 035 | • 16 | 8 | 8 | 57 | ✓ | | 20,20 |
| 11 3111 040 | • 20 | 12 | 6 | 60 | ✓ | | 23,95 |
| 11 3111 045 | • 25 | 12,7 | 6 | 60 | ✓ | | 38,45 |










⊘ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



HP-2

Die am meisten verwendete Einfachverzählung The most widely used single cutting style

ANWENDUNG · APPLICATION














| | | | | | | | | | |
|---|---|---|---|--|---|--|---|---|--|
|  Stahl Steel |  Gehärteter Stahl Hardened steel |  Edelstahl Stainless |  Gusseisen Cast iron |  Titan Titanium |  Cermet Cermet |  Nickel Nickel |  Kupfer, Kupferlegierungen Copper, copper alloys |  Alu Alu |  Kunststoffe GFK/CFK Plastics GRP/CRP |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL
OPTIMAL
✓ GUT
GOOD

- Hohe Zerspanleistung mit guter Oberflächengüte
- Für alle Stahlsorten wie:
 - Gusseisen
 - Stahl < 60 HRC
 - Edelstahl (INOX)
 - Nickelbasis- und Titanlegierungen
- Auch Kupfer, Messing, Bronze

- High cutting action with good surface finish
- For use on all ferrous metals such as:
 - Cast iron
 - Steel < 60 HRC
 - Stainless steel (INOX)
 - Nickel basis and titanium alloy
- Also copper, brass, bronze

Lagerprogramm + Katalogseiten · Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM | WKN | KSJ | KSK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M | N | J | K |
| Art. 11 5000 Art. 11 3000 | Art. 11 5010 Art. 11 3010 | Art. 11 5020 Art. 11 3020 | Art. 11 5030 Art. 11 3030 | Art. 11 5040 Art. 11 3040 | Art. 11 5050 Art. 11 3050 | Art. 11 5060 Art. 11 3060 | Art. 11 5070 Art. 11 3070 | Art. 11 5080 Art. 11 3080 | Art. 11 5090 Art. 11 3090 | Art. 11 5099 Art. 11 3099 | Art. 11 5100 Art. 11 3100 | Art. 11 5110 Art. 11 3110 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| 706 | 706 | 707 | 707 | 708 | 708 | 709 | 709 | 710 | 710 | 711 | 711 | 712 |
| Zylinder Cylinder | Zylinder + Stirnverzählung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Winkel Inverted cone | Kegel 60° Countersink 60° | Kegel 90° Countersink 90° |



BLUE-TEC-beschichtet
BLUE-TEC-coated

Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|------------------|---|---|--|--------------------------------|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm ² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Grobes Zerpanen mit hohem Materialabtrag | 450-600 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 250-350 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Grobes Zerpanen mit hohem Materialabtrag | 250-350 |
| NE-Metalle | Harte NE-Metalle | Bronze, Titan/Titanlegierungen, harte Alulegierungen (hoher Si-Anteil) | Grobes Zerpanen mit hohem Materialabtrag | 250-350 |
| | Hochwarmfeste Werkstoffe | Nickelbasis- und Kobaltbasislegierungen (Triebwerk- und Turbinenbau) | | 300-450 |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/Späroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | Grobes Zerpanen mit hohem Materialabtrag | 450-600 |

| Material groups | | | Application | Cutting speed m/min |
|------------------------|---|---|--|---------------------|
| Steel, cast steel | Non-hardened, non-heat treated steels up to 1200 N/mm ² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Coarse machining with high stock removal | 450-600 |
| | Hardened, heat-treated steels exceeding 1200 N/mm ² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 250-350 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Coarse machining with high stock removal | 250-350 |
| Non-ferrous metals | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard alu-alloys (high Si content) | Coarse machining with high stock removal | 250-350 |
| | High-temperature resistant materials | Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction) | | 300-450 |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Coarse machining with high stock removal | 450-600 |



| Schnittgeschwindigkeit • Cutting speed (m/min) | | | | | | | |
|--|--|--------|--------|--------|--------|--------|--------|
| | 250 | 300 | 350 | 400 | 450 | 500 | 600 |
| ∅ (mm) | Drehzahlen (min ⁻¹) • Rotational speed (rpm) | | | | | | |
| 2 | 40.000 | 48.000 | 56.000 | 64.000 | 72.000 | 80.000 | 95.000 |
| 3 | 27.000 | 32.000 | 37.000 | 42.000 | 48.000 | 53.000 | 64.000 |
| 4 | 20.000 | 24.000 | 28.000 | 32.000 | 36.000 | 40.000 | 48.000 |
| 6 | 13.000 | 16.000 | 19.000 | 21.000 | 24.000 | 27.000 | 32.000 |
| 8 | 10.000 | 12.000 | 14.000 | 16.000 | 18.000 | 20.000 | 24.000 |
| 10 | 8.000 | 10.000 | 11.000 | 13.000 | 14.000 | 16.000 | 19.000 |
| 12 | 7.000 | 8.000 | 9.000 | 11.000 | 12.000 | 13.000 | 16.000 |
| 16 | 5.000 | 6.000 | 7.000 | 8.000 | 9.000 | 10.000 | 12.000 |
| 20 | 4.000 | 5.000 | 6.000 | 6.000 | 7.000 | 8.000 | 10.000 |
| 25 | 3.000 | 4.000 | 4.000 | 5.000 | 6.000 | 6.000 | 8.000 |



11 5000



11 3000

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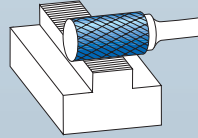
9

Index

A FORM / SHAPE ZYA

Zylinder ohne Stirnverzahnung

Cylindrical without end cut



Schnittdaten
Cutting data

Film
Movie



705



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5000 030 | • 3 | 14 | 3 | 38 | | ✓ | 8,50 |
| 11 5000 060 | • 6 | 13 | 3 | 45 | ✓ | | 13,60 |
| 11 5000 065 | • 6 | 18 | 6 | 50 | | ✓ | 11,50 |
| 11 5000 080 | • 8 | 20 | 6 | 65 | ✓ | | 14,15 |
| 11 5000 090 | • 10 | 20 | 6 | 65 | ✓ | | 16,55 |
| 11 5000 105 | • 12 | 25 | 6 | 70 | ✓ | | 25,40 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3000 030 | • 3 | 14 | 3 | 38 | | ✓ | 6,50 |
| 11 3000 060 | • 6 | 13 | 3 | 45 | ✓ | | 11,60 |
| 11 3000 065 | • 6 | 18 | 6 | 50 | | ✓ | 9,50 |
| 11 3000 080 | • 8 | 20 | 6 | 65 | ✓ | | 12,15 |
| 11 3000 090 | • 10 | 20 | 6 | 65 | ✓ | | 13,25 |
| 11 3000 105 | • 12 | 25 | 6 | 70 | ✓ | | 20,60 |

11 5010

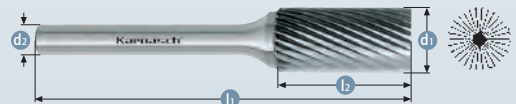
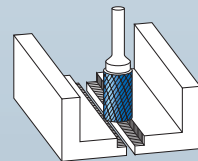


11 3010

B FORM / SHAPE ZYB

Zylinder mit Stirnverzahnung

Cylindrical with end cut



Schnittdaten
Cutting data

Film
Movie



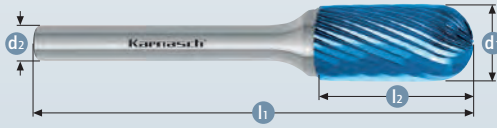
705



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5010 015 | • 3 | 14 | 3 | 38 | | ✓ | 8,65 |
| 11 5010 045 | • 6 | 13 | 3 | 45 | ✓ | | 14,80 |
| 11 5010 050 | • 6 | 18 | 6 | 50 | | ✓ | 12,25 |
| 11 5010 070 | • 6 | 25 | 6 | 50 | | ✓ | 16,85 |
| 11 5010 075 | • 8 | 20 | 6 | 65 | ✓ | | 15,55 |
| 11 5010 085 | • 10 | 20 | 6 | 65 | ✓ | | 17,85 |
| 11 5010 100 | • 12 | 25 | 6 | 70 | ✓ | | 26,50 |

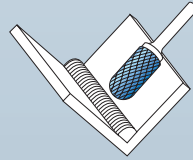
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3010 015 | • 3 | 14 | 3 | 38 | | ✓ | 6,60 |
| 11 3010 045 | • 6 | 13 | 3 | 45 | ✓ | | 12,75 |
| 11 3010 050 | • 6 | 18 | 6 | 50 | | ✓ | 10,20 |
| 11 3010 070 | • 6 | 25 | 6 | 50 | | ✓ | 14,85 |
| 11 3010 075 | • 8 | 20 | 6 | 65 | ✓ | | 13,55 |
| 11 3010 085 | • 10 | 20 | 6 | 65 | ✓ | | 14,55 |
| 11 3010 100 | • 12 | 25 | 6 | 70 | ✓ | | 21,75 |

11 5020



C FORM / SHAPE WRC

Walzenrundform
Ball nosed cylinder

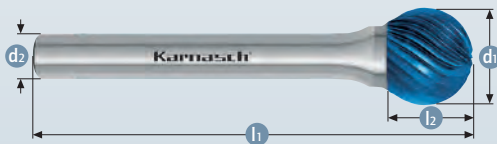


| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 705 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|----|-------------------|--------------|-------|
| 11 5020 022 | • 2,5 | 11 | 3 | 38 | | ✓ | 8,50 |
| 11 5020 025 | • 3 | 14 | 3 | 38 | | ✓ | 8,50 |
| 11 5020 050 | • 6 | 12,7 | 3 | 44 | ✓ | | 12,90 |
| 11 5020 055 | • 6 | 18 | 6 | 50 | | ✓ | 12,95 |
| 11 5020 075 | • 8 | 20 | 6 | 65 | ✓ | | 15,45 |
| 11 5020 085 | • 10 | 20 | 6 | 65 | ✓ | | 17,85 |
| 11 5020 105 | • 12 | 25 | 6 | 70 | ✓ | | 27,70 |

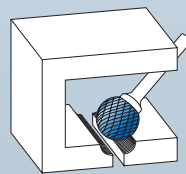
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|----|-------------------|--------------|-------|
| 11 3020 022 | • 2,5 | 11 | 3 | 38 | | ✓ | 3,55 |
| 11 3020 025 | • 3 | 14 | 3 | 38 | | ✓ | 6,50 |
| 11 3020 050 | • 6 | 12,7 | 3 | 44 | ✓ | | 10,85 |
| 11 3020 055 | • 6 | 18 | 6 | 50 | | ✓ | 10,95 |
| 11 3020 075 | • 8 | 20 | 6 | 65 | ✓ | | 13,40 |
| 11 3020 085 | • 10 | 20 | 6 | 65 | ✓ | | 14,60 |
| 11 3020 105 | • 12 | 25 | 6 | 70 | ✓ | | 22,90 |

11 5030



D FORM / SHAPE KUD

Kugel
Ball



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 705 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|-------------------|--------------|-------|
| 11 5030 025 | • 3 | 2,5 | 3 | 38 | | ✓ | 8,50 |
| 11 5030 045 | • 4 | 3,4 | 3 | 38 | | ✓ | 17,95 |
| 11 5030 046 | • 4 | 3,0 | 6 | 50 | | ✓ | 5,75 |
| 11 5030 047 | • 5 | 4,7 | 3 | 38 | | ✓ | 17,80 |
| 11 5030 048 | • 5 | 4,0 | 6 | 50 | | ✓ | 11,95 |
| 11 5030 050 | • 6 | 5,0 | 3 | 38 | ✓ | | 11,70 |
| 11 5030 055 | • 6 | 4,7 | 6 | 50 | | ✓ | 12,05 |
| 11 5030 060 | • 8 | 7,0 | 6 | 52 | ✓ | | 12,85 |
| 11 5030 070 | • 10 | 8,0 | 6 | 54 | ✓ | | 15,40 |
| 11 5030 080 | • 12 | 11,0 | 6 | 56 | ✓ | | 21,05 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|-------------------|--------------|-------|
| 11 3030 025 | • 3 | 2,5 | 3 | 38 | | ✓ | 6,50 |
| 11 3030 045 | • 4 | 3,4 | 3 | 38 | | ✓ | 15,95 |
| 11 3030 047 | • 5 | 4,7 | 3 | 38 | | ✓ | 15,75 |
| 11 3030 048 | • 5 | 4,0 | 6 | 50 | | ✓ | 9,95 |
| 11 3030 050 | • 6 | 5,0 | 3 | 38 | ✓ | | 9,70 |
| 11 3030 055 | • 6 | 4,7 | 6 | 50 | | ✓ | 10,05 |
| 11 3030 060 | • 8 | 7,0 | 6 | 52 | ✓ | | 10,80 |
| 11 3030 070 | • 10 | 8,0 | 6 | 54 | ✓ | | 12,15 |
| 11 3030 080 | • 12 | 11,0 | 6 | 56 | ✓ | | 16,25 |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



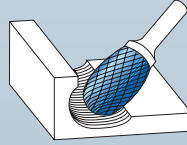
11 5040



E FORM / SHAPE TRE

Tropfen

Oval



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5040 010 | • 3 | 6 | 3 | 38 | | ✓ | 8,50 |
| 11 5040 015 | • 6 | 10 | 3 | 42 | ✓ | ✓ | 12,90 |
| 11 5040 020 | • 6 | 10 | 6 | 50 | | ✓ | 14,35 |
| 11 5040 025 | • 8 | 15 | 6 | 60 | ✓ | | 16,45 |
| 11 5040 030 | • 10 | 16 | 6 | 60 | ✓ | | 18,00 |
| 11 5040 035 | • 12 | 22 | 6 | 67 | ✓ | | 26,30 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3040 010 | • 3 | 6 | 3 | 38 | | ✓ | 3,60 |
| 11 3040 015 | • 6 | 10 | 3 | 42 | ✓ | | 6,05 |
| 11 3040 020 | • 6 | 10 | 6 | 50 | | ✓ | 6,85 |
| 11 3040 025 | • 8 | 15 | 6 | 60 | ✓ | | 8,00 |
| 11 3040 030 | • 10 | 16 | 6 | 60 | ✓ | | 8,15 |
| 11 3040 035 | • 12 | 22 | 6 | 67 | ✓ | | 11,95 |

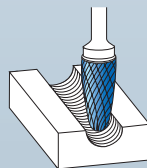
11 5050



F FORM / SHAPE RBF

Rundbogen

Ball nosed tree



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5050 015 | • 3 | 14 | 3 | 38 | | ✓ | 8,50 |
| 11 5050 025 | • 6 | 12 | 3 | 44 | ✓ | | 12,75 |
| 11 5050 030 | • 6 | 18 | 6 | 50 | | ✓ | 13,45 |
| 11 5050 035 | • 8 | 20 | 6 | 65 | ✓ | | 17,45 |
| 11 5050 040 | • 10 | 20 | 6 | 65 | ✓ | | 17,65 |
| 11 5050 050 | • 12 | 25 | 6 | 70 | ✓ | | 26,05 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3050 015 | • 3 | 14 | 3 | 38 | | ✓ | 6,50 |
| 11 3050 025 | • 6 | 12 | 3 | 44 | ✓ | | 10,75 |
| 11 3050 030 | • 6 | 18 | 6 | 50 | | ✓ | 11,45 |
| 11 3050 035 | • 8 | 20 | 6 | 65 | ✓ | | 15,45 |
| 11 3050 040 | • 10 | 20 | 6 | 65 | ✓ | | 14,35 |
| 11 3050 050 | • 12 | 25 | 6 | 70 | ✓ | | 21,30 |

- 1
- 2
- 3
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- 6
- 7
- 8
- 9

11 5060

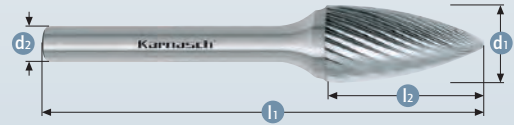
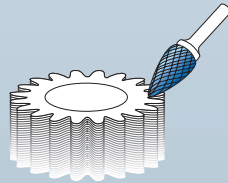


G FORM / SHAPE **SPG**



Spitzbogen

Tree



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 705 | |

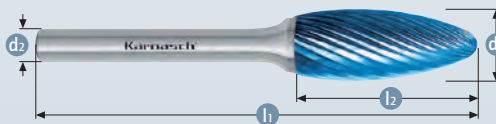
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5060 012 | • 3 | 10 | 3 | 38 | | ✓ | 8,50 |
| 11 5060 015 | • 3 | 14 | 3 | 38 | | ✓ | 8,50 |
| 11 5060 030 | • 6 | 12 | 3 | 44 | ✓ | | 12,70 |
| 11 5060 035 | • 6 | 18 | 6 | 50 | | ✓ | 13,45 |
| 11 5060 040 | • 8 | 20 | 6 | 65 | ✓ | | 15,75 |
| 11 5060 045 | • 10 | 20 | 6 | 65 | ✓ | | 18,45 |
| 11 5060 060 | • 12 | 25 | 6 | 70 | ✓ | | 25,50 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3060 012 | • 3 | 10 | 3 | 38 | | ✓ | 6,50 |
| 11 3060 015 | • 3 | 14 | 3 | 38 | | ✓ | 6,50 |
| 11 3060 030 | • 6 | 12 | 3 | 44 | ✓ | | 10,70 |
| 11 3060 035 | • 6 | 18 | 6 | 50 | | ✓ | 11,45 |
| 11 3060 040 | • 8 | 20 | 6 | 65 | ✓ | | 13,70 |
| 11 3060 045 | • 10 | 20 | 6 | 65 | ✓ | | 15,15 |
| 11 3060 060 | • 12 | 25 | 6 | 70 | ✓ | | 20,70 |

11 5070

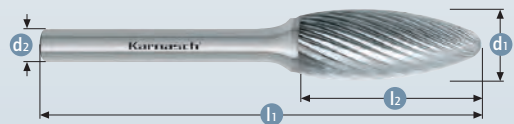
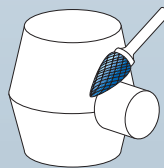


H FORM / SHAPE



Flamme

Flame



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 705 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5070 005 | • 3 | 6 | 3 | 38 | | ✓ | 8,60 |
| 11 5070 015 | • 8 | 20 | 6 | 65 | ✓ | | 17,15 |
| 11 5070 020 | • 10 | 20 | 6 | 65 | ✓ | | 30,50 |
| 11 5070 025 | • 12 | 32 | 6 | 77 | ✓ | | 35,95 |

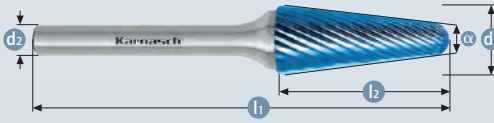
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3070 005 | • 3 | 6 | 3 | 38 | | ✓ | 6,60 |
| 11 3070 015 | • 8 | 20 | 6 | 65 | ✓ | | 15,10 |
| 11 3070 020 | • 10 | 20 | 6 | 65 | ✓ | | 27,20 |
| 11 3070 025 | • 12 | 32 | 6 | 77 | ✓ | | 31,15 |



11 5080

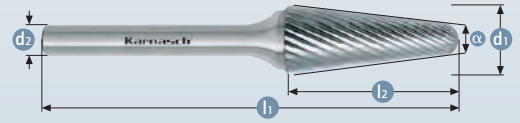
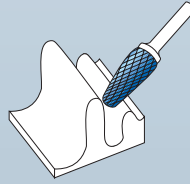


L FORM / SHAPE KEL



Rundkegel

Ball nosed cone



Schnittdaten
Cutting data

Film
Movie



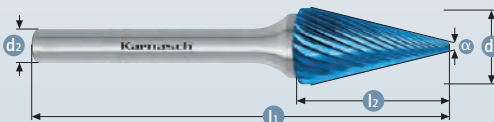
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 5080 010 | • 3 | 14 | 3 | 38 | | ✓ | 8° | 8,50 |
| 11 5080 015 | • 6 | 16 | 3 | 48 | ✓ | | 22° | 13,60 |
| 11 5080 020 | • 6 | 18 | 6 | 50 | | ✓ | 14° | 13,60 |
| 11 5080 025 | • 8 | 25 | 6 | 70 | ✓ | | 14° | 17,30 |
| 11 5080 030 | • 10 | 20 | 6 | 65 | ✓ | | 14° | 23,45 |
| 11 5080 045 | • 12 | 32 | 6 | 77 | ✓ | | 14° | 27,60 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 3080 010 | • 3 | 14 | 3 | 38 | | ✓ | 8° | 6,50 |
| 11 3080 015 | • 6 | 16 | 3 | 48 | ✓ | | 22° | 11,60 |
| 11 3080 020 | • 6 | 18 | 6 | 50 | | ✓ | 14° | 11,55 |
| 11 3080 025 | • 8 | 25 | 6 | 70 | ✓ | | 14° | 15,30 |
| 11 3080 030 | • 10 | 20 | 6 | 65 | ✓ | | 14° | 20,15 |
| 11 3080 045 | • 12 | 32 | 6 | 77 | ✓ | | 14° | 22,80 |

11 5090

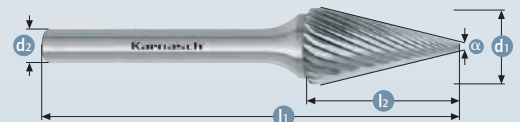
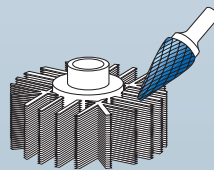


M FORM / SHAPE SKM



Spitzkegel

Cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 5090 015 | • 3 | 11 | 3 | 38 | | ✓ | 14° | 8,50 |
| 11 5090 025 | • 6 | 12 | 3 | 48 | ✓ | | 22° | 12,90 |
| 11 5090 030 | • 6 | 20 | 6 | 50 | | ✓ | 14° | 13,60 |
| 11 5090 040 | • 10 | 20 | 6 | 65 | ✓ | | 28° | 21,65 |
| 11 5090 045 | • 12 | 25 | 6 | 70 | ✓ | | 28° | 26,90 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 3090 015 | • 3 | 11 | 3 | 38 | | ✓ | 14° | 6,50 |
| 11 3090 025 | • 6 | 12 | 3 | 48 | ✓ | | 22° | 10,85 |
| 11 3090 030 | • 6 | 20 | 6 | 50 | | ✓ | 14° | 11,55 |
| 11 3090 040 | • 10 | 20 | 6 | 65 | ✓ | | 28° | 18,40 |
| 11 3090 045 | • 12 | 25 | 6 | 70 | ✓ | | 28° | 22,10 |

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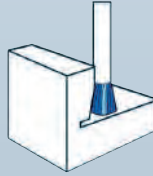
11 5099



N FORM / SHAPE WKN

Winkel

Inverted cone



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 705 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 5099 005 | • 3 | 5 | 3 | 38 | | ✓ | 10° | 8,65 |
| 11 5099 010 | • 6 | 7 | 3 | 39 | ✓ | ✓ | 10° | 12,90 |
| 11 5099 015 | • 6 | 8 | 6 | 50 | | ✓ | 10° | 13,15 |
| 11 5099 020 | • 10 | 10 | 6 | 55 | ✓ | | 13° | 19,40 |
| 11 5099 025 | • 12 | 13 | 6 | 58 | ✓ | | 30° | 27,85 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 3099 005 | • 3 | 5 | 3 | 38 | | ✓ | 10° | 6,60 |
| 11 3099 010 | • 6 | 7 | 3 | 39 | ✓ | | 10° | 10,85 |
| 11 3099 015 | • 6 | 8 | 6 | 50 | | ✓ | 10° | 11,15 |
| 11 3099 020 | • 10 | 10 | 6 | 55 | ✓ | | 13° | 16,10 |
| 11 3099 025 | • 12 | 13 | 6 | 58 | ✓ | | 30° | 23,05 |

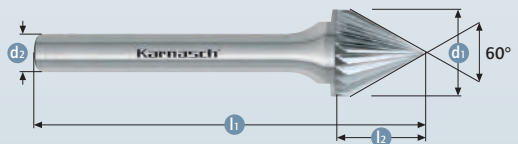
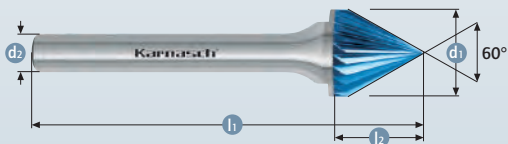
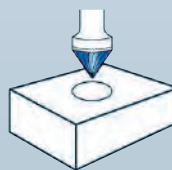
11 5100



J FORM / SHAPE KSJ

Kegel 60°

Countersink 60°



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 705 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5100 005 | • 3 | 3 | 3 | 38 | | ✓ | 8,50 |
| 11 5100 010 | • 6 | 6 | 6 | 50 | | ✓ | 11,95 |
| 11 5100 015 | • 10 | 8 | 6 | 56 | ✓ | | 16,50 |
| 11 5100 020 | • 12 | 11 | 6 | 60 | ✓ | | 20,80 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3100 005 | • 3 | 3 | 3 | 38 | | ✓ | 6,50 |
| 11 3100 010 | • 6 | 6 | 6 | 50 | | ✓ | 9,95 |
| 11 3100 015 | • 10 | 8 | 6 | 56 | ✓ | | 13,20 |
| 11 3100 020 | • 12 | 11 | 6 | 60 | ✓ | | 16,00 |



Index

11 5110

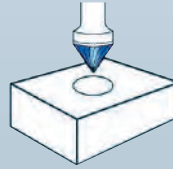


K FORM / SHAPE

KSK

Kegel 90°

Countersink 90°



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|-----|----|----|-------------------|--------------|-------|
| 11 5110 005 | • 3 | 1,5 | 3 | 38 | | ✓ | 8,50 |
| 11 5110 010 | • 6 | 3 | 6 | 50 | | ✓ | 11,95 |
| 11 5110 015 | • 10 | 5 | 6 | 56 | ✓ | | 16,50 |
| 11 5110 020 | • 12 | 7 | 6 | 60 | ✓ | | 20,80 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|-----|----|----|-------------------|--------------|-------|
| 11 3110 005 | • 3 | 1,5 | 3 | 38 | | ✓ | 6,50 |
| 11 3110 010 | • 6 | 3 | 6 | 50 | | ✓ | 9,95 |
| 11 3110 015 | • 10 | 5 | 6 | 56 | ✓ | | 13,20 |
| 11 3110 020 | • 12 | 7 | 6 | 60 | ✓ | | 16,00 |

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HP-4

Feine Kreuzverzahnung

Fine cross cutting style

ANWENDUNG · APPLICATION









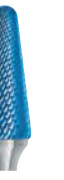


| | | | | | | | | | |
|---|---|---|---|--|---|--|---|---|--|
|  Stahl Steel |  Gehärteter Stahl Hardened steel |  Edelstahl Stainless |  Gusseisen Cast iron |  Titan Titanium |  Cermet Cermet |  Nickel Nickel |  Kupfer, Kupferlegierungen Copper, copper alloys |  Alu Alu |  Kunststoffe GFK/CFK Plastics GRP/CRP |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL
OPTIMAL

✓ GUT
GOOD

- Exzellente Kontrolle (Auch an schwierig zugänglichen Stellen)
 - Ruhiger Lauf
 - Kurze Späne
 - Gute Oberflächengüte
- Mittlere Zerspanleistung
- Für alle Stahlsorten wie:
 - Bis zu extra harten Stählen ca. 70 HRC
 - Gusseisen
 - Edelstahl (INOX)
 - Hochwärmefeste Werkstoffe wie z.B. Nickel-Basis + Kobalt Basislegierungen
- Excellent control (also at difficult to reach positions)
 - Smooth operation
 - Short chips
 - Good surface finish
- Medium cutting action
- For all kinds of steel:
 - Up to extra hard steel approx. 70 HRC
 - Cast iron
 - Stainless steel (INOX)
 - Heat-resistant substances, such as e.g. nickel based + cobalt based alloys

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM | WKN |
|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M | N |
| Art. 11 5002 Art. 11 3002 | Art. 11 5012 Art. 11 3012 | Art. 11 5022 Art. 11 3022 | Art. 11 5032 Art. 11 3032 | Art. 11 5042 Art. 11 3042 | Art. 11 5052 Art. 11 3052 | Art. 11 5062 Art. 11 3062 | Art. 11 5072 Art. 11 3072 | Art. 11 5082 Art. 11 3082 | Art. 11 5092 Art. 11 3092 | Art. 11 5098 Art. 11 3098 |
|  |  |  |  |  |  |  |  |  |  |  |
| 716 | 716 | 717 | 718 | 718 | 719 | 719 | 720 | 720 | 721 | 721 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrund- form Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Winkel Inverted cone |



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Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|------------------|---|---|---|--------------------------------|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm ² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Feines Zerspanen = mittlerer Materialabtrag | 650-750 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 450-600 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Feines Zerspanen = mittlerer Materialabtrag | 450-600 |
| NE-Metalle | Harte NE-Metalle | Bronze, Titan/Titanlegierungen, harte Alulegierungen (hoher Si-Anteil) | Feines Zerspanen = mittlerer Materialabtrag | 450-600 |
| | Hochwarmfeste Werkstoffe | Nickelbasis- und Kobaltbasislegierungen (Triebwerk- und Turbinenbau) | | |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/Späroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | Feines Zerspanen = mittlerer Materialabtrag | 650-750 |

| Material groups | | | Application | Cutting speed m/min |
|------------------------|---|---|---------------------------------------|---------------------|
| Steel, cast steel | Non-hardened, non-heat treated-steels up to 1200 N/mm ² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Fine machining = medium stock removal | 650-750 |
| | Hardened, heat-treated steels exceeding 1200 N/mm ² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 450-600 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Fine machining = medium stock removal | 450-600 |
| Non-ferrous metals | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard alu-alloys (high Si content) | Fine machining = medium stock removal | 450-600 |
| | High-temperature resistant materials | Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction) | | |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Fine machining = medium stock removal | 650-750 |

| Schnittgeschwindigkeit • Cutting speed (m/min) | | | | |
|--|--|--------|---------|---------|
| | 450 | 600 | 650 | 750 |
| ∅ (mm) | Drehzahlen (min ⁻¹) • Rotational speed (rpm) | | | |
| 2 | 72.000 | 95.000 | 104.000 | 120.000 |
| 3 | 48.000 | 64.000 | 68.000 | 80.000 |
| 4 | 36.000 | 48.000 | 52.000 | 60.000 |
| 6 | 24.000 | 32.000 | 34.000 | 40.000 |
| 8 | 18.000 | 24.000 | 26.000 | 30.000 |
| 10 | 14.000 | 19.000 | 21.000 | 24.000 |
| 12 | 12.000 | 16.000 | 18.000 | 21.000 |
| 16 | 9.000 | 12.000 | 14.000 | 17.000 |



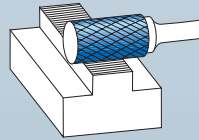
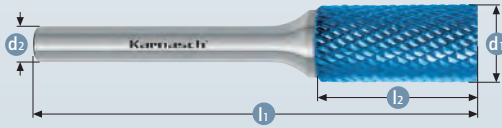
11 5002



A FORM / SHAPE ZYA

Zylinder ohne Stirnverzahnung

Cylinder without end cut



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|----|----|-----|-------------------|--------------|-------|
| 11 5002 015 | • 1,5 | 6 | 3 | 38 | | ✓ | 9,25 |
| 11 5002 025 | • 2 | 11 | 3 | 38 | | ✓ | 9,25 |
| 11 5002 030 | • 3 | 14 | 3 | 38 | | ✓ | 9,25 |
| 11 5002 035 | • 3 | 14 | 3 | 50 | | ✓ | 10,75 |
| 11 5002 040 | • 3 | 14 | 3 | 65 | | ✓ | 12,00 |
| 11 5002 045 | • 3 | 14 | 3 | 75 | | ✓ | 13,15 |
| 11 5002 050 | • 3 | 14 | 3 | 100 | | ✓ | 15,70 |
| 11 5002 055 | • 4 | 14 | 6 | 50 | | ✓ | 13,35 |
| 11 5002 060 | • 6 | 13 | 3 | 45 | ✓ | | 14,80 |
| 11 5002 065 | • 6 | 18 | 6 | 50 | | ✓ | 13,35 |
| 11 5002 080 | • 8 | 20 | 6 | 65 | ✓ | | 16,60 |
| 11 5002 090 | • 10 | 20 | 6 | 65 | ✓ | | 18,75 |
| 11 5002 095 | • 10 | 20 | 6 | 172 | ✓ | | 28,80 |
| 11 5002 100 | • 10 | 25 | 6 | 70 | ✓ | | 19,05 |
| 11 5002 105 | • 12 | 25 | 6 | 70 | ✓ | | 29,15 |
| 11 5002 115 | • 12 | 25 | 8 | 70 | ✓ | | 29,25 |
| 11 5002 120 | • 16 | 25 | 6 | 70 | ✓ | | 36,00 |
| 11 5002 125 | • 16 | 25 | 8 | 70 | ✓ | | 21,00 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|----|----|-----|-------------------|--------------|-------|
| 11 3002 015 | • 1,5 | 6 | 3 | 38 | | ✓ | 3,95 |
| 11 3002 025 | • 2 | 11 | 3 | 38 | | ✓ | 7,25 |
| 11 3002 030 | • 3 | 14 | 3 | 38 | | ✓ | 7,25 |
| 11 3002 035 | • 3 | 14 | 3 | 50 | | ✓ | 4,75 |
| 11 3002 040 | • 3 | 14 | 3 | 65 | | ✓ | 6,05 |
| 11 3002 045 | • 3 | 14 | 3 | 75 | | ✓ | 6,05 |
| 11 3002 050 | • 3 | 14 | 3 | 100 | | ✓ | 7,40 |
| 11 3002 055 | • 4 | 14 | 6 | 50 | | ✓ | 11,30 |
| 11 3002 060 | • 6 | 13 | 3 | 45 | ✓ | | 12,75 |
| 11 3002 065 | • 6 | 18 | 6 | 50 | | ✓ | 11,30 |
| 11 3002 070 | • 6 | 18 | 6 | 100 | ✓ | | 11,95 |
| 11 3002 080 | • 8 | 20 | 6 | 65 | ✓ | | 14,55 |
| 11 3002 090 | • 10 | 20 | 6 | 65 | ✓ | | 15,45 |
| 11 3002 095 | • 10 | 20 | 6 | 172 | ✓ | | 12,05 |
| 11 3002 100 | • 10 | 25 | 6 | 70 | ✓ | | 15,80 |
| 11 3002 105 | • 12 | 25 | 6 | 70 | ✓ | | 24,35 |
| 11 3002 115 | • 12 | 25 | 8 | 70 | ✓ | | 24,45 |
| 11 3002 125 | • 16 | 25 | 8 | 70 | ✓ | | 33,95 |

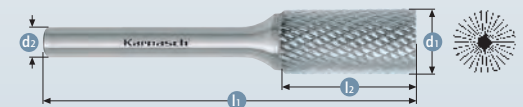
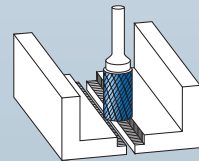
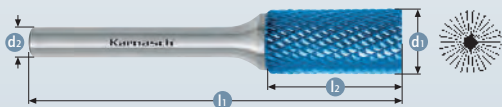
11 5012



B FORM / SHAPE ZYB

Zylinder mit Stirnverzahnung

Cylinder with end cut



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|----|----|-----|-------------------|--------------|-------|
| 11 5012 005 | • 1,5 | 6 | 3 | 38 | | ✓ | 9,80 |
| 11 5012 010 | • 2 | 11 | 3 | 38 | | ✓ | 9,80 |
| 11 5012 015 | • 3 | 14 | 3 | 38 | | ✓ | 9,80 |
| 11 5012 020 | • 3 | 14 | 3 | 50 | | ✓ | 11,65 |
| 11 5012 025 | • 3 | 14 | 3 | 65 | | ✓ | 12,90 |
| 11 5012 030 | • 3 | 14 | 3 | 75 | | ✓ | 14,25 |
| 11 5012 035 | • 3 | 14 | 3 | 100 | | ✓ | 17,45 |
| 11 5012 040 | • 4 | 14 | 6 | 50 | | ✓ | 14,30 |
| 11 5012 045 | • 6 | 13 | 3 | 45 | ✓ | | 16,10 |
| 11 5012 050 | • 6 | 18 | 6 | 50 | | ✓ | 14,30 |
| 11 5012 060 | • 6 | 18 | 6 | 100 | ✓ | | 26,30 |
| 11 5012 075 | • 8 | 20 | 6 | 65 | ✓ | | 18,00 |
| 11 5012 080 | • 8 | 20 | 6 | 170 | ✓ | | 26,55 |
| 11 5012 085 | • 10 | 20 | 6 | 65 | ✓ | | 20,45 |
| 11 5012 090 | • 10 | 20 | 6 | 172 | ✓ | | 31,65 |
| 11 5012 100 | • 12 | 25 | 6 | 70 | ✓ | | 31,65 |
| 11 5012 105 | • 12 | 25 | 6 | 175 | ✓ | | 47,20 |
| 11 5012 110 | • 12 | 25 | 8 | 70 | ✓ | | 31,65 |
| 11 5012 115 | • 16 | 25 | 6 | 70 | ✓ | | 39,10 |
| 11 5012 120 | • 16 | 25 | 8 | 70 | ✓ | | 41,85 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|----|----|-----|-------------------|--------------|-------|
| 11 3012 005 | • 1,5 | 6 | 3 | 38 | | ✓ | 4,25 |
| 11 3012 010 | • 2 | 11 | 3 | 38 | | ✓ | 4,25 |
| 11 3012 015 | • 3 | 14 | 3 | 38 | | ✓ | 7,80 |
| 11 3012 020 | • 3 | 14 | 3 | 50 | | ✓ | 9,65 |
| 11 3012 025 | • 3 | 14 | 3 | 65 | | ✓ | 5,90 |
| 11 3012 030 | • 3 | 14 | 3 | 75 | | ✓ | 6,65 |
| 11 3012 035 | • 3 | 14 | 3 | 100 | | ✓ | 8,55 |
| 11 3012 040 | • 4 | 14 | 6 | 50 | | ✓ | 12,25 |
| 11 3012 045 | • 6 | 13 | 3 | 45 | ✓ | | 14,10 |
| 11 3012 050 | • 6 | 18 | 6 | 50 | | ✓ | 12,25 |
| 11 3012 075 | • 8 | 20 | 6 | 65 | ✓ | | 16,00 |
| 11 3012 085 | • 10 | 20 | 6 | 65 | ✓ | | 17,15 |
| 11 3012 090 | • 10 | 20 | 6 | 172 | ✓ | | 25,10 |
| 11 3012 100 | • 12 | 25 | 6 | 70 | ✓ | | 26,85 |
| 11 3012 105 | • 12 | 25 | 6 | 175 | ✓ | | 21,30 |
| 11 3012 110 | • 12 | 25 | 8 | 70 | ✓ | | 14,60 |

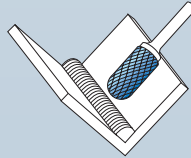
- 1
- 2
- 3
- 4
- 5
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11 5022



C FORM / SHAPE **WRC**

Walzenrundform
Ball nosed cylinder



Schnittdaten
Cutting data

Film
Movie

i

715

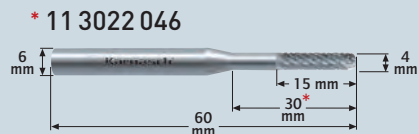
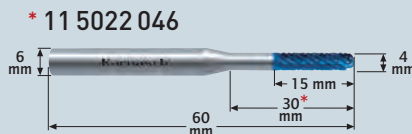
▶

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|---------|----|-----|-------------------|--------------|-------|
| 11 5022 020 | • 2 | 11 | 3 | 38 | | ✓ | 9,25 |
| 11 5022 025 | • 3 | 14 | 3 | 38 | | ✓ | 9,25 |
| 11 5022 030 | • 3 | 14 | 3 | 50 | | ✓ | 12,00 |
| 11 5022 032 | •• 3 | 14 | 3 | 60 | | ✓ | 12,55 |
| 11 5022 035 | •• 3 | 14 | 3 | 75 | | ✓ | 13,15 |
| 11 5022 040 | •• 3 | 14 | 3 | 100 | | ✓ | 16,60 |
| 11 5022 043 | •• 3 | 30*(15) | 6 | 60 | | ✓ | 27,25 |
| 11 5022 045 | • 4 | 16 | 6 | 50 | | ✓ | 15,10 |
| 11 5022 046 | •• 4 | 30*(15) | 6 | 60 | | ✓ | 27,90 |
| 11 5022 050 | • 6 | 12,7 | 3 | 44 | ✓ | | 14,80 |
| 11 5022 055 | •• 6 | 18 | 6 | 50 | | ✓ | 15,10 |
| 11 5022 056 | •• 6 | 18 | 6 | 60 | | ✓ | 18,90 |
| 11 5022 058 | •• 6 | 18 | 6 | 80 | | ✓ | 22,55 |
| 11 5022 060 | •• 6 | 18 | 6 | 100 | ✓ | | 27,60 |
| 11 5022 065 | •• 6 | 18 | 6 | 150 | ✓ | | 39,20 |
| 11 5022 070 | • 6 | 25 | 6 | 50 | | ✓ | 18,95 |
| 11 5022 075 | • 8 | 20 | 6 | 65 | ✓ | | 17,85 |
| 11 5022 080 | • 8 | 20 | 6 | 170 | ✓ | | 22,65 |
| 11 5022 085 | • 10 | 20 | 6 | 65 | ✓ | | 20,70 |
| 11 5022 090 | • 10 | 20 | 6 | 170 | ✓ | | 31,30 |
| 11 5022 095 | • 10 | 25 | 6 | 70 | ✓ | | 24,05 |
| 11 5022 100 | • 12 | 20 | 6 | 65 | ✓ | | 31,15 |
| 11 5022 105 | • 12 | 25 | 6 | 70 | ✓ | | 32,00 |
| 11 5022 110 | • 12 | 25 | 6 | 175 | ✓ | | 46,85 |
| 11 5022 115 | •% 12 | 25 | 8 | 70 | ✓ | | 17,80 |
| 11 5022 120 | • 16 | 25 | 6 | 70 | ✓ | | 39,55 |
| 11 5022 125 | • 16 | 25 | 8 | 70 | ✓ | | 39,55 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|---------|----|-----|-------------------|--------------|-------|
| 11 3022 020 | •% 2 | 11 | 3 | 38 | | ✓ | 3,95 |
| 11 3022 025 | • 3 | 14 | 3 | 38 | | ✓ | 7,25 |
| 11 3022 032 | •• 3 | 14 | 3 | 60 | | ✓ | 10,55 |
| 11 3022 040 | •• 3 | 14 | 3 | 100 | | ✓ | 14,55 |
| 11 3022 043 | •• 3 | 30*(15) | 6 | 60 | | ✓ | 25,25 |
| 11 3022 045 | •• 4 | 16 | 6 | 50 | | ✓ | 13,10 |
| 11 3022 046 | •• 4 | 30*(15) | 6 | 60 | | ✓ | 25,85 |
| 11 3022 050 | • 6 | 12,7 | 3 | 44 | ✓ | | 12,75 |
| 11 3022 055 | •• 6 | 18 | 6 | 50 | | ✓ | 13,10 |
| 11 3022 056 | •• 6 | 18 | 6 | 60 | | ✓ | 16,90 |
| 11 3022 058 | •• 6 | 18 | 6 | 80 | | ✓ | 20,55 |
| 11 3022 060 | •• 6 | 18 | 6 | 100 | ✓ | | 25,55 |
| 11 3022 065 | •% 6 | 18 | 6 | 150 | ✓ | | 19,55 |
| 11 3022 075 | • 8 | 20 | 6 | 65 | ✓ | | 15,85 |
| 11 3022 080 | • 8 | 20 | 6 | 170 | ✓ | | 20,65 |
| 11 3022 085 | • 10 | 20 | 6 | 65 | ✓ | | 17,40 |
| 11 3022 090 | • 10 | 20 | 6 | 170 | ✓ | | 24,75 |
| 11 3022 095 | • 10 | 25 | 6 | 70 | ✓ | | 20,80 |
| 11 3022 100 | •% 12 | 20 | 6 | 65 | ✓ | | 14,30 |
| 11 3022 105 | • 12 | 25 | 6 | 70 | ✓ | | 27,20 |
| 11 3022 110 | •% 12 | 25 | 6 | 175 | ✓ | | 21,10 |
| 11 3022 115 | • 12 | 25 | 8 | 70 | ✓ | | 27,40 |
| 11 3022 125 | •% 16 | 25 | 8 | 70 | ✓ | | 18,90 |

• Frässtifte speziell für Schlüsseldienste siehe Seite 776/777
Burs specially for locksmiths see page 776/777

* Von 30 mm sind 15 mm verzahnt
15 mm by 30 mm are not machined



11 5032

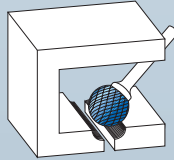


D FORM / SHAPE KUD



Kugel

Ball



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|-----|-------------------|--------------|-------|
| 11 5032 020 | • 2 | 1,8 | 3 | 38 | | ✓ | 9,25 |
| 11 5032 025 | • 3 | 2,5 | 3 | 38 | | ✓ | 9,25 |
| 11 5032 030 | • 3 | 2,5 | 3 | 50 | | ✓ | 11,20 |
| 11 5032 035 | • 3 | 2,5 | 3 | 75 | | ✓ | 12,45 |
| 11 5032 040 | • 3 | 2,5 | 6 | 50 | | ✓ | 14,05 |
| 11 5032 045 | • 4 | 3,4 | 3 | 38 | | ✓ | 20,80 |
| 11 5032 050 | • 6 | 5,0 | 3 | 38 | ✓ | | 12,70 |
| 11 5032 055 | • 6 | 4,7 | 6 | 50 | | ✓ | 14,05 |
| 11 5032 060 | • 8 | 6,0 | 6 | 52 | ✓ | | 14,80 |
| 11 5032 065 | • 8 | 6,0 | 6 | 180 | ✓ | | 21,80 |
| 11 5032 070 | • 10 | 8,0 | 6 | 54 | ✓ | | 17,00 |
| 11 5032 075 | • 10 | 8,0 | 6 | 185 | ✓ | | 26,90 |
| 11 5032 080 | • 12 | 11,0 | 6 | 56 | ✓ | | 23,35 |
| 11 5032 085 | • 12 | 11,0 | 8 | 56 | ✓ | | 23,35 |
| 11 5032 090 | • 12 | 11,0 | 6 | 162 | ✓ | | 35,50 |
| 11 5032 095 | • 16 | 14,0 | 6 | 60 | ✓ | | 28,75 |
| 11 5032 100 | • 16 | 14,0 | 8 | 60 | ✓ | | 31,10 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|-----|-------------------|--------------|-------|
| 11 3032 020 | • 2 | 1,8 | 3 | 38 | | ✓ | 7,25 |
| 11 3032 025 | • 3 | 2,5 | 3 | 38 | | ✓ | 7,25 |
| 11 3032 030 | • 3 | 2,5 | 3 | 50 | | ✓ | 9,20 |
| 11 3032 035 | • 3 | 2,5 | 3 | 75 | | ✓ | 10,45 |
| 11 3032 040 | • 3 | 2,5 | 6 | 50 | ✓ | | 6,55 |
| 11 3032 045 | • 4 | 3,4 | 3 | 38 | | ✓ | 18,75 |
| 11 3032 050 | • 6 | 5,0 | 3 | 38 | ✓ | | 10,70 |
| 11 3032 055 | • 6 | 4,7 | 6 | 50 | | ✓ | 12,00 |
| 11 3032 060 | • 8 | 6,0 | 6 | 52 | ✓ | | 12,75 |
| 11 3032 065 | • 8 | 6,0 | 6 | 180 | ✓ | | 18,60 |
| 11 3032 070 | • 10 | 8,0 | 6 | 54 | ✓ | | 13,70 |
| 11 3032 075 | • 10 | 8,0 | 6 | 185 | ✓ | | 11,05 |
| 11 3032 080 | • 12 | 11,0 | 6 | 56 | ✓ | | 18,55 |
| 11 3032 085 | • 12 | 11,0 | 8 | 56 | ✓ | | 10,05 |
| 11 3032 090 | • 12 | 11,0 | 6 | 162 | ✓ | | 27,50 |
| 11 3032 095 | • 16 | 14,0 | 6 | 60 | ✓ | | 24,20 |
| 11 3032 100 | • 16 | 14,0 | 8 | 60 | ✓ | | 14,30 |

11 5042

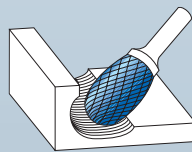


E FORM / SHAPE TRE



Tropfen

Oval



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5042 010 | • 3 | 6 | 3 | 38 | | ✓ | 9,25 |
| 11 5042 015 | • 6 | 10 | 3 | 42 | ✓ | | 14,80 |
| 11 5042 020 | • 6 | 10 | 6 | 50 | | ✓ | 16,75 |
| 11 5042 025 | • 8 | 15 | 6 | 60 | ✓ | | 17,95 |
| 11 5042 030 | • 10 | 16 | 6 | 60 | ✓ | | 20,70 |
| 11 5042 035 | • 12 | 22 | 6 | 67 | ✓ | | 30,30 |
| 11 5042 040 | • 12 | 22 | 8 | 67 | ✓ | | 30,30 |
| 11 5042 045 | • 16 | 25 | 6 | 70 | ✓ | | 40,45 |
| 11 5042 050 | • 16 | 25 | 8 | 70 | ✓ | | 21,95 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3042 010 | • 3 | 6 | 3 | 38 | | ✓ | 7,25 |
| 11 3042 015 | • 6 | 10 | 3 | 42 | ✓ | | 12,75 |
| 11 3042 020 | • 6 | 10 | 6 | 50 | | ✓ | 14,75 |
| 11 3042 025 | • 8 | 15 | 6 | 60 | ✓ | | 15,95 |
| 11 3042 030 | • 10 | 16 | 6 | 60 | ✓ | | 17,40 |
| 11 3042 035 | • 12 | 22 | 6 | 67 | ✓ | | 25,50 |
| 11 3042 040 | • 12 | 22 | 8 | 67 | ✓ | | 13,85 |
| 11 3042 045 | • 16 | 25 | 6 | 70 | ✓ | | 19,35 |
| 11 3042 050 | • 16 | 25 | 8 | 70 | ✓ | | 19,35 |



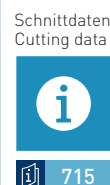
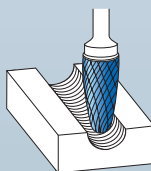
11 5052



F FORM / SHAPE RBF



Rundbogen
Ball nosed tree



715

Film Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|-----|----------------|-----------|-------|
| 11 5052 010 | • 3 | 8 | 3 | 38 | | ✓ | 9,25 |
| 11 5052 015 | • 3 | 14 | 3 | 38 | | ✓ | 9,25 |
| 11 5052 020 | • 3 | 14 | 3 | 50 | | ✓ | 12,00 |
| 11 5052 025 | • 6 | 12 | 3 | 44 | ✓ | | 14,80 |
| 11 5052 030 | • 6 | 18 | 6 | 50 | | ✓ | 15,75 |
| 11 5052 035 | • 8 | 20 | 6 | 65 | ✓ | | 19,05 |
| 11 5052 040 | • 10 | 20 | 6 | 65 | ✓ | | 21,05 |
| 11 5052 045 | • 10 | 20 | 6 | 170 | ✓ | | 30,80 |
| 11 5052 050 | • 12 | 25 | 6 | 70 | ✓ | | 29,55 |
| 11 5052 055 | • 12 | 25 | 8 | 70 | ✓ | | 29,55 |
| 11 5052 060 | • 12 | 25 | 6 | 175 | ✓ | | 43,65 |
| 11 5052 065 | • 16 | 25 | 6 | 70 | ✓ | | 39,15 |
| 11 5052 070 | • 16 | 25 | 8 | 80 | ✓ | | 21,25 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|-----|----------------|-----------|-------|
| 11 3052 010 | • 3 | 8 | 3 | 38 | | ✓ | 4,00 |
| 11 3052 015 | • 3 | 14 | 3 | 38 | | ✓ | 7,25 |
| 11 3052 020 | • 3 | 14 | 3 | 50 | | ✓ | 5,40 |
| 11 3052 025 | • 6 | 12 | 3 | 44 | ✓ | | 12,75 |
| 11 3052 030 | • 6 | 18 | 6 | 50 | | ✓ | 13,70 |
| 11 3052 035 | • 8 | 20 | 6 | 65 | ✓ | | 17,05 |
| 11 3052 040 | • 10 | 20 | 6 | 65 | ✓ | | 17,80 |
| 11 3052 045 | • 10 | 20 | 6 | 170 | ✓ | | 24,20 |
| 11 3052 050 | • 12 | 25 | 6 | 70 | ✓ | | 24,80 |
| 11 3052 055 | • 12 | 25 | 8 | 70 | ✓ | | 13,45 |
| 11 3052 060 | • 12 | 25 | 6 | 175 | ✓ | | 35,60 |
| 11 3052 065 | • 16 | 25 | 6 | 70 | ✓ | | 34,40 |
| 11 3052 070 | • 16 | 25 | 8 | 80 | ✓ | | 18,70 |

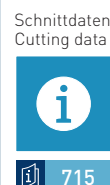
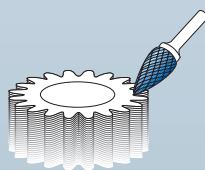
11 5062



G FORM / SHAPE SPG



Spitzbogen
Tree



715

Film Movie



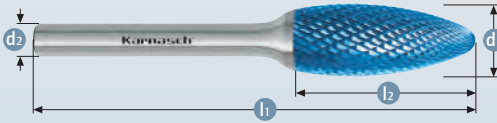
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|-----|----------------|-----------|-------|
| 11 5062 010 | • 3 | 6 | 3 | 38 | | ✓ | 9,25 |
| 11 5062 015 | • 3 | 14 | 3 | 38 | | ✓ | 9,25 |
| 11 5062 020 | • 3 | 14 | 3 | 50 | | ✓ | 10,90 |
| 11 5062 025 | • 3 | 14 | 3 | 75 | | ✓ | 12,95 |
| 11 5062 030 | • 6 | 12 | 3 | 44 | ✓ | | 14,80 |
| 11 5062 035 | • 6 | 18 | 6 | 50 | | ✓ | 15,75 |
| 11 5062 040 | • 8 | 20 | 6 | 65 | ✓ | | 18,45 |
| 11 5062 045 | • 10 | 20 | 6 | 65 | ✓ | | 21,50 |
| 11 5062 050 | • 10 | 20 | 6 | 170 | ✓ | | 17,50 |
| 11 5062 055 | • 12 | 20 | 6 | 65 | ✓ | | 29,20 |
| 11 5062 060 | • 12 | 25 | 6 | 70 | ✓ | | 29,20 |
| 11 5062 065 | • 12 | 25 | 8 | 70 | ✓ | | 29,20 |
| 11 5062 070 | • 12 | 25 | 6 | 175 | ✓ | | 43,25 |
| 11 5062 075 | • 12 | 30 | 6 | 75 | ✓ | | 17,60 |
| 11 5062 080 | • 12 | 30 | 8 | 75 | ✓ | | 17,20 |
| 11 5062 085 | • 16 | 25 | 6 | 70 | ✓ | | 39,60 |
| 11 5062 090 | • 16 | 25 | 8 | 70 | ✓ | | 23,10 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|-----|----------------|-----------|-------|
| 11 3062 010 | • 3 | 6 | 3 | 38 | | ✓ | 3,95 |
| 11 3062 015 | • 3 | 14 | 3 | 38 | | ✓ | 7,25 |
| 11 3062 020 | • 3 | 14 | 3 | 50 | | ✓ | 4,85 |
| 11 3062 025 | • 3 | 14 | 3 | 75 | | ✓ | 10,95 |
| 11 3062 030 | • 6 | 12 | 3 | 44 | ✓ | | 12,75 |
| 11 3062 035 | • 6 | 18 | 6 | 50 | | ✓ | 13,70 |
| 11 3062 040 | • 8 | 20 | 6 | 65 | ✓ | | 16,40 |
| 11 3062 045 | • 10 | 20 | 6 | 65 | ✓ | | 18,25 |
| 11 3062 050 | • 10 | 20 | 6 | 170 | ✓ | | 25,75 |
| 11 3062 055 | • 12 | 20 | 6 | 65 | ✓ | | 13,25 |
| 11 3062 060 | • 12 | 25 | 6 | 70 | ✓ | | 24,40 |
| 11 3062 065 | • 12 | 25 | 8 | 70 | ✓ | | 13,25 |
| 11 3062 070 | • 12 | 25 | 6 | 175 | ✓ | | 35,25 |
| 11 3062 075 | • 12 | 30 | 6 | 75 | ✓ | | 14,65 |
| 11 3062 080 | • 12 | 30 | 8 | 75 | ✓ | | 14,65 |
| 11 3062 085 | • 16 | 25 | 6 | 70 | ✓ | | 18,90 |
| 11 3062 090 | • 16 | 25 | 8 | 70 | ✓ | | 20,50 |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



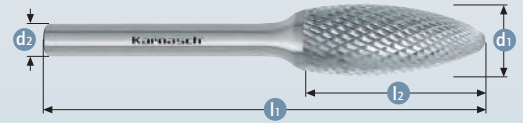
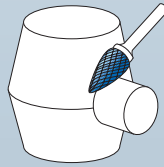
11 5072



H FORM / SHAPE

Flamme

Flame



Schnittdaten
Cutting data

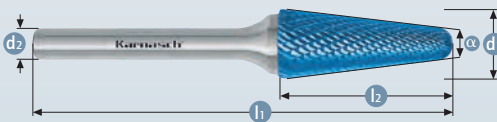
Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5072 005 | • 3 | 6 | 3 | 38 | | ✓ | 9,25 |
| 11 5072 010 | • 6 | 14 | 6 | 60 | | ✓ | 18,25 |
| 11 5072 015 | • 8 | 20 | 6 | 65 | ✓ | | 19,75 |
| 11 5072 020 | • 10 | 20 | 6 | 65 | ✓ | | 33,40 |
| 11 5072 025 | • 12 | 32 | 6 | 77 | ✓ | | 39,15 |
| 11 5072 030 | • 12 | 32 | 8 | 77 | ✓ | | 39,15 |
| 11 5072 035 | • 16 | 36 | 6 | 82 | ✓ | | 55,85 |
| 11 5072 040 | • 16 | 36 | 8 | 82 | ✓ | | 33,35 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3072 005 | • 3 | 6 | 3 | 38 | | ✓ | 7,25 |
| 11 3072 010 | • 6 | 14 | 6 | 60 | | ✓ | 16,20 |
| 11 3072 015 | • 8 | 20 | 6 | 65 | ✓ | | 17,75 |
| 11 3072 020 | • 10 | 20 | 6 | 65 | ✓ | | 30,10 |
| 11 3072 025 | • 12 | 32 | 6 | 77 | ✓ | | 34,40 |
| 11 3072 030 | • 12 | 32 | 8 | 77 | ✓ | | 18,70 |
| 11 3072 035 | • 16 | 36 | 6 | 82 | ✓ | | 27,75 |
| 11 3072 040 | • 16 | 36 | 8 | 82 | ✓ | | 30,10 |

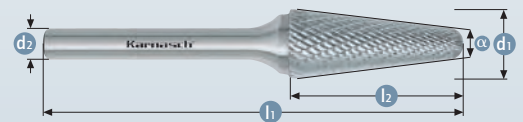
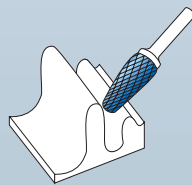
11 5082



L FORM / SHAPE KEL

Rundkegel

Ball nosed cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|-----|-------------------|--------------|-----|-------|
| 11 5082 005 | • 3 | 10 | 3 | 38 | | ✓ | 10° | 9,25 |
| 11 5082 010 | • 3 | 14 | 3 | 38 | | ✓ | 8° | 9,25 |
| 11 5082 015 | • 6 | 16 | 3 | 48 | ✓ | | 22° | 14,80 |
| 11 5082 020 | • 6 | 18 | 6 | 50 | ✓ | | 14° | 16,05 |
| 11 5082 025 | • 8 | 25 | 6 | 70 | ✓ | | 14° | 20,20 |
| 11 5082 030 | • 10 | 20 | 6 | 65 | ✓ | | 14° | 25,00 |
| 11 5082 035 | • 10 | 30 | 6 | 75 | ✓ | | 14° | 25,00 |
| 11 5082 040 | • 10 | 30 | 6 | 176 | ✓ | | 14° | 37,55 |
| 11 5082 045 | • 12 | 32 | 6 | 77 | ✓ | | 14° | 30,00 |
| 11 5082 050 | • 12 | 32 | 8 | 77 | ✓ | | 14° | 30,00 |
| 11 5082 055 | • 12 | 32 | 6 | 182 | ✓ | | 14° | 49,30 |
| 11 5082 060 | • 16 | 33 | 6 | 78 | ✓ | | 14° | 43,65 |
| 11 5082 065 | • 16 | 33 | 8 | 78 | ✓ | | 14° | 43,65 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|-----|-------------------|--------------|-----|-------|
| 11 3082 010 | • 3 | 14 | 3 | 38 | | ✓ | 8° | 7,25 |
| 11 3082 015 | • 6 | 16 | 3 | 48 | ✓ | | 22° | 12,75 |
| 11 3082 020 | • 6 | 18 | 6 | 50 | ✓ | | 14° | 7,80 |
| 11 3082 025 | • 8 | 25 | 6 | 70 | ✓ | | 14° | 18,15 |
| 11 3082 030 | • 10 | 20 | 6 | 65 | ✓ | | 14° | 21,75 |
| 11 3082 035 | • 10 | 30 | 6 | 75 | ✓ | | 14° | 21,75 |
| 11 3082 040 | • 10 | 30 | 6 | 176 | ✓ | | 14° | 17,15 |
| 11 3082 045 | • 12 | 32 | 6 | 77 | ✓ | | 14° | 25,25 |
| 11 3082 050 | • 12 | 32 | 8 | 77 | ✓ | | 14° | 25,25 |
| 11 3082 055 | • 12 | 32 | 6 | 182 | ✓ | | 14° | 22,45 |
| 11 3082 060 | • 16 | 33 | 6 | 78 | ✓ | | 14° | 21,10 |
| 11 3082 065 | • 16 | 33 | 8 | 78 | ✓ | | 14° | 21,10 |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

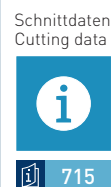
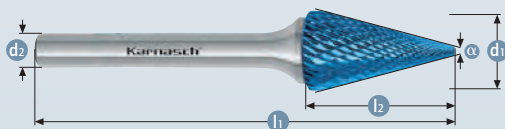
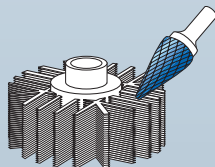
11 5092



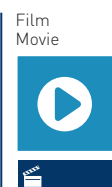
M FORM / SHAPE **SKM**

Spitzkegel

Cone



715



Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|----------------|-----------|-----|-------|
| 11 5092 010 | ● 3 | 8 | 3 | 38 | | ✓ | 18° | 9,25 |
| 11 5092 015 | ● 3 | 11 | 3 | 38 | | ✓ | 14° | 9,25 |
| 11 5092 020 | ● 3 | 15 | 3 | 38 | | ✓ | 10° | 9,25 |
| 11 5092 025 | ● 6 | 12 | 3 | 48 | ✓ | | 22° | 14,80 |
| 11 5092 030 | ● 6 | 20 | 6 | 50 | | ✓ | 14° | 16,05 |
| 11 5092 035 | ● 8 | 18 | 6 | 63 | ✓ | | 13° | 18,35 |
| 11 5092 040 | ● 10 | 20 | 6 | 65 | ✓ | | 28° | 23,55 |
| 11 5092 045 | ● 12 | 25 | 6 | 70 | ✓ | | 28° | 29,20 |
| 11 5092 055 | ● 16 | 26 | 6 | 74 | ✓ | | 33° | 41,30 |
| 11 5092 060 | ● 16 | 26 | 8 | 74 | ✓ | | 33° | 22,40 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|----------------|-----------|-----|-------|
| 11 3092 010 | ● 3 | 8 | 3 | 38 | | ✓ | 18° | 7,25 |
| 11 3092 015 | ● 3 | 11 | 3 | 38 | | ✓ | 14° | 7,25 |
| 11 3092 020 | ● 3 | 15 | 3 | 38 | | ✓ | 10° | 7,25 |
| 11 3092 025 | ● 6 | 12 | 3 | 48 | ✓ | | 22° | 12,75 |
| 11 3092 030 | ● 6 | 20 | 6 | 50 | | ✓ | 14° | 14,05 |
| 11 3092 035 | ● 8 | 18 | 6 | 63 | ✓ | | 13° | 16,35 |
| 11 3092 040 | ● 10 | 20 | 6 | 65 | ✓ | | 28° | 20,25 |
| 11 3092 045 | ● 12 | 25 | 6 | 70 | ✓ | | 28° | 24,40 |
| 11 3092 050 | ● 12 | 25 | 8 | 70 | ✓ | | 28° | 13,25 |
| 11 3092 055 | ● 16 | 26 | 6 | 74 | ✓ | | 33° | 19,80 |
| 11 3092 060 | ● 16 | 26 | 8 | 74 | ✓ | | 33° | 19,80 |

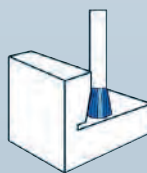
11 5098



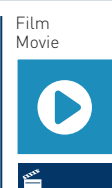
N FORM / SHAPE **WKN**

Winkel

Inverted cone



715



Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|----------------|-----------|-----|-------|
| 11 5098 015 | ● 6 | 8 | 6 | 50 | | ✓ | 10° | 17,10 |
| 11 5098 020 | ● 10 | 10 | 6 | 55 | ✓ | | 13° | 21,25 |
| 11 5098 025 | ● 12 | 13 | 6 | 58 | ✓ | | 30° | 31,95 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|----------------|-----------|-----|-------|
| 11 3098 015 | ● 6 | 8 | 6 | 50 | | ✓ | 10° | 15,10 |
| 11 3098 020 | ● 10 | 10 | 6 | 55 | ✓ | | 13° | 17,95 |
| 11 3098 025 | ● 12 | 13 | 6 | 58 | ✓ | | 30° | 27,15 |

● Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.













Index

HP-7

Für grobe Zerspantung und höchsten Materialabtrag von:
For coarse cutting and highest material removal from:












ANWENDUNG · APPLICATION

| | | | | | | | | | |
|---|---|---|---|--|---|--|---|---|--|
|  Stahl Steel |  Gehärteter Stahl Hardened steel |  Edelstahl Stainless |  Gusseisen Cast iron |  Titan Titanium |  Cermet Cermet |  Nickel Nickel |  Kupfer, Kupferlegierungen Copper, copper alloys |  Alu Alu |  Kunststoffe GFK/CFK Plastics GRP/CRP |
|---|---|---|---|--|---|--|---|---|--|

✓ OPTIMAL
OPTIMAL
✓ GUT
GOOD

- Alulegierungen
- Leichtmetalle
- Weiche Buntmetalle (NE-Metalle)
- Kunststoffe
- Faserverstärkte Kunststoffe GFK/CFK
- Aluminum alloy
- Light metals
- Soft copper and copper alloys (non-ferrous metals)
- Plastics
- Fibre-reinforced plastic (GFK/CFK)

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM | MINI-ALU |
|---|---|---|---|---|---|---|--|---|---|--|
| A | B | C | D | E | F | G | H | L | M | |
| Art. 11 5005 Art. 11 3005 | Art. 11 5015 Art. 11 3015 | Art. 11 5025 Art. 11 3025 | Art. 11 5035 Art. 11 3035 | Art. 11 5045 Art. 11 3045 | Art. 11 5055 Art. 11 3055 | Art. 11 5065 Art. 11 3065 | Art. 11 5075 Art. 11 3075 | Art. 11 5085 Art. 11 3085 | Art. 11 5095 Art. 11 3095 | |
|  |  |  |  |  |  |  |  |  |  |  |
| 724 | 724 | 725 | 725 | 726 | 726 | 727 | 727 | 728 | 728 | 729 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Minifrässtifte in feiner Aluverzahnung Mini-burrs in Alu cutting style |



BLACK-TEC-beschichtet
BLACK-TEC-coated

Karnasch BLACK-TEC-Beschichtung wurde speziell für NE-Metalle entwickelt (Verzahnung HP-7) hervorragende Reib- und Gleiteigenschaften verringern die Bildung von Aufbauschneiden.

Karnasch BLACK-TEC coating is specifically designed for non-ferrous metals (Cut HP-7). Low friction and excellent chip clearance characteristics reduce clogging of the flutes.

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|-------------------------------|---|---|--|--------------------------------|
| NE-Metalle | Weiche NE- Metalle | Alulegierungen, Messing, Kupfer, Zink | Grobes Zerspanen = Hoher Materialabtrag | 600 - 1100 |
| | | | Feines Zerspanen = Geringer Materialabtrag | 900 - 1100 |
| | Harte NE- Metalle | Bronze, Titan, harte Alulegierungen (hoher Si-Anteil) | Grobes Zerspanen = Hoher Materialabtrag | 600 - 1100 |
| | | | Feines Zerspanen = Geringer Materialabtrag | 900 - 1100 |
| Kunststoff, andere Werkstoffe | Faserverstärkte Kunststoffe (GFK/CFK) thermoplastische Kunststoffe, Hartgummi | Grobes Zerspanen = Hoher Materialabtrag | 500 - 1100 | |
| | | Feines Zerspanen = Geringer Materialabtrag | 500 - 1100 | |

| Material groups | | | Application | Cutting speed m/min |
|---------------------------|--|---|---------------------------------------|---------------------|
| Non-ferrous metals | Soft non-ferrous metals | Alu alloys, brass copper, zinc | Coarse machining = high stock removal | 600 - 1100 |
| | | | Fine machining = low stock removal | 900 - 1100 |
| | Hard non-ferrous metals | Bronze, titanium, hard aluminum alloys, (high Si content) | Coarse machining = high stock removal | 600 - 1100 |
| | | | Fine machining = low stock removal | 900 - 1100 |
| Plastics, other materials | Fibre-reinforced plastic (GFK/CFK) thermoplastics, hard rubber | Coarse machining = high stock removal | 500 - 1100 | |
| | | Fine machining = low stock removal | 500 - 1100 | |



| Schnittgeschwindigkeit • Cutting speed (m/min) | | | | |
|--|--|--------|---------|---------|
| | 500 | 600 | 900 | 1100 |
| ∅ (mm) | Drehzahlen (min ⁻¹) • Rotational speed (rpm) | | | |
| 2 | 80.000 | 95.000 | 143.000 | 175.000 |
| 3 | 53.000 | 64.000 | 95.000 | 116.000 |
| 4 | 40.000 | 48.000 | 72.000 | 88.000 |
| 6 | 27.000 | 32.000 | 48.000 | 59.000 |
| 8 | 20.000 | 24.000 | 36.000 | 44.000 |
| 10 | 16.000 | 19.000 | 29.000 | 35.000 |
| 12 | 13.000 | 16.000 | 24.000 | 30.000 |
| 16 | 10.000 | 12.000 | 18.000 | 22.000 |
| 20 | 8.000 | 10.000 | 14.000 | 17.000 |
| 25 | 6.000 | 8.000 | 11.000 | 13.500 |



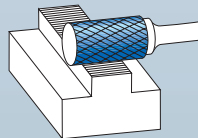
11 5005



A FORM / SHAPE ZYA

Zylinder ohne Stirnverzahnung

Cylinder without end cut



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5005 030 | • 3 | 14 | 3 | 38 | | ✓ | 12,30 |
| 11 5005 060 | • 6 | 13 | 3 | 45 | ✓ | | 20,65 |
| 11 5005 065 | • 6 | 18 | 6 | 50 | | ✓ | 17,25 |
| 11 5005 080 | • 8 | 20 | 6 | 65 | ✓ | | 21,75 |
| 11 5005 090 | • 10 | 20 | 6 | 65 | ✓ | | 25,45 |
| 11 5005 105 | • 12 | 25 | 6 | 70 | ✓ | | 36,20 |
| 11 5005 120 | • 16 | 25 | 6 | 70 | ✓ | | 42,15 |
| 11 5005 125 | • 16 | 25 | 8 | 70 | ✓ | | 24,20 |
| 11 5005 130 | • 20 | 25 | 6 | 70 | ✓ | | 60,70 |
| 11 5005 135 | • 20 | 25 | 8 | 70 | ✓ | | 34,00 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3005 030 | • 3 | 14 | 3 | 38 | | ✓ | 8,85 |
| 11 3005 060 | • 6 | 13 | 3 | 45 | ✓ | | 15,95 |
| 11 3005 065 | • 6 | 18 | 6 | 50 | | ✓ | 12,75 |
| 11 3005 080 | • 8 | 20 | 6 | 65 | ✓ | | 17,05 |
| 11 3005 090 | • 10 | 20 | 6 | 65 | ✓ | | 19,15 |
| 11 3005 105 | • 12 | 25 | 6 | 70 | ✓ | | 28,40 |
| 11 3005 120 | • 16 | 25 | 6 | 70 | ✓ | | 34,40 |
| 11 3005 125 | • 16 | 25 | 8 | 70 | ✓ | | 20,10 |
| 11 3005 130 | • 20 | 25 | 6 | 70 | ✓ | | 47,25 |
| 11 3005 135 | • 20 | 25 | 8 | 70 | ✓ | | 26,90 |
| 11 3005 140 | • 25 | 25 | 6 | 70 | ✓ | | 89,00 |

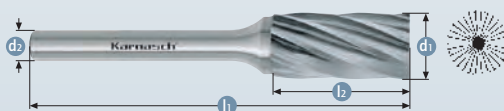
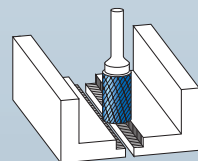
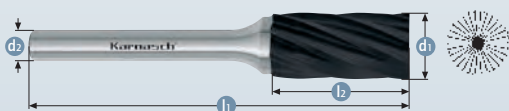
11 5015



B FORM / SHAPE ZYB

Zylinder mit Stirnverzahnung

Cylinder with end cut



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|--------|
| 11 5015 015 | • 3 | 14 | 3 | 38 | | ✓ | 13,25 |
| 11 5015 045 | • 6 | 13 | 3 | 45 | ✓ | | 23,10 |
| 11 5015 050 | • 6 | 18 | 6 | 50 | | ✓ | 18,85 |
| 11 5015 075 | • 8 | 20 | 6 | 65 | ✓ | | 23,40 |
| 11 5015 085 | • 10 | 20 | 6 | 65 | ✓ | | 27,40 |
| 11 5015 100 | • 12 | 25 | 6 | 70 | ✓ | | 38,60 |
| 11 5015 110 | • 12 | 25 | 8 | 70 | ✓ | | 40,90 |
| 11 5015 115 | • 16 | 25 | 6 | 70 | ✓ | | 45,55 |
| 11 5015 120 | • 16 | 25 | 8 | 70 | ✓ | | 48,20 |
| 11 5015 125 | • 20 | 25 | 6 | 70 | ✓ | | 65,40 |
| 11 5015 130 | • 20 | 25 | 8 | 70 | ✓ | | 36,60 |
| 11 5015 135 | • 25 | 25 | 6 | 70 | ✓ | | 115,40 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|--------|
| 11 3015 015 | • 3 | 14 | 3 | 38 | | ✓ | 9,80 |
| 11 3015 045 | • 6 | 13 | 3 | 45 | ✓ | | 18,40 |
| 11 3015 050 | • 6 | 18 | 6 | 50 | | ✓ | 14,15 |
| 11 3015 075 | • 8 | 20 | 6 | 65 | ✓ | | 18,70 |
| 11 3015 085 | • 10 | 20 | 6 | 65 | ✓ | | 21,10 |
| 11 3015 100 | • 12 | 25 | 6 | 70 | ✓ | | 30,85 |
| 11 3015 110 | • 12 | 25 | 8 | 70 | ✓ | | 33,15 |
| 11 3015 115 | • 16 | 25 | 6 | 70 | ✓ | | 37,80 |
| 11 3015 120 | • 16 | 25 | 8 | 70 | ✓ | | 40,45 |
| 11 3015 125 | • 20 | 25 | 6 | 70 | ✓ | | 51,95 |
| 11 3015 130 | • 20 | 25 | 8 | 70 | ✓ | | 29,50 |
| 11 3015 135 | • 25 | 25 | 6 | 70 | ✓ | | 101,90 |

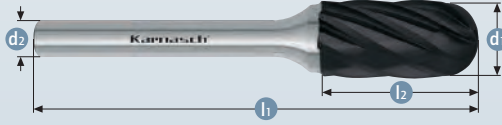
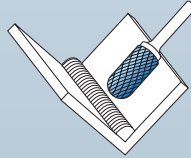


11 5025



C FORM / SHAPE WRC

Walzenrundform
Ball nosed cylinder



Schnittdaten Cutting data [i](#) 723

Film Movie [▶](#)

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|----------------|-----------|-------|
| 11 5025 020 | • 2 | 11 | 3 | 38 | | ✓ | 12,30 |
| 11 5025 025 | • 3 | 14 | 3 | 38 | | ✓ | 12,30 |
| 11 5025 050 | • 6 | 12,7 | 3 | 44 | ✓ | | 21,25 |
| 11 5025 055 | • 6 | 18 | 6 | 50 | | ✓ | 19,00 |
| 11 5025 075 | • 8 | 20 | 6 | 65 | ✓ | | 26,55 |
| 11 5025 085 | • 10 | 20 | 6 | 65 | ✓ | | 25,45 |
| 11 5025 100 | • 12 | 20 | 6 | 65 | ✓ | | 40,50 |
| 11 5025 105 | • 12 | 25 | 6 | 70 | ✓ | | 35,80 |
| 11 5025 120 | • 16 | 25 | 6 | 70 | ✓ | | 54,10 |
| 11 5025 125 | • 16 | 25 | 8 | 70 | ✓ | | 54,10 |
| 11 5025 130 | • 20 | 25 | 6 | 70 | ✓ | | 71,75 |
| 11 5025 135 | • 20 | 25 | 8 | 70 | ✓ | | 38,75 |

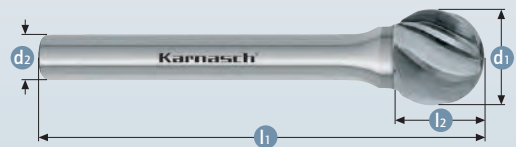
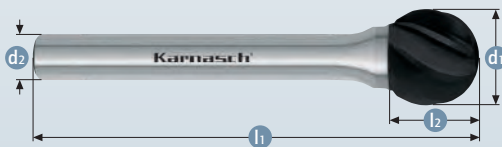
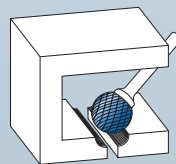
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|----------------|-----------|-------|
| 11 3025 020 | • 2 | 11 | 3 | 38 | | ✓ | 8,85 |
| 11 3025 025 | • 3 | 14 | 3 | 38 | | ✓ | 8,85 |
| 11 3025 050 | • 6 | 12,7 | 3 | 44 | ✓ | | 16,55 |
| 11 3025 055 | • 6 | 18 | 6 | 50 | | ✓ | 14,30 |
| 11 3025 075 | • 8 | 20 | 6 | 65 | ✓ | | 21,85 |
| 11 3025 085 | • 10 | 20 | 6 | 65 | ✓ | | 19,15 |
| 11 3025 100 | • 12 | 20 | 6 | 65 | ✓ | | 32,75 |
| 11 3025 105 | • 12 | 25 | 6 | 70 | ✓ | | 28,05 |
| 11 3025 115 | • 12 | 25 | 8 | 70 | ✓ | | 30,85 |
| 11 3025 120 | • 16 | 25 | 6 | 70 | ✓ | | 46,35 |
| 11 3025 125 | • 16 | 25 | 8 | 70 | ✓ | | 25,15 |
| 11 3025 130 | • 20 | 25 | 6 | 70 | ✓ | | 58,30 |
| 11 3025 135 | • 20 | 25 | 8 | 70 | ✓ | | 31,65 |

11 5035



D FORM / SHAPE KUD

Kugel
Ball



Schnittdaten Cutting data [i](#) 723

Film Movie [▶](#)

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|----------------|-----------|-------|
| 11 5035 020 | • 2 | 1,8 | 3 | 38 | | ✓ | 12,30 |
| 11 5035 025 | • 3 | 2,7 | 3 | 38 | | ✓ | 12,30 |
| 11 5035 045 | • 4 | 3,4 | 3 | 38 | | ✓ | 27,55 |
| 11 5035 050 | • 6 | 5,0 | 3 | 38 | ✓ | | 18,70 |
| 11 5035 055 | • 6 | 4,7 | 6 | 50 | | ✓ | 18,85 |
| 11 5035 060 | • 8 | 6,0 | 6 | 52 | ✓ | | 24,05 |
| 11 5035 070 | • 10 | 8,0 | 6 | 54 | ✓ | | 22,10 |
| 11 5035 080 | • 12 | 11,0 | 6 | 56 | ✓ | | 35,80 |
| 11 5035 085 | • 12 | 11,0 | 8 | 56 | ✓ | | 37,35 |
| 11 5035 095 | • 16 | 11,0 | 6 | 60 | ✓ | | 44,25 |
| 11 5035 100 | • 16 | 11,0 | 8 | 60 | ✓ | | 23,90 |
| 11 5035 105 | • 20 | 16,5 | 6 | 62 | ✓ | | 60,85 |
| 11 5035 110 | • 20 | 16,5 | 8 | 62 | ✓ | | 60,85 |
| 11 5035 115 | • 25 | 22,0 | 6 | 68 | ✓ | | 89,05 |
| 11 5035 120 | • 25 | 22,0 | 8 | 68 | ✓ | | 89,05 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|----------------|-----------|-------|
| 11 3035 020 | • 2 | 1,8 | 3 | 38 | | ✓ | 8,85 |
| 11 3035 025 | • 3 | 2,7 | 3 | 38 | | ✓ | 8,85 |
| 11 3035 045 | • 4 | 3,4 | 3 | 38 | | ✓ | 23,40 |
| 11 3035 050 | • 6 | 5,0 | 3 | 38 | ✓ | | 14,00 |
| 11 3035 055 | • 6 | 4,7 | 6 | 50 | | ✓ | 14,15 |
| 11 3035 060 | • 8 | 6,0 | 6 | 52 | ✓ | | 19,35 |
| 11 3035 070 | • 10 | 8,0 | 6 | 54 | ✓ | | 15,80 |
| 11 3035 080 | • 12 | 11,0 | 6 | 56 | ✓ | | 28,05 |
| 11 3035 085 | • 12 | 11,0 | 8 | 56 | ✓ | | 29,60 |
| 11 3035 095 | • 16 | 11,0 | 6 | 60 | ✓ | | 36,50 |
| 11 3035 105 | • 20 | 16,5 | 6 | 62 | ✓ | | 47,40 |
| 11 3035 110 | • 20 | 16,5 | 8 | 62 | ✓ | | 25,75 |
| 11 3035 115 | • 25 | 22,0 | 6 | 68 | ✓ | | 75,60 |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



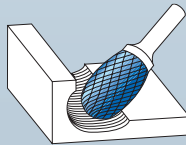
11 5045



E FORM / SHAPE TRE

Tropfen

Oval



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5045 010 | ● 3 | 6 | 3 | 38 | | ✓ | 12,30 |
| 11 5045 015 | ● 6 | 10 | 3 | 42 | ✓ | | 21,40 |
| 11 5045 020 | ● 6 | 10 | 6 | 50 | | ✓ | 26,00 |
| 11 5045 025 | ● 8 | 15 | 6 | 60 | ✓ | | 24,10 |
| 11 5045 030 | ● 10 | 16 | 6 | 60 | ✓ | | 26,70 |
| 11 5045 035 | ● 12 | 22 | 6 | 67 | ✓ | | 33,35 |
| 11 5045 045 | ● 16 | 25 | 6 | 70 | ✓ | | 49,40 |
| 11 5045 050 | ● 16 | 25 | 8 | 70 | ✓ | | 26,70 |
| 11 5045 055 | ● 20 | 25 | 6 | 70 | ✓ | | 69,35 |
| 11 5045 060 | ● 20 | 25 | 8 | 70 | ✓ | | 37,45 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3045 010 | ● 3 | 6 | 3 | 38 | | ✓ | 8,85 |
| 11 3045 015 | ● 6 | 10 | 3 | 42 | ✓ | | 16,70 |
| 11 3045 020 | ● 6 | 10 | 6 | 50 | | ✓ | 21,30 |
| 11 3045 025 | ● 8 | 15 | 6 | 60 | ✓ | | 19,40 |
| 11 3045 030 | ● 10 | 16 | 6 | 60 | ✓ | | 20,35 |
| 11 3045 035 | ● 12 | 22 | 6 | 67 | ✓ | | 25,60 |
| 11 3045 045 | ● 16 | 25 | 6 | 70 | ✓ | | 41,65 |
| 11 3045 050 | ● 16 | 25 | 8 | 70 | ✓ | | 22,60 |
| 11 3045 055 | ● 20 | 25 | 6 | 70 | ✓ | | 55,85 |
| 11 3045 060 | ● 20 | 25 | 8 | 70 | ✓ | | 30,35 |

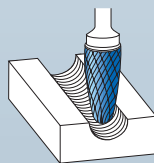
11 5055



F FORM / SHAPE RBF

Rundbogen

Ball nosed tree



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5055 015 | ● 3 | 14 | 3 | 38 | | ✓ | 12,30 |
| 11 5055 025 | ● 6 | 12 | 3 | 44 | ✓ | | 21,40 |
| 11 5055 030 | ● 6 | 18 | 6 | 50 | | ✓ | 19,00 |
| 11 5055 035 | ● 8 | 20 | 6 | 65 | ✓ | | 25,40 |
| 11 5055 040 | ● 10 | 20 | 6 | 65 | ✓ | | 26,60 |
| 11 5055 050 | ● 12 | 25 | 6 | 70 | ✓ | | 37,60 |
| 11 5055 055 | ● 12 | 25 | 8 | 70 | ✓ | | 37,60 |
| 11 5055 065 | ● 16 | 25 | 6 | 70 | ✓ | | 44,25 |
| 11 5055 070 | ● 16 | 25 | 8 | 70 | ✓ | | 44,25 |
| 11 5055 075 | ● 20 | 25 | 6 | 70 | ✓ | | 66,20 |
| 11 5055 080 | ● 20 | 25 | 8 | 70 | ✓ | | 35,75 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3055 015 | ● 3 | 14 | 3 | 38 | | ✓ | 8,85 |
| 11 3055 025 | ● 6 | 12 | 3 | 44 | ✓ | | 16,70 |
| 11 3055 030 | ● 6 | 18 | 6 | 50 | | ✓ | 14,30 |
| 11 3055 035 | ● 8 | 20 | 6 | 65 | ✓ | | 20,70 |
| 11 3055 040 | ● 10 | 20 | 6 | 65 | ✓ | | 20,25 |
| 11 3055 050 | ● 12 | 25 | 6 | 70 | ✓ | | 29,80 |
| 11 3055 055 | ● 12 | 25 | 8 | 70 | ✓ | | 29,80 |
| 11 3055 065 | ● 16 | 25 | 6 | 70 | ✓ | | 36,50 |
| 11 3055 070 | ● 16 | 25 | 8 | 70 | ✓ | | 36,50 |
| 11 3055 075 | ● 20 | 25 | 6 | 70 | ✓ | | 52,75 |
| 11 3055 080 | ● 20 | 25 | 8 | 70 | ✓ | | 28,65 |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

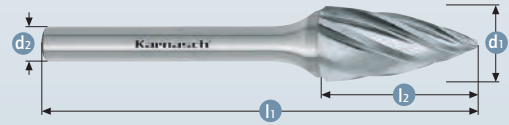
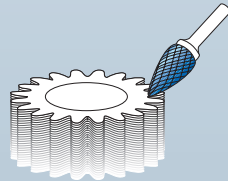
11 5065



G FORM / SHAPE SPG

Spitzbogen

Tree



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 723 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5065 015 | • 3 | 14 | 3 | 38 | ✓ | ✓ | 12,30 |
| 11 5065 030 | • 6 | 12 | 3 | 44 | ✓ | | 21,40 |
| 11 5065 035 | • 6 | 18 | 6 | 50 | | ✓ | 24,40 |
| 11 5065 040 | • 8 | 20 | 6 | 65 | ✓ | | 24,65 |
| 11 5065 045 | • 10 | 20 | 6 | 65 | ✓ | | 28,45 |
| 11 5065 060 | • 12 | 25 | 6 | 70 | ✓ | | 37,40 |
| 11 5065 085 | • 16 | 25 | 6 | 70 | ✓ | | 53,65 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3065 015 | • 3 | 14 | 3 | 38 | | ✓ | 8,85 |
| 11 3065 030 | • 6 | 12 | 3 | 44 | ✓ | | 16,70 |
| 11 3065 035 | • 6 | 18 | 6 | 50 | | ✓ | 19,70 |
| 11 3065 040 | • 8 | 20 | 6 | 65 | ✓ | | 19,95 |
| 11 3065 045 | • 10 | 20 | 6 | 65 | ✓ | | 22,10 |
| 11 3065 060 | • 12 | 25 | 6 | 70 | ✓ | | 29,65 |
| 11 3065 085 | • 16 | 25 | 6 | 70 | ✓ | | 45,90 |

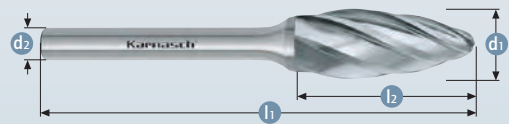
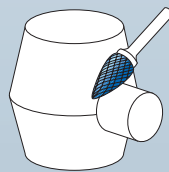
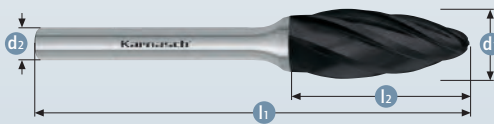
11 5075



H FORM / SHAPE

Flamme

Flame



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 723 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5075 015 | • 8 | 20 | 6 | 65 | ✓ | | 26,20 |
| 11 5075 020 | • 10 | 20 | 6 | 65 | ✓ | | 45,70 |
| 11 5075 025 | • 12 | 32 | 6 | 77 | ✓ | | 49,50 |
| 11 5075 035 | • 16 | 36 | 6 | 82 | ✓ | | 75,05 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3075 015 | • 8 | 20 | 6 | 65 | ✓ | | 21,50 |
| 11 3075 020 | • 10 | 20 | 6 | 65 | ✓ | | 39,35 |
| 11 3075 025 | • 12 | 32 | 6 | 77 | ✓ | | 41,75 |
| 11 3075 035 | • 16 | 36 | 6 | 82 | ✓ | | 67,30 |

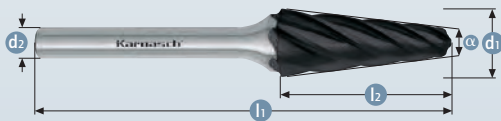


11 5085



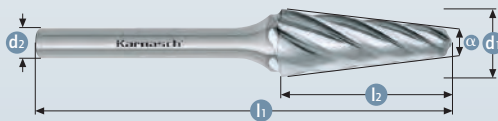
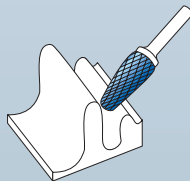
L FORM / SHAPE

KEL



Rundkegel

Ball nosed cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|-----|-------------------|--------------|-----|-------|
| 11 5085 010 | • 3 | 14 | 3 | 38 | | ✓ | 8° | 12,30 |
| 11 5085 015 | • 6 | 16 | 3 | 48 | ✓ | | 22° | 21,40 |
| 11 5085 020 | • 6 | 18 | 6 | 50 | | ✓ | 14° | 25,65 |
| 11 5085 025 | • 8 | 25 | 6 | 70 | ✓ | | 14° | 26,75 |
| 11 5085 035 | • 10 | 30 | 6 | 75 | ✓ | | 14° | 32,30 |
| 11 5085 045 | • 12 | 32 | 6 | 77 | ✓ | | 14° | 40,25 |
| 11 5085 050 | • 12 | 32 | 8 | 77 | ✓ | | 14° | 40,25 |
| 11 5085 055 | • 12 | 32 | 6 | 182 | ✓ | | 14° | 33,10 |
| 11 5085 060 | • 16 | 33 | 6 | 78 | ✓ | | 14° | 54,10 |
| 11 5085 065 | • 16 | 33 | 8 | 78 | ✓ | | 14° | 54,10 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|-----|-------------------|--------------|-----|-------|
| 11 3085 010 | • 3 | 14 | 3 | 38 | | ✓ | 8° | 8,85 |
| 11 3085 015 | • 6 | 16 | 3 | 48 | ✓ | | 22° | 16,70 |
| 11 3085 020 | • 6 | 18 | 6 | 50 | | ✓ | 14° | 20,95 |
| 11 3085 025 | • 8 | 25 | 6 | 70 | ✓ | | 14° | 22,05 |
| 11 3085 035 | • 10 | 30 | 6 | 75 | ✓ | | 14° | 25,95 |
| 11 3085 045 | • 12 | 32 | 6 | 77 | ✓ | | 14° | 32,50 |
| 11 3085 050 | • 12 | 32 | 8 | 77 | ✓ | | 14° | 32,50 |
| 11 3085 055 | • 12 | 32 | 6 | 182 | ✓ | | 14° | 48,20 |
| 11 3085 060 | • 16 | 33 | 6 | 78 | ✓ | | 14° | 46,35 |

11 5095



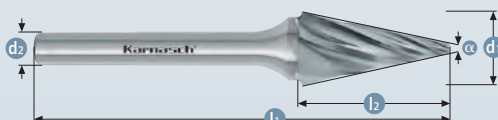
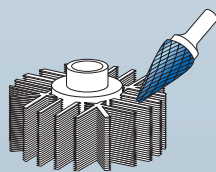
M FORM / SHAPE

SKM



Spitzkegel

Cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 5095 015 | • 3 | 11 | 3 | 38 | | ✓ | 8° | 12,30 |
| 11 5095 025 | • 6 | 12 | 3 | 44 | ✓ | | 22° | 20,65 |
| 11 5095 030 | • 6 | 20 | 6 | 50 | | ✓ | 14° | 23,65 |
| 11 5095 040 | • 10 | 20 | 6 | 65 | ✓ | | 14° | 29,75 |
| 11 5095 045 | • 12 | 25 | 6 | 70 | ✓ | | 14° | 36,00 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 3095 015 | • 3 | 11 | 3 | 38 | | ✓ | 8° | 8,85 |
| 11 3095 025 | • 6 | 12 | 3 | 44 | ✓ | | 22° | 15,95 |
| 11 3095 030 | • 6 | 20 | 6 | 50 | | ✓ | 14° | 18,95 |
| 11 3095 040 | • 10 | 20 | 6 | 65 | ✓ | | 14° | 23,45 |
| 11 3095 045 | • 12 | 25 | 6 | 70 | ✓ | | 14° | 28,25 |



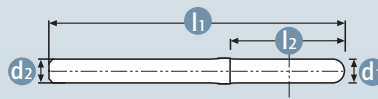
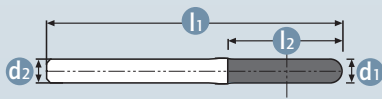
Index

Einsatzgebiete:
Zu bearbeitende Werkstoffe:
Drehzahlempfehlung:

Feinmechanik, Werkzeugbau
Alulegierungen, Leichtmetalle, Buntmetalle, Kunststoffe
ca. 70.000 U/min

Applications:
For use on:
Recommended operating speed:

Precision engineering, tool manufacture
Aluminum alloys, light metals, copper and copper alloys, plastics
approx. 70,000 RPM



| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | | € |
|-------------|-----|------|----|----|------------|----------|--|-------|
| 11 5005 030 | • 3 | 14 | 3 | 38 | A | ZYA | | 12,30 |
| 11 5015 015 | • 3 | 14 | 3 | 38 | B | ZYB | | 13,25 |
| 11 5025 020 | • 2 | 11 | 3 | 38 | C | WRC | | 12,30 |
| 11 5025 025 | • 3 | 14 | 3 | 38 | C | WRC | | 12,30 |
| 11 5035 020 | • 2 | 1,75 | 3 | 38 | D | KUD | | 12,30 |
| 11 5035 025 | • 3 | 2,7 | 3 | 38 | D | KUD | | 12,30 |
| 11 5045 010 | • 3 | 6 | 3 | 38 | E | TRE | | 12,30 |
| 11 5055 015 | • 3 | 14 | 3 | 38 | F | RBF | | 12,30 |
| 11 5065 015 | • 3 | 14 | 3 | 38 | G | SPG | | 12,30 |
| 11 5085 010 | • 3 | 14 | 3 | 38 | L | KEL | | 12,30 |
| 11 5095 015 | • 3 | 11 | 3 | 38 | M | SKM | | 12,30 |

| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | | € |
|-------------|-----|------|----|----|------------|----------|--|------|
| 11 3005 030 | • 3 | 14 | 3 | 38 | A | ZYA | | 8,85 |
| 11 3015 015 | • 3 | 14 | 3 | 38 | B | ZYB | | 9,80 |
| 11 3025 020 | • 2 | 11 | 3 | 38 | C | WRC | | 8,85 |
| 11 3025 025 | • 3 | 14 | 3 | 38 | C | WRC | | 8,85 |
| 11 3035 020 | • 2 | 1,75 | 3 | 38 | D | KUD | | 8,85 |
| 11 3035 025 | • 3 | 2,7 | 3 | 38 | D | KUD | | 8,85 |
| 11 3045 010 | • 3 | 6 | 3 | 38 | E | TRE | | 8,85 |
| 11 3055 015 | • 3 | 14 | 3 | 38 | F | RBF | | 8,85 |
| 11 3065 015 | • 3 | 14 | 3 | 38 | G | SPG | | 8,85 |
| 11 3085 010 | • 3 | 14 | 3 | 38 | L | KEL | | 8,85 |
| 11 3095 015 | • 3 | 11 | 3 | 38 | M | SKM | | 8,85 |



HP-1

Für Superlegierungen. Extrem robuste Kreuzverzahnung
 For super alloys. Extremely robust cross cutting style












ANWENDUNG · APPLICATION

| | | | | | | | | | | |
|---|---|---|---|--|---|--|---|---|--|--|
|  Stahl Steel |  Gehärteter Stahl Hardened steel |  Edelstahl Stainless |  Gusseisen Cast iron |  Titan Titanium |  Cermet Cermet |  Nickel Nickel |  Kupfer, Kupferlegierungen Copper, copper alloys |  Alu Alu |  Kunststoffe GFK/CFK Plastics GRP/CRP | <input checked="" type="checkbox"/> OPTIMAL OPTIMAL |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> GUT GOOD |

- Schlagunempfindlichkeit (Zahnausbrüche, Ablätzungen, Kopfbrüche werden minimiert)
 - Exzellente Kontrolle und Laufruhe
 - Mittlere bis hohe Zerspanleistung
 - Speziell für schwierigste Superlegierungen + Edelstähle wie: Titan, Inconel, Hastelloy, Waspaloy, Duplex, Amanox usw.
- Anwendungsbeispiel: Bearbeitung von Flugzeug Turbinenschaufeln, Gasturbinen

- Impact resistance (tooth breakages, chipping, head breakages are minimised)
 - Excellent control and quiet running
 - Medium to high cutting action
 - Especially for the most difficult super alloys + stainless steel, such as: Titanium, Inconel, Hastelloy, Waspaloy, Duplex, Amanox, etc.
- Application example: Working aeroplane turbine blades, gas turbines

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM | Ø 3 mm |
|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M | |
| Art. 11 5007 Art. 11 3007 | Art. 11 5017 Art. 11 3017 | Art. 11 5027 Art. 11 3027 | Art. 11 5037 Art. 11 3037 | Art. 11 5047 Art. 11 3047 | Art. 11 5057 Art. 11 3057 | Art. 11 5067 Art. 11 3067 | Art. 11 5077 Art. 11 3077 | Art. 11 5087 Art. 11 3087 | Art. 11 5097 Art. 11 3097 | |
|  |  |  |  |  |  |  |  |  |  |  |
| 732 | 732 | 733 | 733 | 734 | 734 | 735 | 735 | 736 | 736 | 737 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Ø 3 mm, Schaft 3 mm, für Superlegierungen! Ø 3 mm, shank 3 mm, for super alloys! |



BLUE-TEC-beschichtet
 BLUE-TEC-coated

Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|--|---|---|---|--------------------------------|
| Schwierigste Legierungen Superlegierungen | Titan, Inconel, Hastelloy, Waspaloy, Duplex, Amanox Udimet, Nicrofer, Conicro, René | Motoren-, Turbinen- und Triebwerksbau Energietechnik, Luft- und Raumfahrt Öl- und Gasindustrie, Gasturbinen | grobes Zerspanen = hoher bis mittlerer Materialabtrag | 250-350 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | grobes Zerspanen = hoher bis mittlerer Materialabtrag | 250-350 |
| Stahl, Stahlguss | Ungehärtet, nicht vergütete Stähle bis 1200 N/mm ² (<38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | grobes Zerspanen = hoher bis mittlerer Materialabtrag | 450-600 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (>38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 250-350 |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/ Sphäroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | grobes Zerspanen = hoher bis mittlerer Materialabtrag | 450-600 |

| Material groups | | | Application | Cutting speed m/min |
|---------------------------------|---|--|---|---------------------|
| difficult alloys superalloys | Titan, Inconel, Hastelloy, Waspaloy, Duplex, Amanox Udimet, Nicrofer, Conicro, René | Engines, aircraft engine and turbine construction, energy technology, aerospace oil and gas industry, gas turbines | Coarse machining = high to medium stock removal | 250-350 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Coarse machining = high to medium stock removal | 250-350 |
| Steel cast steel | Non-hardened, non-heat treated steels up to 1200 N/mm ² (<38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Coarse machining = high to medium stock removal | 450-600 |
| | Hardened, heat treated steels exceeding 1200 N/mm ² (>38 HRC) | tool steels, tempering steels, alloyed steels, cast steels | | 250-350 |
| Cast iron | Grey cast iron, white cast iron | Cast-iron with flake graphite EN-GJL (GG), with nodular graphite cast iron EN-GJS (GGG), white anneales cast iron EN-GJMW (GTW), black cast iron EN-GJMB (GTS) | Coarse machining = high to medium stock removal | 450-600 |



| Schnittgeschwindigkeit • Cutting speed (m/min) | | | | | | | |
|--|--|--------|--------|--------|--------|--------|--------|
| | 250 | 300 | 350 | 400 | 450 | 500 | 600 |
| ∅ (mm) | Drehzahlen (min ⁻¹) • Rotational speed (rpm) | | | | | | |
| 3 | 27.000 | 32.000 | 37.000 | 42.000 | 48.000 | 53.000 | 64.000 |
| 6 | 13.000 | 16.000 | 19.000 | 21.000 | 24.000 | 27.000 | 32.000 |
| 8 | 10.000 | 12.000 | 14.000 | 16.000 | 18.000 | 20.000 | 24.000 |
| 10 | 8.000 | 10.000 | 11.000 | 13.000 | 14.000 | 16.000 | 19.000 |
| 12 | 7.000 | 8.000 | 9.000 | 11.000 | 12.000 | 13.000 | 16.000 |
| 16 | 5.000 | 6.000 | 7.000 | 8.000 | 9.000 | 10.000 | 12.000 |



11 5007

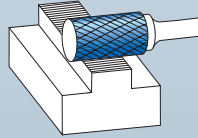


A FORM / SHAPE ZYA



Zylinder ohne Stirnverzahnung

Cylinder without end cut



Schnittdaten
Cutting data

Film
Movie



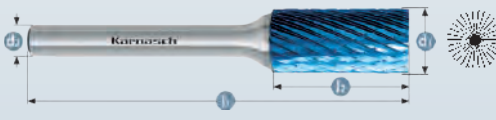
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|----|----|----|-------------------|--------------|-------|
| 11 5007 030 | • 3 | 14 | 3 | 38 | | ✓ | 9,45 |
| 11 5007 060 | • 6 | 13 | 3 | 45 | ✓ | | 11,40 |
| 11 5007 065 | • 6 | 18 | 6 | 50 | | ✓ | 15,20 |
| 11 5007 080 | • 8 | 20 | 6 | 65 | ✓ | | 15,20 |
| 11 5007 090 | • 10 | 20 | 6 | 65 | ✓ | | 17,45 |
| 11 5007 100 | • 10 | 25 | 6 | 70 | ✓ | | 20,20 |
| 11 5007 107 | • 12DIN | 25 | 6 | 70 | ✓ | | 25,00 |
| 11 5007 120 | • 16 | 25 | 6 | 70 | ✓ | | 32,60 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|----|----|----|-------------------|--------------|-------|
| 11 3007 030 | • 3 | 14 | 3 | 38 | | ✓ | 7,40 |
| 11 3007 060 | • 6 | 13 | 3 | 45 | ✓ | | 9,40 |
| 11 3007 065 | • 6 | 18 | 6 | 50 | | ✓ | 13,20 |
| 11 3007 080 | • 8 | 20 | 6 | 65 | ✓ | | 13,20 |
| 11 3007 090 | • 10 | 20 | 6 | 65 | ✓ | | 14,20 |
| 11 3007 100 | • 10 | 25 | 6 | 70 | ✓ | | 16,90 |
| 11 3007 107 | • 12DIN | 25 | 6 | 70 | ✓ | | 20,20 |
| 11 3007 120 | • 16 | 25 | 6 | 70 | ✓ | | 27,85 |

11 5017

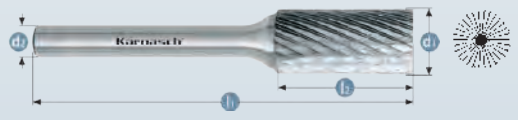
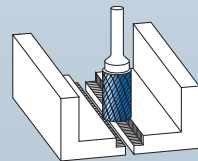


B FORM / SHAPE ZYB



Zylinder mit Stirnverzahnung

Cylinder with end cut



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|----|----|----|-------------------|--------------|-------|
| 11 5017 015 | • 3 | 14 | 3 | 38 | | ✓ | 10,20 |
| 11 5017 045 | • 6 | 13 | 3 | 45 | ✓ | | 12,25 |
| 11 5017 050 | • 6 | 18 | 6 | 50 | | ✓ | 13,00 |
| 11 5017 075 | • 8 | 20 | 6 | 65 | ✓ | | 16,50 |
| 11 5017 085 | • 10 | 20 | 6 | 65 | ✓ | | 18,85 |
| 11 5017 103 | • 12DIN | 25 | 6 | 70 | ✓ | | 27,15 |
| 11 5017 115 | • 16 | 25 | 6 | 70 | ✓ | | 35,35 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|----|----|----|-------------------|--------------|-------|
| 11 3017 015 | • 3 | 14 | 3 | 38 | | ✓ | 8,20 |
| 11 3017 045 | • 6 | 13 | 3 | 45 | ✓ | | 10,25 |
| 11 3017 050 | • 6 | 18 | 6 | 50 | | ✓ | 11,00 |
| 11 3017 075 | • 8 | 20 | 6 | 65 | ✓ | | 14,50 |
| 11 3017 085 | • 10 | 20 | 6 | 65 | ✓ | | 15,55 |
| 11 3017 103 | • 12DIN | 25 | 6 | 70 | ✓ | | 22,35 |
| 11 3017 115 | • 16 | 25 | 6 | 70 | ✓ | | 30,60 |

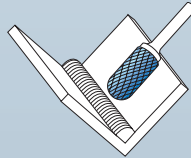


11 5027



C FORM / SHAPE WRC

Walzenrundform
Ball nosed cylinder



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 731 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|------|----|----|-------------------|--------------|-------|
| 11 5027 025 | • 3 | 14 | 3 | 38 | | ✓ | 9,45 |
| 11 5027 050 | • 6 | 12,7 | 3 | 44 | ✓ | ✓ | 11,40 |
| 11 5027 055 | • 6 | 18 | 6 | 50 | | ✓ | 13,70 |
| 11 5027 075 | • 8 | 20 | 6 | 65 | ✓ | | 16,35 |
| 11 5027 085 | • 10 | 20 | 6 | 65 | ✓ | | 19,10 |
| 11 5027 107 | • 12DIN | 25 | 6 | 70 | ✓ | | 27,65 |
| 11 5027 120 | • 16 | 25 | 6 | 70 | ✓ | | 36,05 |

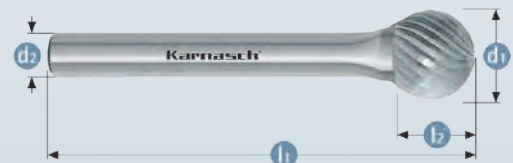
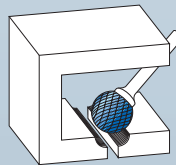
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|------|----|----|-------------------|--------------|-------|
| 11 3027 025 | • 3 | 14 | 3 | 38 | | ✓ | 7,40 |
| 11 3027 050 | • 6 | 12,7 | 3 | 44 | ✓ | ✓ | 9,40 |
| 11 3027 055 | • 6 | 18 | 6 | 50 | | ✓ | 11,70 |
| 11 3027 075 | • 8 | 20 | 6 | 65 | ✓ | | 14,35 |
| 11 3027 085 | • 10 | 20 | 6 | 65 | ✓ | | 15,80 |
| 11 3027 107 | • 12DIN | 25 | 6 | 70 | ✓ | | 22,90 |
| 11 3027 120 | • 16 | 25 | 6 | 70 | ✓ | | 16,95 |

11 5037



D FORM / SHAPE KUD

Kugel
Ball



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 731 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|------|----|----|-------------------|--------------|-------|
| 11 5037 025 | • 3 | 2,5 | 3 | 38 | | ✓ | 9,45 |
| 11 5037 050 | • 6 | 5,0 | 3 | 38 | ✓ | ✓ | 11,40 |
| 11 5037 055 | • 6 | 5,4 | 6 | 50 | | ✓ | 12,80 |
| 11 5037 060 | • 8 | 6,0 | 6 | 52 | ✓ | | 13,60 |
| 11 5037 070 | • 10 | 8,0 | 6 | 54 | ✓ | | 16,20 |
| 11 5037 083 | • 12DIN | 11,0 | 6 | 56 | ✓ | | 20,30 |
| 11 5037 095 | • 16 | 14,0 | 6 | 60 | ✓ | | 26,40 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|------|----|----|-------------------|--------------|-------|
| 11 3037 025 | • 3 | 2,5 | 3 | 38 | | ✓ | 7,40 |
| 11 3037 050 | • 6 | 5,0 | 3 | 38 | ✓ | ✓ | 9,40 |
| 11 3037 055 | • 6 | 5,4 | 6 | 50 | | ✓ | 10,80 |
| 11 3037 060 | • 8 | 6,0 | 6 | 52 | ✓ | | 11,55 |
| 11 3037 070 | • 10 | 8,0 | 6 | 54 | ✓ | | 12,95 |
| 11 3037 083 | • 12DIN | 11,0 | 6 | 56 | ✓ | | 15,50 |

⊘ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



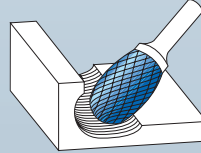
11 5047



E FORM / SHAPE **TRE**

Tropfen

Oval



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|----|----|----|-------------------|--------------|-------|
| 11 5047 010 | • 3 | 6 | 3 | 38 | | ✓ | 9,45 |
| 11 5047 015 | • 6 | 10 | 3 | 42 | ✓ | | 11,40 |
| 11 5047 020 | • 6 | 10 | 6 | 50 | | ✓ | 15,20 |
| 11 5047 025 | • 8 | 15 | 6 | 60 | ✓ | | 18,00 |
| 11 5047 030 | • 10 | 16 | 6 | 60 | ✓ | | 19,10 |
| 11 5047 037 | • 12DIN | 21 | 6 | 66 | ✓ | | 25,95 |
| 11 5047 045 | • 16 | 25 | 6 | 70 | ✓ | | 36,85 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|----|----|----|-------------------|--------------|-------|
| 11 3047 010 | • 3 | 6 | 3 | 38 | | ✓ | 7,40 |
| 11 3047 015 | • 6 | 10 | 3 | 42 | ✓ | | 9,40 |
| 11 3047 020 | • 6 | 10 | 6 | 50 | | ✓ | 13,20 |
| 11 3047 025 | • 8 | 15 | 6 | 60 | ✓ | | 15,95 |
| 11 3047 030 | • 10 | 16 | 6 | 60 | ✓ | | 15,80 |
| 11 3047 037 | • 12DIN | 21 | 6 | 66 | ✓ | | 21,15 |
| 11 3047 045 | • 16 | 25 | 6 | 70 | ✓ | | 17,40 |

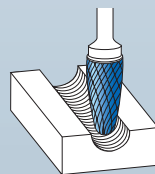
11 5057



F FORM / SHAPE **RBF**

Rundbogen

Ball nosed tree



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|----|----|----|-------------------|--------------|-------|
| 11 5057 015 | • 3 | 14 | 3 | 38 | | ✓ | 9,45 |
| 11 5057 025 | • 6 | 12 | 3 | 44 | ✓ | | 11,40 |
| 11 5057 030 | • 6 | 18 | 6 | 50 | | ✓ | 14,25 |
| 11 5057 035 | • 8 | 20 | 6 | 65 | ✓ | | 19,05 |
| 11 5057 040 | • 10 | 20 | 6 | 65 | ✓ | | 18,60 |
| 11 5057 053 | • 12DIN | 25 | 6 | 70 | ✓ | | 24,10 |
| 11 5057 065 | • 16 | 25 | 6 | 70 | ✓ | | 36,30 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|----|----|----|-------------------|--------------|-------|
| 11 3057 015 | • 3 | 14 | 3 | 38 | | ✓ | 7,40 |
| 11 3057 025 | • 6 | 12 | 3 | 44 | ✓ | | 9,40 |
| 11 3057 030 | • 6 | 18 | 6 | 50 | | ✓ | 12,25 |
| 11 3057 035 | • 8 | 20 | 6 | 65 | ✓ | | 17,05 |
| 11 3057 040 | • 10 | 20 | 6 | 65 | ✓ | | 15,35 |
| 11 3057 053 | • 12DIN | 25 | 6 | 70 | ✓ | | 19,30 |
| 11 3057 065 | • 16 | 25 | 6 | 70 | ✓ | | 17,10 |



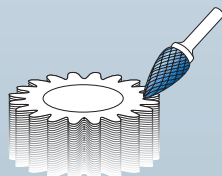
11 5067



G FORM / SHAPE SPG

Spitzbogen

Tree



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 731 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|----|----|----|-------------------|--------------|-------|
| 11 5067 015 | • 3 | 14 | 3 | 38 | | ✓ | 9,45 |
| 11 5067 030 | • 6 | 12 | 3 | 44 | ✓ | | 11,40 |
| 11 5067 035 | • 6 | 18 | 6 | 50 | | ✓ | 14,25 |
| 11 5067 040 | • 8 | 20 | 6 | 65 | ✓ | | 16,85 |
| 11 5067 045 | • 10 | 20 | 6 | 65 | ✓ | | 19,70 |
| 11 5067 063 | • 12DIN | 25 | 6 | 70 | ✓ | | 25,25 |
| 11 5067 085 | • 16 | 25 | 6 | 70 | ✓ | | 35,90 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|----|----|----|-------------------|--------------|-------|
| 11 3067 015 | • 3 | 14 | 3 | 38 | | ✓ | 7,40 |
| 11 3067 030 | • 6 | 12 | 3 | 44 | ✓ | | 9,40 |
| 11 3067 035 | • 6 | 18 | 6 | 50 | | ✓ | 12,25 |
| 11 3067 040 | • 8 | 20 | 6 | 65 | ✓ | | 14,85 |
| 11 3067 045 | • 10 | 20 | 6 | 65 | ✓ | | 16,40 |
| 11 3067 063 | • 12DIN | 25 | 6 | 70 | ✓ | | 20,45 |
| 11 3067 085 | • 16 | 25 | 6 | 70 | ✓ | | 16,90 |

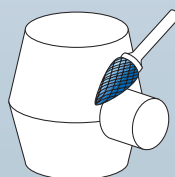
11 5077



H FORM / SHAPE

Flamme

Flame



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 731 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|----|----|----|-------------------|--------------|-------|
| 11 5077 005 | • 3 | 6 | 3 | 38 | | ✓ | 9,45 |
| 11 5077 009 | • 6 | 10 | 3 | 43 | | ✓ | 11,40 |
| 11 5077 010 | • 6 | 14 | 6 | 50 | | ✓ | 18,25 |
| 11 5077 015 | • 8 | 20 | 6 | 65 | ✓ | | 18,15 |
| 11 5077 020 | • 10 | 20 | 6 | 65 | ✓ | | 33,40 |
| 11 5077 027 | • 12DIN | 30 | 6 | 75 | ✓ | | 37,25 |
| 11 5077 035 | • 16 | 36 | 6 | 82 | ✓ | | 50,35 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|----|----|----|-------------------|--------------|-------|
| 11 3077 005 | • 3 | 6 | 3 | 38 | | ✓ | 7,40 |
| 11 3077 009 | • 6 | 10 | 3 | 43 | | ✓ | 9,40 |
| 11 3077 010 | • 6 | 14 | 6 | 50 | | ✓ | 9,00 |
| 11 3077 015 | • 8 | 20 | 6 | 65 | ✓ | | 16,15 |
| 11 3077 020 | • 10 | 20 | 6 | 65 | ✓ | | 30,10 |
| 11 3077 027 | • 12DIN | 30 | 6 | 75 | ✓ | | 32,45 |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



11 5087



L FORM / SHAPE KEL

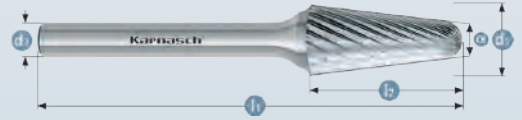
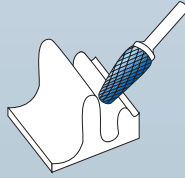


11 3087



Rundkegel

Ball nosed cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|---------|----|----|----|-------------------|--------------|-----|-------|
| 11 5087 010 | • 3 | 14 | 3 | 38 | | ✓ | 8° | 9,45 |
| 11 5087 015 | • 6 | 16 | 3 | 48 | ✓ | | 22° | 11,40 |
| 11 5087 020 | • 6 | 18 | 6 | 50 | | ✓ | 14° | 14,55 |
| 11 5087 025 | • 8 | 25 | 6 | 70 | ✓ | | 14° | 18,35 |
| 11 5087 030 | • 10 | 20 | 6 | 65 | ✓ | | 14° | 23,00 |
| 11 5087 047 | • 12DIN | 25 | 6 | 70 | ✓ | | 14° | 28,05 |
| 11 5087 060 | % 16 | 33 | 6 | 78 | ✓ | | 14° | 23,65 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|---------|----|----|----|-------------------|--------------|-----|-------|
| 11 3087 010 | • 3 | 14 | 3 | 38 | | ✓ | 8° | 7,40 |
| 11 3087 015 | • 6 | 16 | 3 | 48 | ✓ | | 22° | 9,40 |
| 11 3087 020 | • 6 | 18 | 6 | 50 | | ✓ | 14° | 12,50 |
| 11 3087 025 | • 8 | 25 | 6 | 70 | ✓ | | 14° | 16,35 |
| 11 3087 030 | • 10 | 20 | 6 | 65 | ✓ | | 14° | 19,70 |
| 11 3087 047 | • 12DIN | 25 | 6 | 70 | ✓ | | 14° | 23,25 |
| 11 3087 060 | % 16 | 33 | 6 | 78 | ✓ | | 14° | 21,10 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

11 5097



M FORM / SHAPE SKM

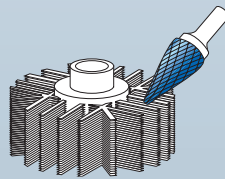


11 3097



Spitzkegel

Cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|---------|----|----|----|-------------------|--------------|-----|-------|
| 11 5097 015 | • 3 | 11 | 3 | 38 | | ✓ | 14° | 9,45 |
| 11 5097 025 | • 6 | 12 | 3 | 48 | ✓ | | 22° | 11,40 |
| 11 5097 030 | • 6 | 20 | 6 | 50 | | ✓ | 14° | 14,55 |
| 11 5097 040 | • 10 | 20 | 6 | 65 | ✓ | | 28° | 23,55 |
| 11 5097 047 | • 12DIN | 25 | 6 | 70 | ✓ | | 28° | 27,30 |
| 11 5097 055 | • 16 | 26 | 6 | 74 | ✓ | | 33° | 37,75 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|---------|----|----|----|-------------------|--------------|-----|-------|
| 11 3097 015 | • 3 | 11 | 3 | 38 | | ✓ | 14° | 7,40 |
| 11 3097 025 | • 6 | 12 | 3 | 48 | ✓ | | 22° | 9,40 |
| 11 3097 030 | • 6 | 20 | 6 | 50 | | ✓ | 14° | 12,50 |
| 11 3097 040 | • 10 | 20 | 6 | 65 | ✓ | | 28° | 20,25 |
| 11 3097 047 | • 12DIN | 25 | 6 | 70 | ✓ | | 28° | 22,50 |
| 11 3097 055 | % 16 | 26 | 6 | 74 | ✓ | | 33° | 17,90 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Speziell optimierte HP-1 Verzahnung für Rotierfräser 3 mm

Specially optimized HP-1 cut for burrs 3 mm



| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | € |
|-------------|-----|-----|----|----|------------|----------|-------|
| 11 5007 030 | ● 3 | 14 | 3 | 38 | A | ZYA | 9,45 |
| 11 5017 015 | ● 3 | 14 | 3 | 38 | B | ZYB | 10,20 |
| 11 5027 025 | ● 3 | 14 | 3 | 38 | C | WRC | 9,45 |
| 11 5037 025 | ● 3 | 2,7 | 3 | 38 | D | KUD | 9,45 |
| 11 5047 010 | ● 3 | 6,0 | 3 | 38 | E | TRE | 9,45 |
| 11 5057 015 | ● 3 | 14 | 3 | 38 | F | RBF | 9,45 |
| 11 5067 015 | ● 3 | 14 | 3 | 38 | G | SPG | 9,45 |
| 11 5077 005 | ● 3 | 6 | 3 | 38 | H | - | 9,45 |
| 11 5087 010 | ● 3 | 14 | 3 | 38 | L | KEL | 9,45 |
| 11 5097 015 | ● 3 | 15 | 3 | 38 | M | SKM | 9,45 |

| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | € |
|-------------|-----|-----|----|----|------------|----------|------|
| 11 3007 030 | ● 3 | 14 | 3 | 38 | A | ZYA | 7,40 |
| 11 3017 015 | ● 3 | 14 | 3 | 38 | B | ZYB | 8,20 |
| 11 3027 025 | ● 3 | 14 | 3 | 38 | C | WRC | 7,40 |
| 11 3037 025 | ● 3 | 2,7 | 3 | 38 | D | KUD | 7,40 |
| 11 3047 010 | ● 3 | 6,0 | 3 | 38 | E | TRE | 7,40 |
| 11 3057 015 | ● 3 | 14 | 3 | 38 | F | RBF | 7,40 |
| 11 3067 015 | ● 3 | 14 | 3 | 38 | G | SPG | 7,40 |
| 11 3077 005 | ● 3 | 6 | 3 | 38 | H | - | 7,40 |
| 11 3087 010 | ● 3 | 14 | 3 | 38 | L | KEL | 7,40 |
| 11 3097 015 | ● 3 | 15 | 3 | 38 | M | SKM | 7,40 |

1



2



3



4



5



6



7



8



9

HP-5

Extrem feine Einfachverzahnung Extremely fine single cutting style

ANWENDUNG · APPLICATION

| | | | | | | | | | |
|---|---|---|---|--|---|--|---|---|--|
|  Stahl Steel |  Gehärteter Stahl Hardened steel |  Edelstahl Stainless |  Gusseisen Cast iron |  Titan Titanium |  Cermet Cermet |  Nickel Nickel |  Kupfer, Kupferlegierungen Copper, copper alloys |  Alu Alu |  Kunststoffe GFK/CFK Plastics GRP/CRP |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |










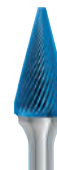
✓ OPTIMAL
OPTIMAL

✓ GUT
GOOD

- Exzellente Oberflächengüte
- Vorzugsweise für feines Entgraten von allen Stahlsorten wie:
 - Bis zu extra harten Stählen ca. 70 HRC
 - Gusseisen
 - Edelstahl (INOX)
 - Hochwarmfeste Werkstoffe wie z.B. Nickel-Basis + Kobalt-Basis + Kobalt-Basis Legierungen

- Excellent surface finish
- Preferred for fine deburring all ferrous metals, such as:
 - Up to extra hard steel approx. 70 HRC
 - Cast iron
 - Stainless steel (INOX)
 - Heat resistant substances, such as, e.g. nickel based + cobalt based alloys

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM |
|---|--|---|---|---|---|--|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 5003 Art. 11 3003 | Art. 11 5013 Art. 11 3013 | Art. 11 5023 Art. 11 3023 | Art. 11 5033 Art. 11 3033 | Art. 11 5043 Art. 11 3043 | Art. 11 5053 Art. 11 3053 | Art. 11 5063 Art. 11 3063 | Art. 11 5073 Art. 11 3073 | Art. 11 5083 Art. 11 3083 | Art. 11 5093 Art. 11 3093 |
|  |  |  |  |  |  |  |  |  |  |
| 740 | 740 | 741 | 741 | 742 | 742 | 743 | 743 | 744 | 744 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone |



BLUETEC
BESCHICHTET
COATED

BLUE-TEC-beschichtet
BLUE-TEC-coated

Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|------------------|---|---|---|--------------------------------|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm ² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Feines Zerspanen = mittlerer Materialabtrag | 650-750 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 450-600 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Feines Zerspanen = mittlerer Materialabtrag | 450-600 |
| NE-Metalle | Harte NE-Metalle | Bronze, Titan/Titanlegierungen, harte Alulegierungen (hoher Si-Anteil) | Feines Zerspanen = mittlerer Materialabtrag | 450-600 |
| | Hochwarmfeste Werkstoffe | Nickelbasis- und Kobaltbasislegierungen (Triebwerk- und Turbinenbau) | | |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/Späroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | Feines Zerspanen = mittlerer Materialabtrag | 650-750 |

| Material groups | | | Application | Cutting speed m/min |
|------------------------|---|---|---------------------------------------|---------------------|
| Steel, cast steel | Non-hardened, non-heat treated-steels up to 1200 N/mm ² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Fine machining = medium stock removal | 650-750 |
| | Hardened, heat-treated steels exceeding 1200 N/mm ² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 450-600 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Fine machining = medium stock removal | 450-600 |
| Non-ferrous metals | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard alu-alloys (high Si content) | Fine machining = medium stock removal | 450-600 |
| | High-temperature resistant materials | Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction) | | |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Fine machining = medium stock removal | 650-750 |



| Schnittgeschwindigkeit • Cutting speed (m/min) | | | | |
|--|--|--------|---------|---------|
| | 450 | 600 | 650 | 750 |
| ∅ (mm) | Drehzahlen (min ⁻¹) • Rotational speed (rpm) | | | |
| 2 | 72.000 | 95.000 | 104.000 | 120.000 |
| 3 | 48.000 | 64.000 | 68.000 | 80.000 |
| 4 | 36.000 | 48.000 | 52.000 | 60.000 |
| 6 | 24.000 | 32.000 | 34.000 | 40.000 |
| 8 | 18.000 | 24.000 | 26.000 | 30.000 |
| 10 | 14.000 | 19.000 | 21.000 | 24.000 |
| 12 | 12.000 | 16.000 | 18.000 | 21.000 |
| 16 | 9.000 | 12.000 | 14.000 | 17.000 |



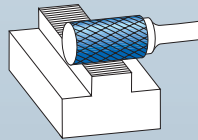
11 5003



A FORM / SHAPE ZYA

Zylinder ohne Stirnverzahnung

Cylinder without end cut



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-----|----|----|-----|-------------------|--------------|-------|
| 11 5003 015 | 1,5 | 6 | 3 | 38 | | ✓ | 9,25 |
| 11 5003 025 | 2 | 11 | 3 | 38 | | ✓ | 8,80 |
| 11 5003 030 | 3 | 14 | 3 | 38 | | ✓ | 9,25 |
| 11 5003 035 | 3 | 14 | 3 | 50 | | ✓ | 10,75 |
| 11 5003 040 | 3 | 14 | 3 | 65 | | ✓ | 6,75 |
| 11 5003 045 | 3 | 14 | 3 | 75 | | ✓ | 7,15 |
| 11 5003 050 | 3 | 14 | 3 | 100 | | ✓ | 9,20 |
| 11 5003 055 | 4 | 14 | 6 | 50 | | ✓ | 12,40 |
| 11 5003 060 | 6 | 13 | 3 | 45 | ✓ | | 14,80 |
| 11 5003 065 | 6 | 18 | 6 | 50 | | ✓ | 12,40 |
| 11 5003 070 | 6 | 18 | 6 | 100 | ✓ | | 12,05 |
| 11 5003 080 | 8 | 20 | 6 | 65 | ✓ | | 15,55 |
| 11 5003 090 | 10 | 20 | 6 | 65 | ✓ | | 17,85 |
| 11 5003 095 | 10 | 20 | 6 | 172 | ✓ | | 26,90 |
| 11 5003 100 | 10 | 25 | 6 | 70 | ✓ | | 11,15 |
| 11 5003 105 | 12 | 25 | 6 | 70 | ✓ | | 27,45 |
| 11 5003 110 | 12 | 25 | 6 | 175 | ✓ | | 39,75 |
| 11 5003 115 | 12 | 25 | 8 | 70 | ✓ | | 29,25 |
| 11 5003 120 | 16 | 25 | 6 | 70 | ✓ | | 33,40 |
| 11 5003 125 | 16 | 25 | 8 | 70 | ✓ | | 19,45 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-----|----|----|-----|-------------------|--------------|-------|
| 11 3003 015 | 1,5 | 6 | 3 | 38 | | ✓ | 3,95 |
| 11 3003 025 | 2 | 11 | 3 | 38 | | ✓ | 6,80 |
| 11 3003 030 | 3 | 14 | 3 | 38 | | ✓ | 7,25 |
| 11 3003 040 | 3 | 14 | 3 | 65 | | ✓ | 5,55 |
| 11 3003 045 | 3 | 14 | 3 | 75 | | ✓ | 6,05 |
| 11 3003 050 | 3 | 14 | 3 | 100 | | ✓ | 8,10 |
| 11 3003 055 | 4 | 14 | 6 | 50 | | ✓ | 10,40 |
| 11 3003 060 | 6 | 13 | 3 | 45 | ✓ | | 12,75 |
| 11 3003 065 | 6 | 18 | 6 | 50 | | ✓ | 10,40 |
| 11 3003 070 | 6 | 18 | 6 | 100 | ✓ | | 10,95 |
| 11 3003 080 | 8 | 20 | 6 | 65 | ✓ | | 13,55 |
| 11 3003 090 | 10 | 20 | 6 | 65 | ✓ | | 14,55 |
| 11 3003 095 | 10 | 20 | 6 | 172 | ✓ | | 11,05 |
| 11 3003 100 | 10 | 25 | 6 | 70 | ✓ | | 9,40 |
| 11 3003 105 | 12 | 25 | 6 | 70 | ✓ | | 22,70 |
| 11 3003 110 | 12 | 25 | 6 | 175 | ✓ | | 17,25 |
| 11 3003 115 | 12 | 25 | 8 | 70 | ✓ | | 13,30 |
| 11 3003 120 | 16 | 25 | 6 | 70 | ✓ | | 28,60 |
| 11 3003 125 | 16 | 25 | 8 | 70 | ✓ | | 16,90 |

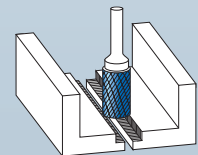
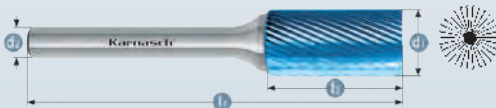
11 5013



B FORM / SHAPE ZYB

Zylinder mit Stirnverzahnung

Cylinder with end cut



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-----|----|----|-----|-------------------|--------------|-------|
| 11 5013 005 | 1,5 | 6 | 3 | 38 | | ✓ | 4,70 |
| 11 5013 010 | 2 | 11 | 3 | 38 | | ✓ | 9,80 |
| 11 5013 015 | 3 | 14 | 3 | 38 | | ✓ | 9,35 |
| 11 5013 020 | 3 | 14 | 3 | 50 | | ✓ | 11,65 |
| 11 5013 025 | 3 | 14 | 3 | 65 | | ✓ | 6,80 |
| 11 5013 030 | 3 | 14 | 3 | 75 | | ✓ | 7,75 |
| 11 5013 035 | 3 | 14 | 3 | 100 | | ✓ | 11,10 |
| 11 5013 040 | 4 | 12 | 6 | 50 | | ✓ | 13,30 |
| 11 5013 045 | 6 | 13 | 3 | 45 | ✓ | | 16,10 |
| 11 5013 050 | 6 | 18 | 6 | 50 | | ✓ | 13,30 |
| 11 5013 060 | 6 | 18 | 6 | 100 | ✓ | | 24,25 |
| 11 5013 075 | 8 | 20 | 6 | 65 | ✓ | | 16,90 |
| 11 5013 080 | 8 | 20 | 6 | 170 | ✓ | | 12,65 |
| 11 5013 085 | 10 | 20 | 6 | 65 | ✓ | | 19,30 |
| 11 5013 090 | 10 | 20 | 6 | 172 | ✓ | | 21,50 |
| 11 5013 100 | 12 | 25 | 6 | 70 | ✓ | | 29,75 |
| 11 5013 105 | 12 | 25 | 6 | 175 | ✓ | | 23,80 |
| 11 5013 110 | 12 | 25 | 8 | 70 | ✓ | | 17,15 |
| 11 5013 115 | 16 | 25 | 6 | 70 | ✓ | | 36,20 |
| 11 5013 120 | 16 | 25 | 8 | 70 | ✓ | | 21,00 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-----|----|----|-----|-------------------|--------------|-------|
| 11 3013 005 | 1,5 | 6 | 3 | 38 | | ✓ | 3,60 |
| 11 3013 010 | 2 | 11 | 3 | 38 | | ✓ | 4,25 |
| 11 3013 015 | 3 | 14 | 3 | 38 | | ✓ | 7,35 |
| 11 3013 020 | 3 | 14 | 3 | 50 | | ✓ | 5,25 |
| 11 3013 025 | 3 | 14 | 3 | 65 | | ✓ | 5,75 |
| 11 3013 030 | 3 | 14 | 3 | 75 | | ✓ | 6,65 |
| 11 3013 035 | 3 | 14 | 3 | 100 | | ✓ | 10,00 |
| 11 3013 040 | 4 | 12 | 6 | 50 | | ✓ | 11,30 |
| 11 3013 045 | 6 | 13 | 3 | 45 | ✓ | | 7,80 |
| 11 3013 050 | 6 | 18 | 6 | 50 | | ✓ | 11,30 |
| 11 3013 060 | 6 | 18 | 6 | 100 | ✓ | | 12,05 |
| 11 3013 075 | 8 | 20 | 6 | 65 | ✓ | | 14,90 |
| 11 3013 080 | 8 | 20 | 6 | 170 | ✓ | | 11,65 |
| 11 3013 085 | 10 | 20 | 6 | 65 | ✓ | | 16,00 |
| 11 3013 090 | 10 | 20 | 6 | 172 | ✓ | | 17,95 |
| 11 3013 100 | 12 | 25 | 6 | 70 | ✓ | | 25,00 |
| 11 3013 105 | 12 | 25 | 6 | 175 | ✓ | | 19,55 |
| 11 3013 110 | 12 | 25 | 8 | 70 | ✓ | | 14,60 |
| 11 3013 115 | 16 | 25 | 6 | 70 | ✓ | | 17,05 |
| 11 3013 120 | 16 | 25 | 8 | 70 | ✓ | | 18,45 |

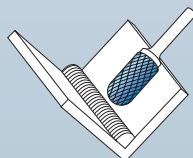
- 1
- 2
- 3
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- 5
- 6
- 7
- 8
- 9

11 5023



C FORM / SHAPE WRC

Walzenrundform
Ball nosed cylinder



Schnittdaten
Cutting data

i

739

Film
Movie

▶

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|-----|-------------------|--------------|-------|
| 11 5023 020 | ● 2 | 11 | 3 | 38 | | ✓ | 9,25 |
| 11 5023 025 | ● 3 | 14 | 3 | 38 | | ✓ | 9,25 |
| 11 5023 030 | ● 3 | 14 | 3 | 50 | | ✓ | 12,00 |
| 11 5023 035 | ● 3 | 14 | 3 | 75 | | ✓ | 13,15 |
| 11 5023 040 | ● 3 | 14 | 3 | 100 | | ✓ | 15,75 |
| 11 5023 045 | ● 4 | 16 | 6 | 50 | | ✓ | 14,00 |
| 11 5023 050 | ● 6 | 12,7 | 3 | 44 | ✓ | | 13,95 |
| 11 5023 055 | ● 6 | 18 | 6 | 50 | | ✓ | 14,00 |
| 11 5023 060 | ● 6 | 18 | 6 | 100 | ✓ | | 25,45 |
| 11 5023 065 | ● 6 | 18 | 6 | 150 | ✓ | | 25,95 |
| 11 5023 070 | ● 6 | 25 | 6 | 50 | ✓ | | 10,50 |
| 11 5023 075 | ● 8 | 20 | 6 | 65 | ✓ | | 16,75 |
| 11 5023 080 | ● 8 | 20 | 6 | 170 | ✓ | | 23,25 |
| 11 5023 085 | ● 10 | 20 | 6 | 65 | ✓ | | 19,45 |
| 11 5023 090 | ● 10 | 20 | 6 | 170 | ✓ | | 15,85 |
| 11 5023 095 | ● 10 | 25 | 6 | 70 | ✓ | | 12,05 |
| 11 5023 100 | ● 12 | 20 | 6 | 65 | ✓ | | 16,90 |
| 11 5023 105 | ● 12 | 25 | 6 | 70 | ✓ | | 30,30 |
| 11 5023 110 | ● 12 | 25 | 6 | 175 | ✓ | | 23,65 |
| 11 5023 115 | ● 12 | 25 | 8 | 70 | ✓ | | 17,80 |
| 11 5023 120 | ● 16 | 25 | 6 | 70 | ✓ | | 19,95 |
| 11 5023 125 | ● 16 | 25 | 8 | 70 | ✓ | | 21,45 |

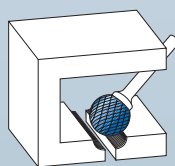
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|-----|-------------------|--------------|-------|
| 11 3023 020 | ● 2 | 11 | 3 | 38 | | ✓ | 3,95 |
| 11 3023 025 | ● 3 | 14 | 3 | 38 | | ✓ | 7,25 |
| 11 3023 030 | ● 3 | 14 | 3 | 50 | | ✓ | 9,95 |
| 11 3023 035 | ● 3 | 14 | 3 | 75 | | ✓ | 11,10 |
| 11 3023 040 | ● 3 | 14 | 3 | 100 | | ✓ | 7,60 |
| 11 3023 045 | ● 4 | 16 | 6 | 50 | | ✓ | 12,00 |
| 11 3023 050 | ● 6 | 12,7 | 3 | 44 | ✓ | | 11,95 |
| 11 3023 055 | ● 6 | 18 | 6 | 50 | | ✓ | 12,00 |
| 11 3023 060 | ● 6 | 18 | 6 | 100 | ✓ | | 12,75 |
| 11 3023 065 | ● 6 | 18 | 6 | 150 | ✓ | | 17,95 |
| 11 3023 070 | ● 6 | 25 | 6 | 50 | ✓ | | 9,40 |
| 11 3023 075 | ● 8 | 20 | 6 | 65 | ✓ | | 14,75 |
| 11 3023 080 | ● 8 | 20 | 6 | 170 | ✓ | | 21,25 |
| 11 3023 085 | ● 10 | 20 | 6 | 65 | ✓ | | 16,20 |
| 11 3023 090 | ● 10 | 20 | 6 | 170 | ✓ | | 12,30 |
| 11 3023 095 | ● 10 | 25 | 6 | 70 | ✓ | | 10,30 |
| 11 3023 100 | ● 12 | 20 | 6 | 65 | ✓ | | 14,30 |
| 11 3023 105 | ● 12 | 25 | 6 | 70 | ✓ | | 25,50 |
| 11 3023 110 | ● 12 | 25 | 6 | 175 | ✓ | | 19,35 |
| 11 3023 115 | ● 12 | 25 | 8 | 70 | ✓ | | 14,90 |
| 11 3023 120 | ● 16 | 25 | 6 | 70 | ✓ | | 32,00 |
| 11 3023 125 | ● 16 | 25 | 8 | 70 | ✓ | | 18,90 |

11 5033



D FORM / SHAPE KUD

Kugel
Ball



Schnittdaten
Cutting data

i

739

Film
Movie

▶

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|-----|-------------------|--------------|-------|
| 11 5033 020 | ● 2 | 1,8 | 3 | 38 | | ✓ | 9,25 |
| 11 5033 025 | ● 3 | 2,5 | 3 | 38 | | ✓ | 9,25 |
| 11 5033 030 | ● 3 | 2,5 | 3 | 50 | | ✓ | 11,20 |
| 11 5033 035 | ● 3 | 2,5 | 3 | 75 | | ✓ | 12,45 |
| 11 5033 040 | ● 3 | 2,5 | 6 | 50 | ✓ | | 7,10 |
| 11 5033 045 | ● 4 | 3,0 | 3 | 38 | | ✓ | 19,50 |
| 11 5033 050 | ● 6 | 5,0 | 3 | 38 | ✓ | | 12,70 |
| 11 5033 055 | ● 6 | 4,7 | 6 | 50 | | ✓ | 13,10 |
| 11 5033 060 | ● 8 | 6,0 | 6 | 52 | ✓ | | 13,90 |
| 11 5033 065 | ● 8 | 6,0 | 6 | 180 | ✓ | | 19,10 |
| 11 5033 070 | ● 10 | 8,0 | 6 | 54 | ✓ | | 17,00 |
| 11 5033 075 | ● 10 | 8,0 | 6 | 185 | ✓ | | 25,25 |
| 11 5033 080 | ● 12 | 11,0 | 6 | 56 | ✓ | | 23,35 |
| 11 5033 085 | ● 12 | 11,0 | 8 | 56 | ✓ | | 12,65 |
| 11 5033 090 | ● 12 | 11,0 | 6 | 162 | ✓ | | 33,20 |
| 11 5033 095 | ● 16 | 14,0 | 6 | 60 | ✓ | | 27,00 |
| 11 5033 100 | ● 16 | 14,0 | 8 | 60 | ✓ | | 29,55 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|-----|-------------------|--------------|-------|
| 11 3033 020 | ● 2 | 1,8 | 3 | 38 | | ✓ | 7,25 |
| 11 3033 025 | ● 3 | 2,5 | 3 | 38 | | ✓ | 7,25 |
| 11 3033 030 | ● 3 | 2,5 | 3 | 50 | | ✓ | 9,20 |
| 11 3033 035 | ● 3 | 2,5 | 3 | 75 | | ✓ | 5,70 |
| 11 3033 040 | ● 3 | 2,5 | 6 | 50 | ✓ | | 6,00 |
| 11 3033 045 | ● 4 | 3,0 | 3 | 38 | | ✓ | 17,45 |
| 11 3033 050 | ● 6 | 5,0 | 3 | 38 | ✓ | | 10,70 |
| 11 3033 055 | ● 6 | 4,7 | 6 | 50 | | ✓ | 11,05 |
| 11 3033 060 | ● 8 | 6,0 | 6 | 52 | ✓ | | 11,90 |
| 11 3033 065 | ● 8 | 6,0 | 6 | 180 | ✓ | | 17,10 |
| 11 3033 070 | ● 10 | 8,0 | 6 | 54 | ✓ | | 13,70 |
| 11 3033 075 | ● 10 | 8,0 | 6 | 185 | ✓ | | 10,15 |
| 11 3033 080 | ● 12 | 11,0 | 6 | 56 | ✓ | | 18,55 |
| 11 3033 085 | ● 12 | 11,0 | 8 | 56 | ✓ | | 10,05 |
| 11 3033 090 | ● 12 | 11,0 | 6 | 162 | ✓ | | 25,15 |
| 11 3033 095 | ● 16 | 14,0 | 6 | 60 | ✓ | | 12,05 |
| 11 3033 100 | ● 16 | 14,0 | 8 | 60 | ✓ | | 13,45 |

● Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



11 5043

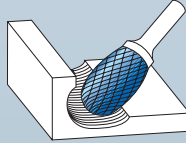


E FORM / SHAPE TRE



Tropfen

Oval



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5043 010 | • 3 | 6 | 3 | 38 | | ✓ | 9,25 |
| 11 5043 015 | • 6 | 10 | 3 | 42 | ✓ | | 13,95 |
| 11 5043 020 | • 6 | 10 | 6 | 50 | | ✓ | 15,55 |
| 11 5043 025 | • 8 | 15 | 6 | 60 | ✓ | | 17,95 |
| 11 5043 030 | • 10 | 16 | 6 | 60 | ✓ | | 19,45 |
| 11 5043 035 | • 12 | 22 | 6 | 67 | ✓ | | 28,50 |
| 11 5043 040 | • 12 | 22 | 8 | 67 | ✓ | | 16,45 |
| 11 5043 050 | • 16 | 25 | 8 | 70 | ✓ | | 21,95 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3043 010 | • 3 | 6 | 3 | 38 | | ✓ | 7,25 |
| 11 3043 015 | • 6 | 10 | 3 | 42 | ✓ | | 11,95 |
| 11 3043 020 | • 6 | 10 | 6 | 50 | | ✓ | 13,55 |
| 11 3043 025 | • 8 | 15 | 6 | 60 | ✓ | | 15,95 |
| 11 3043 030 | • 10 | 16 | 6 | 60 | ✓ | | 16,20 |
| 11 3043 035 | • 12 | 22 | 6 | 67 | ✓ | | 23,70 |
| 11 3043 040 | • 12 | 22 | 8 | 67 | ✓ | | 13,85 |
| 11 3043 045 | • 16 | 25 | 6 | 70 | ✓ | | 17,90 |

11 5053

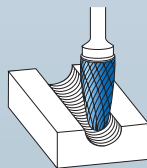


F FORM / SHAPE RBF



Rundbogen

Ball nosed tree



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|-----|-------------------|--------------|-------|
| 11 5053 010 | • 3 | 8 | 3 | 38 | | ✓ | 9,25 |
| 11 5053 015 | • 3 | 14 | 3 | 38 | | ✓ | 9,25 |
| 11 5053 020 | • 3 | 14 | 3 | 50 | | ✓ | 12,00 |
| 11 5053 025 | • 6 | 12 | 3 | 44 | ✓ | | 13,95 |
| 11 5053 030 | • 6 | 18 | 6 | 50 | | ✓ | 14,60 |
| 11 5053 035 | • 8 | 20 | 6 | 65 | ✓ | | 19,05 |
| 11 5053 040 | • 10 | 20 | 6 | 65 | ✓ | | 19,10 |
| 11 5053 045 | • 10 | 20 | 6 | 170 | ✓ | | 28,80 |
| 11 5053 050 | • 12 | 25 | 6 | 70 | ✓ | | 28,20 |
| 11 5053 055 | • 12 | 25 | 8 | 70 | ✓ | | 16,40 |
| 11 5053 060 | • 12 | 25 | 6 | 175 | ✓ | | 22,00 |
| 11 5053 065 | • 16 | 25 | 6 | 70 | ✓ | | 20,15 |
| 11 5053 070 | • 16 | 25 | 8 | 80 | ✓ | | 21,25 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|-----|-------------------|--------------|-------|
| 11 3053 010 | • 3 | 8 | 3 | 38 | | ✓ | 3,95 |
| 11 3053 015 | • 3 | 14 | 3 | 38 | | ✓ | 7,25 |
| 11 3053 020 | • 3 | 14 | 3 | 50 | | ✓ | 5,40 |
| 11 3053 025 | • 6 | 12 | 3 | 44 | ✓ | | 11,95 |
| 11 3053 030 | • 6 | 18 | 6 | 50 | | ✓ | 12,55 |
| 11 3053 035 | • 8 | 20 | 6 | 65 | ✓ | | 17,05 |
| 11 3053 040 | • 10 | 20 | 6 | 65 | ✓ | | 15,80 |
| 11 3053 045 | • 10 | 20 | 6 | 170 | ✓ | | 12,05 |
| 11 3053 050 | • 12 | 25 | 6 | 70 | ✓ | | 23,40 |
| 11 3053 055 | • 12 | 25 | 8 | 70 | ✓ | | 13,45 |
| 11 3053 060 | • 12 | 25 | 6 | 175 | ✓ | | 17,75 |
| 11 3053 065 | • 16 | 25 | 6 | 70 | ✓ | | 17,55 |
| 11 3053 070 | • 16 | 25 | 8 | 80 | ✓ | | 18,70 |



11 5063

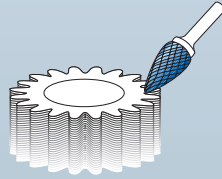


G FORM / SHAPE **SPG**



Spitzbogen

Tree



Schnittdaten Cutting data **i** 739

Film Movie **▶**

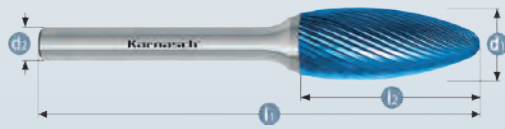
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|-----|----------------|-----------|-------|
| 11 5063 010 | ● 3 | 6 | 3 | 38 | | ✓ | 9,25 |
| 11 5063 015 | ● 3 | 14 | 3 | 38 | | ✓ | 9,25 |
| 11 5063 020 | ● 3 | 14 | 3 | 50 | | ✓ | 10,90 |
| 11 5063 025 | ● 3 | 14 | 3 | 75 | | ✓ | 12,95 |
| 11 5063 030 | ● 6 | 12 | 3 | 44 | ✓ | | 13,95 |
| 11 5063 035 | ● 6 | 18 | 6 | 50 | | ✓ | 14,60 |
| 11 5063 040 | ● 8 | 20 | 6 | 65 | ✓ | | 17,30 |
| 11 5063 045 | ● 10 | 20 | 6 | 65 | ✓ | | 20,20 |
| 11 5063 050 | ● 10 | 20 | 6 | 170 | ✓ | | 16,35 |
| 11 5063 055 | ● 12 | 20 | 6 | 65 | ✓ | | 15,40 |
| 11 5063 060 | ● 12 | 25 | 6 | 70 | ✓ | | 27,85 |
| 11 5063 065 | ● 12 | 25 | 8 | 70 | ✓ | | 29,20 |
| 11 5063 070 | ● 12 | 25 | 6 | 175 | ✓ | | 40,30 |
| 11 5063 075 | ● 12 | 30 | 6 | 75 | ✓ | | 31,75 |
| 11 5063 080 | ● 12 | 30 | 8 | 75 | ✓ | | 16,80 |
| 11 5063 085 | ● 16 | 25 | 6 | 70 | ✓ | | 19,90 |
| 11 5063 090 | ● 16 | 25 | 8 | 70 | ✓ | | 21,25 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|-----|----------------|-----------|-------|
| 11 3063 010 | ● 3 | 6 | 3 | 38 | | ✓ | 7,25 |
| 11 3063 015 | ● 3 | 14 | 3 | 38 | | ✓ | 7,25 |
| 11 3063 020 | ● 3 | 14 | 3 | 50 | | ✓ | 8,90 |
| 11 3063 025 | ● 3 | 14 | 3 | 75 | | ✓ | 5,95 |
| 11 3063 030 | ● 6 | 12 | 3 | 44 | ✓ | | 11,95 |
| 11 3063 035 | ● 6 | 18 | 6 | 50 | | ✓ | 12,55 |
| 11 3063 040 | ● 8 | 20 | 6 | 65 | ✓ | | 15,25 |
| 11 3063 045 | ● 10 | 20 | 6 | 65 | ✓ | | 16,90 |
| 11 3063 050 | ● 10 | 20 | 6 | 170 | ✓ | | 12,80 |
| 11 3063 055 | ● 12 | 20 | 6 | 65 | ✓ | | 12,50 |
| 11 3063 060 | ● 12 | 25 | 6 | 70 | ✓ | | 23,05 |
| 11 3063 065 | ● 12 | 25 | 8 | 70 | ✓ | | 13,25 |
| 11 3063 070 | ● 12 | 25 | 6 | 175 | ✓ | | 17,55 |
| 11 3063 075 | ● 12 | 30 | 6 | 75 | ✓ | | 26,95 |
| 11 3063 080 | ● 12 | 30 | 8 | 75 | ✓ | | 14,20 |
| 11 3063 085 | ● 16 | 25 | 6 | 70 | ✓ | | 31,90 |
| 11 3063 090 | ● 16 | 25 | 8 | 70 | ✓ | | 18,70 |

11 5073

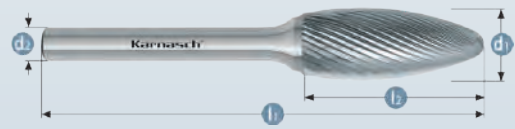
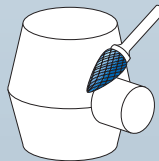


H FORM / SHAPE



Flamme

Flame



Schnittdaten Cutting data **i** 739

Film Movie **▶**

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|----------------|-----------|-------|
| 11 5073 005 | ● 3 | 6 | 3 | 38 | | ✓ | 9,25 |
| 11 5073 010 | ● 6 | 14 | 6 | 60 | | ✓ | 18,25 |
| 11 5073 015 | ● 8 | 20 | 6 | 65 | ✓ | | 18,70 |
| 11 5073 020 | ● 10 | 20 | 6 | 65 | ✓ | | 33,40 |
| 11 5073 025 | ● 12 | 32 | 6 | 77 | ✓ | | 39,15 |
| 11 5073 030 | ● 12 | 32 | 8 | 77 | ✓ | | 21,25 |
| 11 5073 035 | ● 16 | 36 | 6 | 82 | ✓ | | 28,00 |
| 11 5073 040 | ● 16 | 36 | 8 | 82 | ✓ | | 29,95 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|----------------|-----------|-------|
| 11 3073 005 | ● 3 | 6 | 3 | 38 | | ✓ | 7,25 |
| 11 3073 010 | ● 6 | 14 | 6 | 60 | | ✓ | 16,20 |
| 11 3073 015 | ● 8 | 20 | 6 | 65 | ✓ | | 16,65 |
| 11 3073 020 | ● 10 | 20 | 6 | 65 | ✓ | | 30,10 |
| 11 3073 025 | ● 12 | 32 | 6 | 77 | ✓ | | 34,40 |
| 11 3073 030 | ● 12 | 32 | 8 | 77 | ✓ | | 34,40 |
| 11 3073 035 | ● 16 | 36 | 6 | 82 | ✓ | | 46,80 |
| 11 3073 040 | ● 16 | 36 | 8 | 82 | ✓ | | 49,30 |

● Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

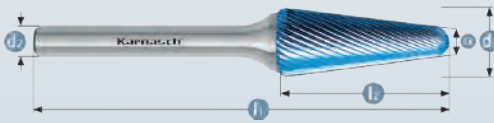


11 5083



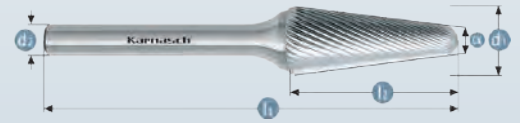
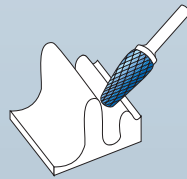
L FORM / SHAPE

KEL



Rundkegel

Ball nosed cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|-----|-------------------|--------------|-----|-------|
| 11 5083 005 | • 3 | 10 | 3 | 38 | | ✓ | 10° | 9,25 |
| 11 5083 010 | • 3 | 14 | 3 | 38 | | ✓ | 8° | 9,25 |
| 11 5083 015 | • 6 | 16 | 3 | 48 | ✓ | | 22° | 14,80 |
| 11 5083 020 | • 6 | 18 | 6 | 50 | | ✓ | 14° | 14,85 |
| 11 5083 025 | • 8 | 25 | 6 | 70 | ✓ | | 14° | 18,90 |
| 11 5083 030 | • 10 | 20 | 6 | 65 | ✓ | | 14° | 23,65 |
| 11 5083 035 | • 10 | 30 | 6 | 75 | ✓ | | 14° | 23,55 |
| 11 5083 040 | • 10 | 30 | 6 | 176 | ✓ | | 14° | 18,95 |
| 11 5083 045 | • 12 | 32 | 6 | 77 | ✓ | | 14° | 30,00 |
| 11 5083 050 | • 12 | 32 | 8 | 77 | ✓ | | 14° | 16,25 |
| 11 5083 055 | • 12 | 32 | 6 | 182 | ✓ | | 14° | 24,70 |
| 11 5083 060 | • 16 | 33 | 6 | 78 | ✓ | | 14° | 43,65 |
| 11 5083 065 | • 16 | 33 | 8 | 78 | ✓ | | 14° | 43,65 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|-----|-------------------|--------------|-----|-------|
| 11 3083 005 | • 3 | 10 | 3 | 38 | | ✓ | 10° | 3,95 |
| 11 3083 010 | • 3 | 14 | 3 | 38 | | ✓ | 8° | 7,25 |
| 11 3083 015 | • 6 | 16 | 3 | 48 | ✓ | | 22° | 12,75 |
| 11 3083 020 | • 6 | 18 | 6 | 50 | | ✓ | 14° | 12,85 |
| 11 3083 025 | • 8 | 25 | 6 | 70 | ✓ | | 14° | 16,90 |
| 11 3083 030 | • 10 | 20 | 6 | 65 | ✓ | | 14° | 21,75 |
| 11 3083 035 | • 10 | 30 | 6 | 75 | ✓ | | 14° | 20,25 |
| 11 3083 040 | • 10 | 30 | 6 | 176 | ✓ | | 14° | 15,45 |
| 11 3083 045 | • 12 | 32 | 6 | 77 | ✓ | | 14° | 25,25 |
| 11 3083 050 | • 12 | 32 | 8 | 77 | ✓ | | 14° | 13,70 |
| 11 3083 055 | • 12 | 32 | 6 | 182 | ✓ | | 14° | 37,50 |
| 11 3083 060 | • 16 | 33 | 6 | 78 | ✓ | | 14° | 21,10 |
| 11 3083 065 | • 16 | 33 | 8 | 78 | ✓ | | 14° | 21,10 |

11 5093



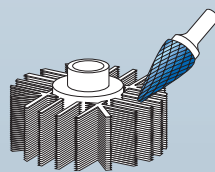
M FORM / SHAPE

SKM



Spitzkegel

Cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 5093 010 | • 3 | 8 | 3 | 38 | | ✓ | 18° | 9,25 |
| 11 5093 015 | • 3 | 11 | 3 | 38 | | ✓ | 14° | 9,25 |
| 11 5093 020 | • 3 | 15 | 3 | 38 | | ✓ | 10° | 9,25 |
| 11 5093 025 | • 6 | 12 | 3 | 48 | ✓ | | 22° | 13,95 |
| 11 5093 030 | • 6 | 20 | 6 | 50 | | ✓ | 14° | 14,85 |
| 11 5093 035 | • 8 | 18 | 6 | 63 | ✓ | | 13° | 18,35 |
| 11 5093 040 | • 10 | 20 | 6 | 65 | ✓ | | 28° | 23,55 |
| 11 5093 045 | • 12 | 25 | 6 | 70 | ✓ | | 28° | 29,20 |
| 11 5093 050 | • 12 | 25 | 8 | 70 | ✓ | | 28° | 15,80 |
| 11 5093 055 | • 16 | 26 | 6 | 74 | ✓ | | 33° | 38,70 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 3093 010 | • 3 | 8 | 3 | 38 | | ✓ | 18° | 7,25 |
| 11 3093 015 | • 3 | 11 | 3 | 38 | | ✓ | 14° | 7,25 |
| 11 3093 020 | • 3 | 15 | 3 | 38 | | ✓ | 10° | 7,25 |
| 11 3093 025 | • 6 | 12 | 3 | 48 | ✓ | | 22° | 11,95 |
| 11 3093 030 | • 6 | 20 | 6 | 50 | | ✓ | 14° | 12,85 |
| 11 3093 035 | • 8 | 18 | 6 | 63 | ✓ | | 13° | 16,35 |
| 11 3093 040 | • 10 | 20 | 6 | 65 | ✓ | | 28° | 20,25 |
| 11 3093 045 | • 12 | 25 | 6 | 70 | ✓ | | 28° | 24,40 |
| 11 3093 050 | • 12 | 25 | 8 | 70 | ✓ | | 28° | 13,25 |
| 11 3093 055 | • 16 | 26 | 6 | 74 | ✓ | | 33° | 18,40 |
| 11 3093 060 | • 16 | 26 | 8 | 74 | ✓ | | 33° | 19,80 |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

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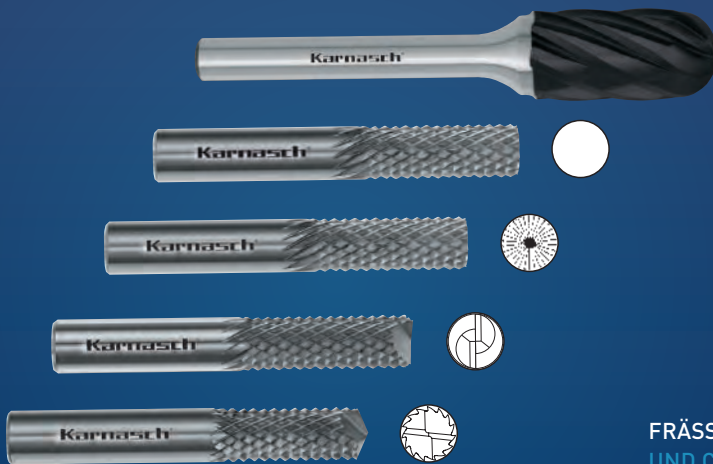
Qualitätsprodukte für die Metallbearbeitung.
Quality products for metalworking.



→ AUTOMOBILINDUSTRIE
→ AUTOMOTIVE

→ LUFTFAHRTINDUSTRIE
→ AEROSPACE INDUSTRY

→ RAUMFAHRTINDUSTRIE
→ OUTER SPACE INDUSTRY



FRÄSSTIFTE SPEZIELL FÜR ABRASIVE WERKSTOFFE WIE GFK UND CFK, AL > 30% SI/ MAGNESIUM SIEHE HP-7 VERZÄHNUNG SEITE 722-729 SOWIE UNSERE ART. 11 6001, 11 6002, 11 6003, 11 6004 SIEHE SEITE 781



ROTARY BURRS SPECIALLY DESIGNED FOR ABRASIVE MATERIALS SUCH AS GRP AND CFRP AND AL > 30% SI/MAGNESIUM SEE HP-7 CUT ON PAGE 722-729 AND OUR ART. 11 6001, 11 6002, 11 6003, 11 6004 SEE PAGE 781



HP-6

Extrem grobe Kreuzverzahnung Extremely rough cross cutting style











ANWENDUNG · APPLICATION

| | | | | | | | | | |
|---|---|---|---|--|---|--|---|---|--|
|  Stahl Steel |  Gehärteter Stahl Hardened steel |  Edelstahl Stainless |  Gusseisen Cast iron |  Titan Titanium |  Cermet Cermet |  Nickel Nickel |  Kupfer, Kupferlegierungen Copper, copper alloys |  Alu Alu |  Kunststoffe GFK/CFK Plastics GRP/CRP |
|---|---|---|---|--|---|--|---|---|--|

✓ OPTIMAL
OPTIMAL
✓ GUT
GOOD

- Extrem hoher Materialabtrag (Schuppen)
- Für alle Stahlsorten wie:
 - Gusseisen
 - Stahl < 60 HRC
- Auch für Kupfer, Messing, Bronze
- Für den harten Schruppeinsatz wie z.B. auf Werften, Gießereien entwickelt.
- Extremely fast metal removal (roughing)
- For all ferrous metals, such as:
 - Cast iron
 - Steel < 60 HRC
- Also for copper, brass, bronze
- Developed for use in tough roughing conditions, such as, e.g., on shipyards, foundries.

Lagerprogramm + Katalogseiten · Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM |
|---|--|---|---|---|---|--|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 5004 Art. 11 5004 | Art. 11 5014 Art. 11 3014 | Art. 11 5024 Art. 11 3024 | Art. 11 5034 Art. 11 3034 | Art. 11 5044 Art. 11 3044 | Art. 11 5054 Art. 11 3054 | Art. 11 5064 Art. 11 3064 | Art. 11 5074 Art. 11 3074 | Art. 11 5084 Art. 11 3084 | Art. 11 5094 Art. 11 3094 |
|  |  |  |  |  |  |  |  |  |  |
| 748 | 748 | 749 | 749 | 750 | 750 | 751 | 751 | 752 | 752 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone |



BLUE-TEC-beschichtet
BLUE-TEC-coated

Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|------------------|---|---|---|--------------------------------|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm ² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Grobes Zerspanen = hoher Materialabtrag mit Schlagbelastung | 250 - 600 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 250 - 350 |
| NE-Metalle | Hochwarmfeste Werkstoffe | Nickelbasis- und Kobaltbasislegierungen, (Triebwerk- und Turbinenbau) | Grobes Zerspanen = hoher Materialabtrag mit Schlagbelastung | 250 - 450 |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/ Sphäroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | Grobes Zerspanen = hoher Materialabtrag mit Schlagbelastung | 250 - 600 |

| Material groups | | | Application | Cutting speed m/min |
|--------------------|---|--|--|---------------------|
| Steel cast steel | Non-hardened, non-heat treated steels up to 1200 N/mm ² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Coarse machining = high stock removal with impact load | 250 - 600 |
| | Hardened, heat treated steels exceeding 1200 N/mm ² (> 38 HRC) | tool steels, tempering steels, alloyed steels, cast steels | | 250 - 350 |
| Non-Ferrous metals | High-temperature resistant materials | Nickel based alloys (aircraft engine and turbine construction) | Coarse machining = high stock removal with impact load | 250 - 450 |
| Cast iron | Grey cast iron, white cast iron | Cast-iron with flake graphite EN-GJL (GG), with nodular graphite cast iron EN-GJS (GGG), white annealed cast iron EN-GJMW (GTW), black cast iron EN-GJMB (GTS) | Coarse machining = high stock removal with impact load | 250 - 600 |



| Schnittgeschwindigkeit • Cutting speed (m/min) | | | | |
|--|--|--------|--------|--------|
| | 250 | 500 | 600 | 900 |
| ∅ (mm) | Drehzahlen (min ⁻¹) • Rotational speed (rpm) | | | |
| 6 | 13.000 | 27.000 | 32.000 | 48.000 |
| 8 | 10.000 | 20.000 | 24.000 | 36.000 |
| 10 | 8.000 | 16.000 | 19.000 | 29.000 |
| 12 | 7.000 | 13.000 | 16.000 | 24.000 |
| 16 | 5.000 | 10.000 | 12.000 | 18.000 |



11 5004

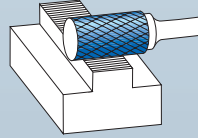


A FORM / SHAPE ZYA



Zylinder ohne Stirnverzahnung

Cylinder without end cut



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5004 065 | • 6 | 18 | 6 | 50 | | ✓ | 12,40 |
| 11 5004 080 | • 8 | 20 | 6 | 65 | ✓ | | 15,55 |
| 11 5004 090 | • 10 | 20 | 6 | 65 | ✓ | | 18,50 |
| 11 5004 100 | • 10 | 25 | 6 | 70 | ✓ | | 20,60 |
| 11 5004 105 | • 12 | 25 | 6 | 70 | ✓ | | 27,45 |
| 11 5004 115 | • 12 | 25 | 8 | 70 | ✓ | | 28,80 |
| 11 5004 120 | • 16 | 25 | 6 | 70 | ✓ | | 33,40 |
| 11 5004 125 | • 16 | 25 | 8 | 70 | ✓ | | 19,45 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3004 065 | • 6 | 18 | 6 | 50 | | ✓ | 10,40 |
| 11 3004 080 | • 8 | 20 | 6 | 65 | ✓ | | 13,55 |
| 11 3004 090 | • 10 | 20 | 6 | 65 | ✓ | | 15,20 |
| 11 3004 100 | • 10 | 25 | 6 | 70 | ✓ | | 17,30 |
| 11 3004 105 | • 12 | 25 | 6 | 70 | ✓ | | 22,70 |
| 11 3004 115 | • 12 | 25 | 8 | 70 | ✓ | | 24,05 |
| 11 3004 120 | • 16 | 25 | 6 | 70 | ✓ | | 28,60 |
| 11 3004 125 | • 16 | 25 | 8 | 70 | ✓ | | 16,90 |

11 5014

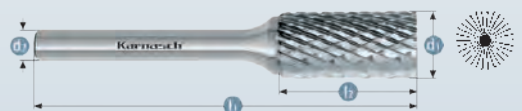
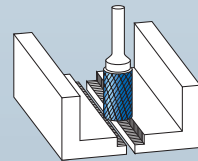


B FORM / SHAPE ZYB



Zylinder mit Stirnverzahnung

Cylinder with end cut



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5014 050 | • 6 | 18 | 6 | 50 | | ✓ | 13,30 |
| 11 5014 075 | • 8 | 20 | 6 | 65 | ✓ | | 16,90 |
| 11 5014 085 | • 10 | 20 | 6 | 65 | ✓ | | 19,30 |
| 11 5014 100 | • 12 | 25 | 6 | 70 | ✓ | | 29,75 |
| 11 5014 110 | • 12 | 25 | 8 | 70 | ✓ | | 16,85 |
| 11 5014 120 | • 16 | 25 | 8 | 70 | ✓ | | 38,75 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3014 050 | • 6 | 18 | 6 | 50 | | ✓ | 11,30 |
| 11 3014 075 | • 8 | 20 | 6 | 65 | ✓ | | 14,90 |
| 11 3014 085 | • 10 | 20 | 6 | 65 | ✓ | | 16,00 |
| 11 3014 100 | • 12 | 25 | 6 | 70 | ✓ | | 25,00 |
| 11 3014 110 | • 12 | 25 | 8 | 70 | ✓ | | 26,30 |
| 11 3014 115 | • 16 | 25 | 6 | 70 | ✓ | | 31,40 |
| 11 3014 120 | • 16 | 25 | 8 | 70 | ✓ | | 18,45 |

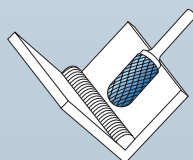
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11 5024



C FORM / SHAPE WRC

Walzenrundform
Ball nosed cylinder



Schnittdaten
Cutting data



747

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5024 055 | • 6 | 18 | 6 | 50 | | ✓ | 14,00 |
| 11 5024 075 | • 8 | 20 | 6 | 65 | ✓ | | 16,75 |
| 11 5024 085 | • 10 | 20 | 6 | 65 | ✓ | | 19,45 |
| 11 5024 105 | • 12 | 25 | 6 | 70 | ✓ | | 30,30 |
| 11 5024 115 | • 12 | 25 | 8 | 70 | ✓ | | 31,70 |
| 11 5024 120 | • 16 | 25 | 6 | 70 | ✓ | | 36,75 |
| 11 5024 125 | • 16 | 25 | 8 | 70 | ✓ | | 38,85 |

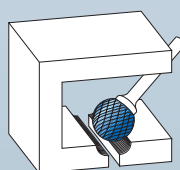
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3024 055 | • 6 | 18 | 6 | 50 | | ✓ | 12,00 |
| 11 3024 075 | • 8 | 20 | 6 | 65 | ✓ | | 14,75 |
| 11 3024 085 | • 10 | 20 | 6 | 65 | ✓ | | 16,20 |
| 11 3024 105 | • 12 | 25 | 6 | 70 | ✓ | | 25,50 |
| 11 3024 115 | • 12 | 25 | 8 | 70 | ✓ | | 26,90 |
| 11 3024 120 | • 16 | 25 | 6 | 70 | ✓ | | 32,00 |
| 11 3024 125 | • 16 | 25 | 8 | 70 | ✓ | | 34,05 |

11 5034



D FORM / SHAPE KUD

Kugel
Ball



Schnittdaten
Cutting data



747

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|-------------------|--------------|-------|
| 11 5034 055 | • 6 | 4,7 | 6 | 50 | | ✓ | 13,10 |
| 11 5034 060 | • 8 | 6,0 | 6 | 52 | ✓ | | 13,90 |
| 11 5034 070 | • 10 | 8,0 | 6 | 54 | ✓ | | 16,75 |
| 11 5034 080 | • 12 | 11,0 | 6 | 56 | ✓ | | 22,95 |
| 11 5034 085 | % 12 | 11,0 | 8 | 56 | ✓ | | 12,45 |
| 11 5034 095 | • 16 | 14,0 | 6 | 60 | ✓ | | 27,00 |
| 11 5034 100 | % 16 | 14,0 | 8 | 60 | ✓ | | 16,60 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|-------------------|--------------|-------|
| 11 3034 055 | • 6 | 4,7 | 6 | 50 | | ✓ | 11,05 |
| 11 3034 060 | • 8 | 6,0 | 6 | 52 | ✓ | | 11,90 |
| 11 3034 070 | • 10 | 8,0 | 6 | 54 | ✓ | | 13,45 |
| 11 3034 080 | • 12 | 11,0 | 6 | 56 | ✓ | | 18,15 |
| 11 3034 085 | • 12 | 11,0 | 8 | 56 | ✓ | | 18,15 |
| 11 3034 095 | • 16 | 14,0 | 6 | 60 | ✓ | | 22,25 |
| 11 3034 100 | % 16 | 14,0 | 8 | 60 | ✓ | | 14,05 |

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Special price / sale article. While stocks last.

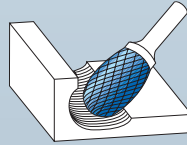
11 5044



E FORM / SHAPE TRE

Tropfen

Oval



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5044 020 | • 6 | 10 | 6 | 50 | | ✓ | 15,55 |
| 11 5044 025 | • 8 | 15 | 6 | 60 | ✓ | | 17,65 |
| 11 5044 030 | • 10 | 16 | 6 | 60 | ✓ | | 19,45 |
| 11 5044 035 | • 12 | 22 | 6 | 67 | ✓ | | 28,50 |
| 11 5044 040 | • 12 | 22 | 8 | 67 | ✓ | | 29,80 |
| 11 5044 045 | • 16 | 25 | 6 | 70 | ✓ | | 37,75 |
| 11 5044 050 | • 16 | 25 | 8 | 70 | ✓ | | 39,75 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3044 020 | • 6 | 10 | 6 | 50 | | ✓ | 13,55 |
| 11 3044 025 | • 8 | 15 | 6 | 60 | ✓ | | 15,65 |
| 11 3044 030 | • 10 | 16 | 6 | 60 | ✓ | | 16,20 |
| 11 3044 035 | • 12 | 22 | 6 | 67 | ✓ | | 23,70 |
| 11 3044 040 | • 12 | 22 | 8 | 67 | ✓ | | 13,60 |
| 11 3044 045 | • 16 | 25 | 6 | 70 | ✓ | | 33,00 |

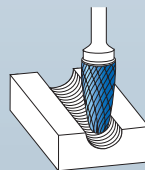
11 5054



F FORM / SHAPE RBF

Rundbogen

Ball nosed tree



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5054 030 | • 6 | 18 | 6 | 50 | | ✓ | 14,60 |
| 11 5054 035 | • 8 | 20 | 6 | 65 | ✓ | | 18,75 |
| 11 5054 040 | • 10 | 20 | 6 | 65 | ✓ | | 19,10 |
| 11 5054 050 | • 12 | 25 | 6 | 70 | ✓ | | 29,15 |
| 11 5054 055 | • 12 | 25 | 8 | 70 | ✓ | | 29,15 |
| 11 5054 065 | • 16 | 25 | 6 | 70 | ✓ | | 38,60 |
| 11 5054 070 | • 16 | 25 | 8 | 70 | ✓ | | 38,60 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3054 030 | • 6 | 18 | 6 | 50 | | ✓ | 12,55 |
| 11 3054 035 | • 8 | 20 | 6 | 65 | ✓ | | 16,75 |
| 11 3054 040 | • 10 | 20 | 6 | 65 | ✓ | | 15,80 |
| 11 3054 050 | • 12 | 25 | 6 | 70 | ✓ | | 24,35 |
| 11 3054 055 | • 12 | 25 | 8 | 70 | ✓ | | 24,35 |
| 11 3054 065 | • 16 | 25 | 6 | 70 | ✓ | | 33,80 |
| 11 3054 070 | • 16 | 25 | 8 | 70 | ✓ | | 18,35 |



Index

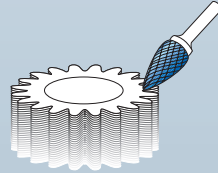
11 5064



G FORM / SHAPE SPG

Spitzbogen

Tree



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 747 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5064 035 | • 6 | 18 | 6 | 50 | | ✓ | 14,60 |
| 11 5064 040 | • 8 | 20 | 6 | 65 | ✓ | | 17,30 |
| 11 5064 045 | • 10 | 20 | 6 | 65 | ✓ | | 20,20 |
| 11 5064 060 | • 12 | 25 | 6 | 70 | ✓ | | 28,75 |
| 11 5064 065 | • 12 | 25 | 8 | 70 | ✓ | | 28,75 |
| 11 5064 085 | • 16 | 25 | 6 | 70 | ✓ | | 36,70 |
| 11 5064 090 | % 16 | 25 | 8 | 70 | ✓ | | 21,70 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3064 035 | • 6 | 18 | 6 | 50 | | ✓ | 12,55 |
| 11 3064 040 | • 8 | 20 | 6 | 65 | ✓ | | 15,25 |
| 11 3064 045 | • 10 | 20 | 6 | 65 | ✓ | | 16,90 |
| 11 3064 060 | • 12 | 25 | 6 | 70 | ✓ | | 23,95 |
| 11 3064 065 | % 12 | 25 | 8 | 70 | ✓ | | 13,00 |
| 11 3064 090 | % 16 | 25 | 8 | 70 | ✓ | | 18,70 |

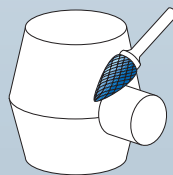
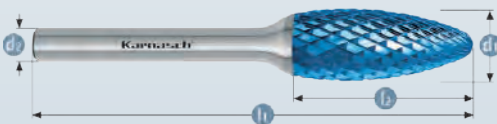
11 5074



H FORM / SHAPE

Flamme

Flame



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 747 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5074 010 | • 6 | 14 | 6 | 50 | | ✓ | 18,00 |
| 11 5074 015 | • 8 | 20 | 6 | 65 | ✓ | | 19,30 |
| 11 5074 020 | • 10 | 20 | 6 | 65 | ✓ | | 32,80 |
| 11 5074 025 | • 12 | 32 | 6 | 77 | ✓ | | 38,60 |
| 11 5074 030 | • 12 | 32 | 8 | 77 | ✓ | | 38,60 |
| 11 5074 035 | • 16 | 36 | 6 | 82 | ✓ | | 51,60 |
| 11 5074 040 | • 16 | 36 | 8 | 82 | ✓ | | 54,05 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 3074 010 | • 6 | 14 | 6 | 50 | | ✓ | 15,95 |
| 11 3074 015 | • 8 | 20 | 6 | 65 | ✓ | | 17,30 |
| 11 3074 020 | • 10 | 20 | 6 | 65 | ✓ | | 29,50 |
| 11 3074 025 | • 12 | 32 | 6 | 77 | ✓ | | 33,80 |
| 11 3074 030 | • 12 | 32 | 8 | 77 | ✓ | | 33,80 |
| 11 3074 035 | • 16 | 36 | 6 | 82 | ✓ | | 46,80 |
| 11 3074 040 | % 16 | 36 | 8 | 82 | ✓ | | 26,75 |

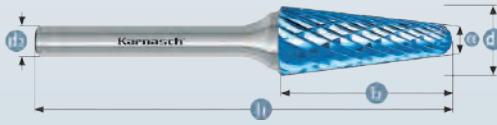
% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



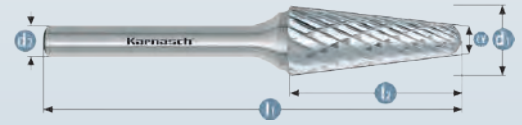
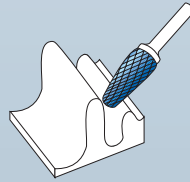
11 5084



L FORM / SHAPE KEL



Rundkegel
Ball nosed cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 5084 020 | • 6 | 18 | 6 | 50 | | ✓ | 14° | 14,85 |
| 11 5084 025 | • 8 | 25 | 6 | 70 | ✓ | | 14° | 18,90 |
| 11 5084 035 | • 10 | 30 | 6 | 75 | ✓ | | 14° | 23,55 |
| 11 5084 045 | • 12 | 32 | 6 | 77 | ✓ | | 14° | 29,50 |
| 11 5084 050 | • 12 | 32 | 8 | 77 | ✓ | | 14° | 29,50 |
| 11 5084 060 | • 16 | 33 | 6 | 78 | ✓ | | 14° | 42,95 |
| 11 5084 065 | % 16 | 33 | 8 | 78 | ✓ | | 14° | 23,30 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 3084 020 | • 6 | 18 | 6 | 50 | | ✓ | 14° | 12,85 |
| 11 3084 025 | • 8 | 25 | 6 | 70 | ✓ | | 14° | 16,90 |
| 11 3084 035 | • 10 | 30 | 6 | 75 | ✓ | | 14° | 20,25 |
| 11 3084 045 | • 12 | 32 | 6 | 77 | ✓ | | 14° | 24,70 |
| 11 3084 050 | • 12 | 32 | 8 | 77 | ✓ | | 14° | 24,70 |
| 11 3084 060 | % 16 | 33 | 6 | 78 | ✓ | | 14° | 20,70 |
| 11 3084 065 | • 16 | 33 | 8 | 78 | ✓ | | 14° | 38,15 |

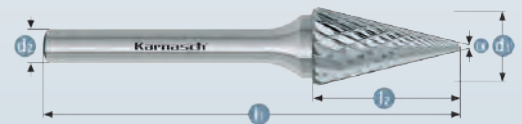
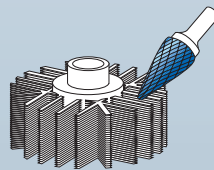
11 5094



M FORM / SHAPE SKM



Spitzkegel
Cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 5094 030 | • 6 | 20 | 6 | 50 | | ✓ | 14° | 14,85 |
| 11 5094 040 | • 10 | 20 | 6 | 65 | ✓ | | 13° | 23,10 |
| 11 5094 045 | • 12 | 25 | 6 | 70 | ✓ | | 28° | 28,75 |
| 11 5094 050 | % 12 | 25 | 8 | 70 | ✓ | | 28° | 15,60 |
| 11 5094 055 | • 16 | 26 | 6 | 74 | ✓ | | 33° | 38,70 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 3094 030 | • 6 | 20 | 6 | 50 | | ✓ | 14° | 12,85 |
| 11 3094 040 | • 10 | 20 | 6 | 65 | ✓ | | 13° | 19,85 |
| 11 3094 045 | • 12 | 25 | 6 | 70 | ✓ | | 28° | 23,95 |
| 11 3094 050 | % 12 | 25 | 8 | 70 | ✓ | | 28° | 13,00 |
| 11 3094 055 | % 16 | 26 | 6 | 74 | ✓ | | 33° | 18,40 |
| 11 3094 060 | % 16 | 26 | 8 | 74 | ✓ | | 33° | 19,45 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

- 1
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- 9



1



2



3



4



5



6



7



8



9

POWER.
PRECISION.
PERFORMANCE.

Karnasch®
PROFESSIONAL TOOLS


Index

HP-9

Speziell für Edelstahl. Extrem hohe Zerspanleistung

Epecially for stainless steel. Extremely high machining output.

ANWENDUNG · APPLICATION








| | | | | | | | | | |
|---|---|---|---|--|---|--|---|---|--|
|  Stahl Steel |  Gehärteter Stahl Hardened steel |  Edelstahl Stainless |  Gusseisen Cast iron |  Titan Titanium |  Cermet Cermet |  Nickel Nickel |  Kupfer, Kupferlegierungen Copper, copper alloys |  Alu Alu |  Kunststoffe GFK/CFK Plastics GRP/CRP |
|---|---|---|---|--|---|--|---|---|--|

✓ OPTIMAL
OPTIMAL
✓ GUT
GOOD

- Extrem hohe Zerspanleistung und Standzeit für alle austenitischen, rost- und säurebeständigen Stähle.
- Nickelbasis und Titanlegierungen (Drehzahl reduzieren um Funkenbildung zu vermeiden)
- Hochwertige Oberflächengüte
- Keine Anlauffarben am Werkstück durch geringe Wärmeentwicklung

- Extremely high machining output and service life for all austenitic, rust- and acid-resilient steels.
- Nickel basis and titanium alloy (reduce speed to avoid sparking)
- High-quality surface.
- No annealing colours at the workpiece due to low heat development.

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM |
|---|---|---|---|---|---|--|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 6031 Art. 11 4031 | Art. 11 6032 Art. 11 4032 | Art. 11 6033 Art. 11 4033 | Art. 11 6034 Art. 11 4034 | Art. 11 6035 Art. 11 4035 | Art. 11 6036 Art. 11 4036 | Art. 11 6037 Art. 11 4037 | Art. 11 6038 Art. 11 4038 | Art. 11 6039 Art. 11 4039 | Art. 11 6040 Art. 11 4040 |
|  |  |  |  |  |  |  |  |  |  |
| 756 | 756 | 757 | 757 | 758 | 758 | 759 | 759 | 760 | 760 |
| Zylinder Cylinder | Zylinder + Stirn- verzählung Cylinder + end cut | Walzenrund- form Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone |



Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|------------------|----------------------------------|--|--|--------------------------------|
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Grobes Zerspanen = Hoher Materialabtrag | 450 - 600 |
| | | | Feines Zerspanen = Geringer Materialabtrag | |

| Material groups | | | Application | Cutting speed m/min |
|----------------------|--------------------------------|--|---------------------------------------|---------------------|
| Stainless steel INOX | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Coarse machining = high stock removal | 450 - 600 |
| | | | Fine machining = low stock removal | |



| Schnittgeschwindigkeit • Cutting speed (m/min) | | |
|--|--|--------|
| | 450 | 600 |
| ∅ (mm) | Drehzahlen (min ⁻¹) • Rotational speed (rpm) | |
| 3 | 48.000 | 64.000 |
| 6 | 24.000 | 32.000 |
| 8 | 18.000 | 24.000 |
| 10 | 14.000 | 19.000 |
| 12 | 12.000 | 16.000 |
| 16 | 9.000 | 12.000 |



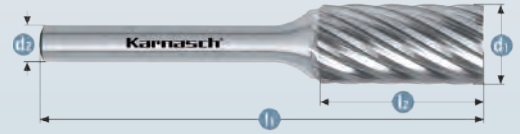
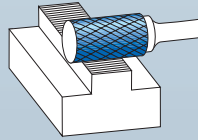
11 6031



A FORM / SHAPE ZYA

Zylinder ohne Stirnverzahnung

Cylinder without end cut



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|----|-------------------|--------------|-------|
| 11 6031 005 | • 3 | 14 | 3 | 38 | | ✓ | 11,00 |
| 11 6031 007 | • 6,3 | 12,7 | 3 | 45 | | ✓ | 18,10 |
| 11 6031 010 | • 6 | 18 | 6 | 50 | | ✓ | 13,35 |
| 11 6031 015 | • 8 | 20 | 6 | 65 | ✓ | | 16,75 |
| 11 6031 020 | • 10 | 20 | 6 | 65 | ✓ | | 19,20 |
| 11 6031 025 | • 12 | 25 | 6 | 70 | ✓ | | 29,45 |
| 11 6031 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|----|-------------------|--------------|-------|
| 11 4031 005 | • 3 | 14 | 3 | 38 | | ✓ | 8,95 |
| 11 4031 007 | • 6,3 | 12,7 | 3 | 45 | | ✓ | 16,05 |
| 11 4031 010 | • 6 | 18 | 6 | 50 | | ✓ | 11,35 |
| 11 4031 015 | • 8 | 20 | 6 | 65 | ✓ | | 14,75 |
| 11 4031 020 | • 10 | 20 | 6 | 65 | ✓ | | 15,90 |
| 11 4031 025 | • 12 | 25 | 6 | 70 | ✓ | | 24,65 |
| 11 4031 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

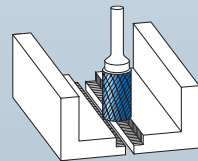
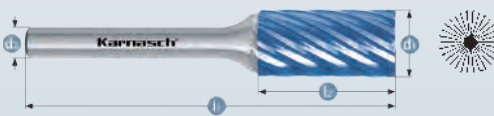
11 6032



B FORM / SHAPE ZYB

Zylinder mit Stirnverzahnung

Cylinder with end cut



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|---|
| 11 6032 015 | ○ 8 | 20 | 6 | 65 | ✓ | | - |
| 11 6032 020 | ○ 10 | 20 | 6 | 65 | ✓ | | - |
| 11 6032 025 | ○ 12 | 25 | 6 | 70 | ✓ | | - |
| 11 6032 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|---|
| 11 4032 015 | ○ 8 | 20 | 6 | 65 | ✓ | | - |
| 11 4032 020 | ○ 10 | 20 | 6 | 65 | ✓ | | - |
| 11 4032 025 | ○ 12 | 25 | 6 | 70 | ✓ | | - |
| 11 4032 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

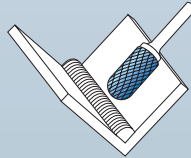


11 6033



C FORM / SHAPE WRC

Walzenrundform
Ball nosed cylinder



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 755 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|----|-------------------|--------------|-------|
| 11 6033 005 | • 3 | 14 | 3 | 38 | | ✓ | 11,00 |
| 11 6033 007 | • 6,3 | 12,7 | 3 | 45 | | ✓ | 16,65 |
| 11 6033 010 | • 6 | 18 | 6 | 50 | | ✓ | 15,15 |
| 11 6033 015 | • 8 | 20 | 6 | 65 | ✓ | | 18,10 |
| 11 6033 020 | • 10 | 20 | 6 | 65 | ✓ | | 20,95 |
| 11 6033 025 | • 12 | 25 | 6 | 70 | ✓ | | 32,55 |
| 11 6033 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

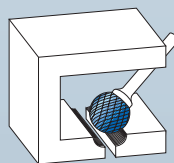
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|----|-------------------|--------------|-------|
| 11 4033 005 | • 3 | 14 | 3 | 38 | | ✓ | 8,95 |
| 11 4033 007 | • 6,3 | 12,7 | 3 | 45 | | ✓ | 14,60 |
| 11 4033 010 | • 6 | 18 | 6 | 50 | | ✓ | 13,15 |
| 11 4033 015 | • 8 | 20 | 6 | 65 | ✓ | | 16,05 |
| 11 4033 020 | • 10 | 20 | 6 | 65 | ✓ | | 17,70 |
| 11 4033 025 | • 12 | 25 | 6 | 70 | ✓ | | 27,80 |
| 11 4033 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

11 6034



D FORM / SHAPE KUD

Kugel
Ball



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 755 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|----|-------------------|--------------|-------|
| 11 6034 005 | • 3 | 2,5 | 3 | 38 | | ✓ | 11,00 |
| 11 6034 007 | • 6,3 | 5,0 | 3 | 38 | | ✓ | 16,25 |
| 11 6034 010 | % 6 | 4,7 | 6 | 50 | | ✓ | 14,05 |
| 11 6034 015 | • 8 | 6,0 | 6 | 52 | ✓ | | 14,95 |
| 11 6034 020 | • 10 | 8,0 | 6 | 54 | ✓ | | 17,80 |
| 11 6034 025 | • 12 | 11,0 | 6 | 56 | ✓ | | 24,35 |
| 11 6034 030 | ○ 16 | 11,0 | 6 | 60 | ✓ | | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|----|-------------------|--------------|-------|
| 11 4034 005 | • 3 | 2,5 | 3 | 38 | | ✓ | 8,95 |
| 11 4034 007 | • 6,3 | 5,0 | 3 | 38 | | ✓ | 14,25 |
| 11 4034 010 | % 6 | 4,7 | 6 | 50 | | ✓ | 6,65 |
| 11 4034 015 | • 8 | 6,0 | 6 | 52 | ✓ | | 12,90 |
| 11 4034 020 | • 10 | 8,0 | 6 | 54 | ✓ | | 14,55 |
| 11 4034 025 | • 12 | 11,0 | 6 | 56 | ✓ | | 19,55 |
| 11 4034 030 | ○ 16 | 11,0 | 6 | 60 | ✓ | | - |



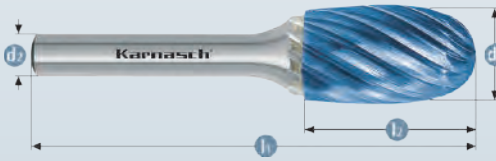
11 6035



E FORM / SHAPE TRE

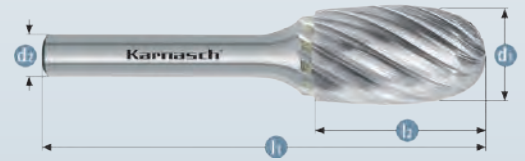
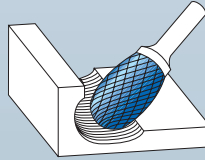


11 4035



Tropfen

Oval



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6035 015 | ● 8 | 15 | 6 | 60 | ✓ | | 19,90 |
| 11 6035 020 | ● 10 | 16 | 6 | 60 | ✓ | | 20,95 |
| 11 6035 025 | ● 12 | 22 | 6 | 67 | ✓ | | 30,65 |
| 11 6035 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4035 015 | ● 8 | 15 | 6 | 60 | ✓ | | 17,90 |
| 11 4035 020 | ● 10 | 16 | 6 | 60 | ✓ | | 17,70 |
| 11 4035 025 | ● 12 | 22 | 6 | 67 | ✓ | | 25,85 |
| 11 4035 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

11 6036



F FORM / SHAPE RBF

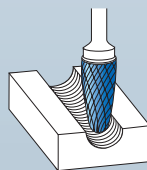


11 4036



Rundbogen

Ball nosed tree



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|----|-------------------|--------------|-------|
| 11 6036 005 | ● 3 | 14 | 3 | 38 | | ✓ | 11,00 |
| 11 6036 007 | ● 6,3 | 12,7 | 3 | 45 | | ✓ | 16,65 |
| 11 6036 010 | ● 6 | 18 | 6 | 50 | | ✓ | 15,75 |
| 11 6036 015 | ● 8 | 20 | 6 | 65 | ✓ | | 21,10 |
| 11 6036 020 | ● 10 | 20 | 6 | 65 | ✓ | | 20,45 |
| 11 6036 025 | ● 12 | 25 | 6 | 70 | ✓ | | 28,55 |
| 11 6036 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|----|-------------------|--------------|-------|
| 11 4036 005 | ● 3 | 14 | 3 | 38 | | ✓ | 8,95 |
| 11 4036 007 | ● 6,3 | 12,7 | 3 | 45 | | ✓ | 8,10 |
| 11 4036 010 | ● 6 | 18 | 6 | 50 | | ✓ | 13,75 |
| 11 4036 015 | ● 8 | 20 | 6 | 65 | ✓ | | 19,10 |
| 11 4036 020 | ● 10 | 20 | 6 | 65 | ✓ | | 17,20 |
| 11 4036 025 | ● 12 | 25 | 6 | 70 | ✓ | | 23,75 |
| 11 4036 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

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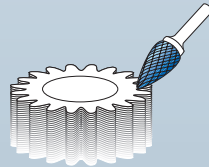
11 6037



G FORM / SHAPE SPG

Spitzbogen

Tree



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 755 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6037 010 | • 6 | 18 | 6 | 50 | | ✓ | 15,75 |
| 11 6037 015 | • 8 | 20 | 6 | 65 | ✓ | | 18,65 |
| 11 6037 020 | • 10 | 20 | 6 | 65 | ✓ | | 21,65 |
| 11 6037 025 | • 12 | 25 | 6 | 70 | ✓ | | 29,95 |
| 11 6037 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4037 010 | • 6 | 18 | 6 | 50 | | ✓ | 13,70 |
| 11 4037 015 | • 8 | 20 | 6 | 65 | ✓ | | 16,65 |
| 11 4037 020 | • 10 | 20 | 6 | 65 | ✓ | | 18,35 |
| 11 4037 025 | • 12 | 25 | 6 | 70 | ✓ | | 25,15 |
| 11 4037 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

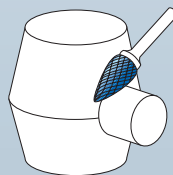
11 6038



H FORM / SHAPE

Flamme

Flame



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 755 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6038 015 | • 8 | 20 | 6 | 65 | ✓ | | 20,15 |
| 11 6038 020 | • 10 | 20 | 6 | 65 | ✓ | | 36,95 |
| 11 6038 025 | • 12 | 32 | 6 | 77 | ✓ | | 43,35 |
| 11 6038 030 | ○ 16 | 36 | 6 | 82 | ✓ | | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4038 015 | • 8 | 20 | 6 | 65 | ✓ | | 18,15 |
| 11 4038 020 | • 10 | 20 | 6 | 65 | ✓ | | 33,70 |
| 11 4038 025 | • 12 | 32 | 6 | 77 | ✓ | | 38,60 |
| 11 4038 030 | ○ 16 | 36 | 6 | 82 | ✓ | | - |



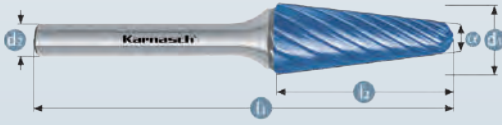
11 6039



L FORM / SHAPE KEL

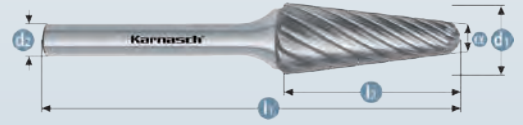
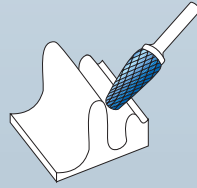


11 4039



Rundkegel

Ball nosed cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 6039 015 | • 8 | 25 | 6 | 70 | ✓ | | 14° | 20,30 |
| 11 6039 020 | • 10 | 30 | 6 | 65 | ✓ | | 14° | 27,60 |
| 11 6039 025 | • 12 | 32 | 6 | 77 | ✓ | | 14° | 32,85 |
| 11 6039 030 | ○ 16 | 33 | 6 | 78 | ✓ | | 14° | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 4039 015 | • 8 | 25 | 6 | 70 | ✓ | | 14° | 18,35 |
| 11 4039 020 | • 10 | 30 | 6 | 65 | ✓ | | 14° | 24,40 |
| 11 4039 025 | • 12 | 32 | 6 | 77 | ✓ | | 14° | 28,20 |
| 11 4039 030 | ○ 16 | 33 | 6 | 78 | ✓ | | 14° | - |

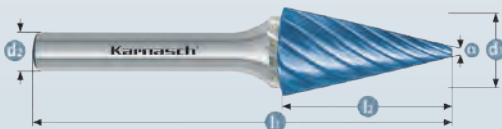
11 6040



M FORM / SHAPE SKM

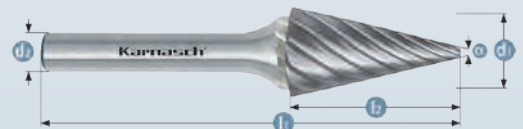
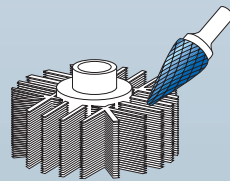


11 4040



Spitzkegel

Cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|---|
| 11 6040 020 | ○ 10 | 20 | 6 | 65 | ✓ | | 14° | - |
| 11 6040 025 | ○ 12 | 25 | 6 | 70 | ✓ | | 14° | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|---|
| 11 4040 020 | ○ 10 | 20 | 6 | 65 | ✓ | | 14° | - |
| 11 4040 025 | ○ 12 | 25 | 6 | 70 | ✓ | | 14° | - |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9



POWER.
PRECISION.
PERFORMANCE.

Karnasch®
PROFESSIONAL TOOLS

HP-8

Speziell für Stahl und Stahlguss. Extrem hohe Zerspanleistung
 Especially for steel and cast steel. Extremely high machining output

ANWENDUNG · APPLICATION


| | | | | | | | | | |
|---|---|---|---|--|---|--|---|---|--|
|  Stahl Steel |  Gehärteter Stahl Hardened steel |  Edelstahl Stainless |  Gusseisen Cast iron |  Titan Titanium |  Cermet Cermet |  Nickel Nickel |  Kupfer, Kupferlegierungen Copper, copper alloys |  Alu Alu |  Kunststoffe GFK/CFK Plastics GRP/CRP |
|---|---|---|---|--|---|--|---|---|--|

✓ OPTIMAL
 ✓ GOOD

- Bis zu 60% höhere Zerspanleistung im Vergleich zu herkömmlichen Kreuzverzahnungen.
- Hohe Aggressivität erzeugt große Späne mit hervorragender Spanabfuhr.
- Keine Anlauffarben am Werkstück durch geringe Wärmeentwicklung

- Up to 60% higher machining output as compared to conventional cross cut.
- High aggressiveness produces large chips with outstanding chip removal.
- No annealing colours at the workpiece due to low heat development.

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | - | KEL | SKM |
|---|--|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 6041 Art. 11 4041 | Art. 11 6042 Art. 11 4042 | Art. 11 6043 Art. 11 4043 | Art. 11 6044 Art. 11 4044 | Art. 11 6045 Art. 11 4045 | Art. 11 6046 Art. 11 4046 | Art. 11 6047 Art. 11 4047 | Art. 11 6048 Art. 11 4048 | Art. 11 6049 Art. 11 4049 | Art. 11 6050 Art. 11 4050 |
|  |  |  |  |  |  |  |  |  |  |
| 764 | 764 | 765 | 765 | 766 | 766 | 767 | 767 | 768 | 768 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone |



BLUE-TEC-beschichtet
 BLUE-TEC-coated

Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---------------------|---|---|---|--------------------------------|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm ² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Grobes Zerspanen = hoher Materialabtrag mit Schlagbelastung | 450 - 750 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | |

| Material groups | | | Application | Cutting speed m/min |
|---------------------|---|--|--|---------------------|
| Steel cast steel | Non-hardened, non-heat treated steels up to 1200 N/mm ² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Coarse machining = high stock removal with impact load | 450 - 750 |
| | Hardened, heat treated steels exceeding 1200 N/mm ² (> 38 HRC) | tool steels, tempering steels, alloyed steels, cast steels | | |



| Schnittgeschwindigkeit • Cutting speed (m/min) | | |
|--|--|--------|
| | 450 | 750 |
| ∅ (mm) | Drehzahlen (min ⁻¹) • Rotational speed (rpm) | |
| 3 | 48.000 | 80.000 |
| 6 | 24.000 | 40.000 |
| 8 | 18.000 | 30.000 |
| 10 | 14.000 | 24.000 |
| 12 | 12.000 | 20.000 |
| 16 | 9.000 | 17.000 |



11 6041

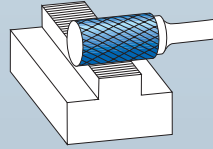


A FORM / SHAPE ZYA



Zylinder ohne Stirnverzahnung

Cylinder without end cut



Schnittdaten
Cutting data

Film
Movie



763



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6041 010 | • 6 | 18 | 6 | 50 | | ✓ | 12,45 |
| 11 6041 015 | • 8 | 20 | 6 | 65 | ✓ | | 15,60 |
| 11 6041 020 | • 10 | 20 | 6 | 65 | ✓ | | 17,85 |
| 11 6041 025 | • 12 | 25 | 6 | 70 | ✓ | | 27,45 |
| 11 6041 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4041 010 | • 6 | 18 | 6 | 50 | | ✓ | 10,40 |
| 11 4041 015 | • 8 | 20 | 6 | 65 | ✓ | | 13,60 |
| 11 4041 020 | • 10 | 20 | 6 | 65 | ✓ | | 14,60 |
| 11 4041 025 | • 12 | 25 | 6 | 70 | ✓ | | 22,70 |
| 11 4041 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

11 6042

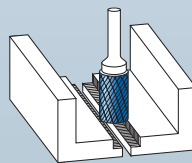


B FORM / SHAPE ZYB



Zylinder mit Stirnverzahnung

Cylinder with end cut



Schnittdaten
Cutting data

Film
Movie



763



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6042 010 | • 6 | 18 | 6 | 50 | | ✓ | 13,25 |
| 11 6042 015 | • 8 | 20 | 6 | 65 | ✓ | | 16,90 |
| 11 6042 020 | • 10 | 20 | 6 | 65 | ✓ | | 19,30 |
| 11 6042 025 | • 12 | 25 | 6 | 70 | ✓ | | 29,75 |
| 11 6042 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4042 010 | • 6 | 18 | 6 | 50 | | ✓ | 11,25 |
| 11 4042 015 | • 8 | 20 | 6 | 65 | ✓ | | 14,85 |
| 11 4042 020 | • 10 | 20 | 6 | 65 | ✓ | | 16,00 |
| 11 4042 025 | • 12 | 25 | 6 | 70 | ✓ | | 25,00 |
| 11 4042 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

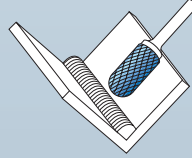


11 6043



C FORM / SHAPE **WRC**

Walzenrundform
Ball nosed cylinder



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 763 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6043 010 | • 6 | 18 | 6 | 50 | | ✓ | 14,05 |
| 11 6043 015 | • 8 | 20 | 6 | 65 | ✓ | | 16,75 |
| 11 6043 020 | • 10 | 20 | 6 | 65 | ✓ | | 19,45 |
| 11 6043 025 | • 12 | 25 | 6 | 70 | ✓ | | 30,30 |
| 11 6043 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

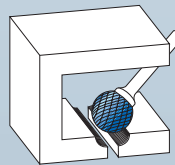
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4043 010 | • 6 | 18 | 6 | 50 | | ✓ | 12,00 |
| 11 4043 015 | • 8 | 20 | 6 | 65 | ✓ | | 14,75 |
| 11 4043 020 | • 10 | 20 | 6 | 65 | ✓ | | 16,20 |
| 11 4043 025 | • 12 | 25 | 6 | 70 | ✓ | | 25,50 |
| 11 4043 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

11 6044



D FORM / SHAPE **KUD**

Kugel
Ball



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 763 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|-------------------|--------------|-------|
| 11 6044 010 | • 6 | 4,7 | 6 | 50 | | ✓ | 13,05 |
| 11 6044 015 | • 8 | 6,0 | 6 | 52 | ✓ | | 13,85 |
| 11 6044 020 | • 10 | 8,0 | 6 | 54 | ✓ | | 16,60 |
| 11 6044 025 | • 12 | 11,0 | 6 | 56 | ✓ | | 22,70 |
| 11 6044 030 | ○ 16 | 11,0 | 6 | 60 | ✓ | | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|-------------------|--------------|-------|
| 11 4044 010 | • 6 | 4,7 | 6 | 50 | | ✓ | 11,05 |
| 11 4044 015 | • 8 | 6,0 | 6 | 52 | ✓ | | 11,85 |
| 11 4044 020 | • 10 | 8,0 | 6 | 54 | ✓ | | 13,35 |
| 11 4044 025 | • 12 | 11,0 | 6 | 56 | ✓ | | 17,90 |
| 11 4044 030 | ○ 16 | 11,0 | 6 | 60 | ✓ | | - |



Index

11 6045



E FORM / SHAPE TRE

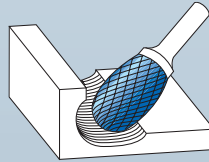


11 4045



Tropfen

Oval



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6045 015 | ○ 8 | 15 | 6 | 60 | ✓ | | - |
| 11 6045 020 | ○ 10 | 16 | 6 | 60 | ✓ | | - |
| 11 6045 025 | ● 12 | 22 | 6 | 67 | ✓ | | 28,50 |
| 11 6045 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4045 015 | ○ 8 | 15 | 6 | 60 | ✓ | | - |
| 11 4045 020 | ○ 10 | 16 | 6 | 60 | ✓ | | - |
| 11 4045 025 | ● 12 | 22 | 6 | 67 | ✓ | | 13,15 |
| 11 4045 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

11 6046



F FORM / SHAPE RBF

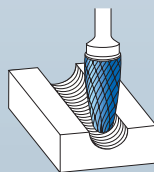


11 4046



Rundbogen

Ball nosed tree



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6046 010 | ● 6 | 18 | 6 | 50 | | ✓ | 14,60 |
| 11 6046 015 | ● 8 | 20 | 6 | 65 | ✓ | | 19,50 |
| 11 6046 020 | ● 10 | 20 | 6 | 65 | ✓ | | 19,50 |
| 11 6046 025 | ● 12 | 25 | 6 | 70 | ✓ | | 26,60 |
| 11 6046 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4046 010 | ● 6 | 18 | 6 | 50 | | ✓ | 12,60 |
| 11 4046 015 | ● 8 | 20 | 6 | 65 | ✓ | | 17,50 |
| 11 4046 020 | ● 10 | 20 | 6 | 65 | ✓ | | 15,80 |
| 11 4046 025 | ● 12 | 25 | 6 | 70 | ✓ | | 21,80 |
| 11 4046 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

11 6047

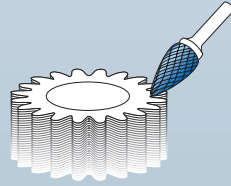


G FORM / SHAPE **SPG**



Spitzbogen

Tree



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 763 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6047 010 | • 6 | 18 | 6 | 50 | | ✓ | 14,60 |
| 11 6047 015 | • 8 | 20 | 6 | 65 | ✓ | | 17,30 |
| 11 6047 020 | • 10 | 20 | 6 | 65 | ✓ | | 20,15 |
| 11 6047 025 | • 12 | 25 | 6 | 70 | ✓ | | 27,80 |
| 11 6047 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4047 010 | • 6 | 18 | 6 | 50 | | ✓ | 12,60 |
| 11 4047 015 | • 8 | 20 | 6 | 65 | ✓ | | 15,25 |
| 11 4047 020 | • 10 | 20 | 6 | 65 | ✓ | | 16,85 |
| 11 4047 025 | • 12 | 25 | 6 | 70 | ✓ | | 23,00 |
| 11 4047 030 | ○ 16 | 25 | 6 | 70 | ✓ | | - |

11 6048

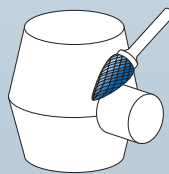


H FORM / SHAPE



Flamme

Flame



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 763 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6048 015 | • 8 | 20 | 6 | 65 | ✓ | | 18,70 |
| 11 6048 020 | ○ 10 | 20 | 6 | 65 | ✓ | | - |
| 11 6048 025 | • 12 | 32 | 6 | 77 | ✓ | | 40,15 |
| 11 6048 030 | ○ 16 | 36 | 6 | 82 | ✓ | | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4048 015 | • 8 | 20 | 6 | 65 | ✓ | | 16,65 |
| 11 4048 020 | ○ 10 | 20 | 6 | 65 | ✓ | | - |
| 11 4048 025 | • 12 | 32 | 6 | 77 | ✓ | | 35,35 |
| 11 4048 030 | ○ 16 | 36 | 6 | 82 | ✓ | | - |



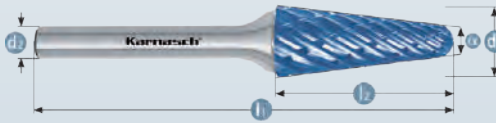
11 6049



L FORM / SHAPE KEL

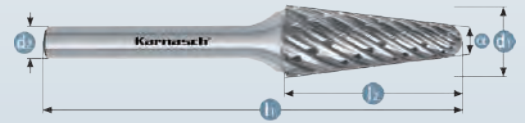
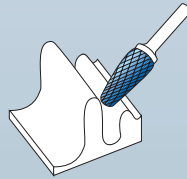


11 4049



Rundkegel

Ball nosed cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 6049 015 | ○ 8 | 25 | 6 | 70 | ✓ | | 14° | - |
| 11 6049 017 | ● 10 | 20 | 6 | 65 | ✓ | | 14° | 25,60 |
| 11 6049 020 | ● 10 | 30 | 6 | 75 | ✓ | | 14° | 25,65 |
| 11 6049 025 | ● 12 | 32 | 6 | 77 | ✓ | | 14° | 30,65 |
| 11 6049 030 | ○ 16 | 33 | 6 | 78 | ✓ | | 14° | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|-------|
| 11 4049 015 | ○ 8 | 25 | 6 | 70 | ✓ | | 14° | - |
| 11 4049 017 | ● 10 | 20 | 6 | 65 | ✓ | | 14° | 22,35 |
| 11 4049 020 | ● 10 | 30 | 6 | 75 | ✓ | | 14° | 23,65 |
| 11 4049 025 | ● 12 | 32 | 6 | 77 | ✓ | | 14° | 25,85 |
| 11 4049 030 | ○ 16 | 33 | 6 | 78 | ✓ | | 14° | - |

11 6050



M FORM / SHAPE SKM

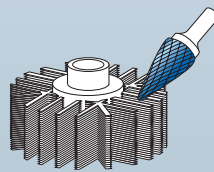


11 4050



Spitzkegel

Cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|---|
| 11 6050 020 | ○ 10 | 20 | 6 | 65 | ✓ | | 14° | - |
| 11 6050 025 | ○ 12 | 25 | 6 | 70 | ✓ | | 14° | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|-----|---|
| 11 4050 020 | ○ 10 | 20 | 6 | 65 | ✓ | | 14° | - |
| 11 4050 025 | ○ 12 | 25 | 6 | 70 | ✓ | | 14° | - |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

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PROFESSIONAL TOOLS

1



2



3



4



5



6



7



8



9












Index

HP-11

Extrem feine Kreuzverzahnung Extremely fine cross cutting style

ANWENDUNG · APPLICATION

| | | | | | | | | | | |
|---|---|---|---|--|---|--|---|---|--|--|
|  Stahl Steel |  Gehärteter Stahl Hardened steel |  Edelstahl Stainless |  Gusseisen Cast iron |  Titan Titanium |  Cermet Cermet |  Nickel Nickel |  Kupfer, Kupferlegierungen Copper, copper alloys |  Alu Alu |  Kunststoffe GFK/CFK Plastics GRP/CRP | <input checked="" type="checkbox"/> OPTIMAL <input checked="" type="checkbox"/> GUT GOOD |
|---|---|---|---|--|---|--|---|---|--|--|

- Exzellent für die: Feinbearbeitung · Extrem feine Putzarbeiten · Korrekturen im Werkzeug- und Formenbau · Schleifen/ Schärfen von Schnittwerkzeugen
- Eigenschaften: Gutes Abtragverhalten · Vibrationsarm · Exzellente Kontrolle/Führung im Handeinsatz · Hohe Oberflächengüte
- Vorteile: Es können nahezu alle Werkstoffe bis zu einer Härte von 70 HRC bearbeitet werden.
In diesem Bereich werden üblicherweise Keramik-Schleifstifte verwendet.
Die neue Micro-Verzahnung garantiert:
 - Keine Geometrieänderung durch Abnutzung/Verschleiß gegenüber Schleifstifte.
 - Wesentlich höheren Materialabtrag sowie Standzeit gegenüber Schleifstifte
- Excellent for: Finishing · Extremely fine cleaning work · Corrections in tool and mould construction · Grinding/ sharpening of cutting tools
- Characteristics: Good stock removal · Low vibrations · Excellent control and guidance under handheld conditions. High surface quality
- Advantages: Micro-cut can be used for work on almost all materials up to a hardness of 70 HRC.
In this area usually mounted points are used.
- Unlike with mounted points, there is no change in geometry due to wear and tear.
- Unlike with mounted points, there is much higher performance, surface quality and lifetime

Lagerprogramm + Katalogseiten · Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | RBF | SPG |
|---|---|---|---|---|---|
| A | B | C | D | F | G |
| Art. 11 6080 Art. 11 4080 | Art. 11 6081 Art. 11 4081 | Art. 11 6082 Art. 11 4082 | Art. 11 6083 Art. 11 4083 | Art. 11 6084 Art. 11 4084 | Art. 11 6085 Art. 11 4085 |
|  |  |  |  |  |  |
| 772 | 772 | 773 | 773 | 774 | 774 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Rundbogen Ball nosed tree | Spitzbogen Tree |



BLUE-TEC-beschichtet
BLUE-TEC-coated

Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|------------------|---|---|---|--------------------------------|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm ² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Feines Zerspanen = mittlerer Materialabtrag | 650-750 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 450-600 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Feines Zerspanen = mittlerer Materialabtrag | 450-600 |
| NE-Metalle | Harte NE-Metalle | Bronze, Titan/Titanlegierungen, harte Alulegierungen (hoher Si-Anteil) | Feines Zerspanen = mittlerer Materialabtrag | 450-600 |
| | Hochwarmfeste Werkstoffe | Nickelbasis- und Kobaltbasislegierungen (Triebwerk- und Turbinenbau) | | |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/Späroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | Feines Zerspanen = mittlerer Materialabtrag | 600-750 |

| Material groups | | | Application | Cutting speed m/min |
|------------------------|---|---|---------------------------------------|---------------------|
| Steel, cast steel | Non-hardened, non-heat treated-steels up to 1200 N/mm ² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Fine machining = medium stock removal | 650-750 |
| | Hardened, heat-treated steels exceeding 1200 N/mm ² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 450-600 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Fine machining = medium stock removal | 450-600 |
| Non-ferrous metals | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard alu-alloys (high Si content) | Fine machining = medium stock removal | 450-600 |
| | High-temperature resistant materials | Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction) | | |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Fine machining = medium stock removal | 600-750 |



| Schnittgeschwindigkeit • Cutting speed (m/min) | | | | |
|--|--|--------|---------|---------|
| | 450 | 600 | 650 | 750 |
| Ø (mm) | Drehzahlen (min ⁻¹) • Rotational speed (rpm) | | | |
| 2 | 72.000 | 95.000 | 104.000 | 120.000 |
| 3 | 48.000 | 64.000 | 68.000 | 80.000 |
| 4 | 36.000 | 48.000 | 52.000 | 60.000 |
| 6 | 24.000 | 32.000 | 34.000 | 40.000 |
| 8 | 18.000 | 24.000 | 26.000 | 30.000 |
| 10 | 14.000 | 19.000 | 21.000 | 24.000 |
| 12 | 12.000 | 16.000 | 18.000 | 21.000 |



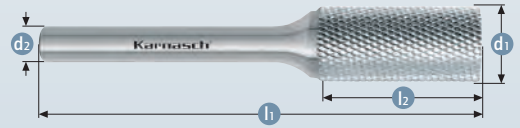
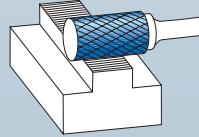
11 6080



A FORM / SHAPE ZYA

Zylinder ohne Stirnverzahnung

Cylinder without end cut



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6080 010 | • 2 | 11 | 3 | 38 | | ✓ | 19,70 |
| 11 6080 020 | • 3 | 14 | 3 | 38 | | ✓ | 19,70 |
| 11 6080 030 | • 4 | 7 | 3 | 38 | | ✓ | 19,55 |
| 11 6080 040 | • 6 | 5 | 3 | 37 | ✓ | | 20,60 |
| 11 6080 050 | • 6 | 18 | 6 | 50 | | ✓ | 20,30 |
| 11 6080 060 | • 8 | 20 | 6 | 65 | ✓ | | 24,35 |
| 11 6080 070 | • 10 | 20 | 6 | 65 | ✓ | | 27,80 |
| 11 6080 080 | • 12 | 25 | 6 | 70 | ✓ | | 35,40 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4080 010 | • 2 | 11 | 3 | 38 | | ✓ | 17,65 |
| 11 4080 020 | • 3 | 14 | 3 | 38 | | ✓ | 17,65 |
| 11 4080 030 | • 4 | 7 | 3 | 38 | | ✓ | 17,55 |
| 11 4080 040 | • 6 | 5 | 3 | 37 | ✓ | | 18,55 |
| 11 4080 050 | • 6 | 18 | 6 | 50 | | ✓ | 18,30 |
| 11 4080 060 | • 8 | 20 | 6 | 65 | ✓ | | 22,35 |
| 11 4080 070 | • 10 | 20 | 6 | 65 | ✓ | | 24,50 |
| 11 4080 080 | • 12 | 25 | 6 | 70 | ✓ | | 30,60 |

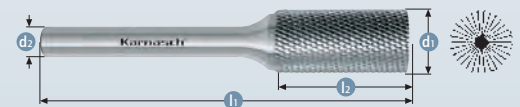
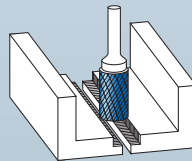
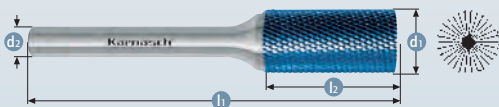
11 6081



B FORM / SHAPE ZYB

Zylinder mit Stirnverzahnung

Cylinder with end cut



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6081 010 | • 6 | 18 | 6 | 50 | | ✓ | 22,10 |
| 11 6081 020 | • 8 | 20 | 6 | 65 | ✓ | | 26,60 |
| 11 6081 030 | • 10 | 20 | 6 | 65 | ✓ | | 31,25 |
| 11 6081 040 | • 12 | 25 | 6 | 70 | ✓ | | 38,50 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4081 010 | • 6 | 18 | 6 | 50 | | ✓ | 20,10 |
| 11 4081 020 | • 8 | 20 | 6 | 65 | ✓ | | 24,60 |
| 11 4081 030 | • 10 | 20 | 6 | 65 | ✓ | | 27,95 |
| 11 4081 040 | • 12 | 25 | 6 | 70 | ✓ | | 33,70 |

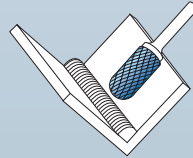
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11 6082



C FORM / SHAPE WRC

Walzenrundform
Ball nosed cylinder



Schnittdaten
Cutting data



771

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|-------------------|--------------|-------|
| 11 6082 010 | • 2 | 11 | 3 | 38 | | ✓ | 21,65 |
| 11 6082 020 | • 3 | 14 | 3 | 38 | | ✓ | 21,65 |
| 11 6082 030 | • 6 | 12,7 | 3 | 44 | ✓ | | 22,65 |
| 11 6082 040 | • 6 | 18 | 6 | 50 | | ✓ | 22,30 |
| 11 6082 050 | • 8 | 20 | 6 | 65 | ✓ | | 26,75 |
| 11 6082 060 | • 10 | 20 | 6 | 65 | ✓ | | 29,75 |
| 11 6082 070 | • 12 | 25 | 6 | 70 | ✓ | | 40,35 |

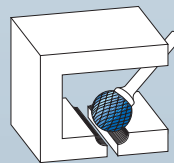
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|-------------------|--------------|-------|
| 11 4082 010 | • 2 | 11 | 3 | 38 | | ✓ | 19,65 |
| 11 4082 020 | • 3 | 14 | 3 | 38 | | ✓ | 19,65 |
| 11 4082 030 | • 6 | 12,7 | 3 | 44 | ✓ | | 20,60 |
| 11 4082 040 | • 6 | 18 | 6 | 50 | | ✓ | 20,25 |
| 11 4082 050 | • 8 | 20 | 6 | 65 | ✓ | | 24,75 |
| 11 4082 060 | • 10 | 20 | 6 | 65 | ✓ | | 26,50 |
| 11 4082 070 | • 12 | 25 | 6 | 70 | ✓ | | 35,55 |

11 6083



D FORM / SHAPE KUD

Kugel
Ball



Schnittdaten
Cutting data



771

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|-----|----|----|-------------------|--------------|-------|
| 11 6083 010 | • 2 | 1,8 | 3 | 38 | | ✓ | 17,95 |
| 11 6083 020 | • 3 | 2,5 | 3 | 38 | | ✓ | 17,95 |
| 11 6083 030 | • 4 | 3,4 | 3 | 38 | | ✓ | 18,65 |
| 11 6083 040 | • 6 | 5 | 3 | 38 | ✓ | | 18,75 |
| 11 6083 050 | • 6 | 4,7 | 6 | 50 | | ✓ | 18,45 |
| 11 6083 060 | • 8 | 6 | 6 | 52 | ✓ | | 19,95 |
| 11 6083 070 | • 10 | 8 | 6 | 54 | ✓ | | 21,85 |
| 11 6083 080 | • 12 | 11 | 6 | 56 | ✓ | | 30,20 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|-----|----|----|-------------------|--------------|-------|
| 11 4083 010 | • 2 | 1,8 | 3 | 38 | | ✓ | 15,95 |
| 11 4083 020 | • 3 | 2,5 | 3 | 38 | | ✓ | 15,95 |
| 11 4083 030 | • 4 | 3,4 | 3 | 38 | | ✓ | 16,65 |
| 11 4083 040 | • 6 | 5 | 3 | 38 | ✓ | | 16,75 |
| 11 4083 050 | • 6 | 4,7 | 6 | 50 | | ✓ | 16,45 |
| 11 4083 060 | • 8 | 6 | 6 | 52 | ✓ | | 17,90 |
| 11 4083 070 | • 10 | 8 | 6 | 54 | ✓ | | 18,60 |
| 11 4083 080 | • 12 | 11 | 6 | 56 | ✓ | | 25,45 |

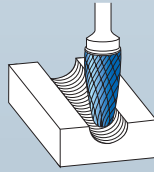


11 6084



F FORM / SHAPE **RBF**

Rundbogen
Ball nosed tree



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6084 010 | • 3 | 8 | 3 | 38 | | ✓ | 21,85 |
| 11 6084 020 | • 3 | 14 | 3 | 38 | | ✓ | 21,85 |
| 11 6084 030 | • 6 | 12 | 3 | 44 | ✓ | | 22,90 |
| 11 6084 040 | • 6 | 18 | 6 | 50 | | ✓ | 21,45 |
| 11 6084 050 | • 8 | 20 | 6 | 65 | ✓ | | 28,15 |
| 11 6084 060 | • 10 | 20 | 6 | 65 | ✓ | | 32,05 |
| 11 6084 070 | • 12 | 25 | 6 | 70 | ✓ | | 39,80 |

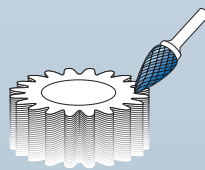
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4084 010 | • 3 | 8 | 3 | 38 | | ✓ | 19,85 |
| 11 4084 020 | • 3 | 14 | 3 | 38 | | ✓ | 19,85 |
| 11 4084 030 | • 6 | 12 | 3 | 44 | ✓ | | 20,85 |
| 11 4084 040 | • 6 | 18 | 6 | 50 | | ✓ | 19,45 |
| 11 4084 050 | • 8 | 20 | 6 | 65 | ✓ | | 26,15 |
| 11 4084 060 | • 10 | 20 | 6 | 65 | ✓ | | 28,75 |
| 11 4084 070 | • 12 | 25 | 6 | 70 | ✓ | | 35,00 |

11 6085



G FORM / SHAPE **SPG**

Spitzbogen
Tree



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6085 010 | • 3 | 6 | 3 | 38 | | ✓ | 21,85 |
| 11 6085 020 | • 3 | 14 | 3 | 38 | | ✓ | 21,85 |
| 11 6085 030 | • 6 | 12 | 3 | 44 | ✓ | | 22,90 |
| 11 6085 040 | • 6 | 18 | 6 | 50 | | ✓ | 23,60 |
| 11 6085 050 | • 8 | 20 | 6 | 65 | ✓ | | 24,75 |
| 11 6085 060 | • 10 | 20 | 6 | 65 | ✓ | | 28,30 |
| 11 6085 070 | • 12 | 25 | 6 | 70 | ✓ | | 36,05 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4085 010 | • 3 | 6 | 3 | 38 | | ✓ | 19,85 |
| 11 4085 020 | • 3 | 14 | 3 | 38 | | ✓ | 19,85 |
| 11 4085 030 | • 6 | 12 | 3 | 44 | ✓ | | 20,85 |
| 11 4085 040 | • 6 | 18 | 6 | 50 | | ✓ | 21,60 |
| 11 4085 050 | • 8 | 20 | 6 | 65 | ✓ | | 22,70 |
| 11 4085 060 | • 10 | 20 | 6 | 65 | ✓ | | 25,05 |
| 11 4085 070 | • 12 | 25 | 6 | 70 | ✓ | | 31,25 |

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FRÄSSTIFTE / LOCHSÄGEN FÜR SCHLÜSSELDIENSTE

ROTARY BURRS / HOLE SAWS FOR LOCKSMITHS



4.2

KONTAKT | CONTACT

KARNASCH PROFESSIONAL TOOLS[®]
INDUSTRIAL TOOLS DIVISION

Straße des Friedens 10
D-15848 Tauche/OT Görzdorf
mail@karnasch.tools

+49 (0) 33675 - 7265-0

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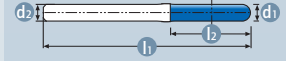
11 5021 11 5022 11 5025



C FORM / SHAPE **WRC**

Walzenrundform

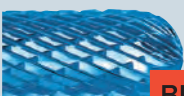
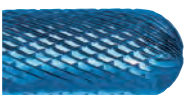

Ball nosed cylinder



Film
Movie



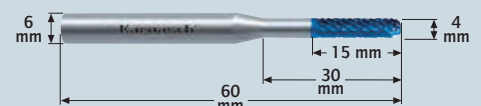
Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | Zahnung · Cut | € |
|-------------|-------|-----|----|-----|---|-------|
| 11 5021 030 | • 3,0 | 14 | 3 | 50 |  <p>HP-3 Die am meisten verwendete Universalverzahnung Stahl bis < 60 HRC</p> <p>The most widely used universal cutting style < 60 HRC</p> | 9,70 |
| 11 5021 032 | • 3,0 | 14 | 3 | 60 | | 10,20 |
| 11 5021 035 | • 3,0 | 14 | 3 | 75 | | 10,70 |
| 11 5021 040 | • 3,0 | 14 | 3 | 100 | | 13,40 |
| 11 5021 043 | • 3,0 | 30* | 6 | 60 | | 21,30 |
| 11 5021 046 | • 4,0 | 30* | 6 | 60 | | 21,80 |
| 11 5021 055 | • 6,0 | 18 | 6 | 50 | | 11,10 |
| 11 5021 056 | • 6,0 | 18 | 6 | 60 | | 14,90 |
| 11 5021 058 | • 6,0 | 18 | 6 | 80 | | 17,70 |
| 11 5021 060 | • 6,0 | 18 | 6 | 100 | | 20,00 |
| 11 5021 065 | • 6,0 | 18 | 6 | 150 | 28,45 | |
| 11 5022 030 | • 3,0 | 14 | 3 | 50 |  <p>HP-4 Extra feine Kreuzverzahnung für Stähle bis ca. 70 HRC</p> <p>Extra fine cross cutting style up to extra hard steel 70 HRC</p> | 12,00 |
| 11 5022 032 | • 3,0 | 14 | 3 | 60 | | 12,55 |
| 11 5022 035 | • 3,0 | 14 | 3 | 75 | | 13,15 |
| 11 5022 040 | • 3,0 | 14 | 3 | 100 | | 16,60 |
| 11 5022 043 | • 3,0 | 30* | 6 | 60 | | 27,25 |
| 11 5022 046 | • 4,0 | 30* | 6 | 60 | | 27,90 |
| 11 5022 055 | • 6,0 | 18 | 6 | 50 | | 15,10 |
| 11 5022 056 | • 6,0 | 18 | 6 | 60 | | 18,90 |
| 11 5022 058 | • 6,0 | 18 | 6 | 80 | | 22,55 |
| 11 5022 060 | • 6,0 | 18 | 6 | 100 | | 27,60 |
| 11 5022 065 | • 6,0 | 18 | 6 | 150 | 39,20 | |
| 11 5025 055 | • 6,0 | 18 | 6 | 50 |  <p>HP-7 Grobe Zerspantung und höchster Materialabtrag bei Alulegierungen</p> <p>For coarse cutting and highest material removal of aluminum alloys</p> | 19,00 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

*11 5021 043 / 11 5022 043



*11 5021 046 / 11 5022 046



* Davon 15 mm verzahnt | Of which 15 mm teathed

- * Durch Verjüngung eines Ø 6 mm Frässtiftes auf Ø 3 mm oder Ø 4 mm wird die Arbeitszeit um ca. die Hälfte reduziert, da weniger Material zerspant werden muss.
- Durch Ø 6 mm Schaft wesentlich bruchunempfindlicher als durchgehend Ø 3 mm oder Ø 4 mm Schaft
- Bei Ø 3 mm, 4 mm, 6 mm kann mit der gleichen Ø 6 mm Spannzange gearbeitet werden.
- Die Kernziehschutzblende muss in der Regel wegen des geringen Fräskopf-Durchmessers nicht zerstört werden.

- * By tapering of a 6 mm burr to Ø 3 mm or Ø 4 mm working time is reduced by about half, because less material needs to be machined.
- Because of its 6 mm shank, significantly less susceptible to breakage than continuous Ø 3 mm or Ø 4 mm shank
- At Ø 3 mm, Ø 4 mm the same collet can be used for Ø 6 mm
- Because of the limited diameter of the burr head, the core drawing tray may not be disturbed

11 3021

11 3022

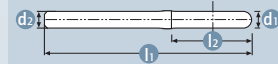
11 3025



C FORM / SHAPE WRC

Walzenrundform

Ball nosed cylinder



Film
Movie



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | Zahnung · Cut | € |
|-------------|-------|-----|----|-----|--|-------|
| 11 3021 030 | • 3,0 | 14 | 3 | 50 | <p>HP-3 Die am meisten verwendete Universalverzahnung Stahl bis < 60 HRC The most widely used universal cutting style < 60 HRC</p> | 7,95 |
| 11 3021 032 | • 3,0 | 14 | 3 | 60 | | 8,45 |
| 11 3021 035 | • 3,0 | 14 | 3 | 75 | | 8,95 |
| 11 3021 043 | • 3,0 | 14 | 3 | 100 | | 11,65 |
| 11 3021 043 | • 3,0 | 30* | 6 | 60 | | 19,55 |
| 11 3021 046 | • 4,0 | 30* | 6 | 60 | | 20,10 |
| 11 3021 055 | • 6,0 | 18 | 6 | 50 | | 9,40 |
| 11 3021 056 | • 6,0 | 18 | 6 | 60 | | 13,15 |
| 11 3021 058 | • 6,0 | 18 | 6 | 80 | | 16,00 |
| 11 3021 060 | • 6,0 | 18 | 6 | 100 | | 18,25 |
| 11 3021 065 | • 6,0 | 18 | 6 | 150 | 25,70 | |
| 11 3022 030 | • 3,0 | 14 | 3 | 50 | <p>HP-4 Extra feine Kreuzverzahnung für Stähle bis ca. 70 HRC Extra fine cross cutting style up to extra hard steel 70 HRC</p> | 9,10 |
| 11 3022 032 | • 3,0 | 14 | 3 | 60 | | 10,55 |
| 11 3022 040 | • 3,0 | 14 | 3 | 100 | | 14,55 |
| 11 3022 043 | • 3,0 | 30* | 6 | 60 | | 25,25 |
| 11 3022 046 | • 4,0 | 30* | 6 | 60 | | 25,85 |
| 11 3022 055 | • 6,0 | 18 | 6 | 50 | | 13,10 |
| 11 3022 056 | • 6,0 | 18 | 6 | 60 | | 16,90 |
| 11 3022 058 | • 6,0 | 18 | 6 | 80 | | 20,55 |
| 11 3022 060 | • 6,0 | 18 | 6 | 100 | | 25,55 |
| 11 3022 065 | • 6,0 | 18 | 6 | 150 | | 16,45 |
| 11 3025 055 | • 6,0 | 18 | 6 | 50 | <p>HP-7 Grobe Zerspantung und höchster Materialabtrag bei Alulegierungen For coarse cutting and highest material removal of aluminum alloys</p> | 14,30 |
| | | | | | | |
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* Davon 15 mm verzahnt | Of which 15 mm teathed

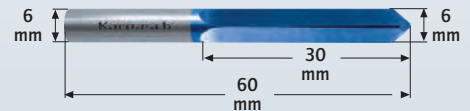
- * Durch Verjüngung eines Ø 6 mm Frässtiftes auf Ø 3 mm oder Ø 4 mm wird die Arbeitszeit um ca. die Hälfte reduziert, da weniger Material zerspant werden muss.
- Durch Ø 6 mm Schaft wesentlich bruchunempfindlicher als durchgehend Ø 3 mm oder Ø 4 mm Schaft
- Bei Ø 3 mm, 4 mm, 6 mm kann mit der gleichen Ø 6 mm Spannzange gearbeitet werden.
- Die Kernziehschutzblende muss in der Regel wegen des geringen Fräskopf-Durchmessers nicht zerstört werden.

- * By tapering of a 6 mm burr to Ø 3 mm or Ø 4 mm working time is reduced by about half, because less material needs to be machined.
- Because of its 6 mm shank, significantly less susceptible to breakage than continuous Ø 3 mm or Ø 4 mm shank
- At Ø 3 mm, Ø 4 mm, the same collet can be used for Ø 6 mm
- Because of the limited diameter of the burr head, the core drawing tray may usually not be disturbed



11 4701

€ 33,50



Schnittdaten
Cutting data



Film
Movie



Vollhartmetall-Bohrfräser der neuesten Generation. Öffnet Schließzylinder in Rekordzeit. Beste Ergebnisse werden mit Geradschleifer erzielt (siehe Seite 1110/1111). Aufbohrungen sind mit Bohrmaschinen/Akku-Bohrmaschinen möglich.

In Verbindung mit Frässtiften (Seite 776) ergibt sich die ideale Werkzeugkombination.

Mit dem Bohrfräser wird der Zylinder in kürzester Zeit geradlinig aufgebohrt. In der Regel sollte der Schließzylinder nun bereits zu schließen sein. Falls nicht, z.B. bei besonderen Bohrschutzsicherungen, wird die Bohrung mit einem Frässtift (siehe Seite 777) seitlich erweitert.

Solid carbide drill of the newest generation. Opens locking cylinders in record time. Best results are achieved with straight grinders (see page 1110/1111). Also drilling with drilling/battery drills. Together with burrs (page 776), the ideal tool combination is achieved. With the drill, the cylinder is drilled in a straight line in the shortest possible time. Usually, the locking cylinder can already be closed now. If not, e.g., in case of special drill prevention, the borehole is sideways expanded with a burr (see page 777).

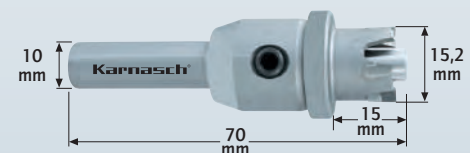


11 4702

€ 17,15



HM-LOCHSÄGE FÜR ABLOY PROTEC-SCHLISSZYLINDER T.C.T. HOLESAWS FOR ABLOY PROTEC LOCKING CYLINDERS



Schnittdaten
Cutting data



Film
Movie



Zu verwenden mit einer Bohrmaschine/starke Akku-Bohrmaschine. Mit dieser Lochsäge ist es möglich, die vor dem Kern liegende, gehärtete Stirnplatte dieses speziellen Hochsicherheitszylinders zu durchdringen um anschließend den Kern herausziehen zu können.

Werkzeugmerkmale:

- 4 x HM-Zähne Ø 15,2
- Gefederte Stiftführung (6,8 mm) zur Zentrierung im Schließkanal
- Tiefenanschlag

To be used with a drilling machine/strong battery drill. With this holesaw it is possible to penetrate the hardened front plate of this special high security locking cylinder that sits in front of the core and then to retrieve the core.

Properties of the tool:

- 4 x T.C.T. teeth Ø 15.2
- Sprung pin guide (6.8 mm) for centring in the locking channel
- Depth stop

SPEZIAL FRÄSSTIFTE

SPECIAL BURRS



4.3

KONTAKT | CONTACT

KARNASCH PROFESSIONAL TOOLS[®]
INDUSTRIAL TOOLS DIVISION

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+49 (0) 33675 - 7265-0

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NOW ONLINE FOR YOU!

<http://shop.karnasch.tools>



ONLINE





Frässtifte für GFK/CFK
Fiberglass routers

781



Mini-Frässtifte Ø 1 + 1,5 mm
Mini-burrs Ø 1 + 1,5 mm

782



Frässtifte + Bohrer für Schlüsseldienste
Burrs + drills for locksmiths

776-778

11 6011



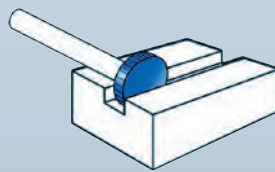
HP-2 VERZÄHNUNG · CUT

11 4011



Scheibenform

RIM shape



Schnittdaten
Cutting data

1321

Film
Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | Form Shape | € |
|-------------|------|-----|----|----|-------------------|---------------|--------|
| 11 6011 005 | • 10 | 1,6 | 3 | 34 | ✓ | | 16,95 |
| 11 6011 010 | • 12 | 2,6 | 6 | 48 | ✓ | | 41,45 |
| 11 6011 015 | • 25 | 5,2 | 8 | 50 | ✓ | | 98,15 |
| 11 6011 020 | • 25 | 6,3 | 8 | 51 | ✓ | | 101,85 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | Form Shape | € |
|-------------|------|-----|----|----|-------------------|---------------|-------|
| 11 4011 005 | • 10 | 1,6 | 3 | 34 | ✓ | | 13,65 |
| 11 4011 010 | • 12 | 2,6 | 6 | 48 | ✓ | | 36,70 |
| 11 4011 015 | • 25 | 5,2 | 8 | 50 | ✓ | | 91,95 |
| 11 4011 020 | • 25 | 6,3 | 8 | 51 | ✓ | | 95,60 |

11 6001

11 6002

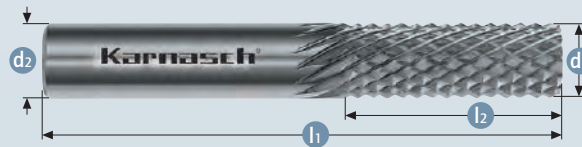
11 6003

11 6004

GFK, CFK

Für Kunststoffe, GFK, CFK, MMC

Routers for fiberglass, GFK, CFK



Toleranzen
Tolerances

- d1
Ø 1.6 mm, 2.4 mm = +0,00/-0,10
Ø 3-12 mm = +0,00/-0,13

Schnittdaten
Cutting data

Film
Movie

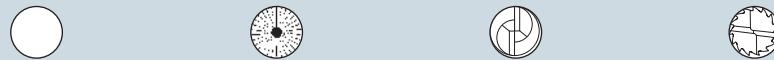
1264

Diese Frässtifte sind geeignet zum Umrissfräsen, Besäumen, Nuten und Bohren der großen Bandbreite von Faserverstärkten Kunststoffen (Fiberglas, GFK CFK). Weiterhin für MMC, Metal Matrix Composites = schwer zerspanbare abrasive Verbundstoffe wie z.B. Leiterplatten, Verbindungen wie Keramik mit Glasfaser, Graphit, Carbon.

These routers are for contouring, grooving, drilling of a wide range of GFK, CFK, fiberglass reinforced plastics, as well as MMC (Metal Matrix Composites). MMC material such as printed circuit boards, composites such as ceramic with glass fiber, graphite, carbon etc.

Sollten höchste Standzeiten erwünscht sein, empfehlen wir eine Diamantbeschichtung. Auf Anfrage.

If highest lifetime is required do we recommend a diamond coating. On request.



| | | | |
|--|--|--|---|
| Ohne Stirnverzahnung No end cut | Mehrschneiden Stirnverzahnung Burr end cut | Zweischneiden Stirnverzahnung 2-flute end mill cut | Bohrspitze 135° Drill point 135° |
|--|--|--|---|

| d1 | l2 | d2 | l1 | VHM solid | 11 6001 | | 11 6002 | | 11 6003 | | 11 6004 | |
|-------|-----|----|----|-----------|---------------|-------|-------------|-------|-------------|-------|---------------|-------|
| | | | | | Art. | € | Art. | € | Art. | € | Art. | € |
| • 1,6 | 5 | 3 | 38 | ✓ | % 11 6001 001 | 5,20 | 11 6002 001 | 11,30 | 11 6003 001 | 11,35 | 11 6004 001 | 12,05 |
| • 2,4 | 9,5 | 3 | 38 | ✓ | % 11 6001 003 | 5,50 | 11 6002 003 | 11,30 | 11 6003 003 | 12,25 | % 11 6004 003 | 7,20 |
| • 3 | 12 | 3 | 38 | ✓ | 11 6001 005 | 10,75 | 11 6002 005 | 11,40 | 11 6003 005 | 13,40 | 11 6004 005 | 13,40 |
| • 4 | 16 | 4 | 50 | ✓ | % 11 6001 010 | 8,30 | 11 6002 010 | 16,10 | 11 6003 010 | 18,00 | 11 6004 010 | 18,00 |
| • 4 | 16 | 6 | 50 | ✓ | % 11 6001 012 | 9,35 | 11 6002 012 | 19,25 | 11 6003 012 | 20,55 | 11 6004 012 | 21,40 |
| • 6 | 19 | 6 | 50 | ✓ | 11 6001 013 | 17,20 | 11 6002 013 | 19,25 | 11 6003 013 | 20,55 | 11 6004 013 | 21,40 |
| • 6 | 19 | 6 | 63 | ✓ | 11 6001 015 | 24,45 | 11 6002 015 | 26,90 | 11 6003 015 | 28,65 | 11 6004 015 | 28,65 |
| • 6 | 25 | 6 | 75 | ✓ | 11 6001 017 | 21,35 | 11 6002 017 | 23,20 | 11 6003 017 | 24,35 | 11 6004 017 | 25,15 |
| • 8 | 25 | 8 | 63 | ✓ | 11 6001 020 | 35,45 | 11 6002 020 | 37,40 | 11 6003 020 | 39,00 | 11 6004 020 | 39,00 |
| ○ 10 | 25 | 10 | 63 | ✓ | % 11 6001 025 | 25,05 | - | - | - | - | - | - |
| • 10 | 25 | 10 | 75 | ✓ | 11 6001 027 | 44,60 | 11 6002 027 | 48,40 | 11 6003 027 | 50,30 | 11 6004 027 | 52,25 |
| • 12 | 25 | 12 | 75 | ✓ | 11 6001 029 | 61,15 | 11 6002 029 | 67,30 | 11 6003 029 | 70,60 | 11 6004 029 | 73,85 |
| ○ 12 | 30 | 12 | 75 | ✓ | % 11 6001 030 | 35,80 | - | - | - | - | - | - |

Schnittgeschwindigkeit • Cutting speed (m/min)

| Ø (mm) | 450 | | 900 | |
|--------|--|--|---------|--|
| | Drehzahlen (min ⁻¹) • Rotational speed (rpm) | | | |
| 2 | 72.000 | | 143.000 | |
| 3 | 48.000 | | 95.000 | |
| 4 | 36.000 | | 72.000 | |
| 6 | 24.000 | | 48.000 | |
| 8 | 17.000 | | 36.000 | |
| 10 | 14.000 | | 29.000 | |
| 12 | 12.000 | | 24.000 | |

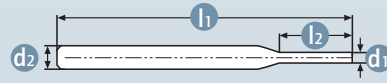
% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



MINI-UNI

Einsatzgebiete: Feinmechanik, Schmuckindustrie, Turbinenbau, Werkzeugbau
Zu bearbeitende Werkstoffe: Edelstähle, Buntmetalle, Zinkdruckguss, weiche Keramiken, Titanlegierungen
Drehzahlempfehlung: ca. 70.000 U/min

Applications: Precision engineering, jewellery industry, turbine manufacture, tool manufacture
For use on: stainless steel, copper and copper alloys, zinc pressure die castings soft ceramics, titanium alloys
Recommended operating speed: +/- 70,000 RPM



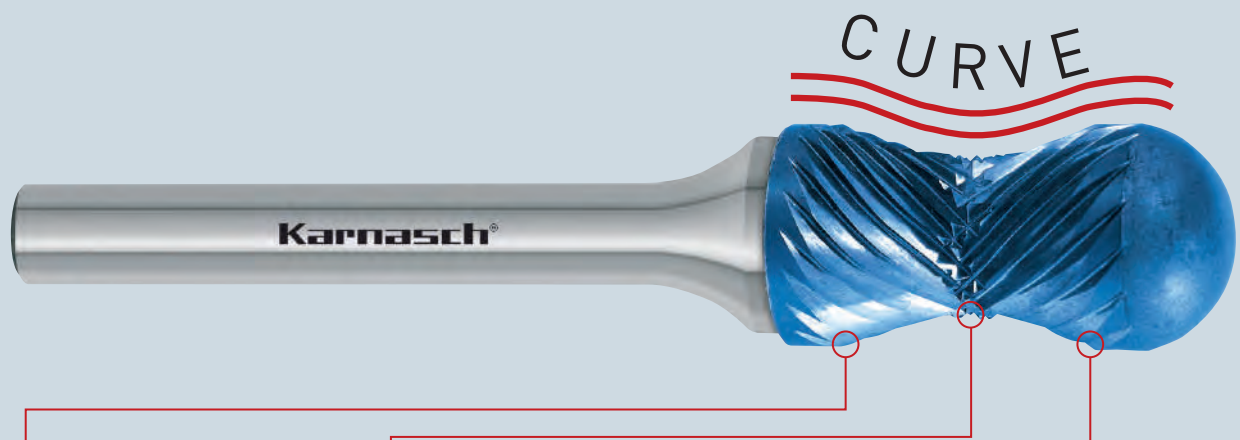
| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | € |
|-------------|-------|----|----|----|------------|----------|-------|
| 11 5006 005 | • 1 | 4 | 3 | 38 | A | ZYA | 12,75 |
| 11 5006 010 | • 1,5 | 4 | 3 | 38 | A | ZYA | 12,75 |
| 11 5006 020 | • 2 | 4 | 3 | 38 | A | ZYA | 12,75 |
| 11 5026 005 | • 1 | 4 | 3 | 38 | C | WRC | 12,75 |
| 11 5026 010 | • 1,5 | 4 | 3 | 38 | C | WRC | 12,75 |
| 11 5026 015 | • 2 | 4 | 3 | 38 | C | WRC | 12,75 |
| 11 5036 005 | • 1 | 1 | 3 | 38 | D | KUD | 12,75 |
| 11 5036 010 | • 1,5 | 1 | 3 | 38 | D | KUD | 12,75 |
| 11 5036 015 | • 2 | 2 | 3 | 38 | D | KUD | 12,75 |
| 11 5046 005 | • 1,5 | 4 | 3 | 38 | E | TRE | 12,75 |
| 11 5056 005 | • 1,5 | 4 | 3 | 38 | F | RBF | 12,75 |
| 11 5066 005 | • 1,5 | 4 | 3 | 38 | G | SPG | 12,75 |
| 11 5196 005 | • 1,5 | 4 | 3 | 38 | M | SKM | 12,75 |

| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | € |
|-------------|-------|----|----|----|------------|----------|-------|
| 11 3006 005 | • 1 | 4 | 3 | 38 | A | ZYA | 10,75 |
| 11 3006 010 | • 1,5 | 4 | 3 | 38 | A | ZYA | 10,75 |
| 11 3006 020 | • 2 | 4 | 3 | 38 | A | ZYA | 10,75 |
| 11 3026 005 | • 1 | 4 | 3 | 38 | C | WRC | 10,75 |
| 11 3026 010 | • 1,5 | 4 | 3 | 38 | C | WRC | 10,75 |
| 11 3026 015 | • 2 | 4 | 3 | 38 | C | WRC | 10,75 |
| 11 3036 005 | • 1 | 1 | 3 | 38 | D | KUD | 10,75 |
| 11 3036 010 | • 1,5 | 1 | 3 | 38 | D | KUD | 10,75 |
| 11 3036 015 | • 2 | 2 | 3 | 38 | D | KUD | 10,75 |
| 11 3046 005 | • 1,5 | 4 | 3 | 38 | E | TRE | 10,75 |
| 11 3056 005 | • 1,5 | 4 | 3 | 38 | F | RBF | 10,75 |
| 11 3066 005 | • 1,5 | 4 | 3 | 38 | G | SPG | 10,75 |
| 11 3196 005 | • 1,5 | 4 | 3 | 38 | M | SKM | 10,75 |



| | COMBI | | CURVE | |
|-----|-------|--|-------|-----|
| ZYA | | | | 786 |
| ZYB | | | | 787 |
| WRC | | | | 788 |
| WRC | | | | 789 |
| RBF | | | | 790 |
| SKM | | | | 791 |
| KEL | | | | 792 |
| KSJ | | | | 793 |
| KSK | | | | 794 |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9



Kegel SKM Form
Cone SKM shape

Die Schnittpunkte zwischen Winkelform (WKN) und Kegelform (SKM) ergeben das einzigartige COMBI+CURVE Führungs-Rundungs-Entgratungssystem

The intersecting points of the countersink (WKN) and cone shapes (SKM) form the unique COMBI+CURVE guiding-rounding-deburring system

Winkel WKN Form
Countersink WKN shape



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

| | COMBI | | CURVE | |
|-----|-------|--|-------|--|
| ZYA | | | | |
| ZYB | | | | |
| WRC | | | | |
| WRC | | | | |
| RBF | | | | |
| SKM | | | | |
| KEL | | | | |
| KSJ | | | | |
| KSK | | | | |

Die Kombination aus den gängigsten Kopfformen wie Zylinder ZYA + ZYB, Walzenrund WRC, Rundbogen RBF, Spitzbogen SPG, Rundkegel KEL, Winkel KSJ + KSK mit dem einzigartigen **COMBI+CURVE Führungs-Rundungs-Entgratungssystem** ergeben folgende Vorteile:

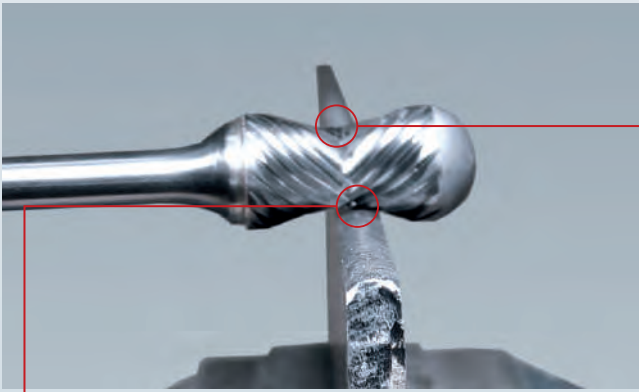
- Ideal zum schnellen Kantenverrunden.
- Die Kanten werden nicht einfach flach abgeschrägt, sondern erhalten durch das einzigartige **Führungs-Rundungs-Entgratungssystem** eine saubere Rundung.
- Der **COMBI+CURVE** zentriert sich selbst, immer mittig zur Kante.
- Durch die einzigartige Selbstzentrierung ist ein Abgleiten oder Ver-rutschen an scharfen Kanten nahezu unmöglich.
- Somit besteht eine deutlich bessere Kontrolle und garantiert einen einfachen und schnellen Materialabtrag.

Anwendbar in den verschiedensten Materialien wie: Gusseisen, Stahl < 60 HRC, Edelstahl (INOX), Nickelbasis- und Titanlegierungen, sowie Kupfer, Messing und Bronze

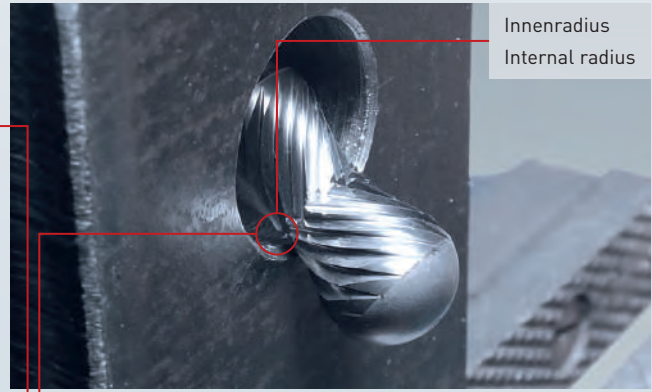
The combination of the most used head shapes as cylinder ZYA + ZYB, ball nosed cylinder WRC, ball nosed tree RBF, tree SPG, ball nosed cone KEL, countersink KSJ + KSK with the unique **COMBI+CURVE guiding-rounding-deburring system** result the following advantages:

- The ideal tool for extremely fast chamfering. The edges are not simply bevelled, but by the unique guiding-rounding-deburring system smoothly rounded.
- **COMBI+CURVE guiding-rounding-deburring system** always centres itself on the centre of the edge.
- Slipping off the edge is almost impossible. This gives best control and guarantees faster and easier removal of material.

Can be used on a wide variety of material e.g. cast iron, steel < 60 HRC, stainless steel (INOX), nickel-based and titanium alloys, copper, brass and bronze.



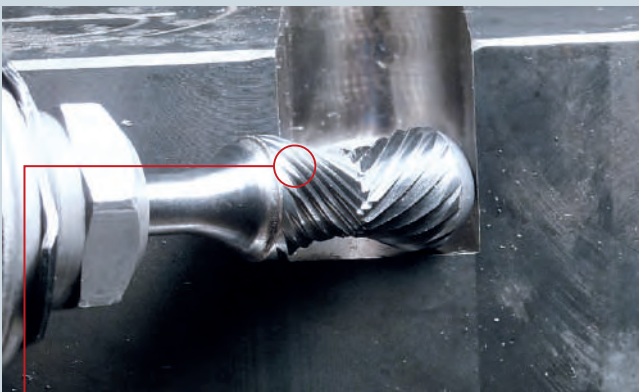
Außenradius
External radius



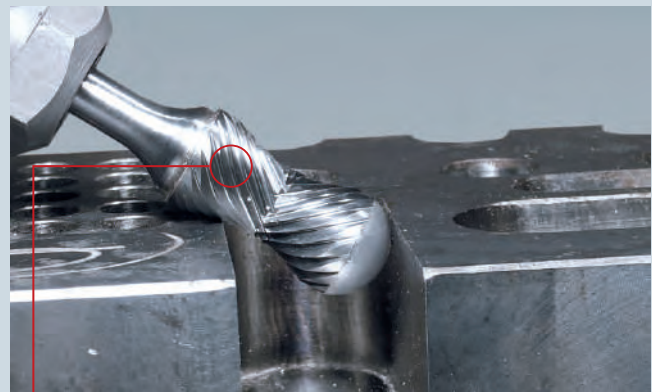
Innenradius
Internal radius

Die Schnittpunkte zwischen Winkelform (WKN) und Kegelform (SKM) ergeben das einzigartige COMBI+CURVE Führungs-Rundungs-Entgratungssystem

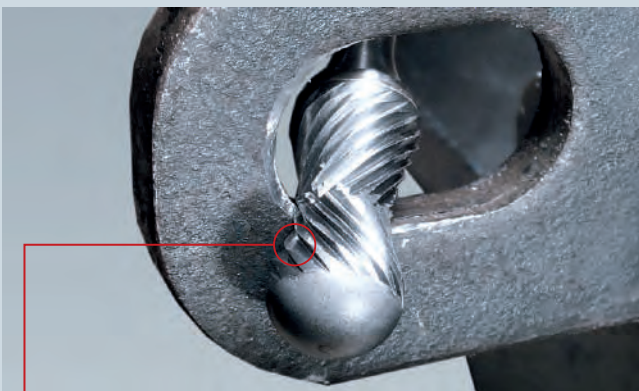
The intersecting points of the countersink (WKN) and cone shapes (SKM) form the unique COMBI+CURVE guiding-rounding-deburring system



Interne Fase in SKM Form
Internal chamfer with SKM shape



Außenfase in SKM Form
External chamfer with SKM shape



Interne Fase in WKN Form
Internal chamfer with WKN shape



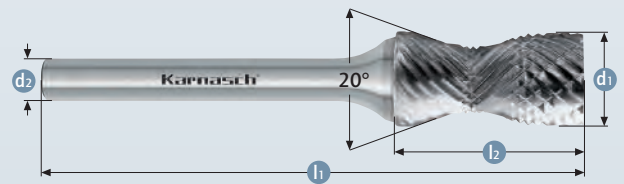
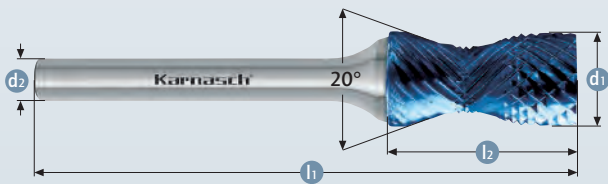
Außenfase in WKN Form
External chamfer with WKN shape



11 6019

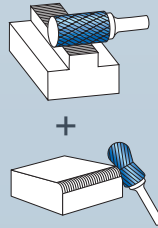


11 4019



Curve + Zylinder

Curve + Cylinder



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6019 100 | • 12 | 25 | 6 | 70 | ✓ | - | 45,05 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4019 100 | • 12 | 25 | 6 | 70 | ✓ | - | 40,25 |

Anwendungsbeispiele / Application examples

COMBI →



+

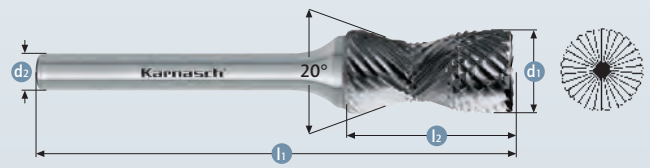
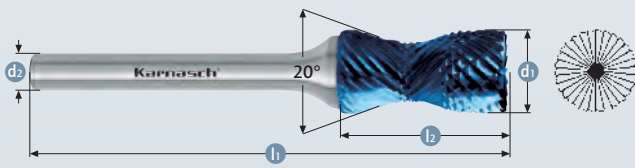
CURVE



11 6020

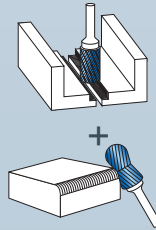


11 4020



Curve + Zylinder mit Stirnverzahnung

Curve + Cylinder with end cut



Schnittdaten
Cutting data

Film
Movie



691

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6020 100 | • 12 | 25 | 6 | 70 | ✓ | - | 56,85 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4020 100 | • 12 | 25 | 6 | 70 | ✓ | - | 52,10 |

Anwendungsbeispiele / Application examples

COMBI →



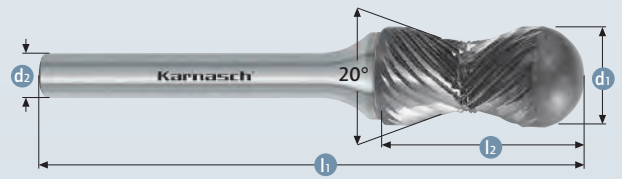
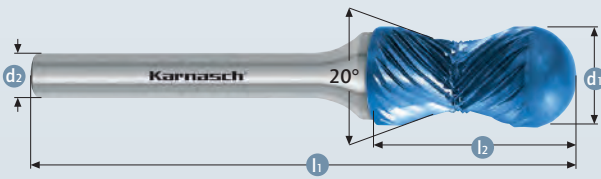
CURVE



11 6021

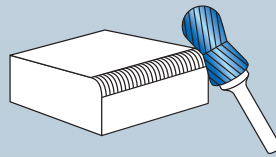


11 4021



Curve + Walzenrundform

Curve + Ball nosed cylinder



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6021 100 | • 12 | 25 | 6 | 70 | ✓ | - | 49,95 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4021 100 | • 12 | 25 | 6 | 70 | ✓ | - | 45,15 |

Anwendungsbeispiele / Application examples

COMBI →



CURVE



Der Radius an der Spitze des Frässtifts dient als Führung und Abstützung. Beschädigungen am Werkstück werden vermieden.

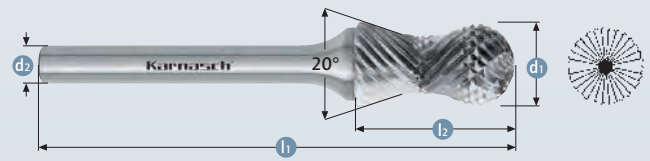
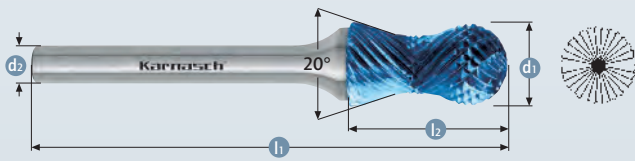
The radius at the front of the burr serves as a guide and a support. Damage to the workpiece can thus be avoided.



11 6022

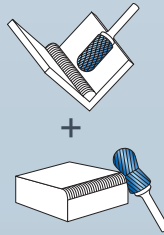


11 4022



Curve + Walzenrundform

Curve + Ball nosed cylinder



Schnittdaten
Cutting data

Film
Movie



691

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6022 100 | • 12 | 25 | 6 | 70 | ✓ | - | 49,95 |

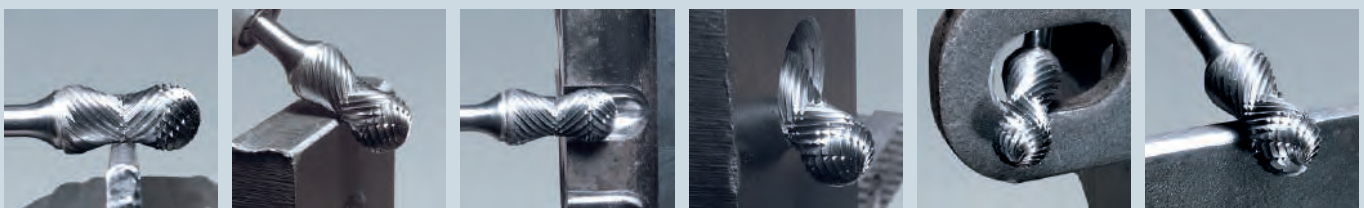
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4022 100 | • 12 | 25 | 6 | 70 | ✓ | - | 45,15 |

Anwendungsbeispiele / Application examples

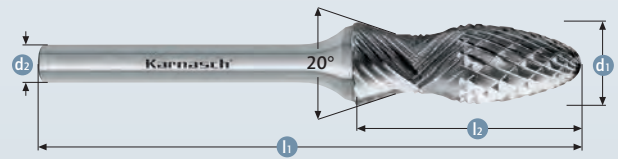
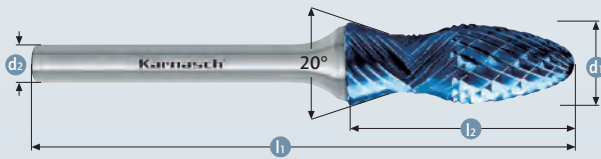
COMBI →



CURVE

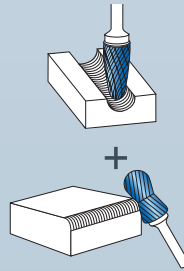


Index



Curve + Rundbogen

Curve + Ball nosed tree



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6023 100 | • 12 | 35 | 6 | 80 | ✓ | - | 58,60 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4023 100 | • 12 | 35 | 6 | 80 | ✓ | - | 53,80 |

Anwendungsbeispiele / Application examples

COMBI →



CURVE

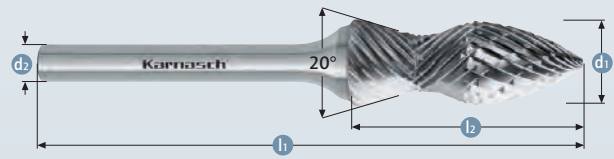
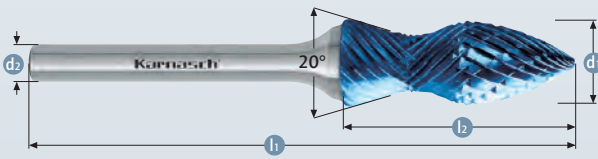


- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

11 6024

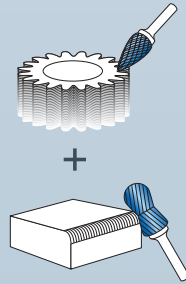


11 4024



Curve + Spitzbogen

Curve + Tree



Schnittdaten
Cutting data

Film
Movie



691

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6024 100 | • 12 | 35 | 6 | 80 | ✓ | - | 45,60 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4024 100 | • 12 | 35 | 6 | 80 | ✓ | - | 40,80 |

Anwendungsbeispiele / Application examples

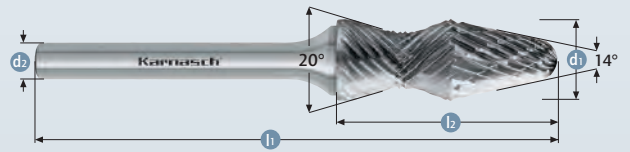
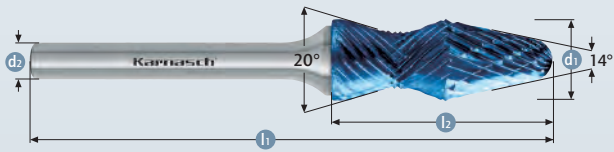
COMBI →

+

CURVE

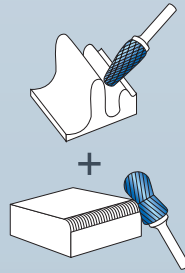


Index



Curve + Rundkegel

Curve + Ball nosed cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6025 100 | • 12 | 35 | 6 | 80 | ✓ | - | 48,70 |

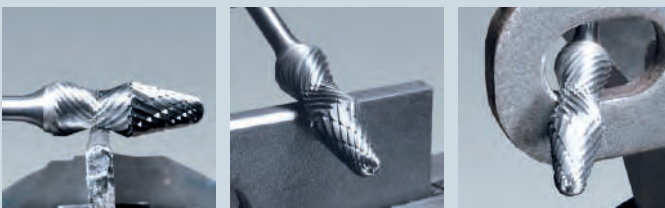
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|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4025 100 | • 12 | 35 | 6 | 80 | ✓ | - | 43,90 |

Anwendungsbeispiele / Application examples

COMBI →



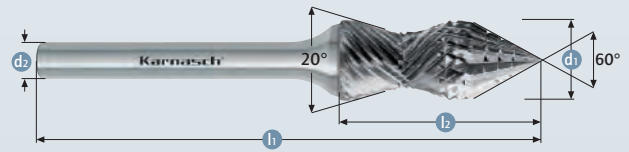
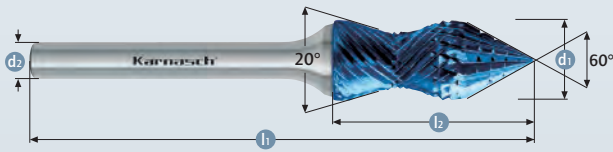
CURVE



11 6026

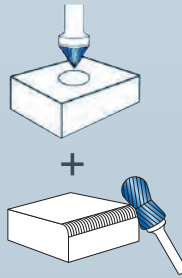


11 4026



Curve + Kegel 60°

Curve + Countersink 60°



| | |
|------------------------------|---------------|
| Schnittdaten Cutting data | Film Movie |
| | |
| 691 | |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6026 100 | • 12 | 28 | 6 | 73 | ✓ | - | 45,15 |

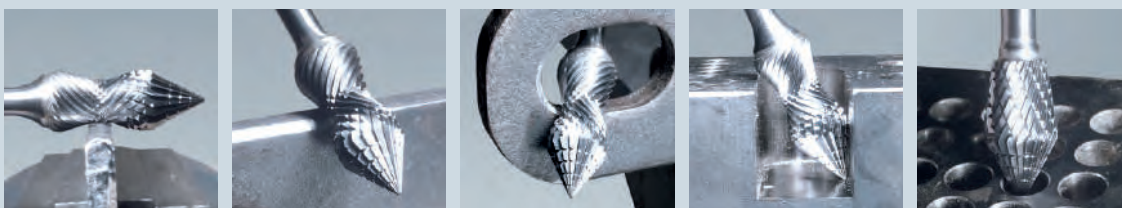
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4026 100 | • 12 | 28 | 6 | 73 | ✓ | - | 40,35 |

Anwendungsbeispiele / Application examples

COMBI →



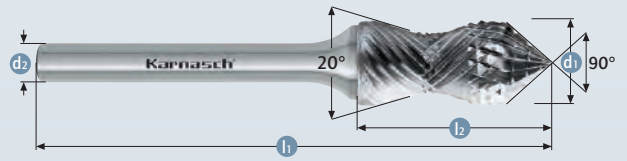
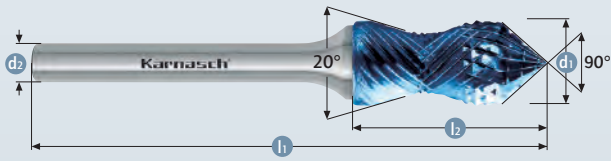
CURVE



11 6027

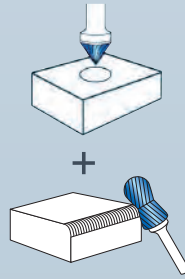


11 4027



Curve + Kegel 90°

Curve + Countersink 90°



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6027 100 | • 12 | 31 | 6 | 76 | ✓ | - | 45,15 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4027 100 | • 12 | 31 | 6 | 76 | ✓ | - | 40,35 |

Anwendungsbeispiele / Application examples

COMBI →



CURVE



KARNASCH PROFESSIONAL TOOLS WORLDWIDE

The rapid progress of technology always poses new challenges to companies from the metal-processing industry. It is more important for these companies to have future-oriented and reliable partner by their side who will not settle for targets achieved but provides impulses for new developments.

KARNASCH Professional Tools has offered an innovative and diverse product range and professional service towards its customers in more than 50 countries. The amount of know-how in our products becomes evident in daily use. Equipped with an extraordinary performance capacity, our products convince customers from all industries and around the world. Our past distinction will continue in future with ever-new product innovations as well. You may continue to count on our excellent service.

KARNASCH – Made for Professionals



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1



2



3



4



5



6



7



8



9



Index



| COMBI | | FORM | | | | | |
|-------|--|-------|--|--|--|--|-----|
| ZYA | | + WKN | | | Zylinder ohne Stirnverzahnung + Winkel | Cylinder without end cut + inverted cone | 798 |
| ZYB | | + WKN | | | Zylinder mit Stirnverzahnung + Winkel | Cylinder with end cut + inverted cone | 798 |
| WRC | | + WKN | | | Walzenrundform + Winkel | Ball nosed cylinder + inverted cone | 799 |
| WKN | | + WKN | | | Winkel + Winkel | Inverted cone + inverted cone | 799 |
| KSJ | | + ZYA | | | Kegel 60° + Zylinder | Countersink 60° + cylinder | 800 |

Anwendungsbeispiele / Application examples

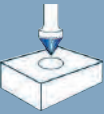
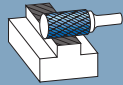
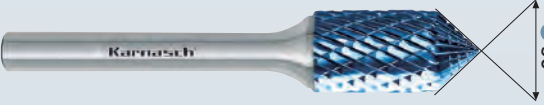

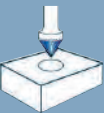

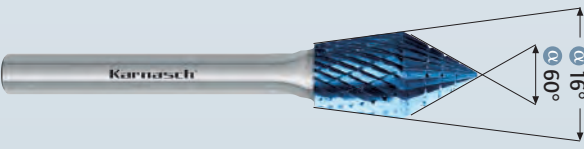



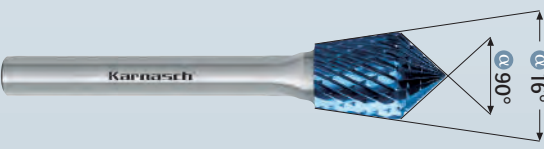


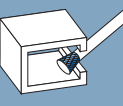




PRODUKTBESCHREIBUNG:

Die neuen COMBI+FORM Frässtifte bieten ein Maß an noch nie zuvor gesehener Vielseitigkeit.

COMBI+FORM Frässtifte sind hervorragend geeignet zum Nachbearbeiten vom komplexen Werkstücken. Durch die Zusammenführung von verschiedenen Formen, werden Rüstkosten minimiert. Zeitaufwendige Werkzeugwechsel, Kauf weiterer Formen wird vermieden. Entgraten, Kanten-, sowie verschiedenartigste Multifunktionsarbeiten sind mit nur einem Werkzeug möglich.

Die COMBI+FORM Frässtifte sind geeignet für eine Vielzahl von Metallen und Stahlsorten wie: Gusseisen, Stahl <60 HRC, Edelstahl (INOX), Nickelbasis- und Titanlegierungen, Kupfer, Messing und Bronze

| COMBI | | FORM | | | | | |
|-------|---|-------|---|---|----------------------|---------------------------------|---|
| KSK |  | + ZYA |  |  | Kegel 90° + Zylinder | Countersink 90° + cylinder |  800 |
| KSJ |  | + WKN |  |  | Kegel 60° + Winkel | Countersink 60° + inverted cone |  801 |
| KSK |  | + WKN |  |  | Kegel 90° + Winkel | Countersink 90° + inverted cone |  801 |
| - |  | - |  |  | Kegel + Kegel | Countersink + Countersink |  802 |



Anwendungsbeispiele / Application examples



PRODUCT DESCRIPTION:

COMBI+FORM versatility to suit almost any application

Just like any multi-tool in the DIY sector, there is now high performance multipurpose burrs for the industry. The COMBI+FORM line has been developed to reduce downtime and cover multi-application processes for metal removal. These exclusive new shapes will cover your deburring, edging and blending work in one simple burr solution. This range is ideal for complex parts where different shapes are required. The COMBI+FORM will maximise your productivity.

Features and benefits

- Reduced downtime for end user
- Special tooth geometry manufactured using the latest CNC machines
- The highest quality sintered tungsten carbide is used to ensure consistent performance
- A versatile burr to be used on a wide range of materials and processes

Can be used on a wide variety of material e.g. cast iron, steel <60 HRC, stainless steel (INOX), nickel-based and titanium alloys, copper, brass and bronze

11 6051

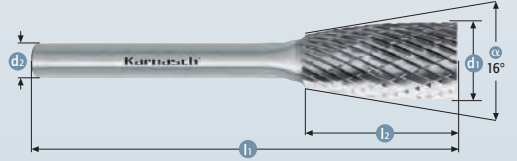
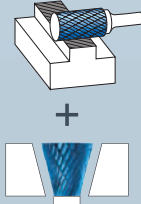


FORM / SHAPE

ZYA / WKN

Zylinder ohne Stirnverzahnung + Winkel

Cylinder without end cut + inverted cone



Schnittdaten
Cutting data

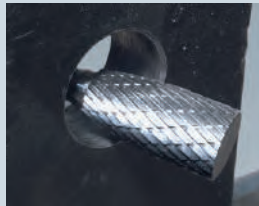
Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|----------------|-----------|-------|
| 11 6051 100 | 12 | 25 | 6 | 70 | | | 24,45 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|----------------|-----------|-------|
| 11 4051 100 | 12 | 25 | 6 | 70 | | | 21,85 |

Anwendungsbeispiele
Application examples



11 6052

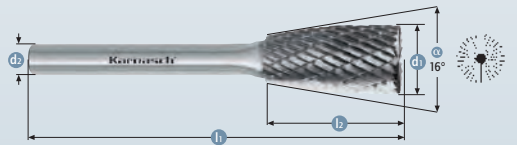
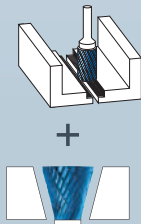


FORM / SHAPE

ZYB / WKN

Zylinder mit Stirnverzahnung + Winkel

Cylinder with end cut + inverted cone



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|----------------|-----------|-------|
| 11 6052 100 | 12 | 25 | 6 | 70 | | | 26,65 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|----------------|-----------|-------|
| 11 4052 100 | 12 | 25 | 6 | 70 | | | 24,05 |

Anwendungsbeispiele
Application examples



Index

11 6053

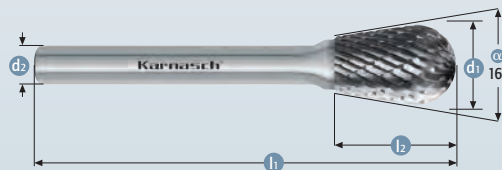
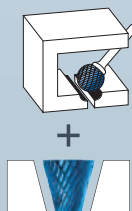


FORM / SHAPE

WRC/
WKN

Walzenrundform + Winkel

Ball nosed cylinder + inverted cone



Schnittdaten
Cutting data

Film
Movie



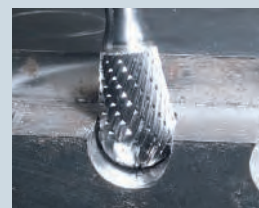
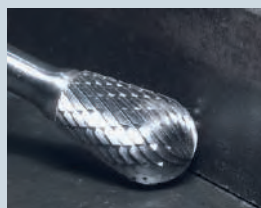
691

691

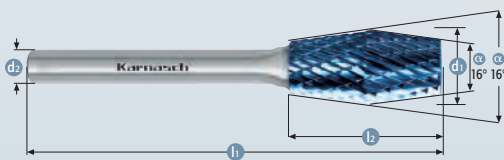
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|-------------------|--------------|-------|
| 11 6053 100 | 12 | 20 | 6 | 65 | | | 19,85 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|-------------------|--------------|-------|
| 11 4053 100 | 12 | 20 | 6 | 65 | | | 17,30 |

Anwendungsbeispiele
Application examples



11 6058

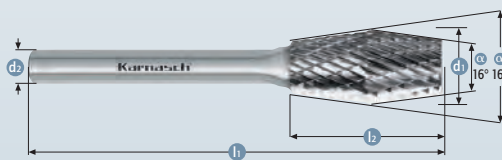
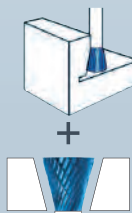


FORM / SHAPE

WKN/
WKN

Winkel + Winkel

Inverted cone + inverted cone



Schnittdaten
Cutting data

Film
Movie



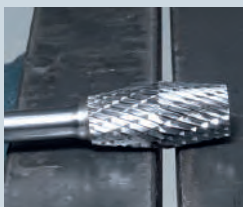
691

691

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|-------------------|--------------|-------|
| 11 6058 100 | 12 | 25 | 6 | 70 | | | 31,30 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|-------------------|--------------|-------|
| 11 4058 100 | 12 | 25 | 6 | 70 | | | 28,70 |

Anwendungsbeispiele
Application examples



% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



11 6059



11 4059

1

2

3

4

5

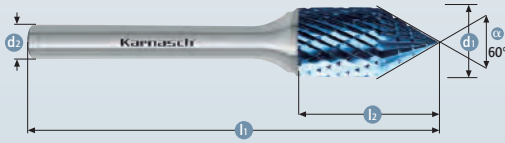
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7

8

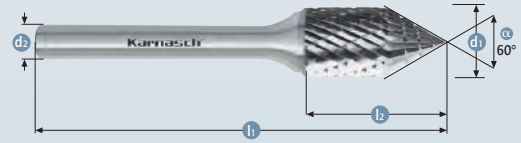
9

Index



FORM / SHAPE **KSJ / ZYA**

Kegel 60° + Zylinder
Countersink 60° + cylinder



Schnittdaten
Cutting data

Film
Movie

691

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|-------------------|--------------|-------|
| 11 6059 100 | 12 | 25 | 6 | 70 | | | 21,50 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|-------------------|--------------|-------|
| 11 4059 100 | 12 | 25 | 6 | 70 | | | 18,95 |

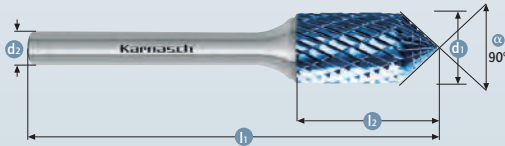
Anwendungsbeispiele
Application examples



11 6060

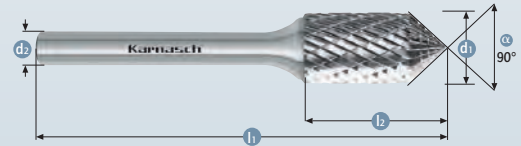


11 4060



FORM / SHAPE **KSK / ZYA**

Kegel 90° + Zylinder
Countersink 90° + cylinder



Schnittdaten
Cutting data

Film
Movie

691

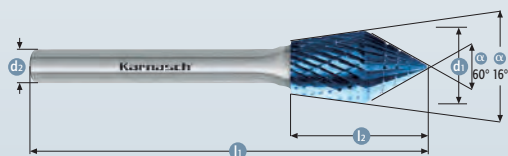
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|-------------------|--------------|-------|
| 11 6060 100 | 12 | 25 | 6 | 70 | | | 19,55 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|-------------------|--------------|-------|
| 11 4060 100 | 12 | 25 | 6 | 70 | | | 16,95 |

Anwendungsbeispiele
Application examples



11 6061

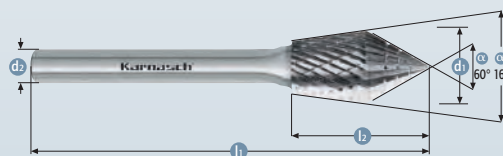


FORM / SHAPE

KSJ / WKN

Kegel 60° + Winkel

Countersink 60° + inverted cone



Schnittdaten
Cutting data



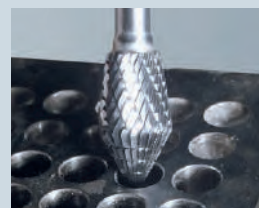
Film
Movie



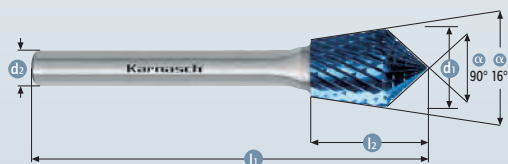
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|-------------------|--------------|-------|
| 11 6061 100 | 12 | 23 | 6 | 68 | | | 19,55 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|-------------------|--------------|-------|
| 11 4061 100 | 12 | 23 | 6 | 68 | | | 16,95 |

Anwendungsbeispiele
Application examples



11 6062

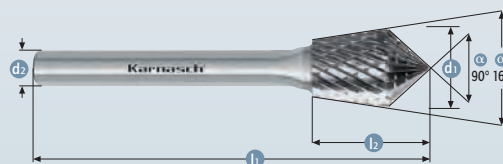


FORM / SHAPE

KSK / WKN

Kegel 90° + Winkel

Countersink 90° + inverted cone



Schnittdaten
Cutting data



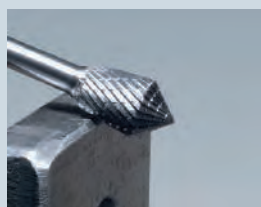
Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|-------------------|--------------|-------|
| 11 6062 100 | 12 | 18 | 6 | 64 | | | 14,25 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|-------------------|--------------|-------|
| 11 4062 100 | 12 | 18 | 6 | 64 | | | 14,25 |

Anwendungsbeispiele
Application examples



% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



11 6063



11 4063

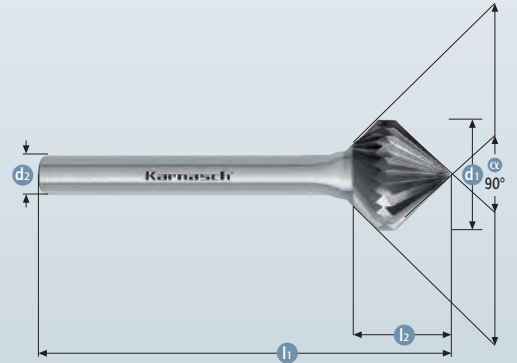
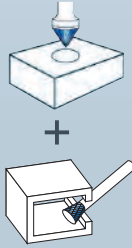


FORM / SHAPE

KSK / KSK

Kegel 90° + Kegel 90°

Countersink 90° + countersink 90°



Schnittdaten
Cutting data

Film
Movie



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6063 100 | • 16 | 15 | 6 | 60 | | | 51,20 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 4063 100 | • 16 | 15 | 6 | 60 | | | 46,45 |

Anwendungsbeispiele
Application examples



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Anwendungsbeispiele / Application examples



Reifenreparatur

Frässtifte für exakte Schadensbearbeitung an Radial und Diagonalreifen.

Geeignet für Reparaturen an Autoreifen, LKW Reifen, Reifen für Fahrzeuge in der Landwirtschaft sowie Baufahrzeugreifen.

Die speziell angepasste Schneidgeometrie ermöglicht eine saubere und Professionelle Bearbeitung des Lochkanals.

Vorgehensweise – Bearbeiten des Lochkanals

Mit einem Vorstecher ist der Verlauf des Lochkanals von innen nach außen festzustellen. Somit wird die Schadensgröße innen und außen am Reifen gemessen (max. 6 mm).

Der Lochkanal wird mit einem **passenden Frässtift** zuerst von innen nach außen und dann von außen nach innen bearbeitet und gesäubert.

Hierbei ist besonders darauf zu achten, dass der Schadenskanal genau durchdrungen wird, ohne den Schaden zu vergrößern, intakte Cordseile nicht verletzt werden und eine Aufweitung/Lösung des umliegenden Gewebes vermieden wird.

Werden hierbei weiterreichende Schäden wie Rostbildung oder Lösung festgestellt, muss der Reifen einer nochmaligen Prüfung auf die Reparaturfähigkeit mit vorgefertigten Reparaturkörpern unterzogen werden.

Tyre repair

Rotating mills for precise damage processing at radial and diagonal tyres.

Suitable for repairs to car tyres, truck tyres, tyres for agricultural vehicles and construction vehicle tyres.

The specifically adjusted cutting geometry permits clean and professional processing of the hole channel.

Procedure – Processing the hole channel

The course of the hole channel from the inside out is to be determined with a pricking awl. This measures the damage size on the inside and the outside of the tyre (max. 6 mm).

The hole channel is first processed and cleaned with a **matching rotating mill** from the inside outwards and then from the outside inwards.

For this, it must be particularly observed that the damage channel is penetrated precisely without enlarging the damage, that intact cord ropes are not damaged and that expansion/loosening of the surrounding tissue is avoided.

If further damage such as rust formation or loosening is found, the tyre must be inspected again for the possibility of repair with prefabricated repair elements.

1



2



3



4



5



6



7



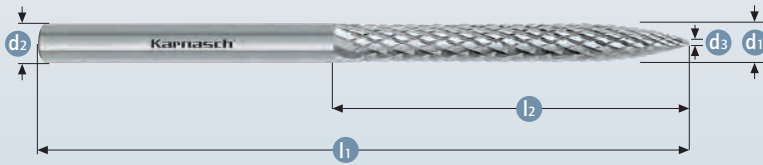
8



9



11 4070



Geeignet für:
Suitable for:

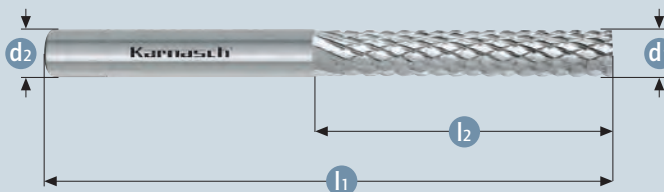


Drehzahl:
Rotational speed:

2500 U/min

| Art. | d1 | d3 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|-----|----|----|----|----------------|-----------|------|
| 11 4070 100 | 3 | 0,4 | 25 | 3 | 50 | | ✓ | 9,05 |

11 4071



Geeignet für:
Suitable for:

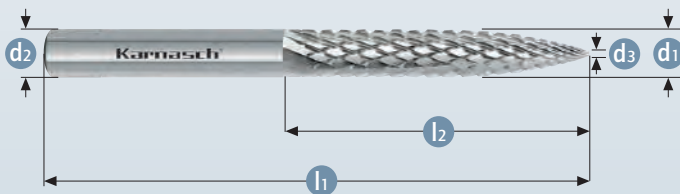


Drehzahl:
Rotational speed:

2500 U/min

| Art. | d1 | d3 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|----|----------------|-----------|-------|
| 11 4071 100 | 6 | - | 35 | 6 | 65 | | ✓ | 17,20 |

11 4072



Geeignet für:
Suitable for:

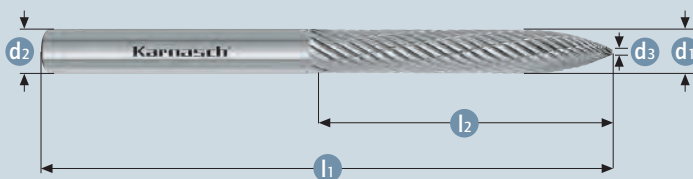


Drehzahl:
Rotational speed:

max. 2500 U/min

| Art. | d1 | d3 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|-----|----|----|----|----------------|-----------|-------|
| 11 4072 100 | 6 | 0,5 | 36 | 6 | 65 | | ✓ | 18,35 |

11 4073



Geeignet für:
Suitable for:



Drehzahl:
Rotational speed:

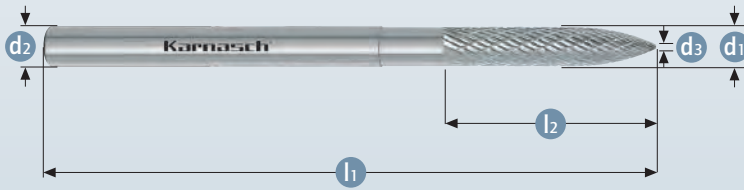
max. 2500 U/min

| Art. | d1 | d3 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|-----|----------------|-----------|-------|
| 11 4073 100 | 8 | 1 | 50 | 8 | 110 | | ✓ | 36,55 |





11 4074



Geeignet für:
Suitable for:



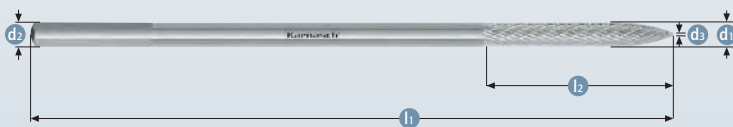
Drehzahl:
Rotational speed:

2500 U/min

| Art. | d1 | d3 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---------------|----|------|----|----|-----|-------------------|--------------|-------|
| 11 4074 100 % | 10 | 0,75 | 50 | 10 | 110 | ✓ | | 32,10 |



11 4075

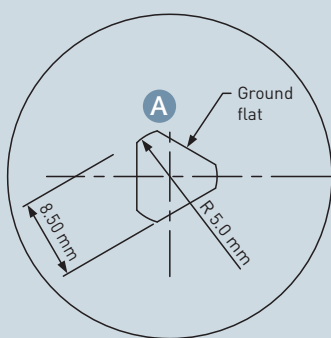


Geeignet für:
Suitable for:



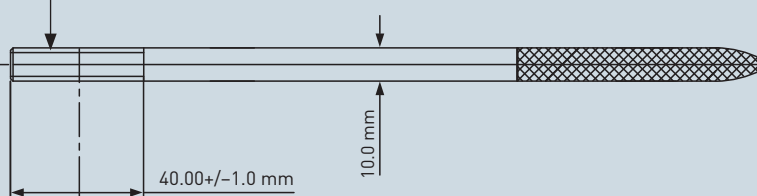
Drehzahl:
Rotational speed:

2500 U/min



3 Flächen am Schaftende,
dreieckiger Querschnitt mit Radius,
auch geeignet für Bohrmaschinen

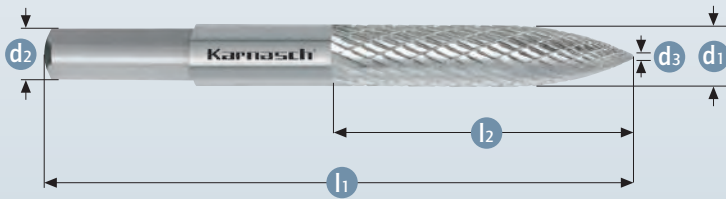
3 flats ground on diameter
triangular section with radius,
suitable for handheld machines



| Art. | d1 | d3 | l2 | d2 + A | l1 | gelötet brazed | VHM solid | € |
|---------------|----|------|----|--------------------------------|-----|-------------------|--------------|-------|
| 11 4075 100 % | 10 | 0,75 | 75 | 10 + 3 Flächen + 3 flats | 250 | ✓ | | 94,35 |



11 4076

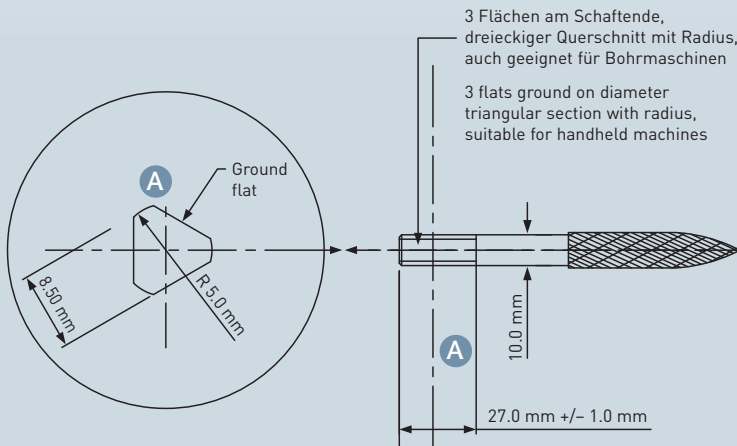


Geeignet für:
Suitable for:



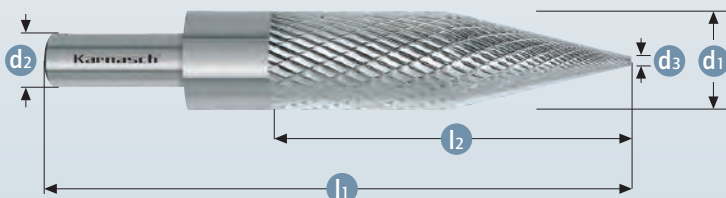
Drehzahl:
Rotational speed:

max. 2500 U/min



| Art. | d1 | d3 | l2 | d2 + A | l1 | gelötet brazed | VHM solid | € |
|-------------|----|-----|----|--------------------------------|-----|----------------|-----------|-------|
| 11 4076 100 | 12 | 0,8 | 55 | 10 + 3 Flächen + 3 flats | 110 | ✓ | | 57,25 |

11 4077

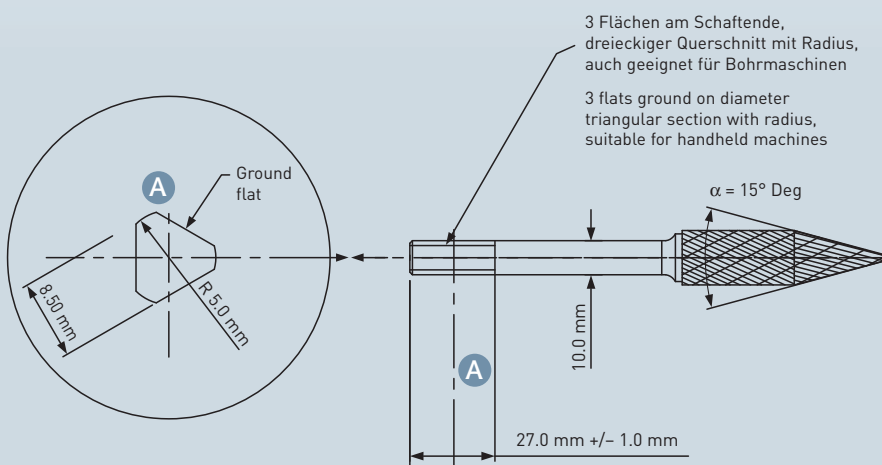


Geeignet für:
Suitable for:



Drehzahl:
Rotational speed:

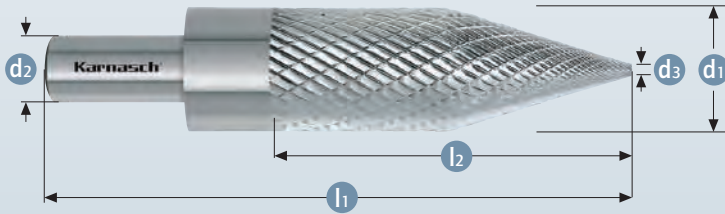
max. 2500 U/min



| Art. | d1 | d3 | l2 | d2 + A | l1 | gelötet brazed | VHM solid | € |
|-------------|----|-----|----|--------------------------------|-----|----------------|-----------|--------|
| 11 4077 100 | 16 | 1,5 | 60 | 10 + 3 Flächen + 3 flats | 140 | ✓ | | 134,05 |



11 4078

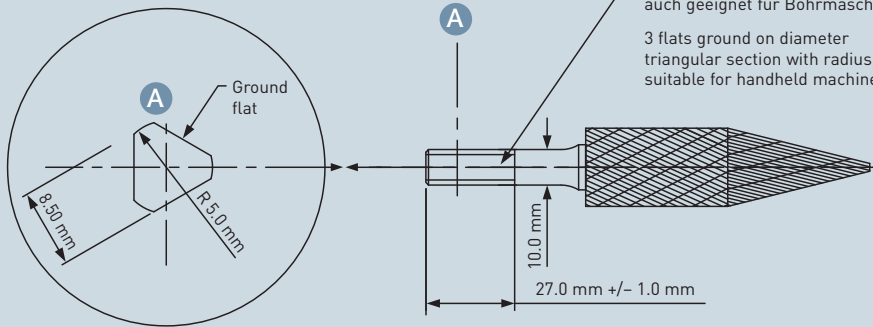


Geeignet für:
Suitable for:



Drehzahl:
Rotational speed:

max. 2500 U/min

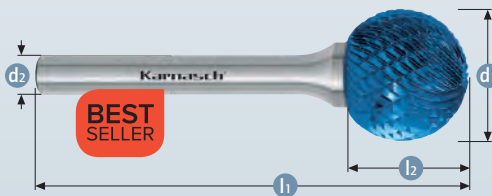


3 Flächen am Schaftende,
dreieckiger Querschnitt mit Radius,
auch geeignet für Bohrmaschinen

3 flats ground on diameter
triangular section with radius,
suitable for handheld machines

| Art. | d1 | d3 | l2 | d2 + A | l1 | gelötet brazed | VHM solid | € |
|---------------|----|-----|----|--------------------------------|-----|-------------------|--------------|--------|
| 11 4078 100 % | 22 | 2,2 | 80 | 10 + 3 Flächen + 3 flats | 125 | ✓ | | 203,55 |

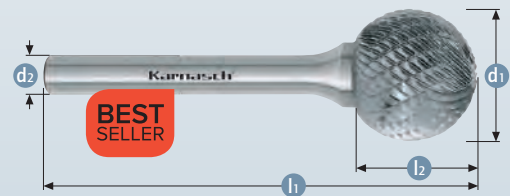
11 5031



D FORM / SHAPE KUD

Kugel

Ball



11 3031

Geeignet für:
Suitable for:



Drehzahl:
Rotational speed:

max. 2500 U/min

Schnittdaten
Cutting data



691

Film
Movie



691

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|------|----|----|-------------------|--------------|-------|
| 11 5031 105 | 20 | 16,5 | 6 | 62 | ✓ | | 29,25 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|------|----|----|-------------------|--------------|-------|
| 11 3031 105 | 20 | 16,5 | 6 | 62 | ✓ | | 23,90 |



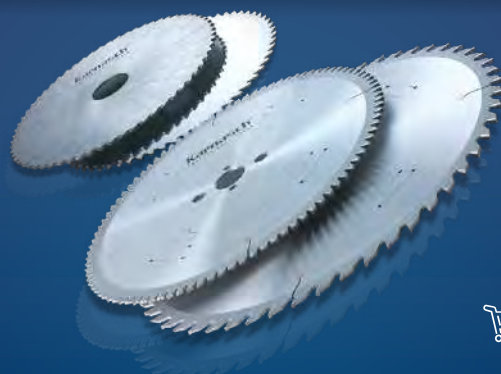
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Reliable performance in everyday service



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- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 



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SETS · DISPLAYS

SETS · DISPLAYS



1



2



3



4



5



6



7



8



9



4.4

KONTAKT | CONTACT

KARNASCH PROFESSIONAL TOOLS[®]
INDUSTRIAL TOOLS DIVISION

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mail@karnasch.tools

+49 (0) 33675 - 7265-0

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ONLINE



11 4853

BEST SELLER

€ 709,60



BEST SELLER

€ 605,85

11 4853 U

VALUETOOL

€ 465,65

neu
new

11 4854 U



Abschließbares Display Ø 6, 8, 10, 12 mm,
Schaft 6 mm (40 Stück)

Lockable display Ø 6, 8, 10, 12 mm,
shank 6 mm (40 pieces)

Film
Movie



BEST SELLER

Bestseller – preisreduziert
Bestseller – price reduced

BEST SELLER

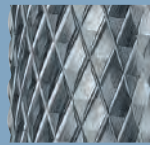
Bestseller – preisreduziert
Bestseller – price reduced



Universal HP-3



Zahnung
Cut



| Art. | d1 | l2 | d2 | l1 |
|-------------|------|----|----|----|
| 11 5011 050 | • 6 | 18 | 6 | 50 |
| 11 5011 075 | • 8 | 20 | 6 | 65 |
| 11 5011 085 | • 10 | 20 | 6 | 65 |
| 11 5011 100 | • 12 | 25 | 6 | 70 |
| 11 5021 055 | • 6 | 18 | 6 | 50 |
| 11 5021 075 | • 8 | 20 | 6 | 65 |
| 11 5021 085 | • 10 | 20 | 6 | 65 |
| 11 5021 105 | • 12 | 25 | 6 | 70 |
| 11 5051 030 | • 6 | 18 | 6 | 50 |
| 11 5051 035 | • 8 | 20 | 6 | 65 |
| 11 5051 040 | • 10 | 20 | 6 | 65 |
| 11 5051 050 | • 12 | 25 | 6 | 70 |
| 11 5061 035 | • 6 | 18 | 6 | 50 |
| 11 5061 040 | • 8 | 20 | 6 | 65 |
| 11 5061 045 | • 10 | 20 | 6 | 65 |
| 11 5061 060 | • 12 | 25 | 6 | 70 |
| 11 5081 020 | • 6 | 18 | 6 | 50 |
| 11 5081 025 | • 8 | 25 | 6 | 50 |
| 11 5081 035 | • 10 | 30 | 6 | 75 |
| 11 5081 045 | • 12 | 32 | 6 | 77 |

| Form Shape | DIN 8033 | Inhalt Contents |
|------------|----------|--|
| B | ZYB | 2x Zylinder mit Stirnverzahnung Cylinder with end cut |
| C | WRC | 2x Walzenrundform Ball nosed cylinder |
| F | RBF | 2x Rundbogen Ball nosed tree |
| G | SPG | 2x Spitzbogen Tree |
| L | KEL | 2x Rundkegel Ball nosed cone |

VALUETOOL

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|-----------------|----------------|------|----|----|----|
| 11 3011 050 | 11 3011 051 | • 6 | 18 | 6 | 50 |
| 11 3011 075 | 11 3011 076 | • 8 | 20 | 6 | 65 |
| 11 3011 085 | 11 3011 086 | • 10 | 20 | 6 | 65 |
| 11 3011 100 | 113011 104 | • 12 | 25 | 6 | 70 |
| 11 3021 055 | 11 3021 054 | • 6 | 18 | 6 | 50 |
| 11 3021 075 | 11 3021 076 | • 8 | 20 | 6 | 65 |
| 11 3021 085 | 11 3021 086 | • 10 | 20 | 6 | 65 |
| 11 3021 105 | 11 3021 108 | • 12 | 25 | 6 | 70 |
| 11 3051 030 | 11 3051 031 | • 6 | 18 | 6 | 50 |
| 11 3051 035 | 11 3051 036 | • 8 | 20 | 6 | 65 |
| 11 3051 040 | 11 3051 041 | • 10 | 20 | 6 | 65 |
| 11 3051 050 | 11 3051 054 | • 12 | 25 | 6 | 70 |
| 11 3061 035 | 11 3061 036 | • 6 | 18 | 6 | 50 |
| 11 3061 040 | 11 3061 041 | • 8 | 20 | 6 | 65 |
| 11 3061 045 | 11 3061 046 | • 10 | 20 | 6 | 65 |
| 11 3061 060 | 11 3061 064 | • 12 | 25 | 6 | 70 |
| 11 3081 020 | 11 3081 021 | • 6 | 18 | 6 | 50 |
| 11 3081 025 | 11 3081 026 | • 8 | 25 | 6 | 50 |
| 11 3081 035 | 11 3081 031 | • 10 | 30 | 6 | 75 |
| 11 3081 045 | 11 3081 048 | • 12 | 32 | 6 | 77 |
| | | | 20 | | 65 |
| | | | 25 | | 70 |

11 4945

Leeres Display /
Empty display

€ 71,45



Sie wollen einen anderen Inhalt? Kein Problem! Wählen Sie aus unserem Gesamt-sortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

Would you like a display of mini-burrs? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

11 4855

BEST SELLER

€ 1140,70



Abschließbares Display Ø 6, 8, 10, 12 mm, Schaft 6 mm (64 Stück)

Lockable display Ø 6, 8, 10, 12 mm, shank 6 mm (64 pieces)

Film Movie



BEST SELLER

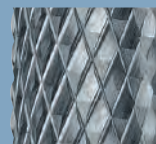
Bestseller – preisreduziert
Bestseller – price reduced



Universal HP-3



Zahnung Cut



| Art. | d1 | l2 | d2 | l1 |
|-------------|----|----|----|----|
| 11 5001 065 | 6 | 18 | 6 | 50 |
| 11 5001 080 | 8 | 20 | 6 | 65 |
| 11 5001 090 | 10 | 20 | 6 | 65 |
| 11 5001 105 | 12 | 25 | 6 | 70 |
| 11 5011 050 | 6 | 18 | 6 | 50 |
| 11 5011 075 | 8 | 20 | 6 | 65 |
| 11 5011 085 | 10 | 20 | 6 | 65 |
| 11 5011 100 | 12 | 25 | 6 | 70 |
| 11 5021 055 | 6 | 18 | 6 | 50 |
| 11 5021 075 | 8 | 20 | 6 | 65 |
| 11 5021 085 | 10 | 20 | 6 | 65 |
| 11 5021 105 | 12 | 25 | 6 | 70 |
| 11 5041 020 | 6 | 10 | 6 | 50 |
| 11 5041 025 | 8 | 15 | 6 | 60 |
| 11 5041 030 | 10 | 16 | 6 | 60 |
| 11 5041 035 | 12 | 22 | 6 | 67 |
| 11 5051 030 | 6 | 18 | 6 | 50 |
| 11 5051 035 | 8 | 20 | 6 | 65 |
| 11 5051 040 | 10 | 20 | 6 | 65 |
| 11 5051 050 | 12 | 25 | 6 | 70 |
| 11 5061 035 | 6 | 18 | 6 | 50 |
| 11 5061 040 | 8 | 20 | 6 | 65 |
| 11 5061 045 | 10 | 20 | 6 | 65 |
| 11 5061 060 | 12 | 25 | 6 | 70 |
| 11 5071 010 | 6 | 14 | 6 | 50 |
| 11 5071 015 | 8 | 20 | 6 | 65 |
| 11 5071 020 | 10 | 20 | 6 | 65 |
| 11 5071 025 | 12 | 32 | 6 | 77 |
| 11 5081 020 | 6 | 18 | 6 | 50 |
| 11 5081 025 | 8 | 25 | 6 | 70 |
| 11 5081 035 | 10 | 30 | 6 | 75 |
| 11 5081 045 | 12 | 32 | 6 | 77 |

| Form Shape | DIN 8033 | Inhalt Contents |
|------------|----------|--|
| A | ZYA | 2x Zylinder ohne Stirnverzahnung Cylinder without end cut |
| B | ZYB | 2x Zylinder mit Stirnverzahnung Cylinder with end cut |
| C | WRC | 2x Walzenrundform Ball nosed cylinder |
| E | TRE | 2x Tropfen Oval |
| F | RBF | 2x Rundbogen Ball nosed tree |
| G | SPG | 2x Spitzbogen Tree |
| H | - | 2x Flamme Flame |
| L | KEL | 2x Rundkegel Ball nosed cone |

BEST SELLER

€ 974,75

11 4855 U

VALUETOOL

€ 720,65

neu new

11 4856 U



BEST SELLER

Bestseller – preisreduziert
Bestseller – price reduced

VALUETOOL

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|-----------------|----------------|----|----|----|----|
| 11 3001 065 | 11 3001 066 | 6 | 18 | 6 | 50 |
| 11 3001 080 | 11 3001 081 | 8 | 20 | 6 | 65 |
| 11 3001 090 | 11 3001 091 | 10 | 20 | 6 | 65 |
| 11 3001 105 | 11 3001 108 | 12 | 25 | 6 | 70 |
| 11 3011 050 | 11 3011 051 | 6 | 18 | 6 | 50 |
| 11 3011 075 | 11 3011 076 | 8 | 20 | 6 | 65 |
| 11 3011 085 | 11 3011 086 | 10 | 20 | 6 | 65 |
| 11 3011 100 | 11 3011 104 | 12 | 25 | 6 | 70 |
| 11 3021 055 | 11 3021 054 | 6 | 18 | 6 | 50 |
| 11 3021 075 | 11 3021 076 | 8 | 20 | 6 | 65 |
| 11 3021 085 | 11 3021 086 | 10 | 20 | 6 | 65 |
| 11 3021 105 | 11 3021 108 | 12 | 25 | 6 | 70 |
| 11 3041 020 | 11 3041 021 | 6 | 10 | 6 | 50 |
| 11 3041 025 | 11 3041 026 | 8 | 15 | 6 | 60 |
| 11 3041 030 | 11 3041 031 | 10 | 16 | 6 | 60 |
| 11 3041 035 | 11 3041 036 | 12 | 22 | 6 | 67 |
| | | | 21 | | 66 |
| 11 3051 030 | 11 3051 031 | 6 | 18 | 6 | 50 |
| 11 3051 035 | 11 3051 036 | 8 | 20 | 6 | 65 |
| 11 3051 040 | 11 3051 041 | 10 | 20 | 6 | 65 |
| 11 3051 050 | 11 3051 054 | 12 | 25 | 6 | 70 |
| 11 3061 035 | 11 3061 036 | 6 | 18 | 6 | 50 |
| 11 3061 040 | 11 3061 041 | 8 | 20 | 6 | 65 |
| 11 3061 045 | 11 3061 046 | 10 | 20 | 6 | 65 |
| 11 3061 060 | 11 3061 064 | 12 | 25 | 6 | 70 |
| 11 3071 010 | 11 3071 011 | 6 | 14 | 6 | 50 |
| 11 3071 015 | 11 3071 016 | 8 | 20 | 6 | 65 |
| 11 3071 020 | 11 3071 021 | 10 | 20 | 6 | 65 |
| 11 3071 025 | 11 3071 026 | 12 | 32 | 6 | 77 |
| | | | 30 | | 75 |
| 11 3081 020 | 11 3081 021 | 6 | 18 | 6 | 50 |
| 11 3081 025 | 11 3081 026 | 8 | 25 | 6 | 70 |
| 11 3081 035 | 11 3081 031 | 10 | 30 | 6 | 75 |
| | | | 20 | | 65 |
| 11 3081 045 | 11 3081 048 | 12 | 32 | 6 | 77 |
| | | | 25 | | 70 |

Sie wollen einen anderen Inhalt? Kein Problem! Wählen Sie aus unserem Gesamtsortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

Would you like a display of mini-burrs? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.



11 4948

Leeres Display / Empty display

€ 81,65



11 4955

Leeres Display / Empty display

€ 38,92



11 4805

€ 127,75

MINI

10 Stück

10 pieces

Film
Movie



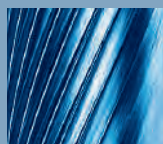
MINI

€ 107,65

11 4805 U



Universal Fein



Zahnung
Cut



| Art. | d1 | l2 | d2 | l1 |
|-------------|-------|----|----|----|
| 11 5006 005 | • 1 | 4 | 3 | 38 |
| 11 5006 010 | • 1,5 | 4 | 3 | 38 |
| 11 5026 005 | • 1 | 4 | 3 | 38 |
| 11 5026 010 | • 1,5 | 4 | 3 | 38 |
| 11 5036 005 | • 1 | 1 | 3 | 38 |
| 11 5036 010 | • 1,5 | 1 | 3 | 38 |
| 11 5046 005 | • 1,5 | 4 | 3 | 38 |
| 11 5056 005 | • 1,5 | 4 | 3 | 38 |
| 11 5066 005 | • 1,5 | 4 | 3 | 38 |
| 11 5196 005 | • 1,5 | 4 | 3 | 38 |

| Form Shape | DIN 8033 | Inhalt Contents |
|------------|----------|--|
| A | ZYA | 1x Zylinder ohne Stirnverzahnung Cylinder without end cut |
| A | ZYA | 1x Zylinder ohne Stirnverzahnung Cylinder without end cut |
| C | WRC | 1x Walzenrundform Ball nosed cylinder |
| C | WRC | 1x Walzenrundform Ball nosed cylinder |
| D | KUD | 1x Kugel Ball |
| D | KUD | 1x Kugel Ball |
| E | TRE | 1x Tropfen Oval |
| F | RBF | 1x Rundbogen Ball nosed tree |
| G | SPG | 1x Spitzbogen Tree |
| M | SKM | 1x Spitzkegel Cone |

| Art. | d1 | l2 | d2 | l1 |
|-------------|-------|----|----|----|
| 11 3006 005 | • 1 | 4 | 3 | 38 |
| 11 3006 010 | • 1,5 | 4 | 3 | 38 |
| 11 3026 005 | • 1 | 4 | 3 | 38 |
| 11 3026 010 | • 1,5 | 4 | 3 | 38 |
| 11 3036 005 | • 1 | 1 | 3 | 38 |
| 11 3036 010 | • 1,5 | 1 | 3 | 38 |
| 11 3046 005 | • 1,5 | 4 | 3 | 38 |
| 11 3056 005 | • 1,5 | 4 | 3 | 38 |
| 11 3066 005 | • 1,5 | 4 | 3 | 38 |
| 11 3196 005 | • 1,5 | 4 | 3 | 38 |

11 4952

Leeres Set /
Empty set

€ 0,65



Sie wollen einen anderen Inhalt an Mini-Frässtiften? Kein Problem! Wählen Sie aus dem Gesamtprogramm Mini-Frässtifte auf Seite 782 Ihren gewünschten Inhalt.

Would you like a display of mini-burrs? No problem! Select the content you want from the complete list of mini-burr products on page 782.

11 4820

€ 621,25

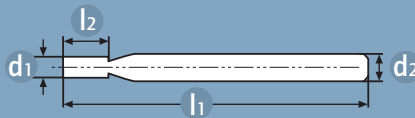


MINI



50 Stück
50 pieces

Film
Movie



€ 537,05

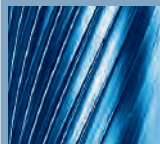
11 4820 U



MINI



Universal Fein



Zahnung
Cut



| Art. | d1 | l2 | d2 | l1 |
|-------------|-------|----|----|----|
| 11 5006 005 | • 1 | 4 | 3 | 38 |
| 11 5006 010 | • 1,5 | 4 | 3 | 38 |
| 11 5006 020 | • 2 | 4 | 3 | 38 |
| 11 5026 005 | • 1 | 4 | 3 | 38 |
| 11 5026 010 | • 1,5 | 1 | 3 | 38 |
| 11 5026 015 | • 2 | 1 | 3 | 38 |
| 11 5036 005 | • 1 | 4 | 3 | 38 |
| 11 5036 010 | • 1,5 | 4 | 3 | 38 |
| 11 5036 015 | • 2 | 4 | 3 | 38 |
| 11 5046 005 | • 1,5 | 4 | 3 | 38 |
| 11 5056 005 | • 1,5 | 4 | 3 | 38 |
| 11 5066 005 | • 1,5 | 4 | 3 | 38 |
| 11 5196 005 | • 1,5 | 4 | 3 | 38 |

| Form Shape | DIN 8033 | Inhalt Contents |
|------------|----------|--|
| A | ZYA | 5x Zylinder ohne Stirnverzahnung Cylinder without end cut |
| A | ZYA | 5x Zylinder ohne Stirnverzahnung Cylinder without end cut |
| A | ZYA | 3x Zylinder ohne Stirnverzahnung Cylinder without end cut |
| C | WRC | 5x Walzenrundform Ball nosed cylinder |
| C | WRC | 5x Walzenrundform Ball nosed cylinder |
| C | WRC | 3x Walzenrundform Ball nosed cylinder |
| D | KUD | 5x Kugel Ball |
| D | KUD | 5x Kugel Ball |
| D | KUD | 2x Kugel Ball |
| E | TRE | 3x Tropfen Oval |
| F | RBF | 3x Rundbogen Ball nosed tree |
| G | SPG | 3x Spitzbogen Tree |
| M | SKM | 3x Spitzkegel Cone |

| Art. | d1 | l2 | d2 | l1 |
|-------------|-------|----|----|----|
| 11 3006 005 | • 1 | 4 | 3 | 38 |
| 11 3006 010 | • 1,5 | 4 | 3 | 38 |
| 11 3006 020 | • 1 | 4 | 3 | 38 |
| 11 3026 005 | • 1,5 | 4 | 3 | 38 |
| 11 3026 010 | • 1,5 | 4 | 3 | 38 |
| 11 3026 015 | • 1,5 | 4 | 3 | 38 |
| 11 3036 005 | • 1,5 | 4 | 3 | 38 |
| 11 3036 010 | • 1 | 1 | 3 | 38 |
| 11 3036 015 | • 1,5 | 1 | 3 | 38 |
| 11 3046 005 | • 1,5 | 4 | 3 | 38 |
| 11 3056 005 | • 1,5 | 4 | 3 | 38 |
| 11 3066 005 | • 1,5 | 4 | 3 | 38 |
| 11 3196 005 | • 1,5 | 4 | 3 | 38 |

Sie wollen einen anderen Inhalt an Mini-Frässtiften? Kein Problem! Wählen Sie aus dem Gesamtprogramm Mini-Frässtifte auf Seite 782 Ihren gewünschten Inhalt.

Would you like a display of mini-burrs? No problem! Select the content you want from the complete list of mini-burr products on page 782.

11 4953

Leeres Set /
Empty set

€ 2,05



Index

11 4904

BEST SELLER

€ 74,45



BEST SELLER

€ 57,15

11 4904 U

VALUETOOL

€ 39,30

neu
new

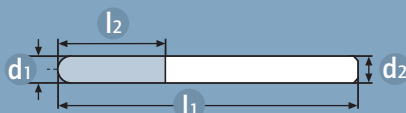
11 4903 U



10 Stück

10 pieces

Film
Movie



BEST SELLER

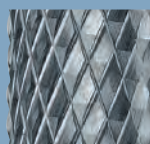
Bestseller – preisreduziert
Bestseller – price reduced



Universal HP-3



Zahnung
Cut



BEST SELLER

Bestseller – preisreduziert
Bestseller – price reduced

VALUETOOL

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 |
|-------------|-----|-----|----|----|
| 11 5001 030 | • 3 | 14 | 3 | 38 |
| 11 5011 015 | • 3 | 14 | 3 | 38 |
| 11 5021 025 | • 3 | 14 | 3 | 38 |
| 11 5031 025 | • 3 | 2,7 | 3 | 38 |
| 11 5041 010 | • 3 | 6 | 3 | 38 |
| 11 5051 015 | • 3 | 14 | 3 | 38 |
| 11 5061 015 | • 3 | 14 | 3 | 38 |
| 11 5071 005 | • 3 | 6 | 3 | 38 |
| 11 5081 010 | • 3 | 14 | 3 | 38 |
| 11 5091 015 | • 3 | 11 | 3 | 38 |

| Form Shape | DIN 8033 | Inhalt Contents |
|------------|----------|--|
| A | ZYA | 1x Zylinder ohne Stirnverzahnung Cylinder without end cut |
| B | ZYB | 1x Zylinder mit Stirnverzahnung Cylinder with end cut |
| C | WRC | 1x Walzenrundform Ball nosed cylinder |
| D | KUD | 1x Kugel Ball |
| E | TRE | 1x Tropfen Oval |
| F | RBF | 1x Rundbogen Ball nosed tree |
| G | SPG | 1x Spitzbogen Tree |
| H | - | 1x Flamme Flame |
| L | KEL | 1x Rundkegel Ball nosed cone |
| M | SKM | 1x Spitzkegel Cone |

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|-----------------|----------------|-----|------------|----|----|
| 11 3001 030 | 11 3001 031 | • 3 | 14 | 3 | 38 |
| 11 3011 015 | 11 3011 016 | • 3 | 14 | 3 | 38 |
| 11 3021 025 | 11 3021 026 | • 3 | 14 | 3 | 38 |
| 11 3031 025 | 11 3031 026 | • 3 | 2,7 2,5 | 3 | 38 |
| 11 3041 010 | 11 3041 009 | • 3 | 6 | 3 | 38 |
| 11 3051 015 | 11 3051 016 | • 3 | 14 | 3 | 38 |
| 11 3061 015 | 11 3061 016 | • 3 | 14 | 3 | 38 |
| 11 3071 005 | 11 3071 004 | • 3 | 6 | 3 | 38 |
| 11 3081 010 | 11 3081 008 | • 3 | 14 | 3 | 38 |
| 11 3091 015 | 11 3091 016 | • 3 | 11 | 3 | 38 |

11 4952

Leeres Set /
Empty set

€ 0,65



Sie wollen einen anderen Inhalt? Kein Problem! Wählen Sie aus unserem Gesamtsortiment 3 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 38 mm.

Would you like a display of mini-burrs? No problem! Select 3.0 mm shafts from the complete list of products. Note that the maximum length is 38 mm.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

11 4837

BEST SELLER

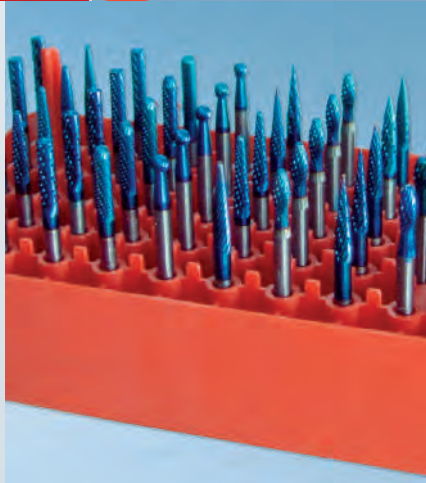
€ 370,95



BEST SELLER

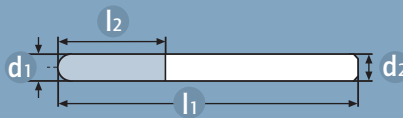
€ 284,45

11 4837 U



50 Stück
50 pieces

Film
Movie

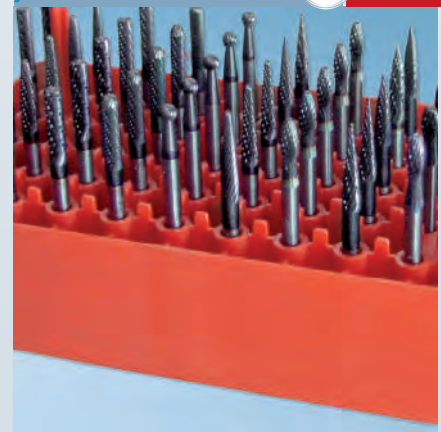


VALUETOOL

€ 195,30

neu
new

11 4838 U



BEST SELLER

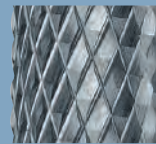
Bestseller – preisreduziert
Bestseller – price reduced



Universal HP-3



Zahnung
Cut



BEST SELLER

Bestseller – preisreduziert
Bestseller – price reduced

VALUETOOL

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 |
|-------------|-----|-----|----|----|
| 11 5001 030 | • 3 | 14 | 3 | 38 |
| 11 5011 015 | • 3 | 14 | 3 | 38 |
| 11 5021 025 | • 3 | 14 | 3 | 38 |
| 11 5031 025 | • 3 | 2,7 | 3 | 38 |
| 11 5041 010 | • 3 | 6 | 3 | 38 |
| 11 5051 015 | • 3 | 14 | 3 | 38 |
| 11 5061 015 | • 3 | 14 | 3 | 38 |
| 11 5071 005 | • 3 | 6 | 3 | 38 |
| 11 5081 010 | • 3 | 14 | 3 | 38 |
| 11 5091 015 | • 3 | 11 | 3 | 38 |

| Form Shape | DIN 8033 | Inhalt Contents |
|------------|----------|--|
| A | ZYA | 5x Zylinder ohne Stirnverzahnung Cylinder without end cut |
| B | ZYB | 5x Zylinder mit Stirnverzahnung Cylinder with end cut |
| C | WRC | 5x Walzenrundform Ball nosed cylinder |
| D | KUD | 5x Kugel Ball |
| E | TRE | 5x Tropfen Oval |
| F | RBF | 5x Rundbogen Ball nosed tree |
| G | SPG | 5x Spitzbogen Tree |
| H | - | 5x Flamme Flame |
| L | KEL | 5x Rundkegel Ball nosed cone |
| M | SKM | 5x Spitzkegel Cone |

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|-----------------|----------------|-----|------------|----|----|
| 11 3001 030 | 11 3001 031 | • 3 | 14 | 3 | 38 |
| 11 3011 015 | 11 3011 016 | • 3 | 14 | 3 | 38 |
| 11 3021 025 | 11 3021 026 | • 3 | 14 | 3 | 38 |
| 11 3031 025 | 11 3031 026 | • 3 | 2,7 2,5 | 3 | 38 |
| 11 3041 010 | 11 3041 009 | • 3 | 6 | 3 | 38 |
| 11 3051 015 | 11 3051 016 | • 3 | 14 | 3 | 38 |
| 11 3061 015 | 11 3061 016 | • 3 | 14 | 3 | 38 |
| 11 3071 005 | 11 3071 004 | • 3 | 6 | 3 | 38 |
| 11 3081 010 | 11 3081 008 | • 3 | 14 | 3 | 38 |
| 11 3091 015 | 11 3091 016 | • 3 | 11 | 3 | 38 |

Sie wollen einen anderen Inhalt? Kein Problem! Wählen Sie aus unserem Gesamt-sortiment 3 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 38 mm.

Would you like a display of mini-burrs? No problem! Select 3.0 mm shafts from the complete list of products. Note that the maximum length is 38 mm.



11 4953

Leeres Set /
Empty set

€ 2,05



11 4918

BEST SELLER

€ 90,70



BEST SELLER

€ 76,60

11 4918 U

VALUETOOL

€ 60,20

neu
new

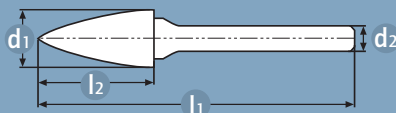
11 4919 U



5 Stück

5 pieces

Film
Movie



BEST SELLER

Bestseller – preisreduziert
Bestseller – price reduced

BEST SELLER

Bestseller – preisreduziert
Bestseller – price reduced



Universal HP-3



Zahnung
Cut



VALUETOOL

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 |
|-------------|------|----|----|----|
| 11 5011 085 | • 10 | 20 | 6 | 65 |
| 11 5021 085 | • 10 | 20 | 6 | 65 |
| 11 5051 040 | • 10 | 20 | 6 | 65 |
| 11 5061 045 | • 10 | 20 | 6 | 65 |
| 11 5081 035 | • 10 | 30 | 6 | 75 |

| Form Shape | DIN 8033 | Inhalt Contents |
|------------|----------|--|
| B | ZYB | 1x Zylinder mit Stirnverzahnung Cylinder with end cut |
| C | WRC | 1x Walzenrundform Ball nosed cylinder |
| F | RBF | 1x Rundbogen Ball nosed tree |
| G | SPG | 1x Spitzbogen Tree |
| L | KEL | 1x Rundkegel Ball nosed cone |

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|-----------------|----------------|------|----------|----|----------|
| 11 3011 085 | 11 3011 086 | • 10 | 20 | 6 | 65 |
| 11 3021 085 | 11 3021 086 | • 10 | 20 | 6 | 65 |
| 11 3051 040 | 11 3051 041 | • 10 | 20 | 6 | 65 |
| 11 3061 045 | 11 3061 046 | • 10 | 20 | 6 | 65 |
| 11 3081 035 | 11 3081 031 | • 10 | 30 20 | 6 | 75 65 |

11 4947

Leeres Set /
Empty set

€ 9,50



Sie wollen einen anderen Inhalt? Kein Problem! Wählen Sie aus unserem Gesamt-sortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

Would you like a display of mini-burrs? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

11 4926

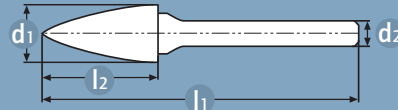
BEST SELLER

€ 125,10



5 Stück
5 pieces

Film
Movie



BEST SELLER

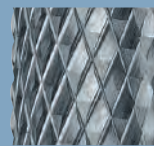
Bestseller – preisreduziert
Bestseller – price reduced



Universal HP-3



Zahnung
Cut



| Art. | d1 | l2 | d2 | l1 |
|-------------|------|----|----|----|
| 11 5011 100 | • 12 | 25 | 6 | 70 |
| 11 5021 105 | • 12 | 25 | 6 | 70 |
| 11 5051 050 | • 12 | 25 | 6 | 70 |
| 11 5061 060 | • 12 | 25 | 6 | 70 |
| 11 5081 045 | • 12 | 25 | 6 | 77 |

| Form Shape | DIN 8033 | Inhalt Contents |
|------------|----------|--|
| B | ZYB | 1x Zylinder mit Stirnverzahnung Cylinder with end cut |
| C | WRC | 1x Walzenrundform Ball nosed cylinder |
| F | RBF | 1x Rundbogen Ball nosed tree |
| G | SPG | 1x Spitzbogen Tree |
| L | KEL | 1x Rundkegel Ball nosed cone |

BEST SELLER

€ 104,60

11 4926 U

VALUETOOL

€ 74,30

neu
new

11 4927 U



BEST SELLER

Bestseller – preisreduziert
Bestseller – price reduced



Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|-----------------|----------------|------|----------|----|----------|
| 11 3011 100 | 11 3011 104 | • 12 | 25 | 6 | 70 |
| 11 3021 105 | 11 3021 108 | • 12 | 25 | 6 | 70 |
| 11 3051 050 | 11 3051 054 | • 12 | 25 | 6 | 70 |
| 11 3061 060 | 11 3061 064 | • 12 | 25 | 6 | 70 |
| 11 3081 045 | 11 3081 048 | • 12 | 32 25 | 6 | 77 70 |

Sie wollen einen anderen Inhalt? Kein Problem! Wählen Sie aus unserem Gesamt-sortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

Would you like a display of mini-burrs? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.



11 4947

Leeres Set /
Empty set

€ 9,50



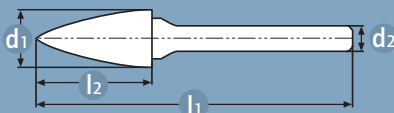
Index

11 4934 **BEST SELLER** € 205,05



10 Stück
10 pieces

Film
Movie



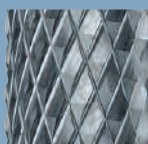
BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced



Universal HP-3



Zahnung
Cut



| Art. | d1 | l2 | d2 | l1 |
|-------------|------|----|----|----|
| 11 5011 085 | • 10 | 20 | 6 | 65 |
| 11 5021 085 | • 10 | 20 | 6 | 65 |
| 11 5051 040 | • 10 | 20 | 6 | 65 |
| 11 5061 045 | • 10 | 20 | 6 | 65 |
| 11 5081 035 | • 10 | 30 | 6 | 75 |
| 11 5011 100 | • 12 | 25 | 6 | 70 |
| 11 5021 105 | • 12 | 25 | 6 | 70 |
| 11 5051 050 | • 12 | 25 | 6 | 70 |
| 11 5061 060 | • 12 | 25 | 6 | 70 |
| 11 5081 045 | • 12 | 32 | 6 | 77 |

| Form Shape | DIN 8033 | Inhalt Contents |
|------------|----------|--|
| B | ZYB | 1x Zylinder mit Stirnverzahnung Cylinder with end cut |
| C | WRC | 1x Walzenrundform Ball nosed cylinder |
| F | RBF | 1x Rundbogen Ball nosed tree |
| G | SPG | 1x Spitzbogen Tree |
| L | KEL | 1x Rundkegel Ball nosed cone |
| B | ZYB | 1x Zylinder mit Stirnverzahnung Cylinder with end cut |
| C | WRC | 1x Walzenrundform Ball nosed cylinder |
| F | RBF | 1x Rundbogen Ball nosed tree |
| G | SPG | 1x Spitzbogen Tree |
| L | KEL | 1x Rundkegel Ball nosed cone |

BEST SELLER € 170,45 11 4934 U

VALUETOOL € 125,15 **neu** 11 4935 U



BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced



Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|-----------------|----------------|------|----------|----|----------|
| 11 3011 085 | 11 3011 086 | • 10 | 20 | 6 | 65 |
| 11 3021 085 | 11 3021 086 | • 10 | 20 | 6 | 65 |
| 11 3051 040 | 11 3051 041 | • 10 | 20 | 6 | 65 |
| 11 3061 045 | 11 3061 046 | • 10 | 20 | 6 | 65 |
| 11 3081 035 | 11 3081 031 | • 10 | 30 20 | 6 | 75 65 |
| 11 3011 100 | 11 3011 104 | • 12 | 25 | 6 | 70 |
| 11 3021 105 | 11 3021 108 | • 12 | 25 | 6 | 70 |
| 11 3051 050 | 11 3051 054 | • 12 | 25 | 6 | 70 |
| 11 3061 060 | 11 3061 064 | • 12 | 25 | 6 | 70 |
| 11 3081 045 | 11 3081 048 | • 12 | 32 25 | 6 | 77 70 |

11 4950

Leeres Set /
Empty set

€ 9,50



Sie wollen einen anderen Inhalt? Kein Problem! Wählen Sie aus unserem Gesamt-sortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

Would you like a display of mini-burrs? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

11 4942

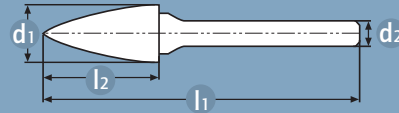
BEST SELLER

€ 242,35



10 Stück
10 pieces

Film
Movie



BEST SELLER

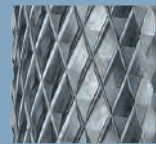
Bestseller – preisreduziert
Bestseller – price reduced



Universal HP-3



Zahnung
Cut



| Art. | d1 | l2 | d2 | l1 |
|-------------|------|------|----|----|
| 11 5001 105 | • 12 | 25 | 6 | 70 |
| 11 5011 100 | • 12 | 25 | 6 | 70 |
| 11 5021 105 | • 12 | 25 | 6 | 70 |
| 11 5031 080 | • 12 | 11,4 | 6 | 65 |
| 11 5041 035 | • 12 | 22 | 6 | 67 |
| 11 5051 050 | • 12 | 25 | 6 | 70 |
| 11 5061 060 | • 12 | 25 | 6 | 70 |
| 11 5071 025 | • 12 | 32 | 6 | 77 |
| 11 5081 045 | • 12 | 32 | 6 | 77 |
| 11 5091 045 | • 12 | 25 | 6 | 70 |

| Form Shape | DIN 8033 | Inhalt Contents |
|------------|----------|--|
| A | ZYA | 1x Zylinder ohne Stirnverzahnung Cylinder without end cut |
| B | ZYB | 1x Zylinder mit Stirnverzahnung Cylinder with end cut |
| C | WRC | 1x Walzenrundform Ball nosed cylinder |
| D | KUD | 1x Kugel Ball |
| E | TRE | 1x Tropfen Oval |
| F | RBF | 1x Rundbogen Ball nosed tree |
| G | SPG | 1x Spitzbogen Tree |
| H | - | 1x Flamme Flame |
| L | KEL | 1x Rundkegel Ball nosed cone |
| M | SKM | 1x Spitzkegel Cone |



BEST SELLER

€ 201,25

11 4942 U

VALUETOOL

€ 140,35

neu
new

11 4943 U



BEST SELLER

Bestseller – preisreduziert
Bestseller – price reduced

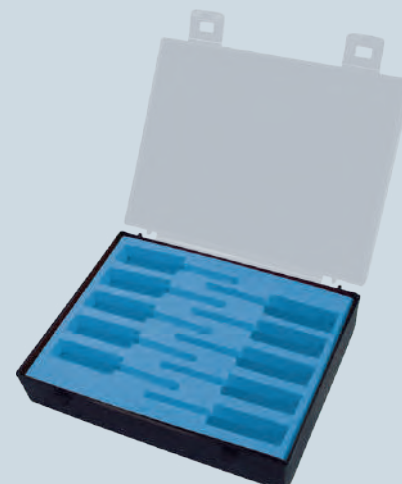
VALUETOOL

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|-----------------|----------------|------|------|----|----|
| 11 3001 105 | 11 3001 108 | • 12 | 25 | 6 | 70 |
| 11 3011 100 | 11 3011 104 | • 12 | 25 | 6 | 70 |
| 11 3021 105 | 11 3021 108 | • 12 | 25 | 6 | 70 |
| 11 3031 080 | 11 3031 084 | • 12 | 11,4 | 6 | 65 |
| | | | 11 | | 56 |
| 11 3041 035 | 11 3041 036 | • 12 | 22 | 6 | 67 |
| | | | 21 | | 66 |
| 11 3051 050 | 11 3051 054 | • 12 | 25 | 6 | 70 |
| 11 3061 060 | 11 3061 064 | • 12 | 25 | 6 | 70 |
| 11 3071 025 | 11 3071 026 | • 12 | 32 | 6 | 77 |
| | | | 30 | | 75 |
| 11 3081 045 | 11 3081 048 | • 12 | 32 | 6 | 77 |
| | | | 25 | | 70 |
| 11 3091 045 | 11 3091 048 | • 12 | 25 | 6 | 70 |

Sie wollen einen anderen Inhalt? Kein Problem! Wählen Sie aus unserem Gesamt-sortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

Would you like a display of mini-burrs? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.



11 4950

Leeres Set /
Empty set

€ 9,50



Index

11 4907

BEST SELLER

€ 115,90



BEST SELLER

€ 95,40

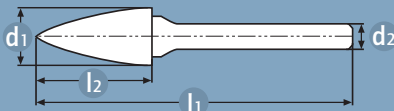
11 4907 U



5 Stück

5 pieces

Film
Movie



BEST SELLER

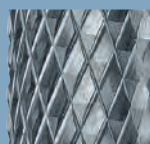
Bestseller – preisreduziert
Bestseller – price reduced



Universal HP-3



Zahnung
Cut



BEST SELLER

Bestseller – preisreduziert
Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 |
|-------------|---------------|----|----|----|
| 11 5011 103 | • 12,0 DIN | 25 | 6 | 70 |
| 11 5021 107 | • 12,0 DIN | 25 | 6 | 70 |
| 11 5051 053 | • 12,0 DIN | 25 | 6 | 70 |
| 11 5061 063 | • 12,0 DIN | 25 | 6 | 70 |
| 11 5081 047 | • 12,0 DIN | 25 | 6 | 70 |

| Form Shape | DIN 8033 | Inhalt Contents |
|------------|----------|--|
| B | ZYB | 1x Zylinder mit Stirnverzahnung Cylinder with end cut |
| C | WRC | 1x Walzenrundform Ball nosed cylinder |
| F | RBF | 1x Rundbogen Ball nosed tree |
| G | SPG | 1x Spitzbogen Tree |
| L | KEL | 1x Rundkegel Ball nosed cone |

| Art. | d1 | l2 | d2 | l1 |
|-------------|---------------|----|----|----|
| 11 3011 103 | • 12,0 DIN | 25 | 6 | 70 |
| 11 3021 107 | • 12,0 DIN | 25 | 6 | 70 |
| 11 3051 053 | • 12,0 DIN | 25 | 6 | 70 |
| 11 3061 063 | • 12,0 DIN | 25 | 6 | 70 |
| 11 3081 047 | • 12,0 DIN | 25 | 6 | 70 |

11 4947

Leeres Set /
Empty set

€ 9,50



Sie wollen einen anderen Inhalt? Kein Problem! Wählen Sie aus unserem Gesamt-sortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

Would you like a display of mini-burrs? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

11 4911

BEST SELLER

€ 223,75



BEST SELLER

€ 182,70

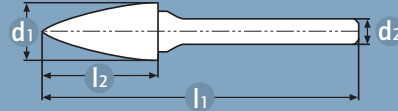
114911U



DIN

10 Stück
 10 pieces

Film
 Movie



DIN

BEST SELLER

Bestseller – preisreduziert
 Bestseller – price reduced



Universal HP-3



Zahnung
 Cut



BEST SELLER

Bestseller – preisreduziert
 Bestseller – price reduced

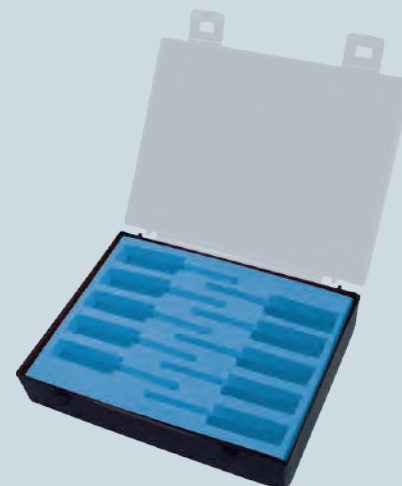
| Art. | d1 | l2 | d2 | l1 |
|-------------|---------------|------|----|----|
| 11 5001 107 | • 12,0 DIN | 25 | 6 | 70 |
| 11 5011 103 | • 12,0 DIN | 25 | 6 | 70 |
| 11 5021 107 | • 12,0 DIN | 25 | 6 | 70 |
| 11 5031083 | • 12,0 DIN | 11,4 | 6 | 65 |
| 11 5041 037 | • 12,0 DIN | 22 | 6 | 66 |
| 11 5051 053 | • 12,0 DIN | 25 | 6 | 70 |
| 11 5061 063 | • 12,0 DIN | 25 | 6 | 70 |
| 11 5071 027 | • 12,0 DIN | 32 | 6 | 70 |
| 11 5081 047 | • 12,0 DIN | 32 | 6 | 70 |
| 11 5091 047 | • 12,0 DIN | 25 | 6 | 70 |

| Form Shape | DIN 8033 | Inhalt Contents |
|------------|----------|--|
| A | ZYA | 1x Zylinder ohne Stirnverzahnung Cylinder without end cut |
| B | ZYB | 1x Zylinder mit Stirnverzahnung Cylinder with end cut |
| C | WRC | 1x Walzenrundform Ball nosed cylinder |
| D | KUD | 1x Kugel Ball |
| E | TRE | 1x Tropfen Oval |
| F | RBF | 1x Rundbogen Ball nosed tree |
| G | SPG | 1x Spitzbogen Tree |
| H | - | 1x Flamme Flame |
| L | KEL | 1x Rundkegel Ball nosed cone |
| M | SKM | 1x Spitzkegel Cone |

| Art. | d1 | l2 | d2 | l1 |
|-------------|---------------|------|----|----|
| 11 3001 107 | • 12,0 DIN | 25 | 6 | 70 |
| 11 3011 103 | • 12,0 DIN | 25 | 6 | 70 |
| 11 3021 107 | • 12,0 DIN | 25 | 6 | 70 |
| 11 3031 083 | • 12,0 DIN | 11,4 | 6 | 65 |
| 11 3041 037 | • 12,0 DIN | 22 | 6 | 66 |
| 11 3051 053 | • 12,0 DIN | 25 | 6 | 70 |
| 11 3061 063 | • 12,0 DIN | 25 | 6 | 70 |
| 11 3071 027 | • 12,0 DIN | 32 | 6 | 70 |
| 11 3081 047 | • 12,0 DIN | 32 | 6 | 70 |
| 11 3091 047 | • 12,0 DIN | 25 | 6 | 70 |

Sie wollen einen anderen Inhalt? Kein Problem! Wählen Sie aus unserem Gesamt-sortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

Would you like a display of mini-burrs? No problem! Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.



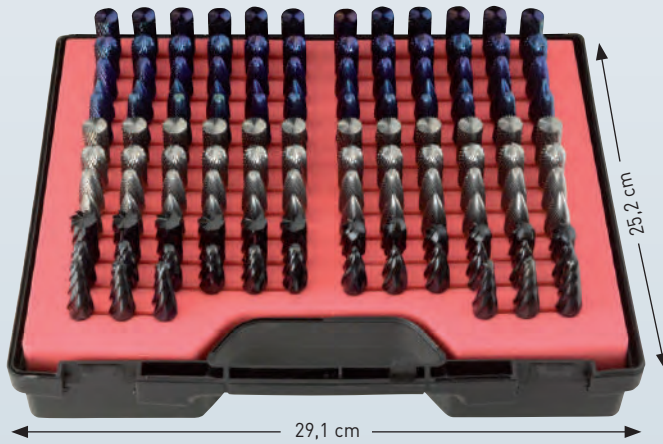
11 4950

Leeres Set /
 Empty set

€ 9,50



Index



Deckel abnehmbar.
Wird dadurch auch zu
einem Tisch-Display.

Removable cover.
Becomes a Display.



Kunststoffkoffer und Display
leer. Zum selbst bestücken bis
138 Stück.

Plastic case and display. Can
be equipped with 138 pieces.

Robuster Kunststoffkoffer mit Tragegriff und Display in einem.

Ideal für den harten Einsatz auf der Baustelle.
Alle Frässtifte gesichert von außen durch schlagfesten Kunststoff.
Alle Frässtifte gesichert von innen durch festen Sitz in einer pass-
genauen Bohrung. Die Köpfe können **nicht** aufeinanderschlagen.

Mit bis zu 138 Stück Frässtifte zu bestücken.
Daher ebenfalls hervorragend geeignet als **Tisch-Display (Deckel
abnehmbar)** oder Lagerung Ihrer gängigsten Frässtifte.

Wählen Sie aus unserem Gesamtsortiment Frässtifte mit Schaft
6 oder 8 mm. Die Gesamtlänge (L1) des Frässtifts sollte 86 mm
nicht überschreiten. **Wir beraten Sie gerne über die gängigsten
Frässtifte.**

Bei Bestellung eines voll bestückten Koffers (138 Stück) ist der
Koffer gratis. Sie bezahlen nur den Inhalt.

Robust plastic case with carry handle and display in one.

Ideal for hard use on the construction site.
All rotary burrs secured from the outside by impact-resilient plastic.
All rotary burrs secured from the inside by tight fit in a precisely
fitting bore. The heads **cannot** touch.

Can be equipped with 138 rotary mills. It is also suitable as **table
display (lid removable)** with our most popular rotary mills.

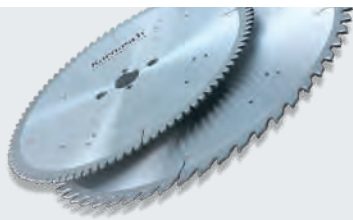
Choose rotary burrs with a 6 or 8 mm shaft from our overall rotary
burrs range. The overall length (L1) of the rotary burr should not
exceed 86 mm. **We will gladly advise you about the most common
rotary burrs.**

When ordering a fully equipped case (138 pieces), the **case** is
enclosed **for free**. You only need to pay for the contents.



5 | KREISSÄGEBLÄTTER CIRCULAR SAW BLADES

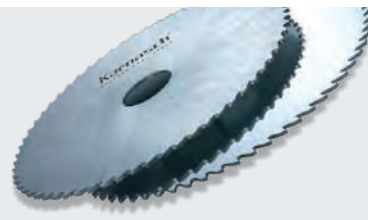
HARTMETALL- / CERMET- / DIAMANTBESTÜCKTE
KREISSÄGEBLÄTTER
CARBIDE- / CERMET- / DIAMOND TIPPED CIRCULAR SAW
BLADES



5.1

☞ 825-1044

HSS-KREISSÄGEBLÄTTER
HSS-SAW BLADES



5.2

☞ 1045-1060

DIN-VHM-KREISSÄGEBLÄTTER
DIN-SOLID CARBIDE-SAW BLADES



5.3

☞ 1061-1068

DIN-HSS-KREISSÄGEBLÄTTER
DIN-HSS-SAW BLADES



5.4

☞ 1069-1074

ORBITALE ROHRKREISSÄGEBLÄTTER
ORBITAL PIPE CUTTING CIRCULAR SAW BLADES



5.5

☞ 1075-1079

AUFNAHMEHALTER FÜR KREISSÄGEBLÄTTER
CIRCULAR SAW BLADE RETAINER



5.6

☞ 1080

1



2



3



4



5



6



7



8



9

Ihre Notizen & Zeichnungen Your notices & drafts

1



2



3



4



5



6



7

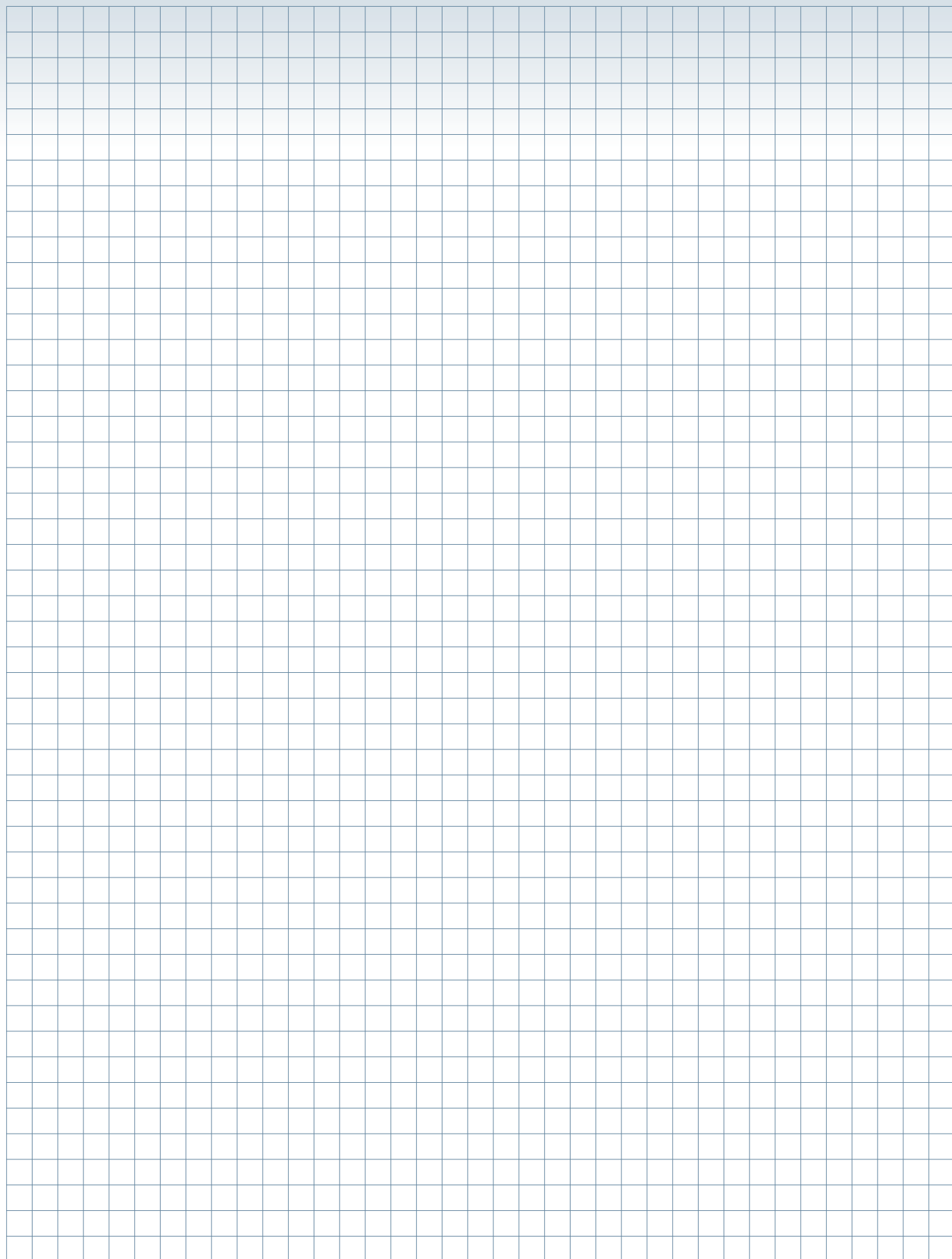


8



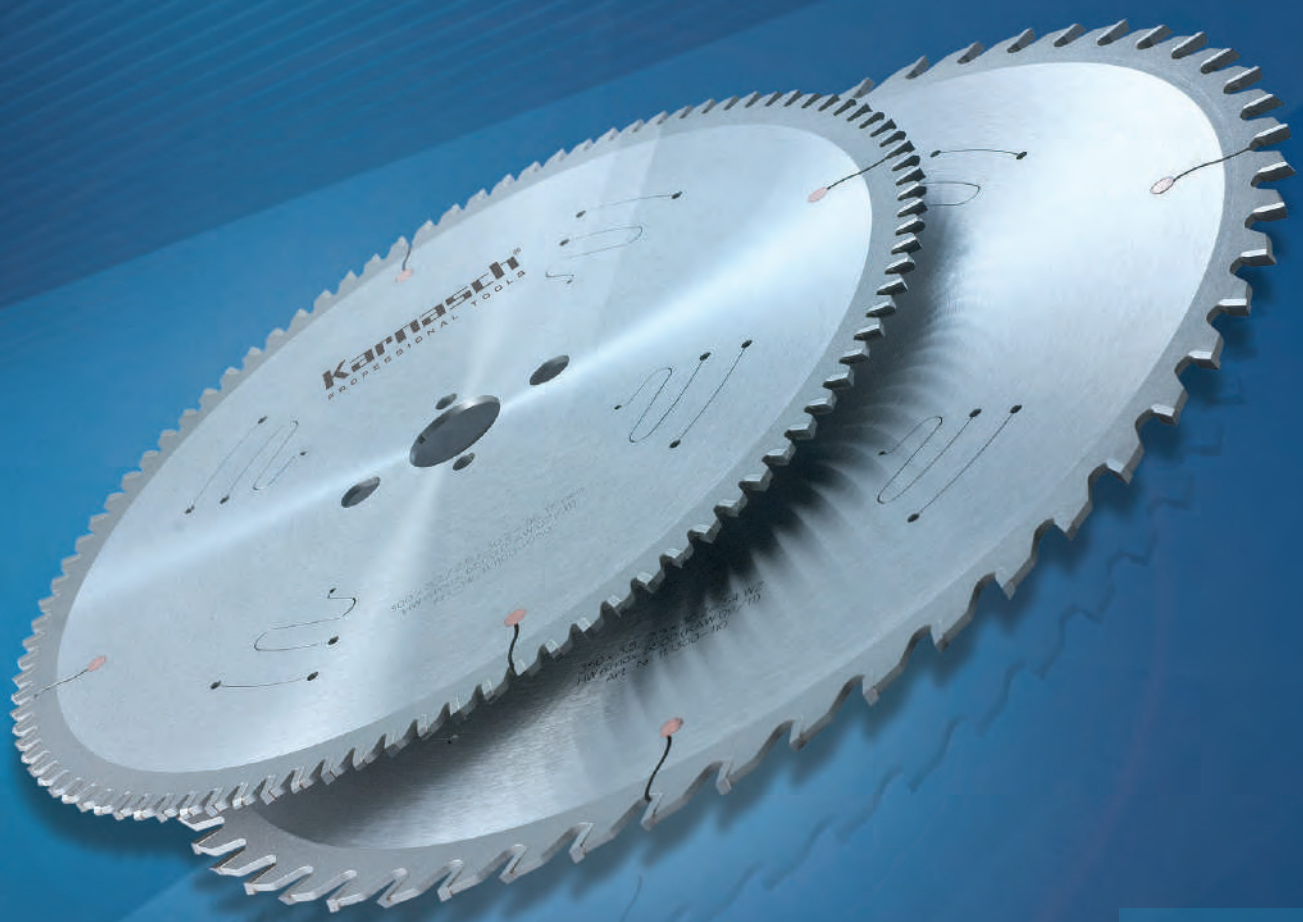
9

Index



HARTMETALL- / CERMET- / DIAMANTBESTÜCKTE KREISSÄGEBLÄTTER

CARBIDE- / CERMET- / DIAMOND TIPPED CIRCULAR SAW BLADES



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

5.1

KONTAKT | CONTACT

KARNASCH PROFESSIONAL TOOLS[®]
INDUSTRIAL TOOLS DIVISION

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D-15848 Tauche/OT Görzdorf
mail@karnasch.tools

+49 (0) 33675 - 7265-0

KARNASCH ONLINESHOP

JETZT FÜR SIE ONLINE!
NOW ONLINE FOR YOU!

<http://shop.karnasch.tools>

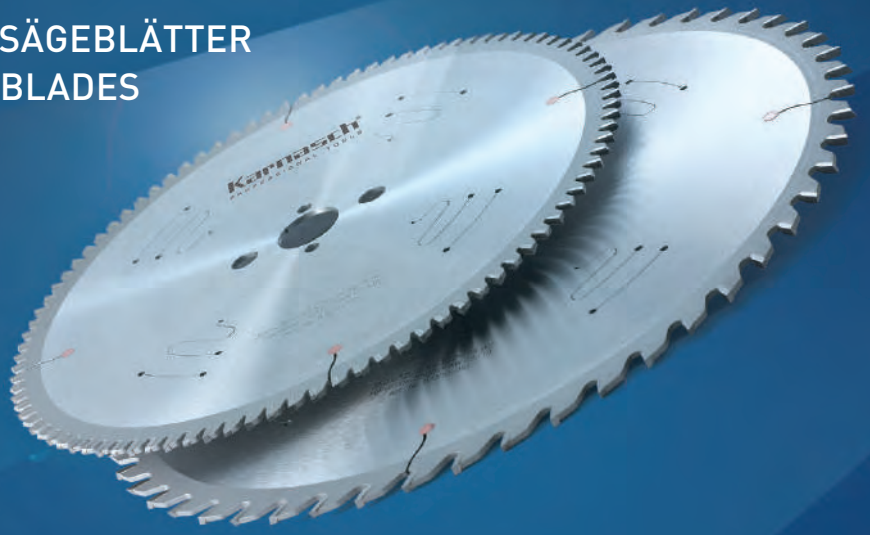


ONLINE



HARTMETALL-BESTÜCKTE KREISSÄGEBLÄTTER

CARBIDE TIPPED CIRCULAR SAW BLADES



Inhaltsverzeichnis · Contents

| | | | |
|---|---|--|---------------|
|  | Zeichenerklärung Qualitätsstandard | Key to symbols Quality standard | 828 |
|  | Schnellfinder | Quick finder | 830/831 |
|  | Finder nach Artikelnummer aufsteigend + Anwendung | Finder by article numbers ascending + application | 832-835 |
|  | Finder nach Blatt- \varnothing aufsteigend + Anwendung | Finder by blade- \varnothing + application | 836-877 |
|  | Maschinenhersteller alphabetisch mit passendem Blatt- \varnothing + Bohrung- \varnothing | Machine manufacturer in alphabetical order with matching blade- \varnothing + bore- \varnothing | 878-883 |
|  | Reduzierringe, geschliffen, außen gerändelt, Passung H7 | Reduction rings, ground, knurled outward, H7 fit | 1042 |
|  | Sägen-Sets und Displays | Saw blade sets and displays | 1043 |
|  | Kühl- und Schmiermittel | Coolants and lubricants | 1144- 1149 |



1



2



3



4



5



6



7



8



9

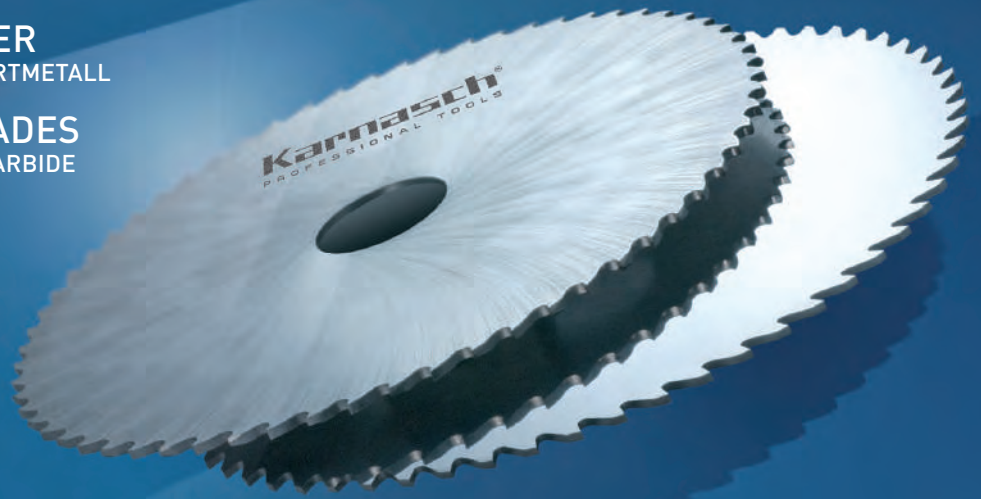


METALLKREISSÄGEBLÄTTER






HSS-DMo5 · HSS-Co5 · HSS-DIN · VOLLHARTMETALL

METAL CIRCULAR SAW BLADES

HSS-DMo5 · HSS-Co5 · HSS-DIN · SOLID CARBIDE



Inhaltsverzeichnis · Contents

| | | | |
|--|--|---|-----------|
|  | Metallkreissägeblätter HSS-DMo5 HSS-Co Cobalt + Beschichtung Kx | Metal circular saw blades HSS-DMo5 HSS-Co Cobalt + Coated Kx | 1045-1060 |
|  | Vollhartmetall-Kreissägeblätter nach DIN | Solid carbide circular saw blades according to DIN | 1061-1068 |
|  | Metallkreissägeblätter nach DIN | Metal circular saw blades according to DIN | 1069-1074 |
|  | Orbitale Rohrkreissägeblätter für Maschinen von: Georg Fischer (GF) · Orbitalum · Exact · SCORP · Rothenberger PipeCut Turbo · T-Drill · Victaulic · Protem | Orbital pipe cutting circular saw blades for machines from: Georg Fischer (GF) · Orbitalum · Exact · SCORP · Rothenberger PipeCut Turbo · T-Drill · Victaulic · Protem | 1075-1079 |
|  | Kreissägeblätter Aufnahmehalter / Fräsdorne | Circular saw blade retainer / milling arbors | 1080 |

1



2



3



4



5



6



7



8



9

Index

Zeichenerklärung
Key to symbols

| | | | | | | |
|------|----------------------------------|--------------------------|---------------------------------------|-------------|-------------------------------------|--------------|
| | | | | | | |
| Ø mm | Schnittbreite & Stammblattstärke | Bohrung Ø mm Toleranz H7 | Zähnezahl Zahnform | Nebenlöcher | Extrem Geräusch + Vibrationsgedämmt | Gewuchtet |
| Ø mm | Cut width, thickness of saw body | Bore Ø mm tolerance H7 | Number of teeth / tooth configuration | Pinholes | Extreme noise + vibration dampened | Balanced out |

- Lagerware
Stock tool
- Keine Lagerware, Lieferzeit und Preis auf Anfrage
No stock tool. Price and delivery on request
- ⊘ Sonderpreis. Solange Vorrat reicht. Rückgabe nicht möglich.
Special price. While stocks last. Return not possible.

100 % MADE IN GERMANY

Extrem Geräusch & Vibrationsgedämmt wo technisch sinnvoll

Gewuchtet wo technisch sinnvoll

100 % Qualitätskontrolle

Alle Blätter in höchster Qualitätsstufe gefertigt

Extreme noise & vibration dampened in case of needed

Balanced in case of needed

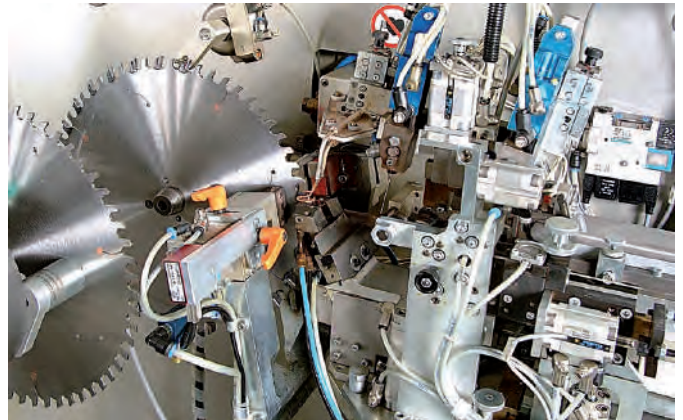
100 % quality control

All blades manufactured to the highest quality level

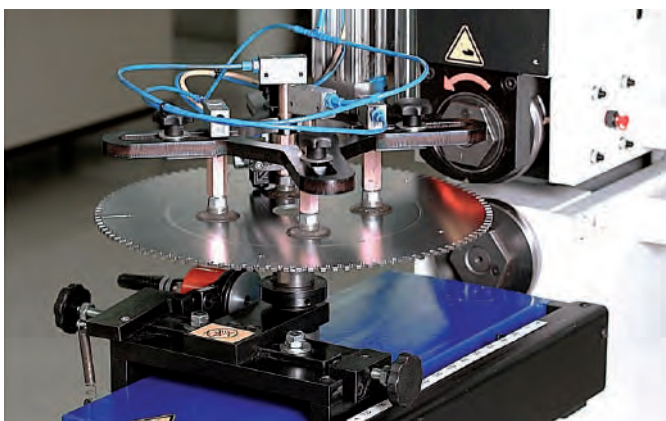
Einblicke der High-Tech Fertigung · Insights our High-Tech manufacturing



NC-Schleifen · NC grinding



NC-Löten · NC soldering

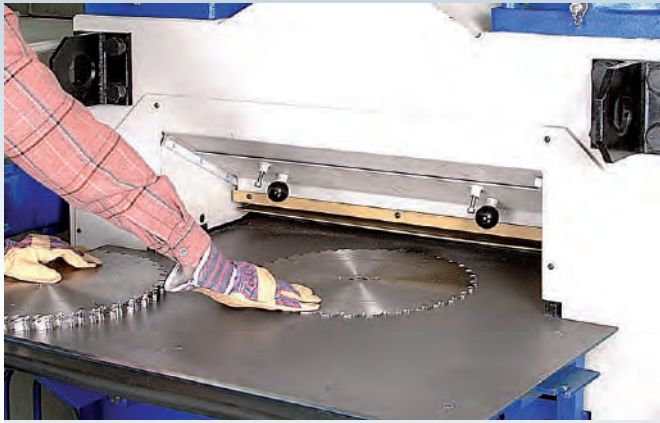


Spannungsring walzen · Making of the tension ring



Sandstrahlen · Sandblasting

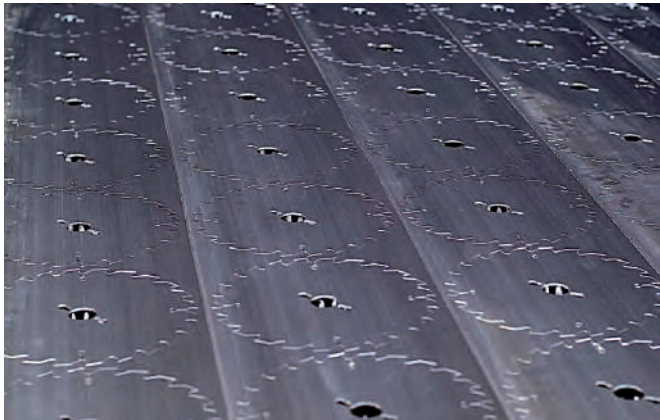
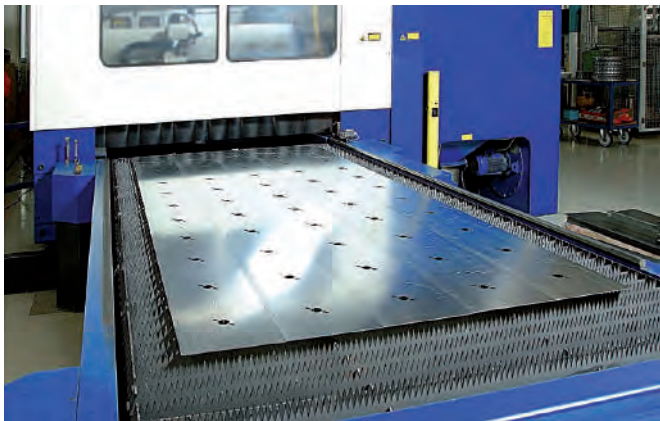




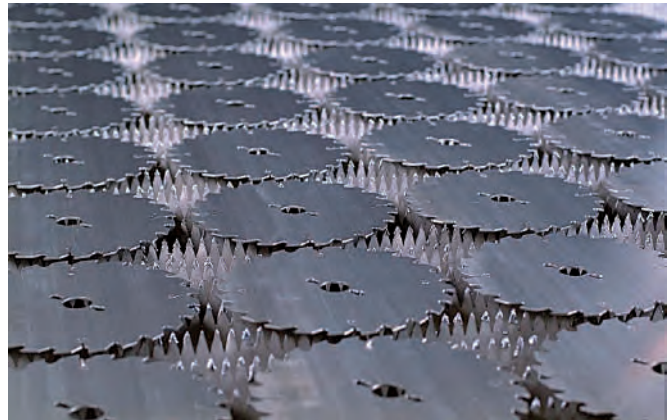
Richten · Straighten of the blades



Feinrichten · High-precision straightening of the blades



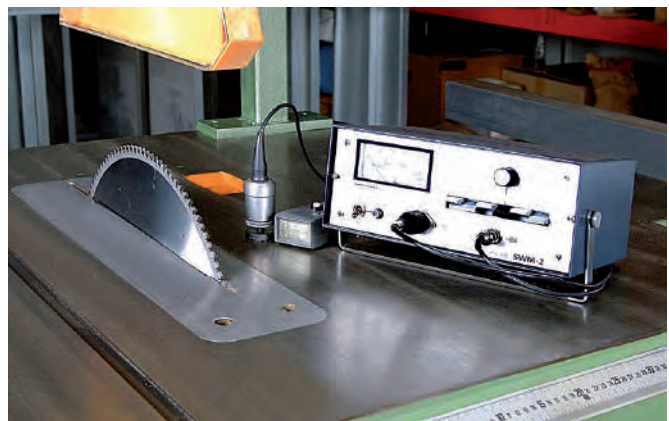
Lasern Stufe 1 · Sawbody laser step 1



Lasern Stufe 2 · Sawbody laser step 2



Anlassofen · Tempering furnace



Lautstärke Messung · Measure of the volume

1



2



3



4



5



6



7



8



9



Index

Schnellfinder

| | Ø mm von-bis | Anwendung / Material | |
|---|---|--|---------------|
| 1 Großanlagen und Produktionsmaschinen Kreissägeblätter für: Edelstahl · Stahl · Guss · Ne-Metalle | Ø 250-2250 mm  |    | 884-889 |
| Baustahl · Edelstahl · Dünnschleif · Sandwichmaterial | Ø 136-500 mm  |    | 890-899 |
| Aluminium · Kupfer · Messing · Bronze | Ø 120-500 mm  |   | 900-915 |
| Kunststoffe | Ø 120-400 mm  |  Plastik | 916-949 |
| Fensterprofile (auch mit Gummidichtung) | Ø 120-600 mm  |  | 924-935 |
| Bau · Universal | Ø 120-700 mm  |    | 950-966 |
| Abrasive Werkstoffe (zu schnellem Schneidenschleiß führende Materialien) | Ø 120-500 mm  |    | 968-979 |
| Plattenaufteilung (Formatieren) großflächig | Ø 125-450 mm  |  | 980-983 |
| Formatieren | Ø 120-500 mm  |    | 984-1013 |
| Massivholz | Ø 120-800 mm  |  | 1014-1033 |
| Handkreissägen + Lamello | Ø 100-355 mm  |  | 1034-1036 |
| Vorritzen (Ritzer) | Ø 80-250 mm  |  | 982-983, 1037 |
| Glasleisten (Glasleisten Kreissägen) | Ø 92-400 mm  |  | 1038-1039 |
| Kreissägen für Straßenrand Freischneider / Böschungsmäher von Mulag, Spearhead, Power usw. | Ø 390-600 mm  |  | 1040 |
| Kreissägen für Vogesenblitz Trommelsäge SAT 4-700 | Ø 700 mm  |  | 1041 |
| Nuten | Ø 200-250 mm  |  | 1042 |
| Kreissägen für Orbitale Rohrsägen von Georg Fischer (GF) · Orbitalum · Exact · SCORP · Rothenberger PipeCut Turbo · T-Drill · Victaulic · Protem | Ø 63-165 mm  |  Rohr | 1076-1079 |



Quickfinder

| | Ø mm from-to | Application / Material | |
|---|---|--|---------------|
| Large-scale industrial sawing-machine/production machine blades for: Stainless steel · Steel · Cast iron · Non-ferrous metals | Ø 250–2250 mm  |    | 884-889 |
| Mild steel · Stainless steel · Thin iron sheets · Sandwich material | Ø 136–500 mm  |    | 890-899 |
| Aluminum · Copper · Brass · Bronze | Ø 120–550 mm  |   | 900-915 |
| Plastics | Ø 120–400 mm  |  Plastic | 916-949 |
| Window profiles (also with rubber seal) | Ø 120–600 mm  |  | 924-935 |
| Construction · Universal | Ø 120–700 mm  |    | 950-966 |
| Abrasive materials (materials difficult to machine and causing high cutting wear) | Ø 120–500 mm  |    | 968-979 |
| Panel sizing large-scale | Ø 125–450 mm  |  | 980-983 |
| Panel-sizing | Ø 120–500 mm  |    | 984-1013 |
| Solid wood | Ø 120–800 mm  |  | 1014-1033 |
| Portable circular saws + Lamello | Ø 100–355 mm  |  | 1034-1036 |
| Scoring | Ø 80–250 mm  |  | 982-983, 1037 |
| Glazing beads (Glass ledge blades) | Ø 92–400 mm  |  | 1038-1039 |
| Circular saws for roadside maintenance hedging and sliding machines from Mulag, Spearhead, Power etc. | Ø 390–600 mm  |  | 1040 |
| Circular saws for Vogesenblitz cylinder circular barrel saw SAT 4-700 | Ø 700 mm  |  | 1041 |
| Grooving | Ø 200–250 mm  |  | 1042 |
| Circular saws for Orbital pipe cutting machines such as: Georg Fischer (GF) · Orbitalum · Exact · SCORP · Rothenberger PipeCut Turbo · T-Drill · Victaulic · Protem | Ø 63–165 mm  |  Tube | 1076-1079 |

1



2



3



4



5



6



7



8



9



Index

Art.
100
101
102

Finder nach Artikelnummer aufsteigend + Anwendung

Finder by article numbers ascending + application

✓ OPTIMAL OPTIMAL ✓ GUT GOOD ✓ MÖGLICH POSSIBLE

| | | | | | |
|--|---|---|--|--|--|
| | | | | | |
| Weichholz, Hartholz, Exotenholz (quer) | Weichholz, Hartholz, Exotenholz, (längs) | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Spanplatten, Hartfaserplatten kunststoffbeschichtet/furniert, MDF, HDF |
| Soft wood, hard wood, and exotic wood across the grain | Soft wood, hard wood, and exotic wood along the grain | Wood with inclusions like nails, clips, concrete residues | Bonded wood, blockboard and veneer plywood, laminated wood | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |

| ART. | TYPE | | | | | | | |
|---------|---|--|--|--|--|---|---|------|
| 5 3950 | Orbitale Rohrkreissägeblätter Hartmetall-bestückt Orbital pipe cutting circular saw blades carbide tipped | | | | | | | 1078 |
| 5 3951 | Orbitale Rohrkreissägeblätter Hartmetall-bestückt Orbital pipe cutting circular saw blades carbide tipped | | | | | | | 1079 |
| 5 3952 | Orbitale Rohrkreissägeblätter Hartmetall-bestückt Orbital pipe cutting circular saw blades carbide tipped | | | | | | | 1079 |
| 5 3960 | Orbitale Rohrkreissägeblätter Cermet-bestückt Orbital pipe cutting circular saw blades cermet tipped | | | | | | | 1078 |
| 5 3961 | Orbitale Rohrkreissägeblätter Cermet-bestückt Orbital pipe cutting circular saw blades cermet tipped | | | | | | | 1078 |
| 5 3965 | Orbitale Rohrkreissägeblätter Cermet-bestückt Orbital pipe cutting circular saw blades cermet tipped | | | | | | | 1077 |
| 5 3970 | Orbitale Rohrkreissägeblätter Diamant-bestreut Orbital pipe cutting circular saw blades diamond-grit | | | | | | | 1079 |
| 5 3980 | Orbitale Rohrkreissägeblätter HSS-Cobalt 5% Orbital pipe cutting circular saw blades HSS-Cobalt 5% | | | | | | | 1076 |
| 5 3990 | Orbitale Rohrkreissägeblätter HSS-Cobalt 5% + Kx beschichtet Orbital pipe cutting circular saw blades HSS-Cobalt 5% + Kx coated | | | | | | | 1076 |
| 10 7000 | Cermet-bestückte Dünnschnitt Kreissägeblätter Cermet tipped thin-cut circular saw blades | | | | | | | 886 |
| 10 7001 | Hartmetall-bestückte Dünnschnitt-Kreissägeblätter TiAlN-beschichtet für Stahl Carbide tipped thin-cut steel circular saw blades TiAlN-coated for steel | | | | | | | 887 |
| 10 7002 | Hartmetall-bestückte Dünnschnitt-Kreissägebl. TiAlN-beschichtet für Edelstahl Carbide tipped thin-cut steel circular saw blades TiAlN-coated for stainless steel | | | | | | | 888 |
| 10 7050 | Hochleistungs Kreissägeblätter für Stahl, Edelstahl, Schienen High-Performance circular saw blades for steel, stainless steel, rails | | | | | | | 889 |
| 10 7100 | Dry-Cutter Baustähle Dry-Cutter mild steel | | | | | ✓ | | 892 |
| 10 7130 | Dry-Cutter Baustähle Dry-Cutter mild steel | | | | | ✓ | | 893 |
| 10 7150 | Super Dry-Cutter Baustähle Super Dry-Cutter mild steel | | | | | | | 894 |
| 10 7300 | Dry-Cutter Edelstahl Dry-Cutter stainless | | | | | | | 896 |
| 10 7400 | Dry-Cutter Sandwich Dry-Cutter sandwich | | | | | | | 897 |
| 10 8000 | Aluminium + Kunststoffe Universal Aluminum + plastics universal | | | | | ✓ | ✓ | 902 |
| 10 8055 | Winkelschleifer + Brutal Einweg-Sägeblätter Angle Grinder + Brutal disposable saw blades | | | | | ✓ | ✓ | 899 |
| 10 9050 | Acrylglas (Plexiglas) Klarsichtschnitt Acrylic (Plexiglas) clear cut view | | | | | | | 923 |
| 11 1000 | Aluminium, Kunststoffe, Fensterprofile · Positiv Aluminum, plastics, window profiles · Positive | | | | | | | 905 |
| 11 1050 | Aluminium, Kunststoffe, Fensterprofile · Positiv Dünnschnitt Aluminum, plastics, window profiles · Positive thin cut | | | | | | | 907 |
| 11 1100 | Aluminium, Kunststoffe, Fensterprofile · Negativ Aluminum, plastics, window profiles · Negative | | | | | | | 911 |
| 11 1120 | Aluminium, Kunststoffe, Fensterprofile · Negativ Dünnschnitt Aluminum, plastics, window profiles · Negative thin-cut | | | | | | | 913 |
| 11 1130 | Aluminium, Kunststoffe · Negativ Dünnschnitt/Fertigschnitt Aluminum, plastics · Negative thin-cut/finishing-cut | | | | | | | 915 |
| 11 1150 | Glasleisten Kreissägeblätter Hartmetall-bestückt Glazing bead (glass ledge) T.C.T. blades | | | | | ✓ | ✓ | 1039 |
| 11 1170 | Glasleisten Kreissägeblätter HSS Glazing bead (glass ledge) HSS blades | | | | | | | 1039 |
| 11 1200 | Zuschmitt Kreissägeblatt · Wechselzahn und Abweiser Rip saw blade · Alternate top bevel and chip limiter tooth | | | | | ✓ | ✓ | 1018 |



Art.
100
101
102

Finder nach Artikelnummer aufsteigend + Anwendung

Finder by article numbers ascending + application

✓ OPTIMAL
OPTIMAL

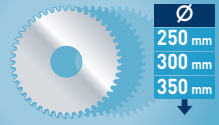
✓ GUT
GOOD

✓ MÖGLICH
POSSIBLE



| | | | | | |
|--|---|---|--|--|--|
| Weichholz, Hartholz, Exotenholz (quer) | Weichholz, Hartholz, Exotenholz, (längs) | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Spanplatten, Hartfaserplatten kunststoffbeschichtet/furniert, MDF, HDF |
| Soft wood, hard wood, and exotic wood across the grain | Soft wood, hard wood, and exotic wood along the grain | Wood with inclusions like nails, clips, concrete residues | Bonded wood, blockboard and veneer plywood, laminated wood | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |

| ART. | TYPE | | | | | | | |
|---------|---|-------------------------|---|---|---|---|---|---|
| 11 1215 | Zuschnitt Kreissägeblatt · Wechselzahn Rip saw blade · Alternate top bevel tooth | 1019 | ✓ | ✓ | | ✓ | ✓ | |
| 11 1220 | Zuschnitt Kreissägeblatt · Flachzahn mit Abweiser Rip saw blade · Flat tooth with chip limiter | 1020 | ✓ | ✓ | | ✓ | ✓ | |
| 11 1230 | Zuschnitt Kreissägeblatt · Tiefschnitt Rip saw blade · Deep-cut | 1021 | ✓ | ✓ | | ✓ | ✓ | |
| 11 1232 | Zuschnitt/Vielblatt mit Räumerschneiden + Abweiser Rip/Multi-rip saw blade with raker teeth + chip limiter | 1022 | ✓ | ✓ | | ✓ | ✓ | |
| 11 1235 | Zuschnitt Vielblatt mit Räumerschneiden Rip/Multi-rip saw blade with raker teeth | 1023 | ✓ | ✓ | | ✓ | ✓ | |
| 11 1238 | Vielblatt mit Räumerschneiden Multi-rip saw blade with raker teeth | 1024 | | ✓ | | | | |
| 11 1239 | Vielblatt mit Räumerschneiden Multi-rip saw blade with raker teeth | 1025 | | ✓ | | | | |
| 11 1250 | Bausäge Construction saw | BEST SELLER 964 | ✓ | ✓ | ✓ | ✓ | ✓ | |
| 11 1260 | Super-Bausäge Super construction saw | 965 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 11 1300 | Formatieren · Massivholz · Universal + Hundegger Panel sizing · Solid wood · Universal + Hundegger | BEST SELLER 991 | ✓ | ✓ | | ✓ | ✓ | ✓ |
| 11 1320 | Formatieren · Massivholz · Fensterprofile · Universal + Achswinkel Panel sizing · Solid wood · Window profiles · Universal + axial angle | 935 | ✓ | | | ✓ | ✓ | ✓ |
| 11 1340 | Kreissägeblatt für Mulag, Spearhead Böschungsmäher Mulag and Spearhead blades for hedging and siding | 1040 | ✓ | ✓ | | | | |
| 11 1345 | Kreissägeblatt für Vogesenblitz Trommelsäge SAT 4-700 Blade for Vogesenblitz cylinder barrel saw | 1041 | ✓ | ✓ | | | | |
| 11 1350 | Diamant (DP) Universal Kreissägeblatt Diamond (DP) universal blade | 937 | | | | | ✓ | ✓ |
| 11 1370 | Diamant (DP) Formatieren, Abrasiv Kreissägeblatt Diamond (DP) panel sizing, abrasive materials | 938 | | | | | | ✓ |
| 11 1400 | Handkreissägeblätter + Lamello Blades for portable circular saws + Lamello | BEST SELLER 1034 | ✓ | ✓ | | ✓ | ✓ | |
| 11 1425 | Formatieren · Massivholz Universal · Dünnschnitt Panel sizing · Solid wood universal · Thin-cut | BEST SELLER 941 | ✓ | | | ✓ | ✓ | ✓ |
| 11 1430 | Formatieren · Harte Kunststoffe · Abrasiv · Dünnschnitt Panel-sizing · Abrasive · Thin-cut | BEST SELLER 943 | | | | | | |
| 11 1450 | Kapp- und Gehrungssägeblätter · Negativ Chop- and mitre saws · Negative | 945 | ✓ | | | ✓ | ✓ | ✓ |
| 11 1460 | Formatieren · Harte Kunststoffe · Platten · Abrasiv Panel sizing · Hard plastics · Boards · Abrasive | 947 | | | | | | ✓ |
| 11 1470 | Formatieren · Kunststoffe · Platten Panel sizing · Plastics · Boards | 949 | | | | | ✓ | ✓ |
| 11 1480 | Ritzer 2-teilig Scorer 2-part | 1037 | | | | | | ✓ |
| 11 1510 | Plattenaufteilsägen großflächig (Formatieren) Panel sizing large-scale | 983 | | | | | ✓ | ✓ |
| 11 1520 | Ritzer konisch Scorer conical | 983 | | | | | | ✓ |
| 11 1600 | Formatieren · Hohlzahn · Dach-Flach · Positiv Panel sizing · Hollow tooth · Inverted V-flat tooth · Positive | BEST SELLER 1005 | ✓ | | | ✓ | ✓ | ✓ |
| 11 1602 | Formatieren · Hohlzahn · Dach-Flach · Negativ Panel sizing · Hollow tooth · Inverted V-flat tooth · Negative | 1007 | ✓ | | | ✓ | ✓ | ✓ |
| 11 1604 | Formatieren · Hohlzahn · Trapez-Trapez · Positiv Panel sizing · Hollow tooth · Triple chip · Positive | 1009 | ✓ | | | ✓ | ✓ | ✓ |
| 11 1610 | Formatieren · Wechselzahn Extrem 35° · Positiv Panel sizing · Alternate top bevel extreme 35° · Positive | 1011 | ✓ | | | ✓ | ✓ | ✓ |
| 11 1615 | Formatieren · Wechselzahn Extrem 35° · Negativ Panel sizing · Alternate top bevel extreme 35° · Negative | 1012 | ✓ | | | ✓ | ✓ | ✓ |



Finder nach Blatt-Ø aufsteigend + Anwendung

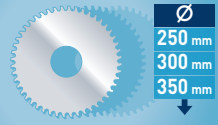
Finder by blade-Ø + application

OPTIMAL
 GUT
 MÖGLICH

█ = BESTSELLER

| | | | | | ART. | | | | | | | |
|-----|-------------|---------|-----------|---------|-----------------|------|---|---|---|---|--|---|
| 63 | 2,0/1,6 | 16 | 28 BW | - | 5 3965 063 010 | 1077 | | | | | | |
| 63 | 1,8/1,4 | 16 | 32 BW | - | 5 3965 063 020 | 1077 | | | | | | |
| 63 | 1,6 | 16 | 64 BW | - | 5 3980 063 010 | 1076 | | | | | | |
| 63 | 1,6 | 16 | 100 BW | - | 5 3980 063 020 | 1076 | | | | | | |
| 63 | 1,6 | 16 | 64 BW | - | 5 3990 063 010 | 1076 | | | | | | |
| 63 | 1,6 | 16 | 100 BW | - | 5 3990 063 020 | 1076 | | | | | | |
| 63 | 1,6 | 16 | 44 BW | - | 5 4000 063 010 | 1076 | | | | | | |
| 63 | 1,6 | 16 | 44 BW | - | 5 4010 063 010 | 1076 | | | | | | |
| 68 | 2,0/1,6 | 16 | 28 BW | - | 5 3965 068 010 | 1077 | | | | | | |
| 68 | 1,8/1,4 | 16 | 32 BW | - | 5 3965 068 020 | 1077 | | | | | | |
| 68 | 1,6 | 16 | 44 BW | - | 5 3980 068 010 | 1076 | | | | | | |
| 68 | 1,6 | 16 | 72 BW | - | 5 3980 068 020 | 1076 | | | | | | |
| 68 | 1,6 | 16 | 44 BW | - | 5 3990 068 010 | 1076 | | | | | | |
| 68 | 1,6 | 16 | 72 BW | - | 5 3990 068 020 | 1076 | | | | | | |
| 68 | 1,6 | 16 | 44 BW | - | 5 4000 068 010 | 1076 | | | | | | |
| 68 | 1,6 | 16 | 44 BW | - | 5 4010 068 010 | 1076 | | | | | | |
| 75 | 2,0 | 16 | 32 BW | - | 5 4010 075 010 | 1076 | | | | | | |
| 80 | 2,0 | 16 | 34 BW | - | 5 3980 080 010 | 1076 | | | | | | |
| 80 | 2,0 | 16 | 54 BW | - | 5 3980 080 020 | 1076 | | | | | | |
| 80 | 2,0 | 16 | 80 BW | - | 5 3980 080 020 | 1076 | | | | | | |
| 80 | 2,0 | 16 | 34 BW | - | 5 3990 080 010 | 1076 | | | | | | |
| 80 | 2,0 | 16 | 54 BW | - | 5 3990 080 020 | 1076 | | | | | | |
| 80 | 2,0 | 16 | 80 BW | - | 5 3990 080 020 | 1076 | | | | | | |
| 80 | 2,8-3,6/2,2 | 20 | 2x10 WZ | - | 11 1480 080 010 | 1037 | | | | | | ✓ |
| 90 | 2,2/1,8 | 16 | 28 BW | - | 5 3965 090 010 | 1077 | | | | | | |
| 90 | 2,0/1,6 | 16 | 36 BW | - | 5 3965 090 020 | 1077 | | | | | | |
| 92 | 3,0/2,5 | 30 | 24 / 45°L | - | 11 1150 092 010 | 1039 | ✓ | | | | | |
| 92 | 3,0/2,5 | 30 | 24 / 45°R | - | 11 1150 092 020 | 1039 | ✓ | | | | | |
| 95 | 2,1/1,6 | 20 | 20 / 45°L | - | 11 1150 095 010 | 1039 | ✓ | | | | | |
| 95 | 2,1/1,6 | 20 | 20 / 45°R | - | 11 1150 095 020 | 1039 | ✓ | | | | | |
| 98 | 3,0/2,0 | 32 | 36 / 45°L | - | 11 1150 098 010 | 1039 | ✓ | | | | | |
| 98 | 3,0/2,0 | 32 | 36 / 45°R | - | 11 1150 098 020 | 1039 | ✓ | | | | | |
| 100 | 2,6/1,6 | 12 | 30 WZ | - | 11 1400 100 010 | 1035 | ✓ | ✓ | | ✓ | | ✓ |
| 100 | 2,6/1,6 | 22/20 | 30 WZ | LAMELLO | 11 1400 100 020 | 1035 | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 100 | 3,97/2,8 | 22 | 6 WZ | LAMELLO | 11 1400 100 030 | 1035 | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 100 | 3,97/2,8 | 22 | 12 WZ | LAMELLO | 11 1400 100 040 | 1035 | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 100 | 2,8-3,6/2,2 | 20 | 2x12 WZ | - | 11 1480 100 010 | 1037 | | | | | | ✓ |
| 100 | 2,8-3,6/2,2 | 22 | 2x12 WZ | - | 11 1480 100 020 | 1037 | | | | | | ✓ |
| 103 | 2,1/1,6 | 32 | 24 / 45° | - | 11 1150 103 010 | 1039 | ✓ | | | | | |
| 103 | 2,1/1,6 | 32 | 24 / 45° | - | 11 1150 103 020 | 1039 | ✓ | | | | | |
| 103 | 2,0 | 32 | 60 / 45°L | - | 11 1170 103 010 | 1039 | | | | | | |
| 103 | 2,0 | 32 | 60 / 45°R | - | 11 1170 103 020 | 1039 | | | | | | |
| 105 | 2,6/1,6 | 22/20 | 30 WZ | - | 11 1400 105 010 | 1035 | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 120 | 2,8/2,0 | 20 | 34 TFN | - | 10 8000 120 010 | 902 | ✓ | | | | | |
| 120 | 2,0/1,4 | 20 | 14 WZ | - | 10 8055 120 003 | 899 | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 120 | 2,0/1,4 | 20 | 24 WZ | - | 10 8055 120 005 | 899 | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 120 | 2,0/1,4 | 20 | 40 WZ | - | 10 8055 120 007 | 899 | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 120 | 2,0/1,4 | 25,4/22 | 14 WZ | - | 10 8055 120 010 | 899 | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 120 | 2,0/1,4 | 25,4/22 | 24 WZ | - | 10 8055 120 020 | 899 | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 120 | 2,0/1,4 | 25,4/22 | 40 WWF | - | 10 8055 120 030 | 899 | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 120 | 2,2/1,6 | 20 | 36 TFND | - | 11 1120 120 010 | 913 | | | | | | |
| 120 | 1,8/1,2 | 20 | 48 TFF-N | - | 11 1130 120 010 | 915 | | | | | | |
| 120 | 2,2/1,6 | 20 | 6 FL | - | 11 1350 120 010 | 937 | | | | | | |
| 120 | 2,4/1,4 | 22 | 24 WZ | LAMELLO | 11 1400 120 010 | 1035 | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 120 | 1,8/1,2 | 20 | 12 WZ | - | 11 1425 120 010 | 941 | ✓ | ✓ | ✓ | ✓ | | ✓ |

| Weichholz, Hartholz, Exotenholz (quer) | Weichholz, Hartholz, Exotenholz (längs) | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Spanplatten, Hartfaserplatten kunststoffbeschichtet/furniert, MDF, HDF |
|--|---|---|--|--|--|
| Soft wood, hard wood, and exotic wood across the grain | Soft wood, hard wood, and exotic wood along the grain | Wood with inclusions like nails, clips, concrete residues | Bonded wood, blockboard and veneer plywood, laminated wood | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |



Finder nach Blatt-Ø aufsteigend + Anwendung

Finder by blade-Ø + application

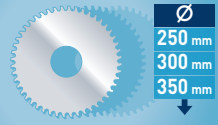
OPTIMAL
 GUT
 MÖGLICH

| | | | | | |
|--|---|---|--|--|--|
| | | | | | |
| Weichholz, Hartholz, Exotenholz (quer) | Weichholz, Hartholz, Exotenholz (längs) | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Spanplatten, Hartfaserplatten kunststoffbeschichtet/furniert, MDF, HDF |
| Soft wood, hard wood, and exotic wood across the grain | Soft wood, hard wood, and exotic wood along the grain | Wood with inclusions like nails, clips, concrete residues | Bonded wood, blockboard and veneer plywood, laminated wood | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |

= BESTSELLER

| | | | | | ART. | | | | | | | | | | |
|-----|-------------|---------|----------|-------------------|-----------------|------|---|---|---|---|---|--|--|--|---|
| 120 | 1,8/1,2 | 20 | 28 WZ | - | 11 1425 120 020 | 941 | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |
| 120 | 1,8/1,2 | 20 | 44 WZ | - | 11 1425 120 030 | 941 | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |
| 120 | 1,8/1,2 | 20 | 40 TFF-P | - | 11 1430 120 010 | 943 | ✓ | ✓ | | | | | | | |
| 120 | 2,8-3,6/2,2 | 20 | 2x12 WZ | - | 11 1480 120 010 | 1037 | | | | | | | | | ✓ |
| 120 | 2,8-3,6/2,2 | 22 | 2x12 WZ | - | 11 1480 120 020 | 1037 | | | | | | | | | ✓ |
| 120 | 2,8-3,8/2,2 | 22 | 2x12 WZ | 4-4,6-39+4-4,6-55 | 11 1480 120 030 | 1037 | | | | | | | | | ✓ |
| 120 | 2,8-3,8/2,2 | 50 | 2x12 WZ | 4-6,4-62 | 11 1480 120 040 | 1037 | | | | | | | | | ✓ |
| 125 | 1,5/1,2 | 16 | 52 WZ | - | 5 3965 125 010 | 1078 | | | | | | | | | |
| 125 | 2,6/1,6 | 20/12,7 | 24 WZ | - | 11 1400 125 010 | 1035 | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |
| 125 | 2,6/1,6 | 20/12,7 | 36 WZ | - | 11 1400 125 020 | 1035 | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |
| 125 | 2,8-3,6/2,2 | 20 | 2x12 WZ | - | 11 1480 125 010 | 1037 | | | | | | | | | ✓ |
| 125 | 2,8-3,6/2,2 | 22 | 2x12 WZ | - | 11 1480 125 020 | 1037 | | | | | | | | | ✓ |
| 125 | 4,4-5,6/3,4 | 20 | 24 KW | - | 11 1520 125 010 | 983 | | | | | | | | | ✓ |
| 125 | 3,1-4,3/2,8 | 22/20 | 24 KW | - | 11 1520 125 020 | 983 | | | | | | | | | ✓ |
| 130 | 2,6/1,6 | 20/16 | 24 WZ | - | 11 1400 130 010 | 1035 | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |
| 130 | 2,6/1,6 | 20/16 | 36 WZ | - | 11 1400 130 020 | 1035 | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |
| 136 | 1,6/1,2 | 20/10 | 30 WWF | 2-6-32 | 10 7100 136 010 | 892 | | | | | | | | | |
| 136 | 2,0/1,4 | 20/10 | 30 TFPS | 2-6-32 | 10 7130 136 010 | 893 | | | | | | | | | |
| 136 | 1,6/1,2 | 20/10 | 32 WWF | 2-6-32 | 10 7150 136 010 | 894 | | | | | | | | | |
| 136 | 1,6/1,2 | 20/10 | 36 FF | 2-6-32 | 10 7300 136 010 | 896 | | | | | | | | | |
| 136 | 1,6/1,2 | 20/10 | 38 TFF | 2-6-32 | 10 7400 136 010 | 897 | | | | | | | | | |
| 136 | 2,8/2,0 | 20/10 | 40 TFN | 2-6-32 | 10 8000 136 010 | 902 | ✓ | | | | | | | | |
| 136 | 2,0/1,4 | 20/10 | 16 WZ | - | 10 8055 136 010 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| 136 | 2,0/1,4 | 20/10 | 30 WZ | - | 10 8055 136 020 | 899 | ✓ | | ✓ | ✓ | ✓ | | | | ✓ |
| 136 | 2,0/1,4 | 20/10 | 40 WWF | - | 10 8055 136 030 | 899 | ✓ | | ✓ | ✓ | ✓ | | | | ✓ |
| 136 | 2,2/1,6 | 20/10 | 40 TFND | 2-6-32 | 11 1120 136 010 | 913 | | | | | | | | | |
| 136 | 1,8/1,2 | 20/10 | 56 TFF-N | 2-6-32 | 11 1130 136 010 | 915 | | | | | | | | | |
| 136 | 2,6/1,6 | 20/10 | 10 TT | 2-6-32 | 11 1250 136 010 | 964 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| 136 | 2,8/1,8 | 20/10 | 20 WZ | 2-6-32 | 11 1260 136 010 | 965 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| 136 | 2,2/1,6 | 20 | 6 FL | 2-6-32 | 11 1350 136 010 | 937 | | | | | | | | | |
| 136 | 1,8/1,2 | 20/10 | 14 WZ | - | 11 1425 136 010 | 941 | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |
| 136 | 1,8/1,2 | 20/10 | 30 WZ | - | 11 1425 136 020 | 941 | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |
| 136 | 1,8/1,2 | 20/10 | 48 WZ | - | 11 1425 136 030 | 941 | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |
| 136 | 1,8/1,2 | 20/10 | 48 TFF-P | 2-6-32 | 11 1430 136 010 | 943 | ✓ | ✓ | | | | | | | |
| 138 | 2,5/2,0 | 14 | 24 FL | - | 11 1150 138 010 | 1039 | ✓ | | | | | | | | |
| 138 | 2,5/2,0 | 20 | 24 FL | - | 11 1150 138 020 | 1039 | ✓ | | | | | | | | |
| 140 | 1,8/1,4 | 62 | 46 WWF | - | 5 3950 140 010 | 1078 | | | | | | | | | |
| 140 | 1,8/1,4 | 62 | 48 WWF | - | 5 3950 140 020 | 1078 | | | | | | | | | |
| 140 | 1,8/1,4 | 62 | 38 WZ | - | 5 3951 140 010 | 1079 | | | | | | | | | |
| 140 | 2,5/1,8 | 62 | 36 TFP | - | 5 3952 140 010 | 1079 | | | | | | | | | |
| 140 | 1,8/1,4 | 62 | 46 WWF | - | 5 3960 140 010 | 1078 | | | | | | | | | |
| 140 | 1,8/1,4 | 62 | 48 WWF | - | 5 3960 140 020 | 1078 | | | | | | | | | |
| 140 | 1,4/1,2 | 62 | 46 WWF | - | 5 3961 140 010 | 1078 | | | | | | | | | |
| 140 | 2,7/1,5 | 62 | DIA | - | 5 3970 140 010 | 1079 | | | | | | | | | |
| 140 | 2,6/1,6 | 20 | 12 WZ | - | 11 1400 140 010 | 1035 | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |
| 140 | 2,6/1,6 | 20 | 20 WZ | - | 11 1400 140 020 | 1035 | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |
| 140 | 2,6/1,6 | 20 | 36 WZ | - | 11 1400 140 030 | 1035 | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |
| 150 | 1,8/1,4 | 20/16 | 30 WWF | 2-6-32 | 10 7100 150 010 | 892 | | | | | | | | | |
| 150 | 2,8/2,0 | 20/16 | 42 TFN | 2-6-32 | 10 8000 150 010 | 902 | ✓ | | ✓ | | | | | | |
| 150 | 2,4/1,6 | 20/16 | 42 TFND | 2-6-32 | 11 1120 150 010 | 913 | | | | | | | | | |
| 150 | 3,2/2,2 | 30 | 24 WZ | UNI | 11 1215 150 010 | 1019 | ✓ | ✓ | | ✓ | ✓ | | | | |
| 150 | 2,8/1,6 | 20/16 | 24 WZ | 2-6-32 | 11 1260 150 010 | 965 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ |
| 150 | 3,2/2,2 | 30 | 36 WZ | UNI | 11 1300 150 010 | 991 | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |
| 150 | 2,6/1,6 | 20/16 | 12 WZ | 2-6-32 | 11 1400 150 010 | 1035 | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |
| 150 | 2,6/1,6 | 20/16 | 24 WZ | 2-6-32 | 11 1400 150 020 | 1035 | ✓ | ✓ | | ✓ | ✓ | | | | ✓ |





Finder nach Blatt-Ø aufsteigend + Anwendung

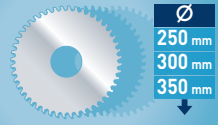
Finder by blade-Ø + application

✓ OPTIMAL
✓ GUT
✓ MÖGLICH

| | | | | | |
|--|---|---|--|--|--|
| | | | | | |
| Weichholz, Hartholz, Exotenholz (quer) | Weichholz, Hartholz, Exotenholz (längs) | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Spanplatten, Kunststoffbeschichtet/furniert, MDF, HDF |
| Soft wood, hard wood, and exotic wood across the grain | Soft wood, hard wood, and exotic wood along the grain | Wood with inclusions like nails, clips, concrete residues | Bonded wood, blockboard and veneer plywood, laminated wood | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |

= BESTSELLER

| | | | | | ART. | | | | | | | | |
|-----|-------------|----------|----------|---------|-----------------|------|---|---|---|---|---|---|---|
| 165 | 2,7/1,5 | 62 | DIA | - | 5 3970 165 010 | 1079 | | | | | | | |
| 170 | 2,8/2,0 | 30 | 48 TFN | - | 10 8000 170 010 | 902 | ✓ | | ✓ | | | | |
| 170 | 2,4/1,8 | 30 | 48 TFND | UNI1 | 11 1120 170 010 | 913 | | | | | | | |
| 170 | 2,6/1,6 | 20/16 | 24 WZ | - | 11 1400 170 010 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 170 | 2,6/1,6 | 30 | 24 WZ | 2-7-42 | 11 1400 170 020 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 170 | 2,6/1,6 | 30 | 36 WZ | 2-7-42 | 11 1400 170 030 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 170 | 2,6/1,6 | 30 | 48 WZ | 2-7-42 | 11 1400 170 040 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 175 | 2,1/1,6 | 20 | 68 WZ | - | 11 1150 175 010 | 1039 | ✓ | | | | | | |
| 180 | 1,8/1,4 | 30/20 | 34 WWF | UNI1 | 10 7100 180 010 | 892 | | | | | | | |
| 180 | 1,8/1,4 | 30/20 | 36 WWF | UNI1 | 10 7150 180 010 | 894 | | | | | | | |
| 180 | 1,8/1,4 | 30/20 | 44 FF | UNI1 | 10 7300 180 010 | 896 | | | | | | | |
| 180 | 1,8/1,4 | 30/20 | 48 TFF | UNI1 | 10 7400 180 010 | 897 | | | | | | | |
| 180 | 2,8/2,0 | 30 | 48 TFN | UNI1 | 10 8000 180 010 | 902 | ✓ | | ✓ | | | | |
| 180 | 2,2/1,6 | 22,22 | 10 WZ | - | 10 8055 180 005 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,0/1,4 | 30/22/20 | 20 WZ | UNI1 | 10 8055 180 010 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,0/1,4 | 30/22/20 | 34 WZ | UNI1 | 10 8055 180 020 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,0/1,4 | 30/22/20 | 48 WWF | UNI1 | 10 8055 180 030 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,4/1,8 | 30 | 48 TFND | UNI1 | 11 1120 180 010 | 913 | | | | | | | |
| 180 | 2,2/1,6 | 30 | 64 TFND | UNI1 | 11 1120 180 020 | 913 | | | | | | | |
| 180 | 3,2/2,2 | 30 | 30 WZ | UNI | 11 1215 180 010 | 1019 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,8/1,8 | 30/20 | 12 TT | 2-7-42 | 11 1250 180 010 | 964 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,8/1,8 | 30/20 | 30 WZ | 2-7-42 | 11 1260 180 010 | 965 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 180 | 3,2/2,2 | 30 | 42 WZ | UNI | 11 1300 180 010 | 991 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,2/1,6 | 30/20 | 8 FL | 2-7-42 | 11 1350 180 010 | 937 | | | | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,8/1,8 | 20/16 | 14 WZ | 2-6-32 | 11 1400 180 010 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,8/1,8 | 20/16 | 24 WZ | 2-6-32 | 11 1400 180 020 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,8/1,8 | 20/16 | 40 WZ | 2-6-32 | 11 1400 180 030 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,8/1,8 | 20/16 | 56 WZ | 2-6-32 | 11 1400 180 040 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,5/1,4 | 22 | 12 WZ | LAMELLO | 11 1400 180 043 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,8/1,8 | 22 | 24 WZ | LAMELLO | 11 1400 180 046 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,8/1,8 | 30 | 14 WZ | 2-7-42 | 11 1400 180 050 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,8/1,8 | 30 | 24 WZ | 2-7-42 | 11 1400 180 060 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,8/1,8 | 30 | 40 WZ | 2-7-42 | 11 1400 180 070 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 2,8/1,8 | 30 | 56 WZ | 2-7-42 | 11 1400 180 080 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 1,8/1,2 | 20/16 | 18 WZ | 2-6-32 | 11 1425 180 010 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 1,8/1,2 | 20/16 | 40 WZ | 2-6-32 | 11 1425 180 020 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 1,8/1,2 | 20/16 | 60 WZ | 2-6-32 | 11 1425 180 030 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 1,8/1,2 | 20/16 | 76 WZ | 2-6-32 | 11 1425 180 040 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 1,8/1,2 | 20/16 | 60 TFF-P | 2-6-32 | 11 1430 180 010 | 943 | | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 180 | 4,4-5,2/3,2 | 45 | 36 K | - | 11 1520 180 010 | 983 | | | | | | | ✓ |
| 180 | 4,8-5,6/3,5 | 45 | 36 K | - | 11 1520 180 020 | 983 | | | | | | | ✓ |
| 180 | 2,8/1,8 | 30/20 | 38 HDF-P | 2-7-42 | 11 1600 180 010 | 1005 | ✓ | | | ✓ | ✓ | ✓ | ✓ |
| 185 | 1,8/1,4 | 20/16 | 34 WWF | 2-6-32 | 10 7100 185 010 | 892 | | | | | | | |
| 185 | 1,8/1,4 | 20/16 | 44 FF | 2-6-32 | 10 7300 185 010 | 896 | | | | | | | |
| 185 | 1,8/1,4 | 20/16 | 48 TFF | 2-6-32 | 10 7400 185 010 | 897 | | | | | | | |
| 185 | 2,8/2,0 | 20/16 | 48 TFN | 2-6-32 | 10 8000 185 010 | 902 | ✓ | | ✓ | | | | |
| 185 | 2,0/1,4 | 20/16 | 20 WZ | 2-6-32 | 10 8055 185 010 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 185 | 2,0/1,4 | 20/16 | 34 WZ | 2-6-32 | 10 8055 185 020 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 185 | 2,0/1,4 | 20/16 | 48 WWF | 2-6-32 | 10 8055 185 030 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 185 | 2,2/1,6 | 20/16 | 64 TFND | 2-6-32 | 11 1120 185 010 | 913 | | | | | | | |
| 185 | 2,8/1,8 | 20/16 | 12 TT | 2-6-32 | 11 1250 185 010 | 964 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 185 | 2,8/1,8 | 20/16 | 30 WZ | 2-6-32 | 11 1260 185 010 | 965 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 185 | 2,8/1,8 | 20/16 | 14 WZ | 2-6-32 | 11 1400 185 010 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 185 | 2,8/1,8 | 20/16 | 24 WZ | 2-6-32 | 11 1400 185 020 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| 185 | 2,8/1,8 | 20/16 | 40 WZ | 2-6-32 | 11 1400 185 030 | 1035 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |



Finder nach Blatt-Ø aufsteigend + Anwendung

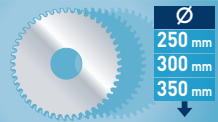
Finder by blade-Ø + application

✓ OPTIMAL
✓ GUT
✓ MÖGLICH

| | | | | | |
|--|---|---|--|--|--|
| | | | | | |
| Weichholz, Hartholz, Exotenholz (quer) | Weichholz, Hartholz, Exotenholz (längs) | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Spanplatten, Hartfaserplatten kunststoffbeschichtet/furniert, MDF, HDF |
| Soft wood, hard wood, and exotic wood across the grain | Soft wood, hard wood, and exotic wood along the grain | Wood with inclusions like nails, clips, concrete residues | Bonded wood, blockboard and veneer plywood, laminated wood | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |

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| | | | | | | ART. | | | | | | | | | | | | |
|-----|---------|-------|-----------|--------------------------|-----------------|------|---|--|---|---|---|---|---|---|--|--|---|--|
| 185 | 2,8/1,8 | 20/16 | 56 WZ | 2-6-32 | 11 1400 185 040 | 1035 | ✓ | | ✓ | | | | | | | | | |
| 190 | 1,8/1,4 | 30 | 38 WWF | UNI1 | 10 7100 190 010 | 892 | | | | | | | | | | | | |
| 190 | 2,2/1,6 | 30 | 38 TFPS | UNI1 | 10 7130 190 010 | 893 | | | | | | | | | | | | |
| 190 | 1,8/1,4 | 30 | 38 WWF | UNI1 | 10 7150 190 010 | 894 | | | | | | | | | | | | |
| 190 | 1,8/1,4 | 30/20 | 48 FF | UNI1 | 10 7300 190 010 | 896 | | | | | | | | | | | | |
| 190 | 1,8/1,4 | 30 | 48 TFF | UNI1 | 10 7400 190 010 | 897 | | | | | | | | | | | | |
| 190 | 2,8/2,0 | 30 | 54 TFN | UNI1 | 10 8000 190 010 | 902 | ✓ | | | ✓ | | | | | | | | |
| 190 | 2,0/1,4 | 30 | 20 WZ | UNI1 | 10 8055 190 010 | 899 | ✓ | | ✓ | ✓ | | ✓ | | ✓ | | | ✓ | |
| 190 | 2,0/1,4 | 30 | 34 WZ | UNI1 | 10 8055 190 020 | 899 | ✓ | | ✓ | ✓ | | ✓ | | ✓ | | | ✓ | |
| 190 | 2,0/1,4 | 30 | 48 WWF | UNI1 | 10 8055 190 030 | 899 | ✓ | | ✓ | ✓ | | ✓ | | ✓ | | | ✓ | |
| 190 | 2,4/1,8 | 30 | 54 TFND | UNI1 | 11 1120 190 010 | 913 | | | | | | | | | | | | |
| 190 | 2,2/1,6 | 30 | 68 TFND | UNI1 | 11 1120 190 020 | 913 | | | | | | | | | | | | |
| 190 | 1,8/1,2 | 30 | 72 TFF-N | UNI1 | 11 1130 190 010 | 915 | | | | | | | | | | | | |
| 190 | 2,8/1,8 | 30 | 14 TT | 2-7-42 | 11 1250 190 010 | 964 | ✓ | | ✓ | ✓ | | ✓ | | ✓ | | | ✓ | |
| 190 | 2,8/1,8 | 30 | 30 WZ | 2-7-42 | 11 1260 190 010 | 965 | ✓ | | ✓ | ✓ | | ✓ | | ✓ | | | ✓ | |
| 190 | 2,2/1,6 | 30/20 | 6 FL | 2-7-42 | 11 1350 190 005 | 937 | | | | | | | | | | | | |
| 190 | 2,2/1,6 | 30/20 | 8 FL | 2-7-42 | 11 1350 190 010 | 937 | | | | | | | | | | | | |
| 190 | 2,2/1,6 | 30/20 | 12 FL | 2-7-42 | 11 1350 190 015 | 937 | | | | | | | | | | | | |
| 190 | 2,2/1,6 | 30/20 | 30 FL | 2-7-42 | 11 1350 190 020 | 937 | | | | | | | | | | | | |
| 190 | 2,8/1,8 | 20/16 | 16 WZ | 2-6-32 | 11 1400 190 010 | 1035 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ | |
| 190 | 2,8/1,8 | 20/16 | 30 WZ | 2-6-32 | 11 1400 190 020 | 1035 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ | |
| 190 | 2,8/1,8 | 20/16 | 48 WZ | 2-6-32 | 11 1400 190 030 | 1035 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ | |
| 190 | 2,8/1,8 | 20/16 | 60 WZ | 2-6-32 | 11 1400 190 040 | 1035 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ | |
| 190 | 2,8/1,8 | 30 | 16 WZ | 2-7-42 | 11 1400 190 050 | 1035 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ | |
| 190 | 2,8/1,8 | 30 | 30 WZ | 2-7-42 | 11 1400 190 060 | 1035 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ | |
| 190 | 2,8/1,8 | 30 | 48 WZ | 2-7-42 | 11 1400 190 070 | 1035 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ | |
| 190 | 2,8/1,8 | 30 | 60 WZ | 2-7-42 | 11 1400 190 080 | 1035 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ | |
| 190 | 1,8/1,2 | 30/20 | 18 WZ | 2-7-42 | 11 1425 190 010 | 941 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ | |
| 190 | 1,8/1,2 | 30/20 | 42 WZ | 2-7-42 | 11 1425 190 020 | 941 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ | |
| 190 | 1,8/1,2 | 30/20 | 60 WZ | 2-7-42 | 11 1425 190 030 | 941 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ | |
| 190 | 1,8/1,2 | 30/20 | 76 WZ | 2-7-42 | 11 1425 190 040 | 941 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ | |
| 190 | 1,8/1,2 | 30/20 | 60 TFF-P | 2-7-42 | 11 1430 190 010 | 943 | | | | | | | | | | | | |
| 190 | 2,8/1,8 | 30 | 42 HDF-P | 2-7-42 | 11 1600 190 010 | 1005 | ✓ | | | | ✓ | | ✓ | | | | ✓ | |
| 190 | 2,8/1,8 | 30 | 60 WZE-P | 2-7-42 | 11 1610 190 010 | 1011 | ✓ | | | | ✓ | | ✓ | | | | ✓ | |
| 200 | 2,0/1,6 | 30 | 40 FF | UNI1 | 10 7100 200 010 | 892 | | | | | | | | | | | | |
| 200 | 2,0/1,6 | 30 | 48 FF | UNI1 | 10 7300 200 010 | 896 | | | | | | | | | | | | |
| 200 | 2,0/1,6 | 30 | 54 TFF | UNI1 | 10 7400 200 010 | 897 | | | | | | | | | | | | |
| 200 | 2,8/2,0 | 30 | 54 TFN | UNI1 | 10 8000 200 010 | 902 | ✓ | | | ✓ | | | | | | | | |
| 200 | 3,2/2,5 | 30 | 54TFP | UNI1+UNI2 | 11 1000 200 010 | 905 | | | | | | | | | | | | |
| 200 | 2,8/2,2 | 30 | 72 TFP | UNI1+UNI2 | 11 1000 200 020 | 905 | | | | | | | | | | | | |
| 200 | 2,4/1,8 | 30 | 54 TFND | UNI1 | 11 1120 200 010 | 913 | | | | | | | | | | | | |
| 200 | 2,2/1,6 | 30 | 68 TFND | UNI1 | 11 1120 200 020 | 913 | | | | | | | | | | | | |
| 200 | 2,0/1,4 | 30 | 100 TFF-N | UNI1 | 11 1130 200 010 | 915 | | | | | | | | | | | | |
| 200 | 2,1/1,6 | 20 | 80 WZ | - | 11 1150 200 010 | 1039 | ✓ | | | | | | | | | | | |
| 200 | 2,1/1,6 | 20 | 80 WZN | - | 11 1150 200 020 | 1039 | ✓ | | | | | | | | | | | |
| 200 | 2,2/1,8 | 20 | 100 TFN | - | 11 1150 200 030 | 1039 | ✓ | | | | | | | | | | | |
| 200 | 2,1/1,6 | 32 | 80 WZ | - | 11 1150 200 040 | 1039 | ✓ | | | | | | | | | | | |
| 200 | 2,2/1,8 | 30 | 100 TFN | - | 11 1150 200 050 | 1039 | ✓ | | | | | | | | | | | |
| 200 | 2,2/1,8 | 32 | 100 TFN | - | 11 1150 200 060 | 1039 | ✓ | | | | | | | | | | | |
| 200 | 2,2/1,8 | 32/30 | 100 WZN | - | 11 1150 200 070 | 1039 | ✓ | | | | | | | | | | | |
| 200 | 2,0 | 32 | 180 HZ | 2-8-45 | 11 1170 200 010 | 1039 | | | | | | | | | | | | |
| 200 | 3,2/2,2 | 30 | 36 WZ | UNI | 11 1215 200 010 | 1019 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ | |
| 200 | 2,8/1,8 | 30 | 30 WZ | 2-7-42 | 11 1260 200 010 | 965 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ | |
| 200 | 3,0/2,2 | 30 | 65 WFA | 2-6,2-42+4-6-52+4-6,6-60 | 11 1320 200 010 | 935 | ✓ | | | | ✓ | | ✓ | | | | ✓ | |
| 200 | 2,4/1,6 | 22 | 12 WZ | LAMELLO | 11 1400 200 003 | 1035 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ | |



Finder nach Blatt-Ø aufsteigend + Anwendung

Finder by blade-Ø + application

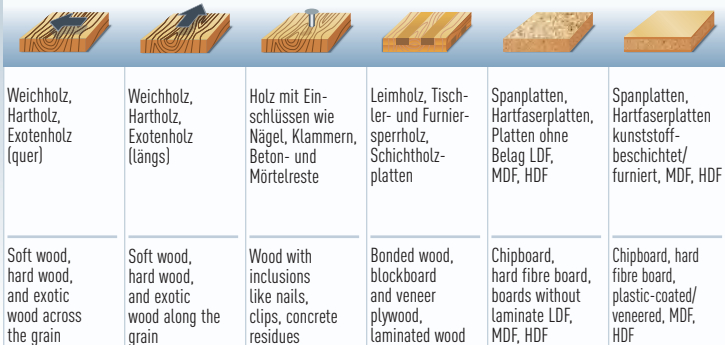
✓ OPTIMAL
OPTIMAL

✓ GUT
GOOD

✓ MÖGLICH
POSSIBLE

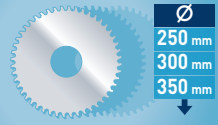
■ = BESTSELLER

| | | | | | | ART. | | | | | | | | | | | |
|-----|---------|---------|----------|-----------|-----------------|------|---|---|---|---|---|---|---|---|---|---|---|
| 216 | 2,8/1,8 | 30 | 34 WZ | 2-7-42 | 11 1260 216 010 | 965 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 210 | 2,2/1,6 | 30 | 8 FL | UNI | 11 1350 216 005 | 937 | | | | | | | | | | | |
| 216 | 2,2/1,6 | 30 | 12 FL | UNI | 11 1350 216 010 | 937 | | | | | | | | | | | |
| 216 | 2,2/1,6 | 30 | 30 FL | UNI | 11 1350 216 020 | 937 | | | | | | | | | | | |
| 216 | 2,0/1,4 | 30 | 20 WZ | 2-7-42 | 11 1425 216 010 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 216 | 2,0/1,4 | 30 | 48 WZ | 2-7-42 | 11 1425 216 020 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 216 | 2,0/1,4 | 30 | 64 WZ | 2-7-42 | 11 1425 216 030 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 216 | 2,0/1,4 | 30 | 80 WZ | 2-7-42 | 11 1425 216 040 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 216 | 2,8/1,8 | 30 | 24 WZN | 2-7-42 | 11 1450 216 010 | 945 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 216 | 2,8/1,8 | 30 | 48 WZN | 2-7-42 | 11 1450 216 020 | 945 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 216 | 2,8/1,8 | 30 | 60 WZN | 2-7-42 | 11 1450 216 030 | 945 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 216 | 2,8/1,8 | 30 | 80 WZN | 2-7-42 | 11 1450 216 040 | 945 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 216 | 2,8/1,8 | 30 | 48 HDF-N | 2-7-42 | 11 1602 216 010 | 1007 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 216 | 2,8/1,8 | 30 | 64 WZE-N | 2-7-42 | 11 1615 216 010 | 1012 | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 220 | 2,8/2,0 | 30 | 54 TFN | UNI1 | 10 8000 220 010 | 902 | ✓ | | ✓ | | | | | | | | |
| 220 | 2,4/1,8 | 30 | 64 TFND | UNI1 | 11 1120 220 010 | 913 | | | | | | | | | | | |
| 220 | 2,2/1,6 | 30 | 80 TFND | UNI1 | 11 1120 220 020 | 913 | | | | | | | | | | | |
| 220 | 3,0/2,2 | 30 | 70 WFA | UNI | 11 1320 220 010 | 935 | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 220 | 2,8/1,8 | 30 | 20 WZ | 2-7-42 | 11 1400 220 010 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 220 | 2,8/1,8 | 30 | 36 WZ | 2-7-42 | 11 1400 220 020 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 220 | 2,8/1,8 | 30 | 48 WZ | 2-7-42 | 11 1400 220 030 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 220 | 2,8/1,8 | 30 | 64 WZ | 2-7-42 | 11 1400 220 040 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 220 | 2,0/1,4 | 30 | 48 WZ | 2-7-42 | 11 1425 220 010 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 220 | 3,2/2,2 | 30 | 64 TFP | UNI | 11 1470 220 010 | 949 | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 220 | 3,2/2,2 | 30 | 42 HDF-P | 2-7-42 | 11 1600 220 010 | 1005 | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 220 | 3,2/2,2 | 30 | 42 HDF-N | 2-7-42 | 11 1602 220 010 | 1007 | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 220 | 2,9/2,0 | 30 | 48 HTT-P | 2-7-42 | 11 1604 220 010 | 1009 | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 220 | 3,2/2,2 | 30 | 68 WZE-P | 2-7-42 | 11 1610 220 010 | 1011 | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 220 | 3,2/2,2 | 30 | 68 WZE-N | 2-7-42 | 11 1615 220 010 | 1013 | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 225 | 2,0/1,4 | 30 | 24 WZ | UNI1 | 10 8055 225 010 | 899 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 225 | 2,0/1,4 | 30 | 36 WZ | UNI1 | 10 8055 225 020 | 899 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 225 | 2,0/1,4 | 30 | 48 WWF | UNI1 | 10 8055 225 030 | 899 | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 225 | 2,5/1,8 | 30 | 68 TFP | UNI1+UNI2 | 11 1000 225 010 | 905 | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 225 | 2,4/1,8 | 30 | 64 TFND | UNI1 | 11 1120 225 010 | 913 | | | | | | | | | | | |
| 225 | 2,2/1,6 | 30 | 80 TFND | UNI1 | 11 1120 225 020 | 913 | | | | | | | | | | | |
| 225 | 2,8/1,8 | 30 | 34 WZ | 2-7-42 | 11 1260 225 010 | 965 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 225 | 2,8/1,8 | 30 | 24 WZ | 2-7-42 | 11 1400 225 010 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 225 | 2,8/1,8 | 30 | 36 WZ | 2-7-42 | 11 1400 225 020 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 225 | 2,8/1,8 | 30 | 48 WZ | 2-7-42 | 11 1400 225 030 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 225 | 2,8/1,8 | 30 | 64 WZ | 2-7-42 | 11 1400 225 040 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 225 | 2,0/1,4 | 30 | 24 WZ | 2-7-42 | 11 1425 225 010 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 225 | 2,0/1,4 | 30 | 48 WZ | 2-7-42 | 11 1425 225 020 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 225 | 2,0/1,4 | 30 | 68 WZ | 2-7-42 | 11 1425 225 030 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 225 | 2,0/1,4 | 30 | 88 WZ | 2-7-42 | 11 1425 225 040 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 225 | 2,0/1,4 | 30 | 68 TFF-P | 2-7-42 | 11 1430 225 010 | 943 | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 230 | 2,0/1,6 | 30/25,4 | 44 WWF | UNI1 | 10 7100 230 010 | 892 | | | | | | | | | | | |
| 230 | 2,2/1,8 | 30/25,4 | 44 TFPS | UNI1 | 10 7130 230 010 | 893 | | | | | | | | | | | |
| 230 | 2,0/1,6 | 30/25,4 | 48 WWF | UNI1 | 10 7150 230 010 | 894 | | | | | | | | | | | |
| 230 | 2,0/1,6 | 30/25,4 | 56 FF | UNI1 | 10 7300 230 010 | 896 | | | | | | | | | | | |
| 230 | 2,0/1,6 | 30/25,4 | 54 TFF | UNI1 | 10 7400 230 010 | 897 | | | | | | | | | | | |
| 230 | 2,8/2,0 | 30 | 64 TFN | UNI1 | 10 8000 230 010 | 902 | ✓ | | ✓ | | | | | | | | |
| 230 | 2,0/1,4 | 30/22 | 24 WZ | UNI1 | 10 8055 230 010 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 230 | 2,0/1,4 | 30/22 | 36 WZ | UNI1 | 10 8055 230 020 | 899 | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 230 | 2,0/1,4 | 30/22 | 48 WWF | UNI1 | 10 8055 230 030 | 899 | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 230 | 2,4/1,8 | 30 | 64 TFND | UNI1 | 11 1120 230 010 | 913 | | | | | | | | | | | |



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index



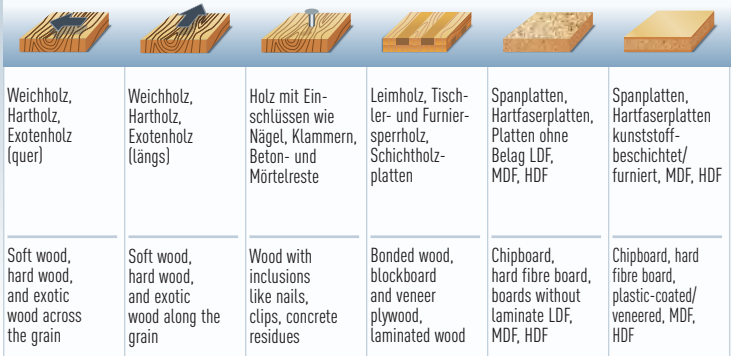
Finder nach Blatt-Ø aufsteigend + Anwendung

Finder by blade-Ø + application

OPTIMAL
 GUT
 MÖGLICH

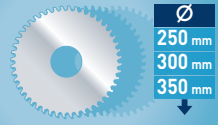
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| | | | | | | ART. | | | | | | | | | | | | | | |
|--|-----|----------|---------|--------------------------|--------------------|-----------------|---------|-----|---|---|---|---|---|---|---|--|--|--|--|---|
| | 230 | 2,2/1,6 | 30 | 80 TFND | UNI1 | 11 1120 230 020 | 913 | | | | | | | | | | | | | |
| | 230 | 2,0/1,4 | 30 | 108 TFF-N | UNI1 | 11 1130 230 010 | 915 | | | | | | | | | | | | | |
| | 230 | 3,2/2,2 | 30 | 24 WZ | UNI | 11 1215 230 010 | 1019 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | | | |
| | 230 | 2,8/1,8 | 30 | 16 TT | 2-7-42 | 11 1250 230 010 | 964 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| | 230 | 2,8/1,8 | 30 | 34 WZ | 2-7-42 | 11 1260 230 010 | 965 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ |
| | 230 | 3,2/2,2 | 30 | 48 WZ | UNI | 11 1300 230 010 | 991 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | ✓ |
| | 230 | 2,4/1,8 | 30 | 6 FL | UNI | 11 1350 230 005 | 937 | | | | | | | | | | | | | ✓ |
| | 230 | 2,4/1,8 | 30 | 8 FL | UNI | 11 1350 230 007 | 937 | | | | | | | | | | | | | ✓ |
| | 230 | 2,4/1,8 | 30 | 15 FL | UNI | 11 1350 230 010 | 937 | | | | | | | | | | | | | ✓ |
| | 230 | 2,4/1,8 | 30 | 30 FL | UNI | 11 1350 230 020 | 937 | | | | | | | | | | | | | ✓ |
| | 230 | 2,8/1,8 | 30 | 24 WZ | 2-7-42 | 11 1400 230 010 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ |
| | 230 | 2,8/1,8 | 30 | 36 WZ | 2-7-42 | 11 1400 230 020 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ |
| | 230 | 2,8/1,8 | 30 | 48 WZ | 2-7-42 | 11 1400 230 030 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ |
| | 230 | 2,8/1,8 | 30 | 64 WZ | 2-7-42 | 11 1400 230 040 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ |
| | 230 | 2,0/1,4 | 30 | 24 WZ | 2-7-42 | 11 1425 230 010 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ |
| | 230 | 2,0/1,4 | 30 | 48 WZ | 2-7-42 | 11 1425 230 020 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ |
| | 230 | 2,0/1,4 | 30 | 68 WZ | 2-7-42 | 11 1425 230 030 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ |
| | 230 | 2,0/1,4 | 30 | 88 WZ | 2-7-42 | 11 1425 230 040 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ |
| | 230 | 2,0/1,4 | 30 | 68 TFF-P | 2-7-42 | 11 1430 230 010 | 943 | | | | | | | | | | | | | |
| | 230 | 2,8/1,8 | 30 | 68 WZE-P | 2-7-42 | 11 1610 230 010 | 1011 | ✓ | | | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ |
| | 240 | 2,8/2,0 | 30 | 64 TFN | UNI1 | 10 8000 240 010 | 902 | ✓ | | | ✓ | | | | | | | | | |
| | 240 | 2,2/1,8 | 30 | 80 TFND | UNI1 | 11 1120 240 010 | 913 | | | | | | | | | | | | | |
| | 240 | 3,0/2,0 | 30 | 24 WZ | 2-7-42 | 11 1400 240 010 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ |
| | 240 | 3,0/2,0 | 30 | 36 WZ | 2-7-42 | 11 1400 240 020 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ |
| | 240 | 3,0/2,0 | 30 | 48 WZ | 2-7-42 | 11 1400 240 030 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ |
| | 250 | 2,0/1,75 | 32 | 54 | 4-9-50 / 4-11-63 | 10 7000 250 010 | 886 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 32 | 60 | 4-9-50 / 4-11-63 | 10 7000 250 020 | 886 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 32 | 72 | 4-9-50 / 4-11-63 | 10 7000 250 030 | 886 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 32 | 80 | 4-9-50 / 4-11-63 | 10 7000 250 040 | 886 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 40 | 54 | 2-8,5-55 / 4-12-64 | 10 7000 250 050 | 886 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 40 | 60 | 2-8,5-55 / 4-12-64 | 10 7000 250 060 | 886 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 40 | 72 | 2-8,5-55 / 4-12-64 | 10 7000 250 070 | 886 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 40 | 80 | 2-8,5-55 / 4-12-64 | 10 7000 250 080 | 886 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 32 | 54 | 4-9-50 / 4-11-63 | 10 7001 250 010 | 887 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 32 | 60 | 4-9-50 / 4-11-63 | 10 7001 250 020 | 887 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 32 | 72 | 4-9-50 / 4-11-63 | 10 7001 250 030 | 887 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 32 | 80 | 4-9-50 / 4-11-63 | 10 7001 250 040 | 887 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 40 | 54 | 2-8,5-55 / 4-12-64 | 10 7001 250 050 | 887 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 40 | 60 | 2-8,5-55 / 4-12-64 | 10 7001 250 060 | 887 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 40 | 72 | 2-8,5-55 / 4-12-64 | 10 7001 250 070 | 887 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 40 | 80 | 2-8,5-55 / 4-12-64 | 10 7001 250 080 | 887 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 32 | 54 | 4-9-50 / 4-11-63 | 10 7002 250 010 | 888 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 32 | 60 | 4-9-50 / 4-11-63 | 10 7002 250 020 | 888 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 32 | 72 | 4-9-50 / 4-11-63 | 10 7002 250 030 | 888 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 32 | 80 | 4-9-50 / 4-11-63 | 10 7002 250 040 | 888 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 40 | 54 | 2-8,5-55 / 4-12-64 | 10 7002 250 050 | 888 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 40 | 60 | 2-8,5-55 / 4-12-64 | 10 7002 250 060 | 888 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 40 | 72 | 2-8,5-55 / 4-12-64 | 10 7002 250 070 | 888 | | | | | | | | | | | | | |
| | 250 | 2,0/1,75 | 40 | 80 | 2-8,5-55 / 4-12-64 | 10 7002 250 080 | 888 | | | | | | | | | | | | | |
| | 250 | 4,0/3,5 | | Auf Anfrage / On request | | | 10 7050 | 889 | | | | | | | | | | | | |
| | 250 | 2,2/1,8 | 30/25,4 | 48 WWF | UNI1+UNI2 | 10 7100 250 010 | 892 | | | | | | | | | | | | | |
| | 250 | 2,2/1,8 | 30/25,4 | 60 WWF | UNI1+UNI2 | 10 7100 250 020 | 892 | | | | | | | | | | | | | |
| | 250 | 2,2/1,8 | 30/25,4 | 48 TFPS | UNI1+UNI2 | 10 7130 250 010 | 893 | | | | | | | | | | | | | |
| | 250 | 2,2/1,8 | 30/25,4 | 60 TFPS | UNI1+UNI2 | 10 7130 250 020 | 893 | | | | | | | | | | | | | |
| | 250 | 2,2/1,8 | 30/25,4 | 60 WWF | UNI1+UNI2 | 10 7150 250 010 | 894 | | | | | | | | | | | | | |



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index



Finder nach Blatt-Ø aufsteigend + Anwendung

Finder by blade-Ø + application

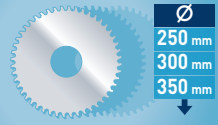
✓ OPTIMAL
✓ GUT
✓ MÖGLICH



| Weichholz, Hartholz, Exotenholz (quer) | Weichholz, Hartholz, Exotenholz (längs) | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Spanplatten, Hartfaserplatten kunststoffbeschichtet/ furniert, MDF, HDF |
|--|---|---|--|--|---|
| Soft wood, hard wood, and exotic wood across the grain | Soft wood, hard wood, and exotic wood along the grain | Wood with inclusions like nails, clips, concrete residues | Bonded wood, blockboard and veneer plywood, laminated wood | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |

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| | | | | | | ART. | | | | | | | | | | | | |
|-----|---------|------------------------|------------|-----------|-----------------|------|---|---|--|---|---|---|---|---|--|--|---|---|
| 250 | 2,2/1,8 | 30 | 60 / 3-Cut | UNI1+UNI2 | 10 7300 250 010 | 896 | | | | | | | | | | | | |
| 250 | 2,2/1,8 | 30 | 72 TFF | UNI1+UNI2 | 10 7400 250 010 | 897 | | | | | | | | | | | | |
| 250 | 3,2/2,5 | 30 | 60 TFN | UNI1+UNI2 | 10 8000 250 010 | 902 | ✓ | | | ✓ | | | | | | | | |
| 250 | 3,2/2,5 | 30 | 80 TFN | UNI1+UNI2 | 10 8000 250 020 | 902 | ✓ | | | ✓ | | | | | | | | |
| 250 | 2,8/2,2 | 30 | 100 TFN | UNI1+UNI2 | 10 8000 250 030 | 902 | ✓ | | | ✓ | | | | | | | | |
| 250 | 2,4/1,8 | 30/25,4 | 28 WZ | UNI1+UNI2 | 10 8055 250 010 | 899 | ✓ | ✓ | | ✓ | | ✓ | | ✓ | | | ✓ | |
| 250 | 2,4/1,8 | 30/25,4 | 44 WZ | UNI1+UNI2 | 10 8055 250 020 | 899 | ✓ | | | ✓ | | ✓ | | ✓ | | | ✓ | |
| 250 | 2,4/1,8 | 30/25,4 | 60 WWF | UNI1+UNI2 | 10 8055 250 030 | 899 | ✓ | | | ✓ | | ✓ | | ✓ | | | ✓ | |
| 250 | 3,2/2,2 | 30 | 48 TTP | UNI | 10 9050 250 010 | 923 | | | | | | | | | | | | |
| 250 | 3,2/2,2 | 30 | 80 WZF | UNI | 10 9050 250 020 | 923 | | | | | | | | | | | | |
| 250 | 3,2/2,5 | 30 | 60 TFP | UNI1+UNI2 | 11 1000 250 010 | 905 | | | | | | | | | | | | |
| 250 | 3,2/2,5 | 30 | 80 TFP | UNI1+UNI2 | 11 1000 250 020 | 905 | | | | | | | | | | | | |
| 250 | 3,2/2,5 | 32 | 80 TFP | UNI2 | 11 1000 250 030 | 905 | | | | | | | | | | | | |
| 250 | 2,2/1,8 | 30 | 60 TFPD | UNI1+UNI2 | 11 1050 250 003 | 907 | | | | | | | | | | | | |
| 250 | 2,2/1,8 | 30 | 80 TFPD | UNI1+UNI2 | 11 1050 250 005 | 907 | | | | | | | | | | | | |
| 250 | 2,2/1,8 | 30 | 100 TFPD | UNI1+UNI2 | 11 1050 250 010 | 907 | | | | | | | | | | | | |
| 250 | 2,2/1,8 | 30 | 120 TFPD | UNI2 | 11 1050 250 020 | 907 | | | | | | | | | | | | |
| 250 | 3,2/2,5 | 30 | 60 TFN | UNI1+UNI2 | 11 1100 250 010 | 911 | | | | | | | | | | | | |
| 250 | 3,2/2,5 | 30 | 80 TFN | UNI1+UNI2 | 11 1100 250 020 | 911 | | | | | | | | | | | | |
| 250 | 2,8/2,2 | 30 | 80 TFN | UNI1+UNI2 | 11 1100 250 030 | 911 | | | | | | | | | | | | |
| 250 | 2,8/2,2 | 30 | 100 TFN | UNI1+UNI2 | 11 1100 250 040 | 911 | | | | | | | | | | | | |
| 250 | 3,2/2,5 | 32 | 60 TFN | UNI2 | 11 1100 250 050 | 911 | | | | | | | | | | | | |
| 250 | 3,2/2,5 | 32 | 80 TFN | UNI2 | 11 1100 250 060 | 911 | | | | | | | | | | | | |
| 250 | 3,2/2,5 | 32 | 100 TFN | UNI2 | 11 1100 250 070 | 911 | | | | | | | | | | | | |
| 250 | 2,8/2,2 | 30 | 80 TFND | UNI1+UNI2 | 11 1120 250 010 | 913 | | | | | | | | | | | | |
| 250 | 2,2/1,8 | 30 | 100 TFND | UNI1+UNI2 | 11 1120 250 020 | 913 | | | | | | | | | | | | |
| 250 | 2,2/1,8 | 32/30 | 120 TFND | UNI2 | 11 1120 250 030 | 913 | | | | | | | | | | | | |
| 250 | 2,2/1,8 | 30 | 120 TFF-N | UNI1+UNI2 | 11 1130 250 010 | 915 | | | | | | | | | | | | |
| 250 | 2,2/1,8 | 20 | 120 WZN | - | 11 1150 250 010 | 1039 | ✓ | | | | | | | | | | | |
| 250 | 3,2/2,2 | 30 | 24 WZA | UNI | 11 1200 250 010 | 1018 | ✓ | | | | ✓ | | ✓ | | | | | |
| 250 | 3,2/2,2 | 30 | 24 WZ | UNI | 11 1215 250 010 | 1019 | ✓ | | | | ✓ | | ✓ | | | | | |
| 250 | 3,2/2,2 | 30 | 30 WZ | UNI | 11 1215 250 020 | 1019 | ✓ | | | | ✓ | | ✓ | | | | | |
| 250 | 3,2/2,2 | 30 | 12 FLA | UNI | 11 1220 250 010 | 1020 | ✓ | | | | ✓ | | ✓ | | | | | |
| 250 | 3,6/2,2 | 30 | 12 FLA | UNI | 11 1230 250 010 | 1021 | ✓ | | | | ✓ | | ✓ | | | | | |
| 250 | 3,6/2,2 | 30 | 16 WZA | UNI | 11 1230 250 020 | 1021 | ✓ | | | | ✓ | | ✓ | | | | | |
| 250 | 3,2/2,2 | 30 | 18 FZ+R | UNI | 11 1232 250 010 | 1022 | ✓ | | | | ✓ | | ✓ | | | | | |
| 250 | 3,2/2,2 | Ø=70 / =13x5 / =20x6,5 | 16 FZ+R | - | 11 1238 250 010 | 1024 | | | | | ✓ | | ✓ | | | | | |
| 250 | 3,2/2,2 | Ø=80 / =14x5 / =22x6,5 | 16 FZ+R | - | 11 1238 250 020 | 1024 | | | | | ✓ | | ✓ | | | | | |
| 250 | 3,6/2,5 | Ø=70 / =13x5 / =20x6,5 | 16 FZ+R | - | 11 1239 250 010 | 1025 | | | | | ✓ | | ✓ | | | | | |
| 250 | 3,6/2,5 | Ø=80 / =14x5 / =22x6,5 | 16 FZ+R | - | 11 1239 250 020 | 1025 | | | | | ✓ | | ✓ | | | | | |
| 250 | 3,2/2,2 | 30 | 20 TT | UNI | 11 1250 250 010 | 964 | ✓ | | | | ✓ | | ✓ | | | | | |
| 250 | 3,0/2,0 | 30 | 42 WZ | UNI | 11 1260 250 010 | 965 | ✓ | | | | ✓ | | ✓ | | | | | ✓ |
| 250 | 3,2/2,2 | 30 | 40 WZ | UNI | 11 1300 250 010 | 991 | ✓ | | | | ✓ | | ✓ | | | | | ✓ |
| 250 | 3,2/2,2 | 30 | 48 WZ | UNI | 11 1300 250 020 | 991 | ✓ | | | | ✓ | | ✓ | | | | | ✓ |
| 250 | 3,2/2,2 | 30 | 60 WZ | UNI | 11 1300 250 030 | 991 | ✓ | | | | ✓ | | ✓ | | | | | ✓ |
| 250 | 3,2/2,2 | 30 | 80 WZ | UNI | 11 1300 250 040 | 991 | ✓ | | | | ✓ | | ✓ | | | | | ✓ |
| 250 | 3,0/2,2 | 30 | 80 WFA | UNI | 11 1320 250 010 | 935 | ✓ | | | | ✓ | | ✓ | | | | | ✓ |
| 250 | 2,4/1,8 | 30 | 6 FL | UNI | 11 1350 250 005 | 937 | | | | | ✓ | | ✓ | | | | | ✓ |
| 250 | 2,4/1,8 | 30 | 8 FL | UNI | 11 1350 250 007 | 937 | | | | | ✓ | | ✓ | | | | | ✓ |
| 250 | 2,4/1,8 | 30 | 16 FL | UNI | 11 1350 250 010 | 937 | | | | | ✓ | | ✓ | | | | | ✓ |
| 250 | 2,4/1,8 | 30 | 28 FL | UNI | 11 1350 250 015 | 937 | | | | | ✓ | | ✓ | | | | | ✓ |
| 250 | 2,4/1,8 | 30 | 40 FL | UNI | 11 1350 250 020 | 937 | | | | | ✓ | | ✓ | | | | | ✓ |
| 250 | 2,4/1,8 | 30 | 48 FL | UNI | 11 1350 250 030 | 937 | | | | | ✓ | | ✓ | | | | | ✓ |
| 250 | 3,2/2,2 | 30 | 80 TFF-P | UNI | 11 1370 250 020 | 938 | | | | | ✓ | | ✓ | | | | | ✓ |
| 250 | 2,2/1,6 | 30 | 30 WZ | UNI | 11 1425 250 010 | 941 | ✓ | | | | ✓ | | ✓ | | | | | ✓ |



Finder nach Blatt-Ø aufsteigend + Anwendung

Finder by blade-Ø + application

OPTIMAL
 GUT
 MÖGLICH











= BESTSELLER

| | | | | | | ART. | | | | | | | | | | | | |
|--|-----|---------|------|------------|-----------|-----------------|------|---|---|---|---|---|---|---|---|--|--|--|
| | 250 | 2,2/1,6 | 30 | 56 WZ | UNI | 11 1425 250 020 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 250 | 2,2/1,6 | 30 | 80 WZ | UNI | 11 1425 250 030 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 250 | 2,2/1,6 | 30 | 100 WZ | UNI | 11 1425 250 040 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 250 | 2,4/1,8 | 30 | 80 TFF-P | UNI | 11 1430 250 010 | 943 | | | | ✓ | | | | | | | |
| | 250 | 2,2/1,8 | 30 | 120 TFF-P | UNI | 11 1430 250 020 | 943 | | | | ✓ | | | | | | | |
| | 250 | 3,2/2,2 | 30 | 24 WZN | UNI | 11 1450 250 010 | 945 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 250 | 3,2/2,2 | 30 | 40 WZN | UNI | 11 1450 250 020 | 945 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 250 | 3,2/2,2 | 30 | 60 WZN | UNI | 11 1450 250 030 | 945 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 250 | 3,2/2,2 | 30 | 80 WZN | UNI | 11 1450 250 040 | 945 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 250 | 3,2/2,2 | 30 | 60 TFF-P | UNI | 11 1460 250 010 | 947 | | | | | | | | | | | |
| | 250 | 3,2/2,2 | 30 | 80 TFF-P | UNI | 11 1460 250 020 | 947 | | | | | | | | | | | |
| | 250 | 3,2/2,2 | 30 | 60 TFP | UNI | 11 1470 250 010 | 949 | | | | | | | | | | | |
| | 250 | 3,2/2,2 | 30 | 80 TFP | UNI | 11 1470 250 020 | 949 | | | | | | | | | | | |
| | 250 | 3,2/2,2 | 30 | 48 HDF-P | UNI | 11 1600 250 010 | 1005 | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 250 | 3,2/2,2 | 30 | 48 HDF-N | UNI | 11 1602 250 010 | 1007 | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 250 | 2,9/2,0 | 30 | 60 HTT-P | UNI | 11 1604 250 010 | 1009 | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 250 | 3,2/2,2 | 30 | 80 WZE-P | UNI | 11 1610 250 010 | 1011 | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 250 | 3,2/2,2 | 30 | 80 WZE-N | UNI | 11 1615 250 010 | 1013 | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 255 | 2,2/1,8 | 25,4 | 60 / 3-Cut | - | 10 7300 255 010 | 896 | | | | | | | | | | | |
| | 255 | 2,2/1,8 | 25,4 | 72 TFF | - | 10 7400 255 010 | 897 | | | | | | | | | | | |
| | 255 | 3,2/2,2 | 30 | 24 WZ | UNI | 11 1215 255 010 | 1019 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 255 | 3,0/2,0 | 30 | 36 WZ | UNI | 11 1400 255 010 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 255 | 3,0/2,0 | 30 | 48 WZ | UNI | 11 1400 255 020 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 255 | 3,0/2,0 | 30 | 64 WZ | UNI | 11 1400 255 030 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 255 | 3,0/2,0 | 30 | 80 WZ | UNI | 11 1400 255 040 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 260 | 2,2/1,8 | 30 | 60 WWF | UNI1+UNI2 | 10 7100 260 010 | 892 | | | | | | | | | | | |
| | 260 | 2,2/1,8 | 30 | 72 / 3-Cut | UNI1+UNI2 | 10 7300 260 010 | 896 | | | | | | | | | | | |
| | 260 | 2,2/1,8 | 30 | 72 TFF | UNI1+UNI2 | 10 7400 260 010 | 897 | | | | | | | | | | | |
| | 260 | 3,2/2,5 | 30 | 80 TFN | UNI1+UNI2 | 10 8000 260 010 | 902 | ✓ | | ✓ | | | | | | | | |
| | 260 | 2,4/1,8 | 30 | 28 WZ | UNI1+UNI2 | 10 8055 260 010 | 899 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 260 | 2,4/1,8 | 30 | 44 WZ | UNI1+UNI2 | 10 8055 260 020 | 899 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 260 | 2,4/1,8 | 30 | 60 WWF | UNI1+UNI2 | 10 8055 260 030 | 899 | ✓ | | ✓ | | | | | | | | |
| | 260 | 2,4/1,8 | 30 | 68 TFND | UNI1+UNI2 | 11 1120 260 010 | 913 | | | | | | | | | | | |
| | 260 | 2,4/1,8 | 30 | 100 TFND | UNI1+UNI2 | 11 1120 260 020 | 913 | | | | | | | | | | | |
| | 260 | 2,2/1,8 | 30 | 120 TFF-N | UNI1+UNI2 | 11 1130 260 010 | 915 | | | | | | | | | | | |
| | 260 | 3,0/2,0 | 30 | 42 WZ | UNI | 11 1260 260 010 | 965 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 260 | 3,2/2,2 | 30 | 24 WZ | UNI | 11 1400 260 010 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 260 | 3,2/2,2 | 30 | 48 WZ | UNI | 11 1400 260 020 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 260 | 3,2/2,2 | 30 | 64 WZ | UNI | 11 1400 260 030 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 260 | 2,2/1,6 | 30 | 30 WZ | UNI | 11 1425 260 010 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 260 | 2,2/1,6 | 30 | 56 WZ | UNI | 11 1425 260 020 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 260 | 2,2/1,6 | 30 | 80 WZ | UNI | 11 1425 260 030 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 260 | 2,5/1,8 | 30 | 48 WZN | UNI | 11 1450 260 010 | 945 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 260 | 2,5/1,8 | 30 | 60 WZN | UNI | 11 1450 260 020 | 945 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 260 | 2,5/1,8 | 30 | 80 WZN | UNI | 11 1450 260 030 | 945 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 270 | 2,2/1,8 | 30 | 60 WWF | UNI1+UNI2 | 10 7100 270 010 | 892 | | | | | | | | | | | |
| | 270 | 2,2/1,8 | 30 | 68 TF | UNI1+UNI2 | 10 7300 270 005 | 896 | | | | | | | | | | | |
| | 270 | 2,2/1,8 | 30 | 72 / 3-Cut | UNI1+UNI2 | 10 7300 270 010 | 896 | | | | | | | | | | | |
| | 270 | 2,2/1,8 | 30 | 72 TFF | UNI1+UNI2 | 10 7400 270 010 | 897 | | | | | | | | | | | |
| | 270 | 3,2/2,5 | 30 | 88 TFN | UNI1+UNI2 | 10 8000 270 010 | 902 | ✓ | | ✓ | | | | | | | | |
| | 270 | 2,4/1,8 | 30 | 30 WZ | UNI1+UNI2 | 10 8055 270 010 | 899 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 270 | 2,4/1,8 | 30 | 46 WZ | UNI1+UNI2 | 10 8055 270 020 | 899 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| | 270 | 2,4/1,8 | 30 | 60 WWF | UNI1+UNI2 | 10 8055 270 030 | 899 | ✓ | | ✓ | | | | | | | | |
| | 270 | 2,4/1,8 | 30 | 80 TFND | UNI1+UNI2 | 11 1120 270 010 | 913 | | | | | | | | | | | |
| | 270 | 2,4/1,8 | 30 | 100 TFND | UNI1+UNI2 | 11 1120 270 020 | 913 | | | | | | | | | | | |

KUNSTSTOFFE • PLASTIC

METALL • METAL

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ABRASIVE

| | |  |  |  |  |  |  |  |  |  |  |
|----------|----------------|---|---|---|---|---|---|---|---|--|---|
| Furniere | Profileleisten | | | | | | | | | | |
| Veneers | Profiled wood | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | HPL High-Pressure-Laminate solid boards/ façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | Plastics, plexiglass, acrylics, duro- and thermoplastics | Thin iron sheets, sandwich material, composites | Non ferrous metals like alu, copper, brass | Mild steel | Stainless steel | Thin iron sheets, sandwich material, composites | Gypsum boards, cement boards, fibre boards, Rockwool, Eternit, GRP, CFK, HPL, mineral material, graphite | Autoclaved aerated concrete blocks |
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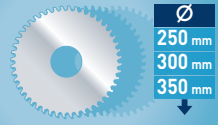
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Index



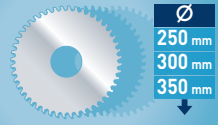
Finder nach Blatt-Ø aufsteigend + Anwendung

Finder by blade-Ø + application

OPTIMAL
 GUT
 MÖGLICH

= BESTSELLER

| | | | | | | ART. | | | | | | | | | | | |
|-----|----------|----|------------|-------------------|-----------------|------|---|---|---|---|---|---|---|---|---|---|---|
| 270 | 3,0/2,0 | 30 | 42 WZ | UNI | 11 1260 270 010 | 965 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 270 | 3,2/2,2 | 30 | 24 WZ | UNI | 11 1400 270 010 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 270 | 3,2/2,2 | 30 | 48 WZ | UNI | 11 1400 270 020 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 270 | 3,2/2,2 | 30 | 80 WZ | UNI | 11 1400 270 030 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 270 | 2,2/1,6 | 30 | 30 WZ | UNI | 11 1425 270 010 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 270 | 2,2/1,6 | 30 | 56 WZ | UNI | 11 1425 270 020 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 270 | 2,2/1,6 | 30 | 80 WZ | UNI | 11 1425 270 030 | 941 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 275 | 3,2/2,5 | 40 | 72 TFP | 2-9-55+4-12-64 | 11 1000 275 010 | 905 | | | | | | | | | | | |
| 275 | 3,2/2,5 | 40 | 88 TFN | 2-9-55+4-12-64 | 11 1100 275 010 | 911 | | | | | | | | | | | |
| 275 | 3,2/2,5 | 40 | 110 TFN | 2-9-55+4-12-64 | 11 1100 275 020 | 911 | | | | | | | | | | | |
| 280 | 2,2/1,8 | 30 | 60 WWF | UNI1+UNI2 | 10 7100 280 010 | 892 | | | | | | | | | | | |
| 280 | 3,2/2,5 | 30 | 88 TFN | UNI1+UNI2 | 10 8000 280 010 | 902 | ✓ | | ✓ | | | | | | | | |
| 280 | 2,4/1,8 | 30 | 32 WZ | UNI1+UNI2 | 10 8055 280 010 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 280 | 2,4/1,8 | 30 | 48 WZ | UNI1+UNI2 | 10 8055 280 020 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 280 | 2,4/1,8 | 30 | 60 WWF | UNI1+UNI2 | 10 8055 280 030 | 899 | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 280 | 3,2/2,5 | 30 | 68 TFP | UNI1+UNI2 | 11 1000 280 010 | 905 | | | | | | | | | | | |
| 280 | 3,2/2,5 | 30 | 96 TFP | UNI1+UNI2 | 11 1000 280 020 | 905 | | | | | | | | | | | |
| 280 | 3,2/2,5 | 30 | 88 TFN | UNI1+UNI2 | 11 1100 280 010 | 911 | | | | | | | | | | | |
| 280 | 3,2/2,2 | 30 | 28 WZA | UNI | 11 1200 280 010 | 1018 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 280 | 3,2/2,2 | 30 | 48 WZ | UNI | 11 1400 280 010 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 280 | 3,2/2,2 | 30 | 64 WZ | UNI | 11 1400 280 020 | 1036 | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 285 | 2,0/1,75 | 32 | 54 | 4-9-50 / 4-11-63 | 10 7000 285 010 | 886 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 32 | 60 | 4-9-50 / 4-11-63 | 10 7000 285 020 | 886 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 32 | 72 | 4-9-50 / 4-11-63 | 10 7000 285 030 | 886 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 32 | 80 | 4-9-50 / 4-11-63 | 10 7000 285 040 | 886 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 40 | 54 | 4-12-64 / 4-11-80 | 10 7000 285 050 | 886 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 40 | 60 | 4-12-64 / 4-11-80 | 10 7000 285 060 | 886 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 40 | 72 | 4-12-64 / 4-11-80 | 10 7000 285 070 | 886 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 40 | 80 | 4-12-64 / 4-11-80 | 10 7000 285 080 | 886 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 32 | 54 | 4-9-50 / 4-11-63 | 10 7001 285 010 | 887 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 32 | 60 | 4-9-50 / 4-11-63 | 10 7001 285 020 | 887 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 32 | 72 | 4-9-50 / 4-11-63 | 10 7001 285 030 | 887 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 32 | 80 | 4-9-50 / 4-11-63 | 10 7001 285 040 | 887 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 40 | 54 | 4-12-64 / 4-11-80 | 10 7001 285 050 | 887 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 40 | 60 | 4-12-64 / 4-11-80 | 10 7001 285 060 | 887 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 40 | 72 | 4-12-64 / 4-11-80 | 10 7001 285 070 | 887 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 40 | 80 | 4-12-64 / 4-11-80 | 10 7001 285 080 | 887 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 32 | 54 | 4-9-50 / 4-11-63 | 10 7002 285 010 | 888 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 32 | 60 | 4-9-50 / 4-11-63 | 10 7002 285 020 | 888 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 32 | 72 | 4-9-50 / 4-11-63 | 10 7002 285 030 | 888 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 32 | 80 | 4-9-50 / 4-11-63 | 10 7002 285 040 | 888 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 40 | 54 | 4-12-64 / 4-11-80 | 10 7002 285 050 | 888 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 40 | 60 | 4-12-64 / 4-11-80 | 10 7002 285 060 | 888 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 40 | 72 | 4-12-64 / 4-11-80 | 10 7002 285 070 | 888 | | | | | | | | | | | |
| 285 | 2,0/1,75 | 40 | 80 | 4-12-64 / 4-11-80 | 10 7002 285 080 | 888 | | | | | | | | | | | |
| 300 | 2,2/1,8 | 30 | 60 WWF | UNI1+UNI2 | 10 7100 300 010 | 892 | | | | | | | | | | | |
| 300 | 2,2/1,8 | 30 | 80 WWF | UNI1+UNI2 | 10 7100 300 020 | 892 | | | | | | | | | | | |
| 300 | 2,2/1,8 | 30 | 72 / 3-Cut | UNI1+UNI2 | 10 7300 300 010 | 896 | | | | | | | | | | | |
| 300 | 2,2/1,8 | 30 | 84 TFF | UNI1+UNI2 | 10 7400 300 010 | 897 | | | | | | | | | | | |
| 300 | 3,2/2,5 | 30 | 72 TFN | UNI1+UNI2 | 10 8000 300 010 | 902 | ✓ | | ✓ | | | | | | | | |
| 300 | 3,2/2,5 | 30 | 96 TFN | UNI1+UNI2 | 10 8000 300 020 | 902 | ✓ | | ✓ | | | | | | | | |
| 300 | 2,8/2,2 | 30 | 120 TFN | UNI1+UNI2 | 10 8000 300 030 | 902 | ✓ | | ✓ | | | | | | | | |
| 300 | 2,4/1,8 | 30 | 32 WZ | UNI1+UNI2 | 10 8055 300 010 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 300 | 2,4/1,8 | 30 | 48 WZ | UNI1+UNI2 | 10 8055 300 020 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 300 | 2,4/1,8 | 30 | 60 WWF | UNI1+UNI2 | 10 8055 300 030 | 899 | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |



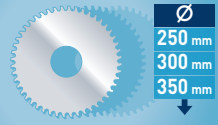
Finder nach Blatt-Ø aufsteigend + Anwendung

Finder by blade-Ø + application

✓ OPTIMAL
✓ GUT
✓ MÖGLICH

█ = BESTSELLER

| | | | | | | ART. | | | | | | | | | | | | | | | |
|--|-----|----------|---------|------------|-----------|-----------------|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 300 | 3,2/2,2 | 30 | 96 TFF-P | UNI | 11 1460 300 020 | 947 | | | | | | | | | | | | | | |
| | 300 | 3,2/2,2 | 30 | 72 TFP | UNI | 11 1470 300 010 | 949 | | | | | | | | | | | | | | |
| | 300 | 3,2/2,2 | 30 | 96 TFP | UNI | 11 1470 300 020 | 949 | | | | | | | | | | | | | | |
| | 300 | 4,4/3,0 | 30 | 60 TFP | 2-10-60 | 11 1510 300 010 | 983 | | | | | | | | | | | | | | |
| | 300 | 3,2/2,2 | 30 | 96 WZE-P | UNI | 11 1610 300 010 | 1011 | ✓ | | | | | | | | | | | | | |
| | 300 | 3,2/2,2 | 30 | 96 WZE-N | UNI | 11 1615 300 010 | 1013 | ✓ | | | | | | | | | | | | | |
| | 303 | 3,0/2,2 | 30 | 100 WFA | UNI | 11 1320 303 010 | 935 | ✓ | | | | | | | | | | | | | |
| | 303 | 3,2/2,2 | 30 | 96 TFF-P | UNI | 11 1370 303 030 | 938 | | | | | | | | | | | | | | |
| | 303 | 3,2/2,2 | 30 | 60 TFF-P | UNI | 11 1460 303 010 | 947 | | | | | | | | | | | | | | |
| | 303 | 3,2/2,2 | 30 | 72 TFF-P | UNI | 11 1460 303 020 | 947 | | | | | | | | | | | | | | |
| | 303 | 3,2/2,2 | 30 | 96 TFF-P | UNI | 11 1460 303 030 | 947 | | | | | | | | | | | | | | |
| | 303 | 3,2/2,2 | 30 | 60 TFP | UNI | 11 1470 303 010 | 949 | | | | | | | | | | | | | | |
| | 303 | 3,2/2,2 | 30 | 72 TFP | UNI | 11 1470 303 020 | 949 | | | | | | | | | | | | | | |
| | 303 | 3,2/2,2 | 30 | 96 TFP | UNI | 11 1470 303 030 | 949 | | | | | | | | | | | | | | |
| | 303 | 3,2/2,2 | 30 | 40 HDF-P | UNI | 11 1600 303 010 | 1005 | ✓ | | | | | | | | | | | | | |
| | 303 | 3,2/2,2 | 30 | 60 HDF-P | UNI | 11 1600 303 020 | 1005 | ✓ | | | | | | | | | | | | | |
| | 303 | 3,2/2,2 | 30 | 72 HDF-P | UNI | 11 1600 303 030 | 1005 | ✓ | | | | | | | | | | | | | |
| | 303 | 3,2/2,2 | 30 | 60 HDF-N | UNI | 11 1602 303 010 | 1007 | ✓ | | | | | | | | | | | | | |
| | 303 | 3,2/2,2 | 30 | 72 HDF-N | UNI | 11 1602 303 020 | 1007 | ✓ | | | | | | | | | | | | | |
| | 303 | 2,9/2,0 | 30 | 72 HTT-P | UNI | 11 1604 303 010 | 1009 | ✓ | | | | | | | | | | | | | |
| | 303 | 3,2/2,2 | 30 | 96 WZE-P | UNI | 11 1610 303 010 | 1011 | ✓ | | | | | | | | | | | | | |
| | 303 | 3,2/2,2 | 30 | 96 WZE-N | UNI | 11 1615 303 010 | 1013 | ✓ | | | | | | | | | | | | | |
| | 305 | 2,2/1,8 | 25,4 | 60 WWF | - | 10 7100 305 010 | 892 | | | | | | | | | | | | | | |
| | 305 | 2,2/1,8 | 25,4 | 80 WWF | - | 10 7100 305 020 | 892 | | | | | | | | | | | | | | |
| | 305 | 2,2/1,8 | 25,4 | 60 TFPS | - | 10 7130 305 010 | 893 | | | | | | | | | | | | | | |
| | 305 | 2,2/1,8 | 25,4 | 80 TFPS | - | 10 7130 305 020 | 893 | | | | | | | | | | | | | | |
| | 305 | 2,2/1,8 | 25,4 | 60 WWF | - | 10 7150 305 010 | 894 | | | | | | | | | | | | | | |
| | 305 | 2,2/1,8 | 25,4 | 80 WWF | - | 10 7150 305 020 | 894 | | | | | | | | | | | | | | |
| | 305 | 2,2/1,8 | 25,4 | 72 / 3-Cut | - | 10 7300 305 010 | 896 | | | | | | | | | | | | | | |
| | 305 | 2,2/1,8 | 25,4 | 84 TFF | - | 10 7400 305 010 | 897 | | | | | | | | | | | | | | |
| | 305 | 2,4/1,8 | 30/25,4 | 32 WZ | UNI1+UNI2 | 10 8055 305 010 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 305 | 2,4/1,8 | 30/25,4 | 48 WZ | UNI1+UNI2 | 10 8055 305 020 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 305 | 2,4/1,8 | 30/25,4 | 60 WWF | UNI1+UNI2 | 10 8055 305 030 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 305 | 3,2/2,5 | 30 | 96 TFN | UNI1+UNI2 | 11 1100 305 010 | 911 | | | | | | | | | | | | | | |
| | 305 | 2,6/2,0 | 30 | 80 TFND | UNI1+UNI2 | 11 1120 305 010 | 913 | | | | | | | | | | | | | | |
| | 305 | 2,4/1,8 | 30 | 120 TFND | UNI1+UNI2 | 11 1120 305 020 | 913 | | | | | | | | | | | | | | |
| | 305 | 2,4/1,8 | 30 | 128 TFF-N | UNI1+UNI2 | 11 1130 305 010 | 915 | | | | | | | | | | | | | | |
| | 305 | 3,2/2,2 | 30 | 48 WZ | UNI | 11 1300 305 010 | 991 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 305 | 3,2/2,2 | 30 | 60 WZ | UNI | 11 1300 305 020 | 991 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 305 | 3,2/2,2 | 30 | 72 WZ | UNI | 11 1300 305 030 | 991 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 305 | 2,6/1,8 | 30 | 32 WZN | UNI | 11 1450 305 010 | 945 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 305 | 2,6/1,8 | 30 | 48 WZN | UNI | 11 1450 305 020 | 945 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 305 | 2,6/1,8 | 30 | 60 WZN | UNI | 11 1450 305 030 | 945 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 305 | 2,6/1,8 | 30 | 72 WZN | UNI | 11 1450 305 040 | 945 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 305 | 2,6/1,8 | 30 | 96 WZN | UNI | 11 1450 305 050 | 945 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 305 | 2,6/1,8 | 30 | 100 WZN | UNI | 11 1450 305 060 | 945 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | 315 | 2,25/2,0 | 32 | 60 | 4-9-50 | 10 7000 315 010 | 886 | | | | | | | | | | | | | | |
| | 315 | 2,25/2,0 | 32 | 72 | 4-9-50 | 10 7000 315 020 | 886 | | | | | | | | | | | | | | |
| | 315 | 2,25/2,0 | 32 | 80 | 4-9-50 | 10 7000 315 030 | 886 | | | | | | | | | | | | | | |
| | 315 | 2,25/2,0 | 40 | 80 | 2-15-80 | 10 7000 315 040 | 886 | | | | | | | | | | | | | | |
| | 315 | 2,25/2,0 | 32 | 60 | 4-9-50 | 10 7001 315 010 | 887 | | | | | | | | | | | | | | |
| | 315 | 2,25/2,0 | 32 | 72 | 4-9-50 | 10 7001 315 020 | 887 | | | | | | | | | | | | | | |
| | 315 | 2,25/2,0 | 32 | 80 | 4-9-50 | 10 7001 315 030 | 887 | | | | | | | | | | | | | | |
| | 315 | 2,25/2,0 | 40 | 80 | 2-15-80 | 10 7001 315 040 | 887 | | | | | | | | | | | | | | |
| | 315 | 2,25/2,0 | 32 | 60 | 4-9-50 | 10 7002 315 010 | 888 | | | | | | | | | | | | | | |



Finder nach Blatt-Ø aufsteigend + Anwendung

Finder by blade-Ø + application

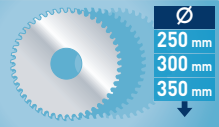
✓ OPTIMAL
✓ GUT
✓ MÖGLICH



| | | | | | |
|--|---|---|--|--|---|
| Weichholz, Hartholz, Exotenholz (quer) | Weichholz, Hartholz, Exotenholz (längs) | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Spanplatten, Hartfaserplatten kunststoffbeschichtet/ furniert, MDF, HDF |
| Soft wood, hard wood, and exotic wood across the grain | Soft wood, hard wood, and exotic wood along the grain | Wood with inclusions like nails, clips, concrete residues | Bonded wood, blockboard and veneer plywood, laminated wood | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Chipboard, hard fibre board, plastic-coated/ veneered, MDF, HDF |

■ = BESTSELLER

| | | | | | | ART. | | | | | | | | | | | | |
|---|-----|----------|--------------------------|------------|-----------|-----------------|------|---|--|---|---|---|---|---|--|--|--|---|
| | 315 | 2,25/2,0 | 32 | 72 | 4-9-50 | 10 7002 315 020 | 888 | | | | | | | | | | | |
| | 315 | 2,25/2,0 | 32 | 80 | 4-9-50 | 10 7002 315 030 | 888 | | | | | | | | | | | |
| | 315 | 2,25/2,0 | 40 | 80 | 2-15-80 | 10 7002 315 040 | 888 | | | | | | | | | | | |
| | 315 | 4,0/3,5 | Auf Anfrage / On request | | | 10 7050 | 889 | | | | | | | | | | | |
| ■ | 315 | 3,2/2,2 | 30 | 28 WZA | UNI | 11 1200 315 010 | 1018 | ✓ | | | | ✓ | | | | | | |
| | 315 | 3,2/2,2 | 30 | 24 WZ | UNI | 11 1215 315 010 | 1019 | ✓ | | | | ✓ | | | | | | |
| | 315 | 3,2/2,2 | 30 | 36 WZ | UNI | 11 1215 315 020 | 1019 | ✓ | | | | ✓ | | | | | | |
| | 315 | 3,2/2,2 | Ø=70 / =13x5 / =20x6,5 | 18 FZ+R | - | 11 1238 315 010 | 1024 | | | | | ✓ | | | | | | |
| | 315 | 3,2/2,2 | Ø=80 / =14x5 / =22x6,5 | 18 FZ+R | - | 11 1238 315 020 | 1024 | | | | | ✓ | | | | | | |
| ■ | 315 | 3,2/2,2 | 30 | 24 FWF | UNI | 11 1250 315 010 | 964 | ✓ | | | ✓ | | | ✓ | | | | |
| | 315 | 3,2/2,2 | 30 | 48 WZ | UNI | 11 1260 315 010 | 965 | ✓ | | | ✓ | | | ✓ | | | | ✓ |
| | 315 | 3,2/2,2 | 30 | 48 WZ | UNI | 11 1300 315 010 | 991 | ✓ | | | ✓ | | | ✓ | | | | ✓ |
| | 315 | 3,2/2,2 | 30 | 60 WZ | UNI | 11 1300 315 020 | 991 | ✓ | | | ✓ | | | ✓ | | | | ✓ |
| | 315 | 3,2/2,2 | 30 | 72 WZ | UNI | 11 1300 315 030 | 991 | ✓ | | | ✓ | | | ✓ | | | | ✓ |
| | 315 | 3,2/2,2 | 30 | 96 WZ | UNI | 11 1300 315 040 | 991 | ✓ | | | ✓ | | | ✓ | | | | ✓ |
| | 320 | 2,2/1,8 | 30/25,4 | 84 WWF | UNI1+UNI2 | 10 7100 320 010 | 892 | | | | | | | | | | | |
| | 320 | 2,2/1,8 | 30/25,4 | 84 / 3-Cut | UNI1+UNI2 | 10 7300 320 010 | 896 | | | | | | | | | | | |
| ■ | 320 | 2,2/1,8 | 30/25,4 | 96 TFF | UNI1+UNI2 | 10 7400 320 010 | 897 | | | | | | | | | | | |
| | 320 | 2,4/1,8 | 30/25,4 | 32 WZ | UNI1+UNI2 | 10 8055 320 010 | 899 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ |
| | 320 | 2,4/1,8 | 30/25,4 | 48 WZ | UNI1+UNI2 | 10 8055 320 020 | 899 | ✓ | | | ✓ | | | ✓ | | | | ✓ |
| | 320 | 2,4/1,8 | 30/25,4 | 60 WWF | UNI1+UNI2 | 10 8055 320 030 | 899 | ✓ | | | ✓ | | | ✓ | | | | ✓ |
| | 320 | 3,2/2,5 | 30 | 84 TFP | UNI1+UNI2 | 11 1000 320 010 | 905 | | | | | | | | | | | |
| | 320 | 4,4/3,2 | 65 | 60 TFP | 2-9-110 | 11 1510 320 010 | 983 | | | | | | | ✓ | | | | ✓ |
| | 330 | 2,2/1,8 | 32/30 | 84 WWF | UNI2 | 10 7100 330 010 | 892 | | | | | | | | | | | |
| | 330 | 2,2/1,8 | 32/30 | 84 / 3-Cut | UNI2 | 10 7300 330 010 | 896 | | | | | | | | | | | |
| ■ | 330 | 2,2/1,8 | 32/30 | 96 TFF | UNI2 | 10 7400 330 010 | 897 | | | | | | | | | | | |
| | 330 | 2,6/2,0 | 32/30 | 36 WZ | UNI2 | 10 8055 330 010 | 899 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ |
| | 330 | 2,6/2,0 | 32/30 | 54 WZ | UNI2 | 10 8055 330 020 | 899 | ✓ | | | ✓ | | | ✓ | | | | ✓ |
| | 330 | 2,6/2,0 | 32/30 | 72 WWF | UNI2 | 10 8055 330 030 | 899 | ✓ | | | ✓ | | | ✓ | | | | ✓ |
| | 330 | 3,2/2,5 | 32/30 | 72 TFP | UNI2 | 11 1000 330 010 | 905 | | | | | | | | | | | |
| | 330 | 3,2/2,5 | 32/30 | 96 TFP | UNI2 | 11 1000 330 020 | 905 | | | | | | | | | | | |
| ■ | 330 | 3,2/2,5 | 30 | 72 TFN | UNI1+UNI2 | 11 1100 330 010 | 911 | | | | | | | | | | | |
| | 330 | 3,2/2,5 | 30 | 96 TFN | UNI1+UNI2 | 11 1100 330 020 | 911 | | | | | | | | | | | |
| | 330 | 2,8/2,2 | 30 | 120 TFN | UNI1+UNI2 | 11 1100 330 030 | 911 | | | | | | | | | | | |
| | 330 | 3,2/2,5 | 32 | 72 TFN | UNI2 | 11 1100 330 040 | 911 | | | | | | | | | | | |
| ■ | 330 | 3,2/2,5 | 32 | 96 TFN | UNI2 | 11 1100 330 050 | 911 | | | | | | | | | | | |
| | 330 | 2,8/2,2 | 32 | 120 TFN | UNI2 | 11 1100 330 060 | 911 | | | | | | | | | | | |
| | 330 | 2,4/1,8 | 30 | 96 TFND | UNI1+UNI2 | 11 1120 330 010 | 913 | | | | | | | | | | | |
| | 330 | 2,4/1,8 | 30 | 120 TFND | UNI1+UNI2 | 11 1120 330 020 | 913 | | | | | | | | | | | |
| | 330 | 2,4/1,8 | 32 | 96 TFND | UNI2 | 11 1120 330 030 | 913 | | | | | | | | | | | |
| | 330 | 2,4/1,8 | 32 | 120 TFND | UNI2 | 11 1120 330 040 | 913 | | | | | | | | | | | |
| | 330 | 2,4/1,8 | 30 | 132 TFF-N | UNI1+UNI2 | 11 1130 330 010 | 915 | | | | | | | | | | | |
| ■ | 330 | 3,2/2,2 | 30 | 24 WZ | UNI | 11 1400 330 010 | 1036 | ✓ | | | | | ✓ | | | | | ✓ |
| | 330 | 3,2/2,2 | 30 | 40 WZ | UNI | 11 1400 330 020 | 1036 | ✓ | | | | | ✓ | | | | | ✓ |
| | 330 | 3,2/2,2 | 30 | 60 WZ | UNI | 11 1400 330 030 | 1036 | ✓ | | | | | ✓ | | | | | ✓ |
| | 335 | 3,2/2,2 | 30 | 36 WZ | UNI | 11 1400 335 010 | 1036 | ✓ | | | | | ✓ | | | | | ✓ |
| | 335 | 3,2/2,2 | 30 | 60 WZ | UNI | 11 1400 335 020 | 1036 | ✓ | | | | | ✓ | | | | | ✓ |
| | 350 | 4,0/3,5 | Auf Anfrage / On request | | | 10 7050 | 889 | | | | | | | | | | | |
| | 350 | 2,2/1,8 | 30 | 80 WWF | UNI1+UNI2 | 10 7100 350 010 | 892 | | | | | | | | | | | |
| | 350 | 2,2/1,8 | 30 | 84 / 3-Cut | UNI1+UNI2 | 10 7300 350 010 | 896 | | | | | | | | | | | |
| ■ | 350 | 2,2/1,8 | 30 | 100 TFF | UNI1+UNI2 | 10 7400 350 010 | 897 | | | | | | | | | | | |
| | 350 | 2,6/2,0 | 30 | 36 WZ | UNI1+UNI2 | 10 8055 350 010 | 899 | ✓ | | ✓ | | ✓ | | ✓ | | | | ✓ |
| | 350 | 2,6/2,0 | 30 | 54 WZ | UNI1+UNI2 | 10 8055 350 020 | 899 | ✓ | | | ✓ | | | ✓ | | | | ✓ |
| | 350 | 2,6/2,0 | 30 | 72 WWF | UNI1+UNI2 | 10 8055 350 030 | 899 | ✓ | | | ✓ | | | ✓ | | | | ✓ |
| | 350 | 3,5/2,5 | 30 | 72 TTP | UNI | 10 9050 350 010 | 923 | | | | | | | | | | | |



Finder nach Blatt-Ø aufsteigend + Anwendung

Finder by blade-Ø + application

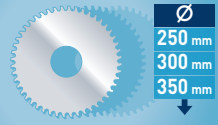
✓ OPTIMAL
✓ GUT
✓ MÖGLICH

■ = BESTSELLER

| | | | | | ART. | | | | | | | | |
|-----|---------|------------------------|-----------|----------------|-----------------|------|---|---|---|---|---|--|---|
| 350 | 3,5/2,5 | 30 | 108 WZF | UNI | 10 9050 350 020 | 923 | | | | | | | |
| 350 | 3,4/2,8 | 30 | 72 TFP | UNI1+UNI2 | 11 1000 350 020 | 905 | | | | | | | |
| 350 | 3,4/2,8 | 30 | 92 TFP | UNI1+UNI2 | 11 1000 350 030 | 905 | | | | | | | |
| 350 | 3,4/2,8 | 30 | 108 TFP | UNI1+UNI2 | 11 1000 350 040 | 905 | | | | | | | |
| 350 | 3,4/2,8 | 32 | 92 TFP | UNI2 | 11 1000 350 050 | 905 | | | | | | | |
| 350 | 3,4/2,8 | 32 | 108 TFP | UNI2 | 11 1000 350 060 | 905 | | | | | | | |
| 350 | 3,4/2,8 | 40 | 92 TFP | 2-9-55+4-12-64 | 11 1000 350 070 | 905 | | | | | | | |
| 350 | 3,4/2,8 | 40 | 108 TFP | 2-9-55+4-12-64 | 11 1000 350 080 | 905 | | | | | | | |
| 350 | 2,4/1,8 | 30 | 72 TFPD | UNI1+UNI2 | 11 1050 350 003 | 907 | | | | | | | |
| 350 | 2,4/1,8 | 30 | 108 TFPD | UNI1+UNI2 | 11 1050 350 005 | 907 | | | | | | | |
| 350 | 2,4/1,8 | 30 | 120 TFPD | UNI1+UNI2 | 11 1050 350 010 | 907 | | | | | | | |
| 350 | 3,4/2,8 | 30 | 90 TFN | UNI1+UNI2 | 11 1100 350 010 | 911 | | | | | | | |
| 350 | 3,4/2,8 | 30 | 108 TFN | UNI1+UNI2 | 11 1100 350 020 | 911 | | | | | | | |
| 350 | 3,2/2,5 | 30 | 140 TFN | UNI1+UNI2 | 11 1100 350 030 | 911 | | | | | | | |
| 350 | 3,4/2,8 | 32 | 90 TFN | UNI2 | 11 1100 350 040 | 911 | | | | | | | |
| 350 | 3,4/2,8 | 32 | 108 TFN | UNI2 | 11 1100 350 050 | 911 | | | | | | | |
| 350 | 3,4/2,8 | 40 | 84 TFN | 2-9-55+4-12-64 | 11 1100 350 060 | 911 | | | | | | | |
| 350 | 3,4/2,8 | 40 | 108 TFN | 2-9-55+4-12-64 | 11 1100 350 070 | 911 | | | | | | | |
| 350 | 3,4/2,8 | 50 | 84 TFN | 4-15-80 | 11 1100 350 080 | 911 | | | | | | | |
| 350 | 3,4/2,8 | 50 | 108 TFN | 4-15-80 | 11 1100 350 090 | 911 | | | | | | | |
| 350 | 2,4/1,8 | 30 | 120 TFND | UNI1+UNI2 | 11 1120 350 010 | 913 | | | | | | | |
| 350 | 2,4/1,8 | 30 | 132 TFF-N | UNI1+UNI2 | 11 1130 350 010 | 915 | | | | | | | |
| 350 | 2,4/1,8 | 32 | 132 TFF-N | UNI2 | 11 1130 350 020 | 915 | | | | | | | |
| 350 | 3,5/2,5 | 30 | 24 WZA | UNI | 11 1200 350 010 | 1018 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 3,5/2,5 | 30 | 32 WZA | UNI | 11 1200 350 020 | 1018 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 3,5/2,5 | 30 | 24 WZ | UNI | 11 1215 350 010 | 1019 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 3,5/2,5 | 30 | 32 WZ | UNI | 11 1215 350 020 | 1019 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 3,5/2,5 | 30 | 36 WZ | UNI | 11 1215 350 030 | 1019 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 3,5/2,5 | 30 | 42 WZ | UNI | 11 1215 350 040 | 1019 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 3,5/2,5 | 30 | 16 FLA | UNI | 11 1220 350 010 | 1020 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 4,2/2,5 | 30 | 16 FLA | UNI | 11 1230 350 010 | 1021 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 4,2/2,5 | 30 | 20 WZA | UNI | 11 1230 350 020 | 1021 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 3,6/2,5 | 30 | 20 FZ+R | UNI | 11 1232 350 010 | 1022 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 3,6/2,5 | 30 | 24 WZ+R | UNI | 11 1232 350 020 | 1022 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 3,6/2,5 | 30 | 32 WZ+R | UNI | 11 1235 350 010 | 1023 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 3,6/2,5 | Ø=70 / =13x5 / =20x6,5 | 20 FZ+R | - | 11 1238 350 010 | 1024 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 3,6/2,5 | Ø=80 / =14x5 / =22x6,5 | 20 FZ+R | - | 11 1238 350 020 | 1024 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 3,6/2,5 | Ø=30, UNI | 24 FZ+R | - | 11 1238 350 030 | 1024 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 4,0/2,8 | Ø=70 / =13x5 / =20x6,5 | 20 FZ+R | - | 11 1239 350 010 | 1025 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 4,0/2,8 | Ø=80 / =14x5 / =22x6,5 | 20 FZ+R | - | 11 1239 350 020 | 1025 | ✓ | ✓ | | ✓ | ✓ | | |
| 350 | 3,5/2,5 | 30 | 28 FWF | UNI | 11 1250 350 010 | 964 | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| 350 | 3,2/2,2 | 30 | 54 WZ | UNI | 11 1260 350 010 | 965 | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 350 | 3,5/2,5 | 30 | 54 WZ | UNI | 11 1300 350 010 | 991 | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 350 | 3,5/2,5 | 30 | 72 WZ | UNI | 11 1300 350 020 | 991 | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 350 | 3,5/2,5 | 30 | 84 WZ | UNI | 11 1300 350 030 | 991 | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 350 | 3,5/2,5 | 30 | 108 WZ | UNI | 11 1300 350 040 | 991 | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 350 | 3,0/2,2 | 30 | 100 WFA | UNI | 11 1320 350 010 | 935 | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 350 | 2,8/2,2 | 30 | 10 FL | UNI | 11 1350 350 002 | 937 | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 350 | 2,8/2,2 | 30 | 24 FL | UNI | 11 1350 350 004 | 937 | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 350 | 2,8/2,2 | 30 | 36 FL | UNI | 11 1350 350 006 | 937 | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 350 | 2,8/2,2 | 30 | 48 FL | UNI | 11 1350 350 008 | 937 | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 350 | 2,8/2,2 | 30 | 60 FL | UNI | 11 1350 350 010 | 937 | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 350 | 3,2/2,2 | 30 | 108 TFF-P | UNI | 11 1370 350 020 | 938 | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 350 | 2,4/1,8 | 30 | 42 WZ | UNI | 11 1425 350 010 | 941 | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| 350 | 2,4/1,8 | 30 | 72 WZ | UNI | 11 1425 350 020 | 941 | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |



| Weichholz, Hartholz, Exotenholz (quer) | Weichholz, Hartholz, Exotenholz (längs) | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Spanplatten, Hartfaserplatten kunststoffbeschichtet/ furniert, MDF, HDF |
|--|---|---|--|--|---|
| Soft wood, hard wood, and exotic wood across the grain | Soft wood, hard wood, and exotic wood along the grain | Wood with inclusions like nails, clips, concrete residues | Bonded wood, blockboard and veneer plywood, laminated wood | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |



Finder nach Blatt-Ø aufsteigend + Anwendung

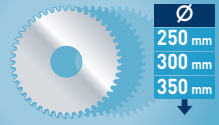
Finder by blade-Ø + application

OPTIMAL
 GUT
 MÖGLICH

| | | | | | |
|--|---|---|--|--|--|
| | | | | | |
| Weichholz, Hartholz, Exotenholz (quer) | Weichholz, Hartholz, Exotenholz (längs) | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Spanplatten, Hartfaserplatten kunststoffbeschichtet/furniert, MDF, HDF |
| Soft wood, hard wood, and exotic wood across the grain | Soft wood, hard wood, and exotic wood along the grain | Wood with inclusions like nails, clips, concrete residues | Bonded wood, blockboard and veneer plywood, laminated wood | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |

= BESTSELLER

| | | | | | ART. | | | | | | | | | | | | | | | |
|-----|----------|---------|------------|-------------------|-----------------|------|---|---|---|---|---|--|--|--|--|--|--|--|--|--|
| 350 | 2,4/1,8 | 30 | 108 WZ | UNI | 11 1425 350 030 | 941 | ✓ | ✓ | | ✓ | ✓ | | | | | | | | | |
| 350 | 2,4/1,8 | 30 | 140 WZ | UNI | 11 1425 350 040 | 941 | ✓ | ✓ | | ✓ | ✓ | | | | | | | | | |
| 350 | 2,4/1,8 | 30 | 108 TFF-P | UNI | 11 1430 350 010 | 943 | | | | | | | | | | | | | | |
| 350 | 2,4/1,8 | 30 | 132 TFF-P | UNI | 11 1430 350 020 | 943 | | | | | | | | | | | | | | |
| 350 | 4,4/2,8 | 30 | 42 WZN | UNI | 11 1450 350 010 | 945 | ✓ | ✓ | | ✓ | ✓ | | | | | | | | | |
| 350 | 3,2/2,2 | 30 | 84 TFF-P | UNI | 11 1460 350 010 | 947 | | | | | | | | | | | | | | |
| 350 | 3,2/2,2 | 30 | 108 TFF-P | UNI | 11 1460 350 020 | 947 | | | | | | | | | | | | | | |
| 350 | 3,5/2,5 | 30 | 84 TFP | UNI | 11 1470 350 010 | 949 | | | | | | | | | | | | | | |
| 350 | 3,5/2,5 | 30 | 108 TFP | UNI | 11 1470 350 020 | 949 | | | | | | | | | | | | | | |
| 350 | 4,4/3,2 | 30 | 72 TFP | 2-10-60 | 11 1510 350 010 | 983 | | | | | | | | | | | | | | |
| 350 | 4,4/3,2 | 60 | 72 TFP | 2-14-100 | 11 1510 350 020 | 983 | | | | | | | | | | | | | | |
| 350 | 3,5/2,5 | 30 | 72 HDF-P | UNI | 11 1600 350 010 | 1005 | ✓ | | | ✓ | ✓ | | | | | | | | | |
| 350 | 3,5/2,5 | 30 | 72 HDF-N | UNI | 11 1602 350 010 | 1007 | ✓ | | | ✓ | ✓ | | | | | | | | | |
| 350 | 2,9/2,2 | 30 | 84 HTT-P | UNI | 11 1604 350 010 | 1009 | ✓ | | | ✓ | ✓ | | | | | | | | | |
| 350 | 3,5/2,2 | 30 | 108 WZE-P | UNI | 11 1610 350 010 | 1011 | ✓ | | | ✓ | ✓ | | | | | | | | | |
| 350 | 3,5/2,5 | 30 | 108 WZE-N | UNI | 11 1615 350 010 | 1013 | ✓ | | | ✓ | ✓ | | | | | | | | | |
| 355 | 2,2/1,8 | 25,4 | 60 WWF | - | 10 7100 355 010 | 892 | | | | | | | | | | | | | | |
| 355 | 2,2/1,8 | 25,4 | 80 WWF | - | 10 7100 355 020 | 892 | | | | | | | | | | | | | | |
| 355 | 2,2/1,8 | 25,4 | 90 WWF | 1-12-55,4 | 10 7100 355 030 | 892 | | | | | | | | | | | | | | |
| 355 | 2,4/2,0 | 25,4 | 80 TFPS | - | 10 7130 355 020 | 893 | | | | | | | | | | | | | | |
| 355 | 2,4/2,0 | 25,4 | 90 TFPS | 1-12-55,4 | 10 7130 355 030 | 893 | | | | | | | | | | | | | | |
| 355 | 2,2/1,8 | 25,4 | 80 WWF | - | 10 7150 355 010 | 894 | | | | | | | | | | | | | | |
| 355 | 2,2/1,8 | 25,4 | 90 WWF | 1-12-55,4 | 10 7150 355 020 | 894 | | | | | | | | | | | | | | |
| 355 | 2,2/1,8 | 25,4 | 84 / 3-Cut | - | 10 7300 355 010 | 896 | | | | | | | | | | | | | | |
| 355 | 2,2/1,8 | 25,4 | 100 TFF | - | 10 7400 355 010 | 897 | | | | | | | | | | | | | | |
| 355 | 2,6/2,0 | 30/25,4 | 36 WZ | UNI1+UNI2 | 10 8055 355 010 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | | | |
| 355 | 2,6/2,0 | 30/25,4 | 54 WZ | UNI1+UNI2 | 10 8055 355 020 | 899 | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | |
| 355 | 2,6/2,0 | 30/25,4 | 72 WWF | UNI1+UNI2 | 10 8055 355 030 | 899 | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | |
| 355 | 3,2/2,2 | 30 | 54 WZ | UNI | 11 1260 355 010 | 965 | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | |
| 355 | 3,2/2,2 | 30 | 30 WZ | UNI | 11 1400 355 010 | 1036 | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | |
| 355 | 3,2/2,2 | 30 | 60 WZ | UNI | 11 1400 355 020 | 1036 | ✓ | | ✓ | ✓ | ✓ | | | | | | | | | |
| 355 | 4,4/3,2 | 75 | 72 TFP | - | 11 1510 355 010 | 983 | | | | | | | | | | | | | | |
| 355 | 3,5/2,5 | 30 | 100 WZE-N | 2-10-60 | 11 1615 355 010 | 1013 | ✓ | | | ✓ | ✓ | | | | | | | | | |
| 360 | 2,6/2,25 | 40 | 60 | 4-15-80 / 4-11-90 | 10 7000 360 010 | 886 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 40 | 72 | 4-15-80 / 4-11-90 | 10 7000 360 020 | 886 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 40 | 80 | 4-15-80 / 4-11-90 | 10 7000 360 030 | 886 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 40 | 100 | 4-15-80 / 4-11-90 | 10 7000 360 040 | 886 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | 10 7000 360 050 | 886 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 50 | 72 | 4-15-80 / 4-11-90 | 10 7000 360 060 | 886 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | 10 7000 360 070 | 886 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | 10 7000 360 080 | 886 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 40 | 60 | 4-15-80 / 4-11-90 | 10 7001 360 010 | 887 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 40 | 72 | 4-15-80 / 4-11-90 | 10 7001 360 020 | 887 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 40 | 80 | 4-15-80 / 4-11-90 | 10 7001 360 030 | 887 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 40 | 100 | 4-15-80 / 4-11-90 | 10 7001 360 040 | 887 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | 10 7001 360 050 | 887 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 50 | 72 | 4-15-80 / 4-11-90 | 10 7001 360 060 | 887 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | 10 7001 360 070 | 887 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | 10 7001 360 080 | 887 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 40 | 60 | 4-15-80 / 4-11-90 | 10 7002 360 010 | 888 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 40 | 72 | 4-15-80 / 4-11-90 | 10 7002 360 020 | 888 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 40 | 80 | 4-15-80 / 4-11-90 | 10 7002 360 030 | 888 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 40 | 100 | 4-15-80 / 4-11-90 | 10 7002 360 040 | 888 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | 10 7002 360 050 | 888 | | | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 50 | 72 | 4-15-80 / 4-11-90 | 10 7002 360 060 | 888 | | | | | | | | | | | | | | |



Finder nach Blatt-Ø aufsteigend + Anwendung

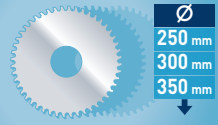
Finder by blade-Ø + application

✓ OPTIMAL
✓ GUT
✓ MÖGLICH

| | | | | | |
|--|---|---|--|--|--|
| | | | | | |
| Weichholz, Hartholz, Exotenholz (quer) | Weichholz, Hartholz, Exotenholz (längs) | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Spanplatten, Hartfaserplatten kunststoffbeschichtet/furniert, MDF, HDF |
| Soft wood, hard wood, and exotic wood across the grain | Soft wood, hard wood, and exotic wood along the grain | Wood with inclusions like nails, clips, concrete residues | Bonded wood, blockboard and veneer plywood, laminated wood | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |

= BESTSELLER

| | | | | | ART. | | | | | | | | | | | | | |
|-----|----------|--------------------------|------------|-------------------|-----------------|------|---|---|---|---|---|---|---|---|---|---|---|---|
| 360 | 2,6/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | 10 7002 360 070 | 888 | | | | | | | | | | | | |
| 360 | 2,6/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | 10 7002 360 080 | 888 | | | | | | | | | | | | |
| 370 | 3,6/3,0 | 30 | 96 TFP | UNI1+UNI2 | 11 1000 370 010 | 905 | | | | | | | | | | | | |
| 370 | 3,6/3,0 | 30 | 90 TFN | UNI1+UNI2 | 11 1100 370 010 | 911 | | | | | | | | | | | | |
| 370 | 3,6/3,0 | 30 | 108 TFN | UNI1+UNI2 | 11 1100 370 020 | 911 | | | | | | | | | | | | |
| 370 | 4,2/2,5 | 30 | 26 WZ | UNI | 11 1215 370 010 | 1019 | ✓ | ✓ | | ✓ | ✓ | | | | | | | |
| 370 | 4,2/2,5 | 30 | 60 WZ | UNI | 11 1300 370 010 | 991 | ✓ | ✓ | | ✓ | ✓ | | | | | | | |
| 380 | 3,8/3,2 | 32 | 90 TFN | UNI2 | 11 1100 380 010 | 911 | | | | | | | | | | | | |
| 380 | 3,8/3,2 | 32 | 110 TFN | UNI2 | 11 1100 380 020 | 911 | | | | | | | | | | | | |
| 380 | 3,8/3,2 | 32 | 132 TFN | UNI2 | 11 1100 380 030 | 911 | | | | | | | | | | | | |
| 380 | 2,4/1,8 | 32 | 132 TFF-N | UNI2 | 11 1130 380 010 | 915 | | | | | | | | | | | | |
| 380 | 4,8/3,5 | 60 | 72 TFP | 2-14-100 | 11 1510 380 010 | 983 | | | | | | | ✓ | ✓ | | | | |
| 380 | 4,4/3,2 | 60 | 72 TFP | 2-14-100 | 11 1510 380 020 | 983 | | | | | | | ✓ | ✓ | | | | |
| 390 | 3,5/2,5 | 25 | 60 WZ | 6-6,0-66 | 11 1340 390 010 | 1040 | ✓ | ✓ | | | | | | | | | | |
| 390 | 3,5/2,5 | 61 | 60 WZ | 6-9-75 | 11 1340 390 020 | 1040 | ✓ | ✓ | | | | | | | | | | |
| 400 | 5,0/4,5 | Auf Anfrage / On request | | | 10 7050 | 889 | | | | | | | | | | | | |
| 400 | 3,0/2,5 | 30 | 84 WWF | UNI1+UNI2 | 10 7100 400 010 | 892 | | | | | | | | | | | | |
| 400 | 2,6/2,2 | 30 | 90 / 3-Cut | UNI1+UNI2 | 10 7300 400 010 | 896 | | | | | | | | | | | | |
| 400 | 2,6/2,0 | 30 | 110 TFF | UNI1+UNI2 | 10 7400 400 010 | 897 | | | | | | | | | | | | |
| 400 | 2,8/2,2 | 30 | 42 WZ | UNI1+UNI2 | 10 8055 400 010 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 400 | 2,8/2,2 | 30 | 60 WZ | UNI1+UNI2 | 10 8055 400 020 | 899 | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 400 | 2,8/2,2 | 30 | 84 WWF | UNI1+UNI2 | 10 8055 400 030 | 899 | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 400 | 3,8/3,2 | 30 | 72 TFP | UNI1+UNI2 | 11 1000 400 010 | 905 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 30 | 96 TFP | UNI1+UNI2 | 11 1000 400 020 | 905 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 30 | 120 TFP | UNI1+UNI2 | 11 1000 400 030 | 905 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 32 | 96 TFP | UNI2 | 11 1000 400 040 | 905 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 40 | 96 TFP | 4-12-64+2-15-80 | 11 1000 400 050 | 905 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 40 | 120 TFP | 4-12-64+2-15-80 | 11 1000 400 060 | 905 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 50 | 96 TFP | 4-15-80 | 11 1000 400 070 | 905 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 50 | 120 TFP | 4-15-80 | 11 1000 400 080 | 905 | | | | | | | | | | | | |
| 400 | 3,1/2,5 | 30 | 96 TFPD | UNI1+UNI2 | 11 1050 400 005 | 907 | | | | | | | | | | | | |
| 400 | 3,1/2,5 | 30 | 128 TFPD | UNI1+UNI2 | 11 1050 400 010 | 907 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 30 | 96 TFN | UNI1+UNI2 | 11 1100 400 010 | 911 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 30 | 108 TFN | UNI1+UNI2 | 11 1100 400 020 | 911 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 30 | 120 TFN | UNI1+UNI2 | 11 1100 400 030 | 911 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 32 | 96 TFN | UNI2 | 11 1100 400 040 | 911 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 32 | 108 TFN | UNI2 | 11 1100 400 050 | 911 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 32 | 120 TFN | UNI2 | 11 1100 400 060 | 911 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 40 | 96 TFN | 4-12-64+2-15-80 | 11 1100 400 070 | 911 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 40 | 120 TFN | 4-12-64+2-15-80 | 11 1100 400 080 | 911 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 50 | 96 TFN | 4-15-80 | 11 1100 400 090 | 911 | | | | | | | | | | | | |
| 400 | 3,8/3,2 | 50 | 120 TFN | 4-15-80 | 11 1100 400 100 | 911 | | | | | | | | | | | | |
| 400 | 3,1/2,5 | 30 | 130 TFND | UNI1+UNI2 | 11 1120 400 010 | 913 | | | | | | | | | | | | |
| 400 | 3,1/2,5 | 30 | 138 TFF-N | UNI1+UNI2 | 11 1130 400 010 | 915 | | | | | | | | | | | | |
| 400 | 3,1/2,5 | 32 | 138 TFF-N | UNI2 | 11 1130 400 020 | 915 | | | | | | | | | | | | |
| 400 | 3,5/2,5 | 30 | 28 WZA | UNI | 11 1200 400 010 | 1018 | ✓ | ✓ | | ✓ | ✓ | | | | | | | |
| 400 | 3,5/2,5 | 30 | 36 WZA | UNI | 11 1200 400 020 | 1018 | ✓ | ✓ | | ✓ | ✓ | | | | | | | |
| 400 | 3,5/2,5 | 30 | 28 WZ | UNI | 11 1215 400 010 | 1019 | ✓ | ✓ | | ✓ | ✓ | | | | | | | |
| 400 | 3,5/2,5 | 30 | 36 WZ | UNI | 11 1215 400 020 | 1019 | ✓ | ✓ | | ✓ | ✓ | | | | | | | |
| 400 | 3,5/2,5 | 30 | 48 WZ | UNI | 11 1215 400 030 | 1019 | ✓ | ✓ | | ✓ | ✓ | | | | | | | |
| 400 | 3,5/2,5 | 30 | 18 FLA | UNI | 11 1230 400 010 | 1021 | ✓ | ✓ | | ✓ | ✓ | | | | | | | |
| 400 | 4,4/2,8 | 30 | 18 FLA | UNI | 11 1230 400 010 | 1021 | ✓ | ✓ | | ✓ | ✓ | | | | | | | |
| 400 | 4,4/2,8 | 30 | 24 WZA | UNI | 11 1230 400 020 | 1021 | ✓ | ✓ | | ✓ | ✓ | | | | | | | |
| 400 | 3,5/2,5 | 30 | 28 FLA | UNI | 11 1230 400 020 | 1021 | ✓ | ✓ | | ✓ | ✓ | | | | | | | |
| 400 | 4,0/2,8 | 30 | 24 FZ+R | UNI | 11 1232 400 010 | 1022 | ✓ | ✓ | | ✓ | ✓ | | | | | | | |



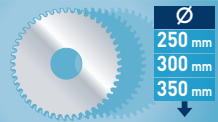
Finder nach Blatt-Ø aufsteigend + Anwendung

Finder by blade-Ø + application

OPTIMAL
 GUT
 MÖGLICH

= BESTSELLER

| | | | | | | ART. | | | | | | | | | | | | | |
|-----|----------|--------------------------|------------|-------------------------|-----------------|---------|-----|---|---|---|---|--|--|--|--|--|--|---|--|
| 400 | 4,0/2,8 | 30 | 28 WZ+R | UNI | 11 1232 400 020 | 1022 | ✓ | ✓ | | ✓ | ✓ | | | | | | | | |
| 400 | 4,0/2,8 | 30 | 36 WZ+R | UNI | 11 1235 400 010 | 1023 | ✓ | ✓ | | ✓ | ✓ | | | | | | | | |
| 400 | 4,0/2,8 | Ø=70 / =13x5 / =20x6,5 | 24 FZ+R | - | 11 1238 400 010 | 1024 | | ✓ | | | | | | | | | | | |
| 400 | 4,0/2,8 | Ø=80 / =14x5 / =22x6,5 | 24 FZ+R | - | 11 1238 400 020 | 1024 | | ✓ | | | | | | | | | | | |
| 400 | 4,0/2,8 | Ø=70 / =13x5 / =20x6,5 | 24 FZ+R | - | 11 1239 400 010 | 1025 | | ✓ | | | | | | | | | | | |
| 400 | 4,0/2,8 | Ø=80 / =14x5 / =22x6,5 | 24 FZ+R | - | 11 1239 400 020 | 1025 | | ✓ | | | | | | | | | | | |
| 400 | 4,2/2,8 | 30 | 28 FWF | UNI | 11 1250 400 010 | 964 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | | |
| 400 | 3,5/2,5 | 30 | 60 WZ | UNI | 11 1260 400 010 | 965 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | ✓ | |
| 400 | 3,5/2,5 | 30 | 60 WZ | UNI | 11 1300 400 010 | 991 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | ✓ | |
| 400 | 3,5/2,5 | 30 | 84 WZ | UNI | 11 1300 400 020 | 991 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | ✓ | |
| 400 | 3,5/2,5 | 30 | 96 WZ | UNI | 11 1300 400 030 | 991 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | ✓ | |
| 400 | 3,5/2,5 | 30 | 120 WZ | UNI | 11 1300 400 040 | 991 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | ✓ | |
| 400 | 3,0/2,2 | 30 | 120 WFA | UNI | 11 1320 400 010 | 935 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | ✓ | |
| 400 | 2,8/2,2 | 30 | 60 WZ | UNI | 11 1425 400 010 | 941 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | ✓ | |
| 400 | 2,8/2,2 | 30 | 96 WZ | UNI | 11 1425 400 020 | 941 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | ✓ | |
| 400 | 2,8/2,2 | 30 | 120 WZ | UNI | 11 1425 400 030 | 941 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | ✓ | |
| 400 | 3,2/2,5 | 30 | 120 TFF-P | UNI | 11 1430 400 010 | 943 | | | | | | | | | | | | | |
| 400 | 3,1/2,5 | 30 | 138 TFF-P | UNI | 11 1430 400 020 | 943 | | | | | | | | | | | | | |
| 400 | 4,4/2,8 | 30 | 48 WZN | UNI | 11 1450 400 010 | 945 | ✓ | ✓ | | ✓ | ✓ | | | | | | | ✓ | |
| 400 | 3,5/2,5 | 30 | 120 TFF-P | UNI | 11 1460 400 010 | 947 | | | | | | | | | | | | | |
| 400 | 3,5/2,5 | 30 | 120 TFP | UNI | 11 1470 400 010 | 949 | | | | | | | | | | | | | |
| 400 | 3,5/2,5 | 30 | 78 HDF-P | UNI | 11 1600 400 010 | 1005 | ✓ | | | ✓ | ✓ | | | | | | | ✓ | |
| 400 | 3,5/2,5 | 30 | 120 WZE-P | UNI | 11 1610 400 010 | 1011 | ✓ | | | ✓ | ✓ | | | | | | | ✓ | |
| 410 | 4,2/2,5 | 30 | 28 WZ | UNI | 11 1215 410 010 | 1019 | ✓ | ✓ | | ✓ | ✓ | | | | | | | | |
| 410 | 4,2/2,5 | 30 | 60 WZ | UNI | 11 1300 410 010 | 991 | ✓ | ✓ | | ✓ | ✓ | | | | | | | ✓ | |
| 420 | 5,0/4,5 | Auf Anfrage / On request | | | | 10 7050 | 889 | | | | | | | | | | | | |
| 420 | 3,0/2,5 | 30 | 84 WWF | UNI1+UNI2 | 10 7100 420 010 | 892 | | | | | | | | | | | | | |
| 420 | 2,6/2,2 | 30 | 96 / 3-Cut | UNI1+UNI2 | 10 7300 420 010 | 896 | | | | | | | | | | | | | |
| 420 | 2,6/2,0 | 30 | 110 TFF | UNI1+UNI2 | 10 7400 420 010 | 897 | | | | | | | | | | | | | |
| 420 | 2,8/2,2 | 30 | 42 WZ | UNI1+UNI2 | 10 8055 420 010 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | ✓ | |
| 420 | 2,8/2,2 | 30 | 60 WZ | UNI1+UNI2 | 10 8055 420 020 | 899 | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | | ✓ | |
| 420 | 2,8/2,2 | 30 | 84 WWF | UNI1+UNI2 | 10 8055 420 030 | 899 | ✓ | | ✓ | ✓ | ✓ | | | | | | | ✓ | |
| 420 | 4,0/3,2 | 30 | 72 TFP | UNI1+UNI2+2-10,5-70 | 11 1000 420 010 | 905 | | | | | | | | | | | | | |
| 420 | 4,0/3,2 | 30 | 96 TFP | UNI1+UNI2+2-10,5-70 | 11 1000 420 020 | 905 | | | | | | | | | | | | | |
| 420 | 4,0/3,2 | 30 | 120 TFP | UNI1+UNI2+2-10,5-70 | 11 1000 420 030 | 905 | | | | | | | | | | | | | |
| 420 | 3,4/2,8 | 30 | 96 TFPD | 2-9-46,4+UNI2+2-10,5-70 | 11 1050 420 005 | 907 | | | | | | | | | | | | | |
| 420 | 3,4/2,8 | 30 | 132 TFPD | UNI1+UNI2+2-10,5-70 | 11 1050 420 010 | 907 | | | | | | | | | | | | | |
| 420 | 4,0/3,2 | 30 | 96 TFN | UNI1+UNI2+2-10,5-70 | 11 1100 420 010 | 911 | | | | | | | | | | | | | |
| 420 | 4,0/3,2 | 30 | 108 TFN | UNI1+UNI2+2-10,5-70 | 11 1100 420 020 | 911 | | | | | | | | | | | | | |
| 420 | 4,0/3,2 | 30 | 120 TFN | UNI1+UNI2+2-10,5-70 | 11 1100 420 030 | 911 | | | | | | | | | | | | | |
| 420 | 4,0/3,2 | 40 | 96 TFN | 4-12-64+2-15-80 | 11 1100 420 040 | 911 | | | | | | | | | | | | | |
| 420 | 4,0/3,2 | 40 | 108 TFN | 4-12-64+2-15-80 | 11 1100 420 050 | 911 | | | | | | | | | | | | | |
| 420 | 4,0/3,2 | 40 | 120 TFN | 4-12-64+2-15-80 | 11 1100 420 060 | 911 | | | | | | | | | | | | | |
| 420 | 3,4/2,8 | 30 | 132 TFND | UNI1+UNI2+2-10,5-70 | 11 1120 420 010 | 913 | | | | | | | | | | | | | |
| 420 | 3,4/2,8 | 30 | 138 TFF-N | 2-9-46,4+UNI2+2-10,5-70 | 11 1130 420 010 | 915 | | | | | | | | | | | | | |
| 420 | 3,4/2,8 | 40 | 138 TFF-N | 4-12-64+2-15-80 | 11 1130 420 020 | 915 | | | | | | | | | | | | | |
| 420 | 4,2/2,8 | 40/30 | 48 WZN | 2-10-60+2-11-63+2-12-64 | 11 1450 420 010 | 945 | ✓ | ✓ | | ✓ | ✓ | | | | | | | ✓ | |
| 420 | 3,5/2,5 | 40/30 | 84 WZN | 2-10-60+2-11-63+2-12-64 | 11 1450 420 020 | 945 | ✓ | ✓ | | ✓ | ✓ | | | | | | | ✓ | |
| 425 | 2,6/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | 10 7000 425 010 | 886 | | | | | | | | | | | | | |
| 425 | 2,6/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | 10 7000 425 020 | 886 | | | | | | | | | | | | | |
| 425 | 2,6/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | 10 7000 425 030 | 886 | | | | | | | | | | | | | |
| 425 | 2,6/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | 10 7001 425 010 | 887 | | | | | | | | | | | | | |
| 425 | 2,6/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | 10 7001 425 020 | 887 | | | | | | | | | | | | | |
| 425 | 2,6/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | 10 7001 425 030 | 887 | | | | | | | | | | | | | |
| 425 | 2,6/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | 10 7002 425 010 | 888 | | | | | | | | | | | | | |



Finder nach Blatt-Ø aufsteigend + Anwendung

Finder by blade-Ø + application

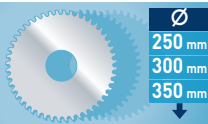
OPTIMAL
 GUT
 MÖGLICH

| = BESTSELLER

| | | | | | | ART. | | | | | | | | | | |
|--|-----|----------|------------------------|-------------|-------------------------|-----------------|------|--|--|--|--|--|--|--|--|--|
| | 425 | 2,6/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | 10 7002 425 020 | 888 | | | | | | | | | |
| | 425 | 2,6/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | 10 7002 425 030 | 888 | | | | | | | | | |
| | 430 | 4,0/3,2 | 30 | 96 TFP | UNI1+UNI2+2-10,5-70 | 11 1000 430 010 | 905 | | | | | | | | | |
| | 450 | 2,8/2,4 | 30 | 90 WWF | UNI1+UNI2 | 10 7100 450 010 | 892 | | | | | | | | | |
| | 450 | 2,8/2,4 | 30 | 108 / 3-Cut | UNI1+UNI2 | 10 7300 450 010 | 896 | | | | | | | | | |
| | 450 | 2,8/2,4 | 30 | 120 TFF | UNI1+UNI2 | 10 7400 450 010 | 897 | | | | | | | | | |
| | 450 | 3,2/2,5 | 30 | 48 WZ | UNI1+UNI2 | 10 8055 450 010 | 899 | | | | | | | | | |
| | 450 | 3,2/2,5 | 30 | 72 WZ | UNI1+UNI2 | 10 8055 450 020 | 899 | | | | | | | | | |
| | 450 | 3,2/2,5 | 30 | 96 WWF | UNI1+UNI2 | 10 8055 450 030 | 899 | | | | | | | | | |
| | 450 | 4,0/3,2 | 30 | 72 TFP | UNI1+UNI2+2-10,5-70 | 11 1000 450 010 | 905 | | | | | | | | | |
| | 450 | 4,0/3,2 | 30 | 108 TFP | UNI1+UNI2+2-10,5-70 | 11 1000 450 020 | 905 | | | | | | | | | |
| | 450 | 4,0/3,2 | 30 | 120 TFP | UNI1+UNI2+2-10,5-70 | 11 1000 450 030 | 905 | | | | | | | | | |
| | 450 | 4,0/3,2 | 32 | 96 TFP | UNI2 | 11 1000 450 040 | 905 | | | | | | | | | |
| | 450 | 4,0/3,2 | 32 | 120 TFP | UNI2 | 11 1000 450 050 | 905 | | | | | | | | | |
| | 450 | 3,4/2,8 | 32 | 92 TFPN | UNI2 | 11 1050 450 005 | 907 | | | | | | | | | |
| | 450 | 3,4/2,8 | 30 | 138 TFPN | UNI1+UNI2+2-10,5-70 | 11 1050 450 010 | 907 | | | | | | | | | |
| | 450 | 4,0/3,2 | 30 | 108 TFN | UNI1+UNI2+2-10,5-70 | 11 1100 450 010 | 911 | | | | | | | | | |
| | 450 | 4,0/3,2 | 30 | 128 TFN | UNI1+UNI2+2-10,5-70 | 11 1100 450 020 | 911 | | | | | | | | | |
| | 450 | 3,4/2,8 | 30 | 138 TFND | UNI1+UNI2+2-10,5-70 | 11 1120 450 010 | 913 | | | | | | | | | |
| | 450 | 3,4/2,8 | 30 | 144 TFF-N | 2-9-46,4+UNI2+2-10,5-70 | 11 1130 450 010 | 915 | | | | | | | | | |
| | 450 | 4,2/2,8 | 30 | 32 WZA | UNI | 11 1200 450 010 | 1018 | | | | | | | | | |
| | 450 | 4,2/2,8 | 30 | 40 WZA | UNI | 11 1200 450 020 | 1018 | | | | | | | | | |
| | 450 | 4,2/2,8 | 30 | 40 WZ | UNI | 11 1215 450 010 | 1019 | | | | | | | | | |
| | 450 | 4,5/2,8 | 30 | 20 FLA | UNI | 11 1230 450 010 | 1021 | | | | | | | | | |
| | 450 | 4,5/2,8 | 30 | 28 WZA | UNI | 11 1230 450 020 | 1021 | | | | | | | | | |
| | 450 | 4,2/2,8 | 30 | 28 FZ+R | UNI | 11 1232 450 010 | 1022 | | | | | | | | | |
| | 450 | 4,0/2,8 | 30 | 36 WZ+R | UNI | 11 1232 450 020 | 1022 | | | | | | | | | |
| | 450 | 4,2/2,8 | 30 | 40 WZ+R | UNI | 11 1235 450 010 | 1023 | | | | | | | | | |
| | 450 | 4,4/3,2 | Ø=70 / =13x5 / =20x6,5 | 28 FZ+R | - | 11 1238 450 010 | 1024 | | | | | | | | | |
| | 450 | 4,4/3,2 | Ø=80 / =14x5 / =22x6,5 | 28 FZ+R | - | 11 1238 450 020 | 1024 | | | | | | | | | |
| | 450 | 4,2/2,8 | 30 | 32 FWF | UNI | 11 1250 450 010 | 964 | | | | | | | | | |
| | 450 | 3,5/2,5 | 30 | 66 WZ | UNI | 11 1260 450 010 | 965 | | | | | | | | | |
| | 450 | 4,0/2,8 | 30 | 66 WZ | UNI | 11 1300 450 010 | 991 | | | | | | | | | |
| | 450 | 4,0/2,8 | 30 | 84 WZ | UNI | 11 1300 450 020 | 991 | | | | | | | | | |
| | 450 | 4,0/2,8 | 30 | 108 WZ | UNI | 11 1300 450 030 | 991 | | | | | | | | | |
| | 450 | 4,0/2,8 | 30 | 132 WZ | UNI | 11 1300 450 040 | 991 | | | | | | | | | |
| | 450 | 3,6/2,8 | 30 | 130 WFA | UNI | 11 1320 450 010 | 935 | | | | | | | | | |
| | 450 | 3,1/2,5 | 30 | 66 WZ | UNI | 11 1425 450 010 | 941 | | | | | | | | | |
| | 450 | 3,1/2,5 | 30 | 108 WZ | UNI | 11 1425 450 020 | 941 | | | | | | | | | |
| | 450 | 3,1/2,5 | 30 | 130 WZ | UNI | 11 1425 450 030 | 941 | | | | | | | | | |
| | 450 | 3,5/2,8 | 30 | 132 TFF-P | UNI | 11 1430 450 010 | 943 | | | | | | | | | |
| | 450 | 3,4/2,8 | 30 | 144 TFF-P | UNI | 11 1430 450 020 | 943 | | | | | | | | | |
| | 450 | 4,4/2,8 | 30 | 54 WZN | UNI | 11 1450 450 010 | 945 | | | | | | | | | |
| | 450 | 3,5/2,5 | 30 | 132 TFF-P | UNI | 11 1460 450 010 | 947 | | | | | | | | | |
| | 450 | 3,5/2,5 | 30 | 132 TFP | UNI | 11 1470 450 010 | 949 | | | | | | | | | |
| | 450 | 4,8/3,5 | 60 | 72 TFP | 2-14-125 | 11 1510 450 010 | 983 | | | | | | | | | |
| | 450 | 3,5/2,5 | 30 | 132 WZE-P | UNI | 11 1610 450 010 | 1011 | | | | | | | | | |
| | 460 | 2,7/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | 10 7000 460 010 | 886 | | | | | | | | | |
| | 460 | 2,7/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | 10 7000 460 020 | 886 | | | | | | | | | |
| | 460 | 2,7/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | 10 7000 460 030 | 886 | | | | | | | | | |
| | 460 | 2,7/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | 10 7001 460 010 | 887 | | | | | | | | | |
| | 460 | 2,7/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | 10 7001 460 020 | 887 | | | | | | | | | |
| | 460 | 2,7/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | 10 7001 460 030 | 887 | | | | | | | | | |
| | 460 | 2,7/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | 10 7002 460 010 | 888 | | | | | | | | | |
| | 460 | 2,7/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | 10 7002 460 020 | 888 | | | | | | | | | |

| | | | | | |
|--|---|---|--|--|--|
| | | | | | |
| Weichholz, Hartholz, Exotenholz (quer) | Weichholz, Hartholz, Exotenholz (längs) | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Spanplatten, Hartfaserplatten kunststoffbeschichtet/furniert, MDF, HDF |
| Soft wood, hard wood, and exotic wood across the grain | Soft wood, hard wood, and exotic wood along the grain | Wood with inclusions like nails, clips, concrete residues | Bonded wood, blockboard and veneer plywood, laminated wood | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |

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- 9



Finder nach Blatt-Ø aufsteigend + Anwendung

Finder by blade-Ø + application

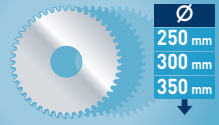
OPTIMAL
 GUT
 MÖGLICH

= BESTSELLER

| ART. | Blatt-Ø | Blattlänge | Blattbreite | Blatttiefe | Blattanzahl | Blattmaterial | Blatttyp | Blattanwendung | Blattanzahl |
|-----------------|---------|--------------------------|-------------|-------------------------|-------------------|-----------------|----------|----------------|-------------|
| 10 7002 460 030 | 460 | 2,7/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | 10 7002 460 030 | 888 | | |
| 500 | 5,0/4,5 | Auf Anfrage / On request | | | 10 7050 | 889 | | | |
| 500 | 3,0/2,6 | 30 | 100 WWF | UNI1+UNI2 | 10 7100 500 010 | 892 | | | |
| 500 | 3,0/2,6 | 30 | 120 / 3-Cut | UNI1+UNI2 | 10 7300 500 010 | 896 | | | |
| 500 | 3,0/2,6 | 30 | 130 TFF | UNI1+UNI2 | 10 7400 500 010 | 897 | | | |
| 500 | 3,4/2,8 | 30 | 54 WZ | UNI1+UNI2 | 10 8055 500 010 | 899 | ✓ | ✓ | ✓ |
| 500 | 3,4/2,8 | 30 | 84 WZ | UNI1+UNI2 | 10 8055 500 020 | 899 | ✓ | ✓ | ✓ |
| 500 | 3,4/2,8 | 30 | 108 WWF | UNI1+UNI2 | 10 8055 500 030 | 899 | ✓ | ✓ | ✓ |
| 500 | 4,2/3,6 | 30 | 72 TFP | UNI1+UNI2+2-10,5-70 | 11 1000 500 010 | 905 | | | |
| 500 | 4,2/3,6 | 30 | 96 TFP | UNI1+UNI2+2-10,5-70 | 11 1000 500 020 | 905 | | | |
| 500 | 4,2/3,6 | 30 | 120 TFP | UNI1+UNI2+2-10,5-70 | 11 1000 500 030 | 905 | | | |
| 500 | 4,2/3,6 | 30 | 144 TFP | UNI1+UNI2+2-10,5-70 | 11 1000 500 040 | 905 | | | |
| 500 | 4,2/3,6 | 32 | 120 TFP | UNI2 | 11 1000 500 050 | 905 | | | |
| 500 | 4,2/3,6 | 32 | 144 TFP | UNI2 | 11 1000 500 060 | 905 | | | |
| 500 | 3,4/2,8 | 30 | 72 TFPN | 2-9-46,4+UNI2+2-10,5-70 | 11 1050 500 003 | 907 | | | |
| 500 | 3,4/2,8 | 30 | 120 TFPN | 2-9-46,4+UNI2+2-10,5-70 | 11 1050 500 005 | 907 | | | |
| 500 | 3,4/2,8 | 30 | 144 TFPN | UNI1+UNI2+2-10,5-70 | 11 1050 500 010 | 907 | | | |
| 500 | 4,2/3,6 | 30 | 120 TFN | UNI1+UNI2+2-10,5-70 | 11 1100 500 010 | 911 | | | |
| 500 | 4,2/3,6 | 30 | 140 TFN | UNI1+UNI2+2-10,5-70 | 11 1100 500 020 | 911 | | | |
| 500 | 3,4/2,8 | 30 | 144 TFND | UNI1+UNI2+2-10,5-70 | 11 1120 500 010 | 913 | | | |
| 500 | 3,4/2,8 | 30 | 148 TFF-N | 2-9-46,4+UNI2+2-10,5-70 | 11 1130 500 010 | 915 | | | |
| 500 | 4,4/2,8 | 30 | 36 WZA | UNI | 11 1200 500 010 | 1018 | ✓ | ✓ | ✓ |
| 500 | 4,4/2,8 | 30 | 44 WZA | UNI | 11 1200 500 020 | 1018 | ✓ | ✓ | ✓ |
| 500 | 4,2/2,8 | 30 | 44 WZ | UNI | 11 1215 500 010 | 1019 | ✓ | ✓ | ✓ |
| 500 | 4,5/2,8 | 30 | 24 FLA | UNI | 11 1230 500 010 | 1021 | ✓ | ✓ | ✓ |
| 500 | 4,5/2,8 | 30 | 32 WZA | UNI | 11 1230 500 020 | 1021 | ✓ | ✓ | ✓ |
| 500 | 4,4/3,2 | 30 | 32 FZ+R | UNI | 11 1232 500 010 | 1022 | ✓ | ✓ | ✓ |
| 500 | 4,4/3,2 | 30 | 44 WZ+R | UNI | 11 1235 500 010 | 1023 | ✓ | ✓ | ✓ |
| 500 | 4,2/2,8 | 30 | 36 FWF | UNI | 11 1250 500 010 | 964 | ✓ | ✓ | ✓ |
| 500 | 4,0/2,8 | 30 | 72 WZ | UNI | 11 1260 500 010 | 965 | ✓ | ✓ | ✓ |
| 500 | 4,0/2,8 | 30 | 60 WZ | UNI+2-10-80 | 11 1300 500 010 | 991 | ✓ | ✓ | ✓ |
| 500 | 4,0/2,8 | 30 | 72 WZ | UNI+2-10-80 | 11 1300 500 020 | 991 | ✓ | ✓ | ✓ |
| 500 | 4,0/2,8 | 30 | 96 WZ | UNI+2-10-80 | 11 1300 500 030 | 991 | ✓ | ✓ | ✓ |
| 500 | 4,0/2,8 | 30 | 120 WZ | UNI+2-10-80 | 11 1300 500 040 | 991 | ✓ | ✓ | ✓ |
| 500 | 4,0/2,8 | 30 | 144 WZ | UNI+2-10-80 | 11 1300 500 050 | 991 | ✓ | ✓ | ✓ |
| 500 | 3,6/2,8 | 30 | 145 WFA | UNI | 11 1320 500 010 | 1021 | ✓ | ✓ | ✓ |
| 500 | 4,0/3,0 | 30 | 60 WZ | 6-8,5-80 | 11 1340 500 010 | 1040 | ✓ | ✓ | ✓ |
| 500 | 4,0/3,0 | 30 | 72 WZ | 6-8,5-80 | 11 1340 500 020 | 1040 | ✓ | ✓ | ✓ |
| 500 | 3,4/2,8 | 30 | 72 WZ | UNI+2-10-80 | 11 1425 500 010 | 941 | ✓ | ✓ | ✓ |
| 500 | 3,4/2,8 | 30 | 120 WZ | UNI+2-10-80 | 11 1425 500 020 | 941 | ✓ | ✓ | ✓ |
| 500 | 3,4/2,8 | 30 | 144 WZ | UNI+2-10-80 | 11 1425 500 030 | 941 | ✓ | ✓ | ✓ |
| 500 | 3,5/2,8 | 30 | 144 TFF-P | UNI | 11 1430 500 010 | 943 | ✓ | ✓ | ✓ |
| 500 | 4,4/2,8 | 30 | 60 WZN | UNI | 11 1450 500 010 | 945 | ✓ | ✓ | ✓ |
| 500 | 3,8/2,8 | 30 | 144 TFF-P | UNI | 11 1460 500 010 | 947 | ✓ | ✓ | ✓ |
| 500 | 3,8/2,8 | 30 | 144 TFP | UNI | 11 1470 500 010 | 949 | ✓ | ✓ | ✓ |
| 500 | 3,8/2,8 | 30 | 144 WZE-P | UNI | 11 1610 500 010 | 1011 | ✓ | ✓ | ✓ |
| 520 | 4,2/3,6 | 30 | 120 TFN | - | 11 1100 520 010 | 911 | | | |
| 550 | 4,4/3,8 | 30 | 72 TFP | UNI1+UNI2+2-10,5-70 | 11 1000 550 010 | 905 | | | |
| 550 | 4,4/3,8 | 30 | 110 TFP | UNI1+UNI2+2-10,5-70 | 11 1000 550 020 | 905 | | | |
| 550 | 4,4/3,8 | 30 | 144 TFP | UNI1+UNI2+2-10,5-70 | 11 1000 550 030 | 905 | | | |
| 550 | 4,4/3,8 | 32 | 96 TFP | UNI2 | 11 1000 550 040 | 905 | | | |
| 550 | 4,4/3,8 | 32 | 128 TFP | UNI2 | 11 1000 550 050 | 905 | | | |
| 550 | 4,4/3,8 | 80 | 128 TFP | 6-9-100 | 11 1000 550 060 | 905 | | | |
| 550 | 3,6/3,0 | 30 | 110 TFPN | 2-9-46,4+UNI2+2-10,5-70 | 11 1050 550 005 | 907 | | | |
| 550 | 3,6/3,0 | 30 | 160 TFPN | UNI1+UNI2+2-10,5-70 | 11 1050 550 010 | 907 | | | |

| | | | | | |
|--|---|---|--|--|--|
| | | | | | |
| Weichholz, Hartholz, Exotenholz (quer) | Weichholz, Hartholz, Exotenholz (längs) | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Spanplatten, Hartfaserplatten kunststoffbeschichtet/furniert, MDF, HDF |
| Soft wood, hard wood, and exotic wood across the grain | Soft wood, hard wood, and exotic wood along the grain | Wood with inclusions like nails, clips, concrete residues | Bonded wood, blockboard and veneer plywood, laminated wood | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |





Finder nach Blatt-Ø aufsteigend + Anwendung

Finder by blade-Ø + application

✓ OPTIMAL
✓ GUT
✓ MÖGLICH

| Weichholz, Hartholz, Exotenholz (quer) | Weichholz, Hartholz, Exotenholz (längs) | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Spanplatten, Hartfaserplatten kunststoffbeschichtet/furniert, MDF, HDF |
|--|---|---|--|--|--|
| Soft wood, hard wood, and exotic wood across the grain | Soft wood, hard wood, and exotic wood along the grain | Wood with inclusions like nails, clips, concrete residues | Bonded wood, blockboard and veneer plywood, laminated wood | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |

■ = BESTSELLER

| | | | | | ART. | |
|------|---------|--------------------------|----------|---|-----------------|------|
| 550 | 4,4/3,8 | 30 | 108 TFN | UNI1+UNI2+2-10,5-70 | 11 1100 550 010 | 911 |
| 550 | 4,4/3,8 | 30 | 132 TFN | UNI1+UNI2+2-10,5-70 | 11 1100 550 020 | 911 |
| 550 | 3,6/3,0 | 30 | 160 TFND | UNI1+UNI2+2-10,5-70 | 11 1120 550 010 | 913 |
| 550 | 4,4/3,0 | 30 | 48 WZA | UNI | 11 1200 550 010 | 1018 |
| 550 | 6,0/4,4 | 30 | 60 WZ | 8-8,5-120 Angesenkt 2-13-240 versetzt 22,5° | 11 1300 550 010 | 991 |
| 550 | 4,8/3,4 | 30 | 64 WZN | UNI | 11 1450 550 010 | 945 |
| 570 | 6,0/5,0 | Auf Anfrage / On request | | | 10 7050 | 889 |
| 590 | 4,5/3,6 | 30 | 78 WZ | 6-8,5-80 | 11 1340 590 010 | 1040 |
| 590 | 4,5/3,6 | 85 | 78 WZ | 6-11-110 | 11 1340 590 020 | 1040 |
| 600 | 4,6/4,0 | 30 | 140 TFP | UNI1+UNI2 | 11 1000 600 010 | 905 |
| 600 | 4,6/4,0 | 30 | 140 TFN | UNI1+UNI2 | 11 1100 600 010 | 911 |
| 600 | 4,4/3,0 | 30 | 40 WZA | UNI | 11 1200 600 010 | 1018 |
| 600 | 4,4/3,0 | 30 | 54 WZA | UNI | 11 1200 600 020 | 1018 |
| 600 | 4,2/3,0 | 30 | 40 WZ | UNI | 11 1250 600 010 | 964 |
| 600 | 4,2/3,0 | 30 | 78 WZ | UNI | 11 1260 600 010 | 965 |
| 600 | 4,8/3,4 | 30 | 48 WZ | 2-8,5-90+2-10-80+2-15-63 | 11 1300 600 010 | 991 |
| 600 | 4,0/3,0 | 45 | 60 WZ | 2-18-120 | 11 1340 600 010 | 1040 |
| 600 | 5,4/4,0 | 30 | 72 WZN | UNI | 11 1450 600 010 | 945 |
| 630 | 6,5/5,0 | Auf Anfrage / On request | | | 10 7050 | 889 |
| 650 | 5,8/4,0 | 30 | 36 WZ | 2-8,5-90+2-10-80+2-15-63 | 11 1300 650 010 | 991 |
| 650 | 5,8/4,0 | 30 | 48 WZ | 2-8,5-90+2-10-80+2-15-63 | 11 1300 650 020 | 991 |
| 650 | 5,8/4,0 | 30 | 96 WZ | 2-8,5-90+2-10-80+2-15-63 | 11 1300 650 030 | 991 |
| 660 | 6,5/5,0 | Auf Anfrage / On request | | | 10 7050 | 889 |
| 700 | 4,4/3,2 | 30 | 46 WZA | UNI | 11 1200 700 010 | 1018 |
| 700 | 4,4/3,2 | 30 | 60 WZA | UNI | 11 1200 700 020 | 1018 |
| 700 | 4,4/3,2 | 30 | 46 WZ | UNI | 11 1250 700 010 | 964 |
| 700 | 4,2/3,2 | 30 | 84 WZ | UNI | 11 1260 700 010 | 965 |
| 700 | 6,0/4,5 | 30 | 42 FLA | - | 11 1345 700 010 | 1041 |
| 710 | 6,5/5,0 | Auf Anfrage / On request | | | 10 7050 | 889 |
| 720 | 6,0/4,4 | 30 | 72 WZ | 8-8,5-120 Angesenkt 4-8,1-90 Versetzt 2-14-400 Versetzt | 11 1300 720 010 | 991 |
| 720 | 6,0/4,4 | 30 | 48 WZ | | 11 1300 720 020 | 991 |
| 720 | 6,0/4,4 | 30 | 72 WZ | | 11 1300 720 030 | 991 |
| 735 | 6,0/4,4 | 30 | 72 WZ | 4-8,5-90+2-15-415 | 11 1300 735 010 | 991 |
| 760 | 6,0/5,0 | Auf Anfrage / On request | | | 10 7050 | 889 |
| 760 | 6,0/4,4 | 30 | 72 WZ | 4-8,5-90+2-15-415 | 11 1300 760 010 | 991 |
| 800 | 4,8/3,6 | 30 | 60 WZA | UNI | 11 1200 800 010 | 1018 |
| 800 | 6,0/4,4 | 30 | 72 WZ | 8-8,5-160 Angesenkt 4-8,1-90 Versetzt 2-14-400 Versetzt | 11 1300 800 010 | 991 |
| 800 | 6,0/4,4 | 30 | 80 WZ | 4-8,5-90+2-15-415 | 11 1300 800 020 | 991 |
| 1020 | 8,8/7,2 | Auf Anfrage / On request | | | 10 7050 | 889 |
| 1300 | 7,5/6,0 | Auf Anfrage / On request | | | 10 7050 | 889 |
| 1400 | 8,0/6,5 | Auf Anfrage / On request | | | 10 7050 | 889 |
| 1560 | 7,0/6,2 | Auf Anfrage / On request | | | 10 7050 | 889 |



| | Type | Ø | | | Type | Ø | | | Type | Ø | |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| Index | Index | Index | Index | Index | Index | Index | Index | Index | Index | Index | Index |



MASCHINENHERSTELLER ALPHABETISCH MIT PASSENDEM BLATT-Ø + BOHRUNG
 MACHINE MANUFACTURER IN ALPHABETICAL ORDER WITH MATCHING BLADE-Ø + BORE-Ø



| | Type | Ø | | | Type | Ø | | | Type | Ø | |
|---------|-----------------|---------|----|----------------|--------------------------------|---------|-------|----------|----------------|-----|------|
| De Walt | DW 936 | 136 | 10 | De Walt | D 23620 K | 180/184 | 16 | Elu | MH 265 | 190 | 30 |
| De Walt | DW 936 K | 136 | 10 | De Walt | DW 62 | 180/184 | 16 | Elu | MH 30 | 200 | 30 |
| De Walt | DW 351 | 150 | 20 | De Walt | DW 62 K | 180/184 | 16 | Elu | MH 182 | 210 | 30 |
| De Walt | D 23550 | 165 | 20 | Einhell | BHS 55 | 160 | 20 | Elu | MH 30 | 210 | 30 |
| De Walt | D 23551 | 165 | 20 | Einhell | HES 160 | 160 | 20 | Elu | MH 82 | 210 | 30 |
| De Walt | DC 310 | 165 | 20 | Einhell | HES 55 | 160 | 20 | Elu | MH 182 | 215 | 30 |
| De Walt | DC 390 | 165 | 20 | Einhell | HK-G 55 | 160 | 20 | Elu | MH 30 | 215 | 30 |
| De Walt | DC 390 KA/3 | 165 | 20 | Einhell | HES 200 | 200 | 30 | Elu | MH 82 | 215 | 30 |
| De Walt | DC 390 KB | 165 | 20 | Einhell | KGF 205 | 205 | 18 | Elu | ETS 41 | 216 | 30 |
| De Walt | DC 390 N | 165 | 20 | Einhell | TK 220 | 220 | 30 | Elu | MH 182 | 216 | 30 |
| De Walt | DW 007 | 165 | 10 | Elektra Beckum | DS 140 - Duplo | 100 | 22 | Elu | MH 274 | 216 | 30 |
| De Walt | DW 007 K | 165 | 10 | Elektra Beckum | MBR 100 Schatten- fugensäge | 100 | 22 | Elu | PS 174 | 216 | 30 |
| De Walt | DWS 520 | 165 | 20 | Elektra Beckum | Multi 180 | 200 | 30 | Elu | PS 274 | 216 | 30 |
| De Walt | DW 934 | 173 | 20 | Elektra Beckum | KS 205 | 205 | 18 | Elu | PS 274 E | 216 | 30 |
| De Walt | DW 934 K 2 | 173 | 20 | Elektra Beckum | TK 205 | 205 | 18 | Elu | MH 286 | 240 | 30 |
| De Walt | DW 934 K 2 H | 173 | 20 | Elektra Beckum | GKS 255 | 210 | 30 | Elu | MH 85 | 240 | 30 |
| De Walt | DW 62 | 184 | 16 | Elektra Beckum | PK 200 | 210 | 30 | Elu | ETS 21 | 250 | 30 |
| De Walt | DW 365 | 190 | 30 | Elektra Beckum | UK 220 | 210 | 30 | Elu | ETS 23 | 250 | 30 |
| De Walt | DW 65 | 190 | 30 | Elektra Beckum | UK 220 E | 210 | 30 | Elu | ETS 31 | 250 | 30 |
| De Walt | DW 700 | 216 | 30 | Elektra Beckum | Secanta | 220 | 30 | Elu | ETS 33 | 250 | 30 |
| De Walt | DW 701 | 216 | 30 | Elektra Beckum | GKS 300 | 250 | 30 | Elu | RAS 1251 | 250 | 30 |
| De Walt | DW 707 | 216 | 30 | Elektra Beckum | GKS 301 | 250 | 30 | Elu | RAS 1253 | 250 | 30 |
| De Walt | DW 383 | 235 | 30 | Elektra Beckum | GKS 303 | 250 | 30 | Elu | RKS 1251 | 250 | 30 |
| De Walt | DW 86 | 240 | 30 | Elektra Beckum | GKS 331 | 250 | 30 | Elu | RKS 1253 | 250 | 30 |
| De Walt | DW 100 | 250 | 16 | Elektra Beckum | KGS 250 | 250 | 30 | Elu | TGS 170 | 250 | 30 |
| De Walt | DW 110 | 250 | 16 | Elektra Beckum | KGS 300 | 250 | 30 | Elu | TGS 171 | 250 | 30 |
| De Walt | DW 111 | 250 | 16 | Elektra Beckum | KGS 330 | 250 | 30 | Elu | TGS 172 | 250 | 30 |
| De Walt | DW 125 | 250 | 30 | Elektra Beckum | KGS 500 | 250 | 30 | Elu | TGS 173 | 250 | 30 |
| De Walt | DW 1251 | 250 | 30 | Elektra Beckum | KGT 500 | 250 | 30 | Elu | TGS 271 | 250 | 30 |
| De Walt | DW 150 | 250 | 30 | Elektra Beckum | KGT 501 | 250 | 30 | Elu | TGS 273 | 250 | 30 |
| De Walt | DW 1501 | 250 | 30 | Elektra Beckum | KGT 550 | 250 | 30 | Elu | TKS 170 | 250 | 30 |
| De Walt | DW 1503 | 250 | 30 | Elektra Beckum | KS 250 | 250 | 20 | Elu | TKS 171 | 250 | 30 |
| De Walt | DW 250 | 250 | 30 | Elektra Beckum | Multi 260 | 250 | 30 | Elu | TKS 172 | 250 | 30 |
| De Walt | DW 252 | 250 | 30 | Elektra Beckum | Multi310 | 250 | 30 | Elu | TKS 173 | 250 | 30 |
| De Walt | DW 320 | 250 | 30 | Elektra Beckum | PK 250 | 250 | 30/20 | Elu | EMTS 711 | 260 | 30 |
| De Walt | DW 702 | 250 | 30 | Elektra Beckum | PK 250 K | 250 | 30/20 | Elu | DG 79 | 300 | 30 |
| De Walt | DW 703 | 250 | 30 | Elektra Beckum | PK 255 | 250 | 30/20 | Elu | ETS 3003 | 300 | 30 |
| De Walt | DW 710 | 250 | 30 | Elektra Beckum | PKF 255 | 250 | 30/20 | Elu | MGS 72 | 300 | 30 |
| De Walt | DW 720 K | 250 | 30 | Elektra Beckum | PKF255 V 8 | 250 | 30/20 | Elu | MGS 73 | 300 | 30 |
| De Walt | DW 742 | 250 | 30 | Elektra Beckum | UK 250 | 250 | 30 | Elu | EMS 705 | 305 | 30 |
| De Walt | DW 743 | 250 | 30 | Elektra Beckum | UK 330 | 250 | 30/20 | Elu | PS 374 | 305 | 30 |
| De Walt | DW 744 | 250 | 30 | Elektra Beckum | PK 300 | 300 | 30 | Elu | RAS 1603 | 350 | 30 |
| De Walt | DW 746 K | 250 | 30 | Elektra Beckum | PKV 300 G | 300 | 30 | Elu | RKS 1603 | 350 | 30 |
| De Walt | DW 709 | 260 | 30 | Elektra Beckum | THKS 315 | 315 | 30 | Elu | MTS 24 | 355 | 25,4 |
| De Walt | DW 711 | 260 | 30 | Elektra Beckum | TK 315 | 315 | 30 | Elu | DG 102 | 420 | 30 |
| De Walt | 1370 | 300 | 30 | Elektra Beckum | TK Combi HSG | 315 | 30 | Elu | DG 104 | 420 | 30 |
| De Walt | 1635 | 300 | 30 | Elektra Beckum | TK Export HG | 315 | 30 | Elu | MGS 105 | 420 | 30 |
| De Walt | 1875 | 300 | 30 | Elektra Beckum | TKH 315 | 315 | 30 | Elu | SA 103/20 | 420 | 30 |
| De Walt | 8003 | 300 | 30 | Elektra Beckum | TKHS 315 | 315 | 30 | Elumatec | DG 163 | 280 | 32 |
| De Walt | 1420 S | 300 | 30 | Elektra Beckum | TK 350 | 350 | 30 | Elumatec | RS 160 | 280 | 32 |
| De Walt | 1600 S | 300 | 30 | Elektra Beckum | BKH 400 | 400 | 30 | Elumatec | TS 161 | 280 | 32 |
| De Walt | 1635/3L | 300 | 30 | Elektra Beckum | BKH 500 | 400 | 30 | Elumatec | KS 101 | 300 | 32 |
| De Walt | 1635/4L | 300 | 30 | Elektra Beckum | BKS 400 | 400 | 30 | Elumatec | MGS 460 | 300 | 32 |
| De Walt | 2155/4 | 300 | 30 | Elektra Beckum | BS 3100 | 400 | 30 | Elumatec | DG 79/03-05 | 330 | 32 |
| De Walt | 3 L | 300 | 30 | Elektra Beckum | BS 3100 W | 400 | 30 | Elumatec | DG 79/50 | 330 | 32 |
| De Walt | 4 L | 300 | 30 | Elektra Beckum | BS 4200 | 400 | 30 | Elumatec | MGS 72/04 | 330 | 32 |
| De Walt | DW 1370 | 300 | 30 | Elektra Beckum | BS 5500 W | 400 | 30 | Elumatec | MGS 73/23 | 330 | 32 |
| De Walt | DW 721 | 300 | 30 | Elektra Beckum | BKH 450 | 450 | 30 | Elumatec | SA 73/25 | 330 | 32 |
| De Walt | DW 722 K | 300 | 30 | Elektra Beckum | BKS 450 | 450 | 30 | Elumatec | DG 79/30-32 | 380 | 32 |
| De Walt | DW 725 K | 300 | 30 | Elektra Beckum | BS 6000 | 450 | 30 | Elumatec | DG 79/51 | 380 | 32 |
| De Walt | DW 726 K | 300 | 30 | Elektra Beckum | BS 8000 D | 450 | 30 | Elumatec | MGS 72/30 | 380 | 32 |
| De Walt | DW 810 | 300 | 30 | Elektra Beckum | BW 500 | 450 | 30 | Elumatec | MGS 73/33 | 380 | 32 |
| De Walt | MC 20 | 300 | 32 | Elektra Beckum | BS 600 | 500 | 30 | Elumatec | SA 73/35 | 380 | 32 |
| De Walt | DW 704 | 305 | 30 | Elektra Beckum | BS 6000 D | 500 | 30 | Elumatec | DG 102 | 420 | 30 |
| De Walt | DW 705 | 305 | 30 | Elektra Beckum | BW 500 | 500 | 30 | Elumatec | DG 104 | 420 | 30 |
| De Walt | DW 706 | 305 | 30 | Elektra Beckum | BW 4000 | 700 | 30 | Elumatec | DG 140 | 420 | 30 |
| De Walt | DW 708 | 305 | 30 | Elektra Beckum | BW 750 | 700 | 30 | Elumatec | MGS 105 | 420 | 30 |
| De Walt | 1365 GL | 350 | 30 | Elu | DS 140 - Duplo | 100 | 22 | Elumatec | MGS 461 | 420 | 30 |
| De Walt | 2155 G | 350 | 30 | Elu | MBR 100 Schatten- fugensäge | 100 | 22 | Elumatec | SA 103/25 | 420 | 30 |
| De Walt | C 14 | 350 | 30 | Elu | MH 25 | 100 | 12 | Elumatec | DG 142 | 500 | 30 |
| De Walt | DW 1600 S | 350 | 30 | Elu | DS 140 Doublo | 102 | 22 | Elumatec | MGS 142 | 500 | 30 |
| De Walt | DW 728 K | 350 | 30 | Elu | DS 140 Doublo | 105 | 22 | Elumatec | SA 142 | 500 | 30 |
| De Walt | DW 729 K | 350 | 30 | Elu | Akku | 136 | 10 | Elumatec | DG 204 | 550 | 30 |
| De Walt | 1634 | 400 | 30 | Elu | MHA 14 KA | 136 | 10 | Elumatec | DG 240 | 550 | 30 |
| De Walt | 1600 S | 400 | 30 | Elu | MHA 18 KA | 136 | 10 | Elumatec | MGS 205 | 550 | 30 |
| De Walt | 1635 GL | 400 | 30 | Elu | MH 14 (alte Ausführung) | 140 | 15 | Emco | EMCOSTAR 3000 | 200 | 30 |
| De Walt | 1635/6L | 400 | 30 | Elu | MH 151 | 150 | 20 | Emco | Emco-Star 3000 | 200 | 30 |
| De Walt | 2155 G | 400 | 30 | Elu | MH 18 (alte Ausführung) | 150 | 15 | Emco | Universal | 200 | 15 |
| De Walt | 2155/6 | 400 | 30 | Elu | MH 18 (neue Aus- führung) | 150 | 30 | Emco | EMCO Rex 2000 | 250 | 20 |
| De Walt | 6 L | 400 | 30 | Elu | MH 155 | 170 | 30 | Emco | Emco-Multistar | 250 | 30 |
| De Walt | C 14 | 400 | 30 | Elu | MH 55 | 170 | 30 | Emco | Emco-Unistar | 250 | 30 |
| De Walt | 6 K | 500 | 30 | Elu | MH 65 | 180 | 30 | Emco | MK 81 | 250 | 30 |
| De Walt | 6 L | 500 | 30 | Elu | MH 165 | 190 | 30 | Emco | Super. 1011 | 250 | 20 |
| De Walt | DA 1635 | 500 | 30 | Elu | | | | Emco | M 50 L | 220 | 30 |
| De Walt | DA 1635/6K + 6L | 500 | 30 | Elu | | | | Eumenia | ML 50 L | 220 | 30 |
| De Walt | D 23620 | 180/184 | 16 | Elu | | | | Fein | SSK 646 | 150 | 20 |





1



2



3



4



5



6



7



8





9



Index



| | Type | Ø | |
|-----------|-----------------------------|---------|----|
| Fein | SSL 646 | 150 | 20 |
| Fein | SSK 660 | 160 | 20 |
| Fein | SSK 661 | 210 | 30 |
| Felisatti | TP 751 | 150 | 20 |
| Felisatti | TP 756 | 160 | 20 |
| Felisatti | M 75 | 250 | 20 |
| Felisatti | M 76 | 250 | 20 |
| FERM | KS-160 | 160 | 20 |
| FERM | FKS-165 | 165 | 20 |
| FERM | FKS-165L | 165 | 20 |
| FERM | FKS-180 | 180 | 20 |
| FERM | ECONOMY EBF-185 | 180/184 | 20 |
| FERM | FDCS-185 | 180/184 | 20 |
| FERM | FDCS-185L | 180/184 | 20 |
| FERM | FKS-185 | 180/184 | 20 |
| FERM | FKS-185L | 180/184 | 20 |
| Festo | AUF 35 S 4 Schatten-nutsäge | 105 | 20 |
| Festo | AUF 35/S3,4 | 105 | 20 |
| Festo | AU 35 S 2 | 120 | 20 |
| Festo | Auf 35-51 | 120 | 20 |
| Festo | AUF 35 | 125 | 20 |
| Festo | S 4 | 125 | 20 |
| Festo | AF 45 E | 150 | 30 |
| Festo | AXF 45 | 150 | 30 |
| Festo | AAU | 160 | 30 |
| Festo | AP 55 | 160 | 20 |
| Festo | AP 55 E | 160 | 20 |
| Festo | AP 55 E 8 | 160 | 20 |
| Festo | AP 55 EB | 160 | 20 |
| Festo | AP 55 EB-Plus | 160 | 20 |
| Festo | AP 55 E-FS | 160 | 20 |
| Festo | AP 55 Plus | 160 | 20 |
| Festo | AP 55-FS | 160 | 20 |
| Festo | AT 55 EB | 160 | 20 |
| Festo | AT 55 EFS | 160 | 20 |
| Festo | AT 55 E-FS | 160 | 20 |
| Festo | ATB 55-EFS | 160 | 20 |
| Festo | ATF 55 | 160 | 20 |
| Festo | ATF 55 - EFS | 160 | 20 |
| Festo | ATF 55 BE | 160 | 20 |
| Festo | ATF 55 E | 160 | 20 |
| Festo | ATF 55 EB | 160 | 20 |
| Festo | ATF 55 E-FS | 160 | 20 |
| Festo | ATF 55 FS | 160 | 20 |
| Festo | AU 50 | 160 | 30 |
| Festo | AUP 50 | 160 | 30 |
| Festo | Basis-Set 1 A | 160 | 20 |
| Festo | TS 55 | 160 | 20 |
| Festo | TS 55 R | 160 | 20 |
| Festo | TS 55 REBQ-Plus | 160 | 20 |
| Festo | TS 55 REBQ-Plus-FS | 160 | 20 |
| Festo | TS 55 RQ-Plus | 160 | 20 |
| Festo | AM 42 A | 170 | 30 |
| Festo | AM 42 S | 170 | 30 |
| Festo | AM 42 STA | 170 | 30 |
| Festo | AMT 42 S | 170 | 30 |
| Festo | AT 55 | 170 | 30 |
| Festo | AT 55 C | 170 | 30 |
| Festo | AU 42 A | 170 | 30 |
| Festo | AU 42 S | 170 | 30 |
| Festo | AUT 42 | 170 | 30 |
| Festo | AXT 50 LA | 170 | 30 |
| Festo | AXT 55 | 170 | 30 |
| Festo | AU 55 S | 180 | 30 |
| Festo | AU 60 P | 180 | 30 |
| Festo | AU 60 S | 180 | 30 |
| Festo | AUP 60 S | 180 | 30 |
| Festo | AUT 60 S | 180 | 30 |
| Festo | AP 65 | 190 | 30 |
| Festo | AP 65 E | 190 | 30 |
| Festo | AP 65 E - FS | 190 | 30 |
| Festo | AP 65 EB - FS | 190 | 30 |
| Festo | AP 65 EB-FS | 190 | 30 |
| Festo | AP 65 E-FS | 190 | 30 |
| Festo | AT 65 | 190 | 30 |
| Festo | AT 65 E | 190 | 30 |
| Festo | AT 65 E - FS | 190 | 30 |
| Festo | AT 65 EB | 190 | 30 |
| Festo | AT 65 EB-FS | 190 | 30 |
| Festo | AT 65 E-FS | 190 | 30 |
| Festo | ATF 65 | 190 | 30 |
| Festo | AD 65 | 200 | 30 |
| Festo | AP 68 E | 200 | 30 |
| Festo | AU 65 - S | 200 | 30 |
| Festo | AU 65-S | 200 | 30 |

| | Type | Ø | |
|---------|--------------|---------|----|
| Festo | AUP 65 S | 200 | 30 |
| Festo | AUT 65 S | 200 | 30 |
| Festo | AXP 65 | 200 | 30 |
| Festo | AU 77 S | 220 | 30 |
| Festo | Compact S 70 | 225 | 30 |
| Festo | CS 70 EB | 225 | 30 |
| Festo | F 70 | 225 | 30 |
| Festo | AU 80 S | 230 | 30 |
| Festo | AO 85 E-FS | 240 | 30 |
| Festo | AP 85 | 240 | 30 |
| Festo | AP 85 E | 240 | 30 |
| Festo | AP 85 E-FS | 240 | 30 |
| Festo | AP 88 | 240 | 30 |
| Festo | AP 88 E | 240 | 30 |
| Festo | AXP 85 | 240 | 30 |
| Festo | AD 85 | 250 | 30 |
| Festo | AE 85 | 250 | 30 |
| Festo | AD 100/1 | 280 | 30 |
| Festo | AD 100 | 290 | 30 |
| Festo | AD 100-1 | 290 | 30 |
| Festo | AD 100-2 | 290 | 30 |
| Festo | AXP 130 | 350 | 30 |
| Festo | AXP 132 | 350 | 30 |
| Festo | AXP 132 E | 350 | 30 |
| Festo | BD 125 | 350 | 30 |
| Festo | BD 145/1 | 400 | 30 |
| Festo | BD 170 | 450 | 30 |
| Festo | AT 55 E | 160/170 | 30 |
| Festo | AUT 42 S | 170/180 | 30 |
| Fezer | KG 20 | 200 | 18 |
| Fezer | KG 20 | 205 | 18 |
| Fezer | KG 25 | 250 | 32 |
| Fezer | KG 30 | 300 | 32 |
| FLEX | CS 3455 | 160 | 20 |
| Flott | 1000 | 250 | 20 |
| Flott | 1011 | 250 | 30 |
| Flott | 2000 | 250 | 20 |
| Flott | 2011 | 250 | 30 |
| Flott | 3011 | 250 | 30 |
| Flott | K 4500 | 250 | 30 |
| Flott | Profi 2001 | 250 | 20 |
| Flott | Profi 3000 | 250 | 20 |
| Graule | TS | 180 | 40 |
| Graule | AKF 1 | 200 | 40 |
| Graule | AKF 4/200 | 200 | 40 |
| Graule | AKF 2 | 250 | 40 |
| Graule | AKF 4/250 | 250 | 40 |
| Graule | AKF 6/250 | 250 | 40 |
| Graule | KS | 250 | 40 |
| Graule | TS | 250 | 40 |
| Graule | AGT | 300 | 40 |
| Graule | AKF 6/300 | 300 | 40 |
| Graule | Typ 85 | 300 | 40 |
| Graule | ZS 85 | 300 | 40 |
| Graule | Typ 135 | 350 | 40 |
| Graule | ZS 135 | 350 | 40 |
| Graule | Typ 170 | 420 | 40 |
| Graule | ZS 170 | 420 | 40 |
| Graule | ZS 170 N | 420 | 40 |
| Graule | ZS 200 | 520 | 50 |
| Gross | 160 A | 160 | 25 |
| Gross | HKS 160 A | 160 | 25 |
| Gross | 200 B | 200 | 25 |
| Gross | 250 B | 250 | 25 |
| Güde | HKS 1200 | 180/184 | 20 |
| Güde | HKS 1600 L | 180/184 | 20 |
| Haffner | RF 30 | 100 | 20 |
| Haffner | RF 60 | 100 | 20 |
| Haffner | KSU 40 | 120 | 20 |
| Haffner | KSU 105 | 125 | 20 |
| Haffner | KSU 50 | 160 | 20 |
| Haffner | KS 110 | 170 | 30 |
| Haffner | KSU 110 | 170 | 30 |
| Haffner | KSU 113 | 180 | 30 |
| Haffner | KSU 60 alt | 180 | 30 |
| Haffner | KSU 60 neu | 180 | 20 |
| Haffner | KS 75 | 210 | 30 |
| Haffner | KL 177 | 220 | 30 |
| Haffner | KL 178 | 220 | 30 |
| Haffner | KSU 118 | 220 | 30 |
| Haffner | KL 176 | 230 | 30 |
| Haffner | KS 85 | 230 | 30 |
| Haffner | KSU 85 | 230 | 30 |
| Haffner | SP 187 | 230 | 30 |
| Haffner | US 85 | 230 | 30 |

| | Type | Ø | |
|---------|--------------|-----|----|
| Haffner | 2 D | 250 | 30 |
| Haffner | 2 W | 250 | 30 |
| Haffner | AKS | 250 | 30 |
| Haffner | GS 1 | 250 | 30 |
| Haffner | GS 150 | 250 | 30 |
| Haffner | GS 165 | 250 | 30 |
| Haffner | GS 166 | 250 | 30 |
| Haffner | SP 189 | 250 | 30 |
| Haffner | SP 195 | 250 | 30 |
| Haffner | SP 196 | 250 | 30 |
| Haffner | SP 197 | 250 | 30 |
| Haffner | SP 198 | 250 | 30 |
| Haffner | TG 161 | 250 | 30 |
| Haffner | TG 162 | 250 | 30 |
| Haffner | TG 163 | 250 | 30 |
| Haffner | TGS 161 | 250 | 30 |
| Haffner | TGS 162 | 250 | 30 |
| Haffner | TGS 163 | 250 | 30 |
| Haffner | TGS 198 | 250 | 30 |
| Haffner | GS 146 | 300 | 30 |
| Haffner | GS 147 | 300 | 30 |
| Haffner | GS 155 | 300 | 30 |
| Haffner | GS 156 | 300 | 30 |
| Haffner | GS 157 | 300 | 30 |
| Haffner | GS 158 | 300 | 30 |
| Haffner | GS 183 | 300 | 30 |
| Haffner | GS 183 M | 300 | 30 |
| Haffner | KS 120 | 300 | 30 |
| Haffner | SP 223 | 300 | 30 |
| Haffner | SP 224 | 300 | 30 |
| Haffner | TGS 168 | 300 | 30 |
| Haffner | TGS 169 | 300 | 30 |
| Haffner | TGS 200 | 300 | 30 |
| Haffner | DGS 180 | 330 | 30 |
| Haffner | DGS 182 | 330 | 30 |
| Haffner | GSA 180 | 330 | 30 |
| Haffner | GSM 180 | 330 | 30 |
| Haffner | GS 159 | 350 | 30 |
| Haffner | GS 160 | 350 | 30 |
| Haffner | DG 181 | 400 | 30 |
| Haffner | DGS 181 | 400 | 30 |
| Haffner | DGS 184 | 400 | 30 |
| Haffner | DGS 184 E | 400 | 30 |
| Haffner | GS 184 | 400 | 30 |
| Haffner | GSA 183 | 400 | 30 |
| Haffner | GSM 183 | 400 | 30 |
| Haffner | KS 155 | 400 | 30 |
| Haffner | ZS 640 | 400 | 30 |
| Haffner | ZS 800 | 400 | 30 |
| Haffner | DGS 123 | 450 | 30 |
| Haffner | DGS 125 | 450 | 30 |
| Haffner | GS 123 | 450 | 30 |
| Haffner | DGS 124 | 500 | 30 |
| Haffner | DGS 126 | 500 | 30 |
| Haffner | DGS 185 | 500 | 30 |
| Haffner | DGS 187 | 500 | 30 |
| Haffner | DGS 202 | 500 | 30 |
| Haffner | GS 124 | 500 | 30 |
| Haffner | GS 161 | 500 | 30 |
| Haffner | GS 162 | 500 | 30 |
| Hanning | TK 20 N | 200 | 16 |
| Hanning | TK 20 S | 200 | 16 |
| Hanning | TK 200 | 200 | 16 |
| Hanning | TK 300 | 200 | 16 |
| Hanning | ZK 205 | 200 | 16 |
| Hanning | 3 SV | 315 | 30 |
| Hanning | 315/1.6 | 315 | 30 |
| Hanning | 315/3.0 | 315 | 30 |
| Hanning | 4.0 | 315 | 30 |
| Hanning | HTK 315 | 315 | 30 |
| Hanning | HTK 315/3 SV | 315 | 30 |
| Hilti | WSC 255 | 160 | 20 |
| Hilti | WSC 55 | 160 | 20 |
| Hilti | WSC 85 | 230 | 30 |
| Hitachi | C 5 Y | 125 | 20 |
| Hitachi | C 5 | 150 | 20 |
| Hitachi | CM 6 | 150 | 20 |
| Hitachi | FC 5 | 150 | 20 |
| Hitachi | FC 5 A | 150 | 20 |
| Hitachi | FC 5 SA | 150 | 20 |
| Hitachi | FC 5 SA 1 | 150 | 20 |
| Hitachi | SA | 150 | 20 |
| Hitachi | SA 1 | 150 | 20 |
| Hitachi | C 6 | 160 | 20 |
| Hitachi | C 6 DA | 160 | 20 |
| Hitachi | C 60 A | 160 | 20 |

|  | Type | Ø |  |
|--|--------------|---------|---|
| Hitachi | DA | 160 | 20 |
| Hitachi | FC 6 A | 160 | 20 |
| Hitachi | FC 6 SA | 160 | 20 |
| Hitachi | FC 65 A | 160 | 20 |
| Hitachi | C 18 DL | 165 | 30 |
| Hitachi | C 6 BU | 165 | 30 |
| Hitachi | C 6 BU2 | 165 | 30 |
| Hitachi | C 6 DD-Akku | 165 | 30 |
| Hitachi | C 6 U | 165 | 30 |
| Hitachi | C 6 U2 | 165 | 30 |
| Hitachi | C 6 SA | 170 | 30 |
| Hitachi | PSU 6 | 170 | 30 |
| Hitachi | FC 7 SA | 190 | 30 |
| Hitachi | PSM 7 | 190 | 30 |
| Hitachi | PSU 7 | 190 | 30 |
| Hitachi | C 8 FA | 210 | 30 |
| Hitachi | C 8 U | 210 | 30 |
| Hitachi | PSM 8 | 210 | 30 |
| Hitachi | PSU 8 | 210 | 30 |
| Hitachi | C 9 U | 235 | 30 |
| Hitachi | PSM 9 | 240 | 30 |
| Hitachi | PSU 9 | 240 | 30 |
| Hitachi | U 210 | 250 | 30 |
| Hitachi | C 10 FB | 255 | 30 |
| Hitachi | C 10 FCA | 255 | 30 |
| Hitachi | C 10 RA | 255 | 30 |
| Hitachi | C 13 U | 335 | 30 |
| Hitachi | PSU 13 | 335 | 30 |
| Hitachi | C 7 BU | 180/184 | 30 |
| Hitachi | C 7 U | 180/184 | 30 |
| Hitachi | P 7 U | 180/184 | 30 |
| Hitachi | C 8 FC | 215/216 | 30 |
| Hitachi | C 8 FS | 215/216 | 30 |
| Holz-Her | KS 5-1 | 105 | 22 |
| Holz-Her | 170 | 140 | 20 |
| Holz-Her | 260 | 140 | 20 |
| Holz-Her | 270 | 140 | 20 |
| Holz-Her | 2260 | 140 | 20 |
| Holz-Her | 2270 | 140 | 20 |
| Holz-Her | 264 | 160 | 20 |
| Holz-Her | 1420 | 160 | 20 |
| Holz-Her | 2103 | 160 | 20 |
| Holz-Her | 2104 | 160 | 20 |
| Holz-Her | 2105 | 160 | 20 |
| Holz-Her | 2106 | 160 | 20 |
| Holz-Her | 2107 | 160 | 20 |
| Holz-Her | 2108 | 160 | 20 |
| Holz-Her | HKU 264 | 160 | 20 |
| Holz-Her | HKU 50 | 160 | 20 |
| Holz-Her | HKUS 50 | 160 | 20 |
| Holz-Her | 281 | 170 | 30 |
| Holz-Her | 1563 | 170 | 30 |
| Holz-Her | 2215 | 170 | 30 |
| Holz-Her | 2266 | 170 | 30 |
| Holz-Her | 2271 | 170 | 30 |
| Holz-Her | 2281 | 170 | 30 |
| Holz-Her | 2115 (t 55a) | 170 | 30 |
| Holz-Her | 55 A | 170 | 30 |
| Holz-Her | HKUS 266 | 170 | 30 |
| Holz-Her | HKUS 281 | 170 | 30 |
| Holz-Her | 269 | 180 | 30 |
| Holz-Her | 272 | 180 | 30 |
| Holz-Her | 282 | 180 | 30 |
| Holz-Her | 2112 | 180 | 30 |
| Holz-Her | 2272 | 180 | 30 |
| Holz-Her | 2291 | 180 | 30 |
| Holz-Her | 2292 | 180 | 30 |
| Holz-Her | HKU 55 | 180 | 30 |
| Holz-Her | HKUS 55 | 180 | 30 |
| Holz-Her | 2114 | 190 | 30 |
| Holz-Her | 2116 | 190 | 30 |
| Holz-Her | 2117 | 190 | 30 |
| Holz-Her | 2119 | 190 | 30 |
| Holz-Her | 2126 | 190 | 30 |
| Holz-Her | 2127 | 190 | 30 |
| Holz-Her | 2269 | 190 | 30 |
| Holz-Her | 2282 | 190 | 30 |
| Holz-Her | Derby 2214 | 190 | 30 |
| Holz-Her | 2113 | 200 | 30 |
| Holz-Her | 2555 | 200 | 30 |
| Holz-Her | HK 201 | 200 | 30 |
| Holz-Her | 284 | 210 | 30 |
| Holz-Her | 2264 | 210 | 30 |
| Holz-Her | 2267 | 210 | 30 |
| Holz-Her | 2284 | 210 | 30 |
| Holz-Her | PKS 267 | 210 | 30 |

|  | Type | Ø |  |
|---|-------------------------|-------------|--|
| Holz-Her | Leistungssäge 2141 | 216 | 30 |
| Holz-Her | 274 | 220 | 30 |
| Holz-Her | 1205 | 220 | 30 |
| Holz-Her | 1331 | 220 | 30 |
| Holz-Her | 1342 | 220 | 30 |
| Holz-Her | 1345 | 220 | 30 |
| Holz-Her | 1346 | 220 | 30 |
| Holz-Her | 2274 | 220 | 30 |
| Holz-Her | HKU 75 | 220 | 30 |
| Holz-Her | PKS 75 | 220 | 30 |
| Holz-Her | 2118 | 230 | 30 |
| Holz-Her | 2120 | 230 | 30 |
| Holz-Her | 2293 | 230 | 30 |
| Holz-Her | 2294 | 230 | 30 |
| Holz-Her | 268 | 240 | 30 |
| Holz-Her | 2268 | 240 | 30 |
| Holz-Her | HKD 65 | 240 | 30 |
| Holz-Her | HKS 2128 | 240 | 30 |
| Holz-Her | 275 | 300 | 30 |
| Holz-Her | 1211 | 300 | 30 |
| Holz-Her | 1212 | 300 | 30 |
| Holz-Her | 1213 | 300 | 30 |
| Holz-Her | 1215 | 300 | 30 |
| Holz-Her | 1220 | 300 | 30 |
| Holz-Her | HKD 85 | 300 | 30 |
| Holz-Her | PK 1225 | 300 | 30 |
| Holz-Her | PK 1230 | 300 | 30 |
| Holz-Her | PKS 1210 | 300 | 30 |
| Holz-Her | 150 | 350 | 30 |
| Holz-Her | 276 | 350 | 30 |
| Holz-Her | HKS 130 | 350 | 30 |
| Holz-Her | 277 | 400 | 30 |
| Holz-Her | B 7 K | 400 | 30 |
| Holz-Her | HKS 155 | 400 | 30 |
| Holz-Her | 2171 | 130/132/134 | 20 |
| Holz-Her | Derby 2110 | 130/132/134 | 20 |
| Holz-Her | Mosquito 2111 | 130/132/134 | 20 |
| Holz-Her | 2279 | 210/220 | 30 |
| INCA | 51 | 150 | 15 |
| INCA | 54 | 150 | 15 |
| INCA | Major | 250 | 20 |
| Jepson | 8219 | 192 | 20 |
| Jepson | 8230N | 230 | 25,4 |
| Jepson | Dry-Miter Cutter 9211 D | 255 | 25,4 |
| Jepson | 9312 | 305 | 25,4 |
| Jepson | 9430 | 305 | 25,4 |
| Jepson | Dry-Cutter 9312/E | 305 | 25,4 |
| Jepson | 9314 | 355 | 25,4 |
| Jepson | 9435 | 355 | 25,4 |
| Jepson | SuperDry-Cutter 9314 | 355 | 25,4 |
| Kango | 6235 | 150 | 20 |
| Kango | 6070 | 184 | 16 |
| Kity | 511 | 150 | 15 |
| Kity | 626 | 150 | 20 |
| Kity | 1611 | 150 | 15 |
| Kity | 1616 | 150 | 15 |
| Kity | 510 | 180 | 15 |
| Kity | 616 | 180 | 15 |
| Kity | 617 | 180 | 15 |
| Kity | 2617 | 180 | 15 |
| Kity | 618 | 200 | 30 |
| Kity | 0419 | 200 | 30 |
| Kity | Junior 6 | 200 | 30 |
| Kity | Kombi 2000 | 200 | 30 |
| Kity | Kombi 5023 | 200 | 30 |
| Kity | KR 419 | 200 | 30 |
| Kity | KR 619 | 200 | 30 |
| Kity | 608 | 250 | 30 |
| Kity | 609 | 250 | 30 |
| Kity | 619 | 250 | 30 |
| Kity | 1609 | 250 | 30 |
| Kity | 5519 | 250 | 30 |
| Kity | 5619 | 250 | 30 |
| Kity | 6619 | 250 | 30 |
| Kity | SC 250 | 250 | 20 |
| Kity | SCE 1600 | 250 | 30 |
| Kity | SCE 250 | 250 | 30 |
| Kity | 1619 | 270 | 30 |
| Kity | 9619 | 270 | 30 |
| Kity | Formatkreissäge 618/619 | 270 | 30 |
| Kity | Kombi 609 | 270 | 30 |
| Kity | 819 | 315 | 30 |
| Kress | 6000 | 150 | 13 |
| Kress | 6006 | 150 | 13 |
| Kress | 6010 | 150 | 13 |

|  | Type | Ø |  |
|---|--------------------------|-----|---|
| Kress | 6018 | 150 | 13 |
| Kress | HKS 400 | 150 | 13 |
| Kress | HKS 6006 | 150 | 13 |
| Kress | HKS 6018 | 150 | 13 |
| Kress | PK 710 | 150 | 13 |
| Kress | PK 710 HK | 150 | 13 |
| Kress | XMC 9060 | 150 | 13 |
| Kress | 6050 | 160 | 20 |
| Kress | 6055 | 160 | 20 |
| Kress | 1050 KS | 160 | 20 |
| Kress | 6055 a | 160 | 20 |
| Kress | 6055 DUO | 160 | 20 |
| Kress | CHKS 6050 | 160 | 20 |
| Kress | CHKS 6055 | 160 | 20 |
| Kress | DUO Säge | 160 | 20 |
| Kress | HKS 6050 | 160 | 20 |
| Kress | 6060 | 190 | 20 |
| Kress | 6066 | 190 | 20 |
| Kress | 1500 KS | 190 | 20 |
| Kress | 1800 KSE | 190 | 20 |
| Kress | 6060 b | 190 | 20 |
| Kress | CHKS 6060 | 190 | 20 |
| Kress | CHKS 6066 | 190 | 20 |
| Kress | HKS 6060 W | 190 | 20 |
| Kress | HTKS 1600 | 190 | 20 |
| Kress | KS 1400 | 190 | 20 |
| Kress | GS 105 | 250 | 30 |
| Kress | GS 90 | 250 | 30 |
| Kress | GST 90 | 250 | 30 |
| Lamello | Nutfräsen | 100 | 22 |
| Lamello | SF Tanga | 150 | 20 |
| Lamello | Tanga | 180 | 22,23 mm (7/8") |
| Lutz | KKS 400 | 315 | 30 |
| Lutz | LBK | 350 | 30 |
| Lutz | RBK 500 | 350 | 30 |
| Lutz | AKS | 700 | 30 |
| Lutz | WKS | 700 | 30 |
| Lutz | ZWS 700 | 700 | 30 |
| Mafell | A 35 | 120 | 20 |
| Mafell | F 35 | 120 | 20 |
| Mafell | FS 35 | 120 | 20 |
| Mafell | KSP 40 | 120 | 20 |
| Mafell | KSS 300 | 120 | 20 |
| Mafell | SF 32 Schattenfugen-säge | 125 | 20 |
| Mafell | X 40 | 125 | 20 |
| Mafell | XE 40 | 125 | 20 |
| Mafell | Biberella | 150 | 13 |
| Mafell | KS 320 | 160 | 30 |
| Mafell | KS 330 | 160 | 20 |
| Mafell | KSP 55 | 160 | 20 |
| Mafell | KSP 55 F | 160 | 20 |
| Mafell | KSS 330 | 160 | 20 |
| Mafell | KSS 400 | 160 | 20 |
| Mafell | KST 55 | 160 | 20 |
| Mafell | MKS 55 | 160 | 20 |
| Mafell | MKS 55 F | 160 | 20 |
| Mafell | MS 55 | 160 | 20 |
| Mafell | MT 55 cc | 160 | 20 |
| Mafell | PS 52 | 160 | 20 |
| Mafell | PSS 3000 | 160 | 20 |
| Mafell | PSS 3100 SE | 160 | 20 |
| Mafell | X 55 | 160 | 20 |
| Mafell | XE 55 | 160 | 20 |
| Mafell | A 55 | 170 | 20 |
| Mafell | B 55 | 170 | 20 |
| Mafell | FK 50 | 170 | 20 |
| Mafell | FU 50 | 170 | 20 |
| Mafell | FUS 50 | 170 | 20 |
| Mafell | Erika 50 | 180 | 30 |
| Mafell | Erika 55 | 180 | 30 |
| Mafell | Erika 65 | 180 | 30 |
| Mafell | Erika 60 | 190 | 30 |
| Mafell | KSP 65 | 190 | 30 |
| Mafell | MKS 65 | 190 | 30 |
| Mafell | MS 65 | 190 | 30 |
| Mafell | B 65 | 200 | 30 |
| Mafell | X 72 | 200 | 30 |
| Mafell | A 65 | 210 | 20 |
| Mafell | FU 65 | 210 | 30 |
| Mafell | FUS 65 | 210 | 20 |
| Mafell | MKS 75 | 210 | 30 |
| Mafell | MS 75 | 210 | 30 |
| Mafell | Erika 220 | 220 | 30 |
| Mafell | Erika 70 E | 225 | 30 |

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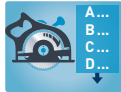
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| | Type | Ø | |
|--------|------------|---------|----|
| Mafell | MKS 85 S/N | 225 | 30 |
| Mafell | KSP 85 F | 230 | 30 |
| Mafell | B 82 | 240 | 30 |
| Mafell | 85 K | 250 | 30 |
| Mafell | Erika 85 | 250 | 30 |
| Mafell | Erika 85 K | 250 | 30 |
| Mafell | Erika 85 L | 250 | 30 |
| Mafell | MS 85 | 250 | 30 |
| Mafell | A 85 | 280 | 30 |
| Mafell | Erika | 280 | 30 |
| Mafell | Erika 65 K | 280 | 30 |
| Mafell | Erika 65 L | 280 | 30 |
| Mafell | Erika 70 L | 280 | 30 |
| Mafell | FS 65 | 280 | 30 |
| Mafell | FUS 85 | 280 | 30 |
| Mafell | Biberex | 315 | 30 |
| Mafell | FS 85 | 315 | 30 |
| Mafell | MKS 102 | 315 | 30 |
| Mafell | MKS 105 | 315 | 30 |
| Mafell | Monika | 315 | 30 |
| Mafell | TFK 85 K | 315 | 30 |
| Mafell | TFK 85 L | 315 | 30 |
| Mafell | Biber | 320 | 30 |
| Mafell | MKS 125 | 350 | 30 |
| Mafell | MSK 125 | 350 | 30 |
| Mafell | SF 32 | 350 | 30 |
| Mafell | MKS 125 E | 355 | 30 |
| Mafell | MKS 145 E | 370 | 30 |
| Mafell | AZB | 400 | 30 |
| Mafell | BK 3 | 400 | 30 |
| Mafell | BSK 4 | 400 | 30 |
| Mafell | FKB 150 | 400 | 30 |
| Mafell | FS 130 | 400 | 30 |
| Mafell | FS 130 K | 400 | 30 |
| Mafell | FS 130 S | 400 | 30 |
| Mafell | TD 3 | 400 | 30 |
| Mafell | TDH 4 | 400 | 30 |
| Mafell | TDH 425 | 400 | 30 |
| Mafell | TK 150 | 400 | 30 |
| Mafell | VKS | 400 | 30 |
| Mafell | VKS 130 | 400 | 30 |
| Mafell | VKS 160 | 400 | 30 |
| Mafell | MKS 165 E | 410 | 30 |
| Mafell | BK | 450 | 30 |
| Mafell | BK 4 | 450 | 30 |
| Mafell | BKV 4 | 450 | 30 |
| Mafell | BSK 5 | 450 | 30 |
| Mafell | FSG 165 | 450 | 30 |
| Mafell | FSG 165 K | 450 | 30 |
| Mafell | TDH 450 | 450 | 30 |
| Mafell | 170 | 500 | 30 |
| Mafell | BKV 5 | 500 | 30 |
| Mafell | BSK 6 | 500 | 30 |
| Mafell | MKS 85 | 225/250 | 30 |
| Mafell | TDH 5 | 450/500 | 30 |
| Mafell | FSG 200 | 450/550 | 30 |
| Mafell | FSG 240 K | 450/640 | 30 |
| Makita | 5000 SR | 140 | 16 |
| Makita | 4341 S | 150 | 20 |
| Makita | BTK 0 | 150 | 20 |
| Makita | 5600 NB | 160 | 20 |
| Makita | 5600 RDW | 160 | 20 |
| Makita | MKS 55 | 160 | 20 |
| Makita | 5603K | 165 | 20 |
| Makita | 5603RK | 165 | 20 |
| Makita | 5604 R | 165 | 20 |
| Makita | BSS610 | 165 | 20 |
| Makita | BSS611 | 165 | 20 |
| Makita | HS6101 | 165 | 20 |
| Makita | SP6000 | 165 | 20 |
| Makita | SP6000K | 165 | 20 |
| Makita | SP6000K1 | 165 | 20 |
| Makita | SP6000K2 | 165 | 20 |
| Makita | SP6000X1 | 165 | 20 |
| Makita | 5800 | 180 | 20 |
| Makita | 5500 S | 180 | 20 |
| Makita | 5800 B | 180 | 20 |
| Makita | 5800 N | 180 | 20 |
| Makita | 5801 B | 180 | 20 |
| Makita | 6317 S | 180 | 20 |
| Makita | S 800 BR | 180 | 20 |
| Makita | 5017 RKB | 190 | 30 |
| Makita | 5703 R | 190 | 30 |
| Makita | 5705 R | 190 | 30 |
| Makita | 5900 B | 235 | 25 |
| Makita | 5903 R | 235 | 30 |

| | Type | Ø | |
|--------------|--------------------|-------------|-------|
| Makita | 2400 B | 250 | 25 |
| Makita | LS 1013 | 260 | 25 |
| Makita | LS 1040 | 260 | 25 |
| Makita | 2402 | 265 | 25 |
| Makita | 5103 R | 270 | 30 |
| Makita | SR 2600 | 270 | 30 |
| Makita | LS 1400 | 350 | 25 |
| Makita | BCS550 | 130/132/134 | 20 |
| Makita | BSS500 | 130/132/134 | 20 |
| Makita | BSS501 | 130/132/134 | 20 |
| Makita | 5600 B | 150/160 | 20 |
| Makita | 5603R | 160/165 | 20 |
| Makita | SR 1600 | 160/165/180 | 20 |
| Makita | 5600 BR | 160/170 | 20 |
| Makita | 4131 | 180/184 | 30 |
| Makita | 5800 BR | 180/184 | 20 |
| Makita | SR 1800 | 180/184 | 20 |
| Makita | 5143 R | 350/355 | 30 |
| Maktec | MT580 | 180/184 | 20 |
| Meisterkraft | MKR 040 S | 160 | 20 |
| Meisterkraft | MKR 1200 | 180 | 20 |
| Metabo | F 0520 | 100 | 22 |
| Metabo | 6311 S | 125 | 13 |
| Metabo | 6311 | 130 | 16 |
| Metabo | KS 3340 S | 130 | 16 |
| Metabo | KS 40 S | 130 | 16 |
| Metabo | SHK 01 | 130 | 16 |
| Metabo | 3340 | 132 | 13 |
| Metabo | 3342 | 132 | 13 |
| Metabo | KS 3342 S | 132 | 13 |
| Metabo | 4345 S | 140 | 20 |
| Metabo | C 1 | 140 | 20 |
| Metabo | C 2 | 140 | 20 |
| Metabo | 4340 S | 142 | 13 |
| Metabo | BHK 3 | 142 | 13 |
| Metabo | 61 | 150 | 20 |
| Metabo | 62 | 150 | 20 |
| Metabo | 4341 S | 150 | 20 |
| Metabo | BTK 61+2 | 150 | 20 |
| Metabo | BTKOC | 150 | 20 |
| Metabo | KS 0846 | 150 | 20 |
| Metabo | KS 0946 | 150 | 20 |
| Metabo | KS 0946 S | 150 | 20 |
| Metabo | KS 52 | 150 | 20 |
| Metabo | KS 52 S | 150 | 20 |
| Metabo | KS 1155 | 160 | 20 |
| Metabo | KS 54 | 160 | 20 |
| Metabo | KS 54 SP | 160 | 20 |
| Metabo | KS 55 FS | 160 | 20 |
| Metabo | KSAP 18 | 160 | 20 |
| Metabo | KSE 55 Plus | 160 | 20 |
| Metabo | KSE 55 Vario Plus | 160 | 20 |
| Metabo | KSTE 1357 S-Signal | 160 | 20 |
| Metabo | KS 1157 S | 165 | 20 |
| Metabo | KSTE 1357 S | 165 | 20 |
| Metabo | Magnum TK 1256 | 165 | 20 |
| Metabo | TK 1256 | 167 | 20 |
| Metabo | KS 1185 S | 170 | 20 |
| Metabo | 6317 S | 180 | 20 |
| Metabo | SR 1800 | 180 | 20 |
| Metabo | 5348 | 190 | 20 |
| Metabo | 46 S | 190 | 20 |
| Metabo | KS 1266 S | 190 | 20 |
| Metabo | KS 1468 S | 190 | 20 |
| Metabo | KS 4345 S | 190 | 20 |
| Metabo | KS 4346 S | 190 | 20/30 |
| Metabo | KS 65 S | 190 | 20 |
| Metabo | KSE 1668 S | 190 | 20 |
| Metabo | TK 5348 | 190 | 20 |
| Metabo | KGSE 1670 | 210 | 30 |
| Metabo | KGSE 1670 S | 210 | 30 |
| Metabo | KSE 1678 S | 210 | 30 |
| Metabo | TK 1066 | 210 | 30 |
| Metabo | TKU 225 | 210 | 30 |
| Metabo | 6323 S | 240 | 30 |
| Metabo | KS 1785 S | 240 | 30 |
| Metabo | KS 6323 S | 240 | 30 |
| Metabo | THU 1693 D | 250 | 30 |
| Metabo | TKU 1633 | 250 | 30 |
| Metabo | TKU 1633 D | 250 | 30 |
| Metabo | TKU 1693 | 250 | 30 |
| Metabo | TKU 1693 D | 250 | 30 |
| Metabo | 4340 | 125/130 | 13/16 |
| Metabo | BHK 1 | 125/130/132 | 13/16 |
| Metabo | Max | 130/132 | 13/16 |
| Metabo | BHK 2 | 130/142 | 13/16 |

| | Type | Ø | |
|-------------------|---------------------------|-------------|-------------|
| Metabo | BTK 0 | 140/150 | 20 |
| Metabo | BTK | 140/160 | 20 |
| Metabo | KS 0846 S | 150/152 | 20 |
| Metabo | KS 0852 S | 150/152 | 20 |
| Metabo | KSE 0946 S | 150/152 | 20 |
| Metabo | KST 1157 S | 165/167 | 20 |
| Metabo | KST 1357 S | 165/167 | 20 |
| Metabo | BTK 1 | 165/167/170 | 20 |
| Metabo | KS 1155 S | 165/167/170 | 20 |
| Metabo | 6322 S | 220/240 | 30 |
| Metabo | 1688 Magnum | 250/300/315 | 30 |
| Metabo | TK 1685 | 250/300/315 | 30 |
| Metabo | TK 1685 D | 250/300/315 | 30 |
| Metabo | TK 1688 D | 250/300/315 | 30 |
| Metabo | TK 168 S | 250/300/315 | 30 |
| Metalkraft | EVO 180 | 180 | 20 |
| Metalkraft | EVO 180 Xtreme | 180 | 20 |
| Milwaukee | CS 55 | 165 | 30 |
| Milwaukee | V28 MS | 170/174 | 20 |
| Narex | EPK 16 D | 160 | 20 |
| Nutool | EPK 16 | 160 | 20 |
| Omga | Diverse | 250 - 240 | 30 |
| Panasonic | EY 3501 | 110 | 20 |
| Panasonic | EY 3530 | 135 | 20 |
| Panasonic | EY3551GOW | 165 | 20 |
| Panasonic | EY3552GOW | 165 | 20 |
| Panasonic | EY3530NMQKW | 130/132/134 | 20 |
| Parkside | PAHKS 18 V | 140 | 10 |
| Performance Power | 110 W | 160 | 20 |
| Perles | 25 S | 100 | 12 |
| Perles | SC 47 C | 140 | 20 |
| Perles | KS 50 | 150 | 20 |
| Perles | KS 51 Chroma | 150 | 20 |
| Perles | Peugeot | 150 | 20 |
| Perles | SC 53 C | 150 | 20 |
| Perles | KS 55 (ab 2007 oder 2008) | 160 | 20 |
| Perles | KS 55 (bis 2007) | 160 | 16 |
| Perles | 6317 S | 180 | 20 |
| Perles | FIP 50 S | 180 | 20 |
| Perles | SR 1800 | 180 | 20 |
| Peugeot | 25 S | 100 | 12 |
| Peugeot | 25 SL | 100 | 12 |
| Peugeot | SC 1 | 132 | 13 |
| Peugeot | HKS 700 | 140 | 20 |
| Peugeot | Proftime | 140 | 20 |
| Peugeot | SC 3 | 140 | 12,7 (1/2") |
| Peugeot | SC 47 C | 140 | 20 |
| Peugeot | TC 3008 | 140 | 20 |
| Peugeot | SC 46 | 150 | 20 |
| Peugeot | SC 52 | 150 | 20 |
| Peugeot | SC 52 C | 150 | 20 |
| Peugeot | SC 52 S | 150 | 20 |
| Peugeot | SC 53 C | 150 | 20 |
| Peugeot | TC 3009 | 150 | 20 |
| Peugeot | SC 55010 XA | 170 | 16 |
| Peugeot | FIP 20 S | 180 | 20 |
| Peugeot | FIP 50 | 180 | 20 |
| Peugeot | FIP 50 S | 180 | 20 |
| Peugeot | TC 3014 | 190 | 30 |
| Peugeot | TC 3014 | 200 | 30 |
| Peugeot | SC 86010 XA | 235 | 16 |
| Peugeot | SC 42 C | 130/132/134 | 20 |
| Peugeot | SC 42 C-H | 130/132/134 | 20 |
| Peugeot | SC 4510 XA | 160/165 | 16 |
| Peugeot | 10 XA | 180/184 | 16 |
| Peugeot | SC 65 C | 180/184 | 16 |
| Peugeot | SC 650 | 180/184 | 16 |
| Peugeot | SC 65010 XA | 180/184 | 16 |
| Peugeot | SC 66 C | 180/184 | 16 |
| Peugeot | SC 66 C-H | 180/184 | 16 |
| Powerplus | POW 1041P | 140 | 16 |
| Powerplus | POW 104 | 160 | 20 |
| Powerplus | POW 1043 | 160 | 20 |
| Powerplus | POW 1044 | 180/184 | 20 |
| Powerplus | POW X052 | 180/184 | 20 |
| Powerplus | POW X142 | 180/184 | 20 |
| Powerplus | POW X05313 | 180/184 | 20 |
| Prostar | HKS 1400 | 140 | 20 |
| Protool | CSP 55-1 | 160 | 20 |
| Protool | CSP 55-2 | 160 | 20 |
| Protool | CSP 56 EQ | 160 | 20 |
| Protool | CSP 56-2 EB | 160 | 20 |
| Protool | CSP 56-Q | 160 | 20 |
| Protool | CSP 68 | 160 | 20 |
| Proviel | HHK 1400 | 140 | 20 |



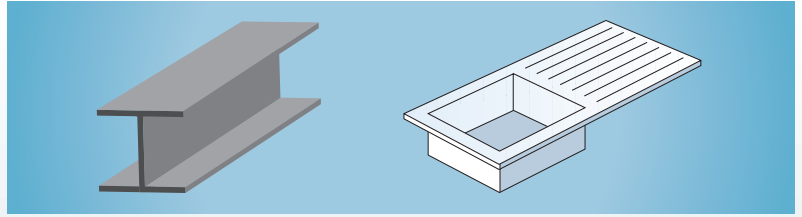
| | Type | Ø | |
|-----------|------------------------|---------|----|
| Proviel | HHK 1805 | 184 | 16 |
| Proviel | HTK 1000 | 200 | 16 |
| Proviel | HTS 600 | 200 | 16 |
| Proviel | WWT 1000 | 200 | 16 |
| Proviel | HKF 205 | 205 | 18 |
| Proviel | HKG 210 | 210 | 30 |
| Robland | K 210-260 | 240 | 30 |
| Robland | X 260 | 250 | 30 |
| Robland | K 310 | 300 | 30 |
| Robland | X 310 | 300 | 30 |
| Rockwell | 346 | 165 | 16 |
| Rockwell | 315 | 184 | 16 |
| Rockwell | 4500 | 184 | 16 |
| Rockwell | 368 Bohrung 20 mm | 210 | 30 |
| Rockwell | 63418 Bohrung 20 mm | 210 | 30 |
| Rockwell | 368 | 220 | 20 |
| Rockwell | 63418 | 220 | 20 |
| Rockwell | 63416 | 165/170 | 16 |
| Rockwell | 63417 | 180/184 | 16 |
| Ryobi | CCS1801/DM | 150 | 10 |
| Ryobi | CCS1801/LM | 150 | 10 |
| Ryobi | LCS180 | 150 | 10 |
| Ryobi | W-5502 | 160 | 20 |
| Ryobi | W-5503 | 160 | 16 |
| Ryobi | W-560 | 160 | 20 |
| Ryobi | W-560 P | 160 | 20 |
| Ryobi | B 6402 | 180 | 20 |
| Ryobi | W-6502 | 180 | 20 |
| Ryobi | W-651 | 180 | 20 |
| Ryobi | W-651 A | 180 | 20 |
| Ryobi | W-651 P | 180 | 20 |
| Ryobi | W-66 N | 180 | 20 |
| Ryobi | HW 600 | 180/184 | 16 |
| Ryobi | W 640 C | 180/184 | 16 |
| Ryobi | W 640 NCI | 180/184 | 16 |
| Ryobi | W 6402 C | 180/184 | 16 |
| Ryobi | W 6402 NC | 180/184 | 16 |
| Ryobi | W 6403 C | 180/184 | 16 |
| Ryobi | W 6403 NC | 180/184 | 16 |
| Ryobi | W 660 | 180/184 | 16 |
| Ryobi | W 6601 | 180/184 | 16 |
| Ryobi | W 6602 | 180/184 | 16 |
| Scheer | HM 5 | 100 | 22 |
| Scheer | HM 6 | 100 | 22 |
| Scheer | MS 45 | 150 | 20 |
| Scheer | MS 45 E | 150 | 20 |
| Scheer | MS 45-3 | 150 | 20 |
| Scheer | MS 50 | 150 | 16 |
| Scheer | FM (160 mm-Ausführung) | 160 | 16 |
| Scheer | M 55 | 160 | 20 |
| Scheer | MS 55 | 160 | 20 |
| Scheer | FM (180 mm-Ausführung) | 180 | 16 |
| Scheer | MS 65 | 190 | 30 |
| Scheer | MS 70 | 200 | 30 |
| Scheer | MS 80 | 220 | 30 |
| Scheer | FM-10A-3100-4200 | 240 | 30 |
| Scheer | MS 85 | 220/230 | 30 |
| Scheppach | KG 205 E | 200 | 30 |
| Scheppach | KSE 250 | 200 | 30 |
| Scheppach | TS 2000 | 200 | 30 |
| Scheppach | KG 205 | 205 | 18 |
| Scheppach | Capas 1 | 216 | 30 |
| Scheppach | Capas 2 | 216 | 30 |
| Scheppach | KG 250 | 250 | 20 |
| Scheppach | KG 260 E | 250 | 30 |
| Scheppach | KG 280 E | 250 | 30 |
| Scheppach | TKG 250 | 250 | 20 |
| Scheppach | TKG 260 E | 250 | 30 |
| Scheppach | TKG 280 E | 250 | 30 |
| Scheppach | TS 2500 | 250 | 30 |
| Scheppach | KSE 300 (Export) | 300 | 30 |
| Scheppach | TK | 300 | 30 |
| Scheppach | TKH | 300 | 30 |
| Scheppach | TKU | 300 | 30 |
| Scheppach | TS 4000 | 300 | 30 |
| Scheppach | Capas 3 | 305 | 30 |
| Scheppach | TKG 305 E | 305 | 30 |
| Scheppach | Forsato XL/XXL | 315 | 30 |
| Scheppach | TS 315 | 315 | 30 |
| Scheppach | TS 315 GT | 315 | 30 |
| Scheppach | TS 4010 | 315 | 30 |
| Scheppach | XXL | 315 | 30 |
| Scheppach | BS 500 | 400 | 30 |
| Scheppach | BSH 400 | 400 | 30 |

| | Type | Ø | |
|-----------------------|-----------|---------|-------------|
| Scheppach | BSH 500 | 400 | 30 |
| Schleicher | 300 | 180 | 12,7 (1/2") |
| Schleicher | 310 | 250 | 30 |
| Schleicher | 330 | 300 | 30 |
| Skil/Skilsaw/-Masters | 5140 | 130 | 16 |
| Skil/Skilsaw/-Masters | 5240 | 130 | 16 |
| Skil/Skilsaw/-Masters | 5740 | 130 | 16 |
| Skil/Skilsaw/-Masters | 532 | 142 | 13 |
| Skil/Skilsaw/-Masters | 1800 | 150 | 20 |
| Skil/Skilsaw/-Masters | 1850 | 150 | 20 |
| Skil/Skilsaw/-Masters | 5246 | 150 | 16 |
| Skil/Skilsaw/-Masters | 1800 H | 150 | 20 |
| Skil/Skilsaw/-Masters | 1850 H | 150 | 20 |
| Skil/Skilsaw/-Masters | 1850 HD | 150 | 20 |
| Skil/Skilsaw/-Masters | 367 | 160 | 16 |
| Skil/Skilsaw/-Masters | 534 | 160 | 16 |
| Skil/Skilsaw/-Masters | 536 | 160 | 16 |
| Skil/Skilsaw/-Masters | 856 | 160 | 16 |
| Skil/Skilsaw/-Masters | 1854 | 160 | 16 |
| Skil/Skilsaw/-Masters | 5750 | 160 | 16 |
| Skil/Skilsaw/-Masters | 5855 | 160 | 16 |
| Skil/Skilsaw/-Masters | 1440 H | 160 | 16 |
| Skil/Skilsaw/-Masters | 1854 U | 160 | 16 |
| Skil/Skilsaw/-Masters | 1855 H | 160 | 16 |
| Skil/Skilsaw/-Masters | 1855 U | 160 | 16 |
| Skil/Skilsaw/-Masters | 416 H | 160 | 16 |
| Skil/Skilsaw/-Masters | 552 B | 160 | 16 |
| Skil/Skilsaw/-Masters | 552 H | 160 | 16 |
| Skil/Skilsaw/-Masters | 5750 A | 160 | 16 |
| Skil/Skilsaw/-Masters | 416 H 1 | 165 | 16 |
| Skil/Skilsaw/-Masters | 1410 H 2 | 170 | 16 |
| Skil/Skilsaw/-Masters | 1522 H | 170 | 20 |
| Skil/Skilsaw/-Masters | 1522 U | 170 | 16 |
| Skil/Skilsaw/-Masters | 416 H 2 | 170 | 16 |
| Skil/Skilsaw/-Masters | 5055 MA | 170 | 16 |
| Skil/Skilsaw/-Masters | 5164 A | 184 | 16 |
| Skil/Skilsaw/-Masters | 1866 | 190 | 16 |
| Skil/Skilsaw/-Masters | 5266 | 190 | 16 |
| Skil/Skilsaw/-Masters | 5565 | 190 | 16 |
| Skil/Skilsaw/-Masters | 5566 | 190 | 16 |
| Skil/Skilsaw/-Masters | 5666 | 190 | 16 |
| Skil/Skilsaw/-Masters | 1965 U | 190 | 30 |
| Skil/Skilsaw/-Masters | 5266 UG | 190 | 16 |
| Skil/Skilsaw/-Masters | 5866 A | 190 | 16 |
| Skil/Skilsaw/-Masters | 1524 H | 210 | 30 |
| Skil/Skilsaw/-Masters | 1526 H | 210 | 30 |
| Skil/Skilsaw/-Masters | 1873 H | 210 | 30 |
| Skil/Skilsaw/-Masters | 1525 H | 235 | 30 |
| Skil/Skilsaw/-Masters | 1886 H | 235 | 30 |
| Skil/Skilsaw/-Masters | 1985 U | 235 | 30 |
| Skil/Skilsaw/-Masters | 1986 U | 235 | 30 |
| Skil/Skilsaw/-Masters | 1523 H | 260 | 30 |
| Skil/Skilsaw/-Masters | 1899 H | 260 | 30 |
| Skil/Skilsaw/-Masters | 22501 B | 125/127 | 12,7 (1/2") |
| Skil/Skilsaw/-Masters | 533 | 142/150 | 13 |
| Skil/Skilsaw/-Masters | 553 | 142/150 | 13 |
| Skil/Skilsaw/-Masters | 1408 H | 160/165 | 16 |
| Skil/Skilsaw/-Masters | 1408 N | 160/165 | 16 |
| Skil/Skilsaw/-Masters | 1409 H | 160/165 | 16 |
| Skil/Skilsaw/-Masters | 1410 H | 160/165 | 16 |
| Skil/Skilsaw/-Masters | 77 | 180/184 | 16 |
| Skil/Skilsaw/-Masters | 537 | 180/184 | 16 |
| Skil/Skilsaw/-Masters | 559 | 180/184 | 16 |
| Skil/Skilsaw/-Masters | 857 | 180/184 | 16 |
| Skil/Skilsaw/-Masters | 1865 | 180/184 | 16 |
| Skil/Skilsaw/-Masters | 1865 H | 180/184 | 16 |
| Skil/Skilsaw/-Masters | 1865 U | 180/184 | 16 |
| Skil/Skilsaw/-Masters | 553 B | 180/184 | 16 |
| Skil/Skilsaw/-Masters | 553 BIH | 180/184 | 16 |
| Skil/Skilsaw/-Masters | 553 H | 180/184 | 16 |
| Skil/Skilsaw/-Masters | 559 U | 180/184 | 16 |
| Skil/Skilsaw/-Masters | 574 U | 180/184 | 16 |
| Skil/Skilsaw/-Masters | 77 U | 180/184 | 16 |
| Smalcalda/DDR | H 162 | 160 | 25 |
| Smalcalda/DDR | H 165 | 160 | 25 |
| Smalcalda/DDR | HKS 160 | 160 | 25 |
| Smalcalda/DDR | HKS 160 A | 160 | 25 |
| Smalcalda/DDR | KS 35 | 160 | 25 |
| Smalcalda/DDR | ZHK 250 | 160 | 25 |
| Smalcalda/DDR | ZHK 43 | 160 | 25 |
| Smalcalda/DDR | ZHK 45 | 160 | 25 |
| Smalcalda/DDR | ZHT 43 | 160 | 25 |
| Smalcalda/DDR | ZHT 45 | 160 | 25 |
| Smalcalda/DDR | ZTK 43 | 160 | 25 |
| Smalcalda/DDR | ZTK 450 | 160 | 25 |
| Stanley | H 272 | 180/184 | 16 |

| | Type | Ø | |
|------------------|--------------|---------|------|
| Stanley | H 273 | 180/184 | 16 |
| Stayer | CP 46 | 140 | 20 |
| Stayer | HKS 700 | 140 | 20 |
| Stayer | Proline | 140 | 20 |
| Stayer | SC 47 C | 140 | 20 |
| Stayer | CP 50 | 150 | 20 |
| Stayer | KS 700 | 205 | 18 |
| Stayer | SC 205 | 205 | 18 |
| Stayer | TKS 2000 | 205 | 18 |
| Stayer | Kapp-Gehrung | 250 | 30 |
| Stayer | SC 250 | 250 | 20 |
| Stayer | SC 251 | 250 | 20 |
| Stayer | SC 260 | 250 | 30 |
| Stayer | SCE 1610 | 250 | 30 |
| Stayer | SCE 250 | 250 | 30 |
| Stayer | SCU 74 | 250 | 20 |
| Stayer | SII 250 | 250 | 30 |
| Stayer | TD 305 | 305 | 25,4 |
| Striebig | Plattensäge | 250 | 30 |
| Striebig | Plattensäge | 300 | 30 |
| Techline | EHS 160 | 160 | 20 |
| TIP | HKS 160 | 160 | 20 |
| TIP | HKS 161 | 160 | 20 |
| TIP | HKS 200 | 200 | 16 |
| Ulmia | Universa | 125 | 16 |
| Ulmia | KS 1 | 150 | 30 |
| Ulmia | 1607 | 160 | 16 |
| Ulmia | 1610 | 160 | 16 |
| Ulmia | 1409 B | 160 | 16 |
| Ulmia | 1706 | 200 | 30 |
| Ulmia | 1708 | 200 | 30 |
| Ulmia | US 1 | 200 | 30 |
| Ulmia | 1622 | 250 | 20 |
| Ulmia | 1625 | 250 | 20 |
| Ulmia | 1710 R | 250 | 30 |
| Ulmia | 1710 S | 250 | 30 |
| Ulmia | 1612 | 300 | 30 |
| Ulmia | 1711 | 300 | 30 |
| Ulmia | KS 300 | 300 | 30 |
| Ulmia | 1712 | 350 | 30 |
| Ulmia | 1728 | 350 | 30 |
| Ulmia | 1729 | 350 | 30 |
| Ulmia | 1712 R | 350 | 30 |
| Ulmia | KS 350 | 350 | 30 |
| Uniropa (Quelle) | HKS 6050 | 160 | 20 |
| Uniropa (Quelle) | HKS 6055 | 160 | 20 |
| Wegoma | TB 204 | 105 | 22 |
| Wegoma | HS 50 | 150 | 20 |
| Wegoma | RZ270S | 160 | 20 |
| Wegoma | TS160 | 160 | 20 |
| Wegoma | TS160M | 160 | 20 |
| Wegoma | TS230 | 230 | 30 |
| Wegoma | TS230M | 230 | 30 |
| Wegoma | KGS48 | 250 | 30 |
| Wegoma | KGS48T | 250 | 30 |
| Wegoma | TS 250 | 250 | 32 |
| Wegoma | KGS33 | 300 | 30 |
| Wegoma | KGS33T | 300 | 30 |
| Wegoma | KGS72 | 300 | 30 |
| Wegoma | KGS72T | 300 | 30 |
| Wegoma | FKS | 315 | 30 |
| Wegoma | S315 | 315 | 30 |
| Wegoma | S315ECO | 315 | 30 |
| Wegoma | S 4 D | 350 | 30 |
| Wegoma | S 4 W | 350 | 30 |
| Wegoma | S400 | 400 | 30 |
| Wegoma | S400ECO | 400 | 30 |
| Wegoma | S400NC | 400 | 30 |
| Wegoma | TS 400 | 400 | 30 |
| Wolf | 6070 | 180/184 | 16 |



Stahl / Edelstahl Steel / stainless steel



Dünnschnitt-Kreissägen für Produktionsmaschinen wie von:
 Thin-section circular saws for production machines, e.g. from:

AMADA, ADIGE, BEHRINGER-EISELE, BEWO, DELTA, EVERISING, EXACT-CUT, FICEP, GERNETTI, ITEC, KALTENBACH, KASTO, MEGA, NORITAKE, NISHIJIMA-SIMAX, RATTUNDE, RSA, OMP, SINICO, SOCO-KENTAI, FONG-HO, TSUNE

886-889

Schnittwertempfehlungen · Recommended cutting values

| Material | Art. | | | fz (mm/z) Vorschub pro Zahn Feed per tooth | Vc (m/min) Schnittgeschwindigkeit Cutting speed | |
|--|-------------------|--------|----------|--|---|---------|
| | DIN | AISI | JIS | (mm/tooth) | (m/min) | |
| Kohlenstoffarmer- und legierter Stahl Low carbon and alloyed steel | Ck10 | 1010 | S10C | 10 7000 | 0,06-0,07 | 110-125 |
| | Ck15 | 1015 | S15C | 10 7000 | 0,06-0,08 | 110-125 |
| | Ck25 | 1025 | S25C | 10 7000 | 0,06-0,09 | 110-125 |
| | 15CrMo5 | 4115 | SCM415 | 10 7000 | 0,06-0,10 | 110-125 |
| | 20MnCr5 | 5120 | SCR420 | 10 7000 | 0,06-0,11 | 110-125 |
| | 25CrMo4 | 4120 | SCM420H | 10 7000 | 0,06-0,12 | 110-125 |
| | 20NiCrMo2 | 8620 | SNCM220M | 10 7000 | 0,06-0,13 | 110-125 |
| Baustahl Mild steel | 22Mn6 | 1524 | SMn420 | 10 7000 | 0,06-0,14 | 110-125 |
| | St37.2 | A283 | SS400 | 10 7000 | 0,06-0,15 | 110-125 |
| Stahl mit mittlerem Kohlenstoffgehalt und legierter Stahl Medium carbon and alloyed steel | Ck35 | 1035 | S35C | 10 7000 | 0,06 | 110-125 |
| | Ck45 | 1045 | S45C | 10 7000 | 0,06 | 110-125 |
| | Ck53 | 1053 | S53C | 10 7000 | 0,06 | 110-125 |
| | Ck55 | 1055 | S55C | 10 7000 | 0,06 | 110-125 |
| | 37Cr4 | 5135 | SCR435 | 10 7000 | 0,06 | 110-125 |
| | 34CrMo4 | 4135 | SCM435 | 10 7000 | 0,06 | 110-125 |
| Stahl mit hohem Kohlenstoffgehalt High carbon alloy steel | 40NiCrMo6 | 4340 | SNCM439 | 10 7000 | 0,05-0,06 | 100-115 |
| | 41Cr4 | 5140 | SCR440 | 10 7000 | 0,05-0,07 | 100-115 |
| | 42CrMo4 | 4140 | SCM440 | 10 7000 | 0,05-0,08 | 100-115 |
| | - | 1541 | SMn443 | 10 7000 | 0,05-0,09 | 100-115 |
| Lagerstahl mit hohem Kohlenstoffgehalt High carbon chromium bearing | 100Cr6 | 52100 | SUJ2 | 10 7000 | 0,04-0,05 | 100-110 |
| Edelstahl Stainless steels | X8CrNiS18-10 | 304 | SUS304 | 10 7002 | 0,03 | 65 |
| | X6CrNiMoTi17 12 2 | 316 | SUS316 | 10 7002 | 0,03 | 65 |
| | X6Cr13 | 403 | SUS403 | 10 7002 | 0,03 | 65 |
| | X6Cr17 | 430 | SUS430 | 10 7002 | 0,03 | 65 |
| | - | S17400 | SUS630 | 10 7002 | 0,03 | 65 |
| Werkzeugstahl Tool steel | DX165CrMoV12 | D2 | SKD11 | 10 7001 | 0,04-0,05 | 80 |
| Ne-Metalle Non ferrous metals | - | - | - | 10 7000 | 0,18-0,24 | 180-250 |

Festlegung der Schnittgeschwindigkeit Vc
 Determination of cutting speed Vc

$$Vc \text{ (m/min)} = \frac{D \cdot \pi \cdot n}{1000}$$

- fz (mm/z) = Vorschub pro Zahn · Feed per tooth
- D (mm) = Sägendurchmesser · Saw blade diameter
- Z = Anzahl der Zähne · Number of teeth
- n (min⁻¹) = Drehzahl · rpm

Festlegung der Vorschubgeschwindigkeit Vf
 Determination of feed rate Vf

$$Vf \text{ (mm/min)} = fz \cdot n \cdot Z$$

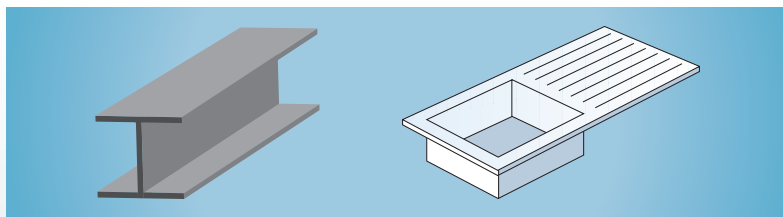
Festlegung der Drehzahl n
 Determination of revolution speed n



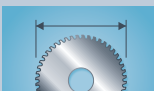

$$n \text{ (min}^{-1}\text{)} = \frac{Vc \cdot 1000}{D \cdot \pi}$$

Weitere
 Schnittdaten
 Additional
 cutting data



Stahl / Edelstahl
Steel / stainless steel

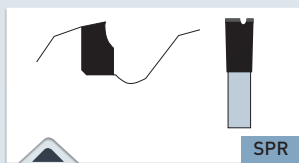
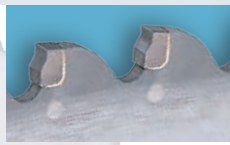


| Art. Ø mm | Type | Anwendung · Application | |
|--|---|--|-----|
| 10 7000 Ø mm 250-460  | Cermet-bestückte Dünnschnitt Kreissägeblätter | Für Kreissägeautomaten mit Sägeblattstabilisatoren | 886 |
| | Cermet tipped thin-cut circular saw blades | For circular saw machines with saw blade stabilisers | |
| 10 7001 Ø mm 250-460  | Hartmetall-bestückte Dünnschnitt Kreissägeblätter TiAlN-beschichtet für Stahl | Für Kreissägeautomaten mit Sägeblattstabilisatoren | 887 |
| | Carbide tipped thin-cut steel circular saw blades TiAlN-coated for steel | For circular saw machines with saw blade stabilisers | |
| 10 7002 Ø mm 250-460  neu new | Hartmetall-bestückte Dünnschnitt-Kreissägeblätter TiAlN-beschichtet für Edelstahl | Für Kreissägeautomaten mit Sägeblattstabilisatoren | 888 |
| | Carbide tipped thin-cut steel circular saw blades TiAlN-coated for stainless steel | For circular saw machines with saw blade stabilisers | |
| 10 7050 Ø mm 250-2250  | Hochleistungs-Kreissägeblätter für Stahl, Edelstahl, Schienen | Für Kreissägeautomaten wie z.B. FRAMAG, LINSINGER, MFL | 889 |
| | High-Performance circular saw blades for steel, stainless steel, rails | For high-tech circular saw machines such as FRAMAG, LINSINGER, MFL | |



10 7000

Dünnschnitt-Kreissägeblatt Cermet-bestückt
Thin-cut circular saw blade Cermet tipped



CERMET-Zähne

CERMET teeth

SPR

- > Spezialgeometrie mit Spanteilerrillen
- > Special geometry with chip breaker

MASCHINE · MACHINE

Für Kreissägeautomaten mit Sägeblattstabilisator wie: ADIGE, BEHRINGER-EISELE, BEWO, DELTA, EVERISING, EXACT-CUT, FICEP, GERNETTI, ITEC, KALTENBACH, KASTO, MEGA, NISHIJIMA-SIMAX, RATTUNDE, RSA, SINICO, TSUNE

For circular saw machines with saw blade stabilisers, such as: ADIGE, BEHRINGER-EISELE, BEWO, DELTA, EVERISING, EXACT-CUT, FICEP, GERNETTI, ITEC, KALTENBACH, KASTO, MEGA, NISHIJIMA-SIMAX, RATTUNDE, RSA, SINICO, TSUNE

FÜR DIE ABGABE EINES ANGEBOTES BENÖTIGEN WIR FOLGENDE

ANGABEN: Abmessung, Stückzahl, DIN-Normbezeichnung des zu sägenden Materials, die Abmessung des zu sägenden Materials, Vorschub, Maschinentyp. Falls vorhanden Zeichnung der Schneidengeometrie oder Musterblatt.

WE REQUIRE THE FOLLOWING INFORMATION FOR DELIVERY OF AN

ORDER: Dimensions, Quantity, DIN standard designation of the material to be cut, the dimensions of the material to be cut, Feed, machine type, diagram of the cutting geometry or sample blade, if available.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|------------------------------------|---|
| ✓ | | Stähle | Steel |
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |

ANWENDUNG · APPLICATION

Zum Sägen von Stählen und NE-Metallen wie Alu, Messing Kupfer, u.ä.

For cutting steel and non-ferrous metals, such as aluminum, copper, brass, etc.

| Art. | Maschinenhersteller Machine manufacturers | | | | | | € |
|-----------------|--|-----------|----------|----|-----|--------------------|---|
| 10 7000 250 010 | Tsune, Kasto, Nichijima, Everising | ○ 250 | 2,0/1,75 | 32 | 54 | 4-9-50 / 4-11-63 | - |
| 10 7000 250 020 | | ○ 250 | 2,0/1,75 | 32 | 60 | 4-9-50 / 4-11-63 | - |
| 10 7000 250 030 | | ○ 250 | 2,0/1,75 | 32 | 72 | 4-9-50 / 4-11-63 | - |
| 10 7000 250 040 | Bewo, Pfeiffner | ○ 250 | 2,0/1,75 | 32 | 80 | 4-9-50 / 4-11-63 | - |
| 10 7000 250 050 | | ○ 250 | 2,0/1,75 | 40 | 54 | 2-8,5-55 / 4-12-64 | - |
| 10 7000 250 060 | | ○ 250 | 2,0/1,75 | 40 | 60 | 2-8,5-55 / 4-12-64 | - |
| 10 7000 250 070 | | ○ 250 | 2,0/1,75 | 40 | 72 | 2-8,5-55 / 4-12-64 | - |
| 10 7000 250 080 | | ○ 250 | 2,0/1,75 | 40 | 80 | 2-8,5-55 / 4-12-64 | - |
| 10 7000 285 010 | Tsune, Kasto, Nichijima, I.T.E.C, Dualcut | ○ 285 | 2,0/1,75 | 32 | 54 | 4-9-50 / 4-11-63 | - |
| 10 7000 285 020 | | ○ 285 | 2,0/1,75 | 32 | 60 | 4-9-50 / 4-11-63 | - |
| 10 7000 285 030 | | ○ 285 | 2,0/1,75 | 32 | 72 | 4-9-50 / 4-11-63 | - |
| 10 7000 285 040 | Everising, Amada, Bewo, Noritake | ○ 285 | 2,0/1,75 | 32 | 80 | 4-9-50 / 4-11-63 | - |
| 10 7000 285 050 | | ○ 285 | 2,0/1,75 | 40 | 54 | 4-12-64 / 4-11-80 | - |
| 10 7000 285 060 | | ○ 285 | 2,0/1,75 | 40 | 60 | 4-12-64 / 4-11-80 | - |
| 10 7000 285 070 | | ○ 285 | 2,0/1,75 | 40 | 72 | 4-12-64 / 4-11-80 | - |
| 10 7000 285 080 | | ○ 285 | 2,0/1,75 | 40 | 80 | 4-12-64 / 4-11-80 | - |
| 10 7000 315 010 | Kasto, Kentaki | ○ 315 | 2,25/2,0 | 32 | 60 | 4-9-50 | - |
| 10 7000 315 020 | | ○ 315 | 2,25/2,0 | 32 | 72 | 4-9-50 | - |
| 10 7000 315 030 | | ○ 315 | 2,25/2,0 | 32 | 80 | 4-9-50 | - |
| 10 7000 315 040 | Behringer | ○ 315 | 2,25/2,0 | 40 | 80 | 2-15-80 | - |
| 10 7000 360 010 | Everising, Amada, Noritake, Behringer, Mega, Missler | ○ 360 | 2,6/2,25 | 40 | 60 | 4-15-80 / 4-11-90 | - |
| 10 7000 360 020 | | ○ 360 | 2,6/2,25 | 40 | 72 | 4-15-80 / 4-11-90 | - |
| 10 7000 360 030 | | ○ 360 | 2,6/2,25 | 40 | 80 | 4-15-80 / 4-11-90 | - |
| 10 7000 360 040 | Tsune, Kasto, Kaltenbach, Nichijima, Endo, Rattunde | ○ 360 | 2,6/2,25 | 40 | 100 | 4-15-80 / 4-11-90 | - |
| 10 7000 360 050 | | ○ 360 | 2,6/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | - |
| 10 7000 360 060 | | ○ 360 | 2,6/2,25 | 50 | 72 | 4-15-80 / 4-11-90 | - |
| 10 7000 360 070 | | ○ 360 | 2,6/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | - |
| 10 7000 360 080 | | ○ 360 | 2,6/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | - |
| 10 7000 425 010 | Tsune, Kasto | ○ 425/420 | 2,6/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | - |
| 10 7000 425 020 | | ○ 425/420 | 2,6/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | - |
| 10 7000 425 030 | | ○ 425/420 | 2,6/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | - |
| 10 7000 460 010 | Amada, Everising, Nichijima, Noritake | ○ 460 | 2,7/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | - |
| 10 7000 460 020 | | ○ 460 | 2,7/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | - |
| 10 7000 460 030 | | ○ 460 | 2,7/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | - |

Weitere Abmessungen auf Anfrage
Other dimensions are available on request

Weitere
Schnittdaten
Additional
cutting data

Film
Movie



1322



Dünnschnitt-Kreissägeblatt Hartmetall-bestückt TiAlN-beschichtet für Stahl
Thin-cut circular saw blade carbide tipped TiAlN-coated for steel

10 7001



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

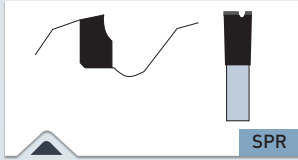
| | | | |
|---|--|--------|-------|
| ✓ | | Stähle | Steel |
|---|--|--------|-------|



ANWENDUNG · APPLICATION

Zum Sägen von Stählen

For cutting steel



Hartmetall-Zähne +
TiAlN-beschichtet

Carbide teeth +
TiAlN-coated

SPR

- > Spezialgeometrie mit Spanteilerrillen
- > Special geometry with chip breaker

MASCHINE · MACHINE

Für Kreissägeautomaten mit Sägeblattstabilisator wie: ADIGE, BEHRINGER-EISELE, BEWO, DELTA, EVERISING, EXACT-CUT, FICEP, GERNETTI, ITEC, KALTENBACH, KASTO, MEGA, NISHIJIMA-SIMAX, RATTUNDE, RSA, SINICO, TSUNE

For circular saw machines with saw blade stabilisers, such as: ADIGE, BEHRINGER-EISELE, BEWO, DELTA, EVERISING, EXACT-CUT, FICEP, GERNETTI, ITEC, KALTENBACH, KASTO, MEGA, NISHIJIMA-SIMAX, RATTUNDE, RSA, SINICO, TSUNE

FÜR DIE ABGABE EINES ANGEBOTES BENÖTIGEN WIR FOLGENDE

ANGABEN: Abmessung, Stückzahl, DIN-Normbezeichnung des zu sägenden Materials, die Abmessung des zu sägenden Materials, Vorschub, Maschinentyp. Falls vorhanden Zeichnung der Schneidengeometrie oder Musterblatt.

WE REQUIRE THE FOLLOWING INFORMATION FOR DELIVERY OF AN ORDER: Dimensions, Quantity, DIN standard designation of the material to be cut, the dimensions of the material to be cut, Feed, machine type, diagram of the cutting geometry or sample blade, if available.

| Art. | Maschinenhersteller Machine manufacturers | | | | | | € |
|-----------------|--|-----------|----------|-----|--------------------|--------------------|---|
| 10 7001 250 010 | Tsune, Kasto, Nijichijima, Everising | ○ 250 | 2,0/1,75 | 32 | 54 | 4-9-50 / 4-11-63 | - |
| 10 7001 250 020 | | ○ 250 | 2,0/1,75 | 32 | 60 | 4-9-50 / 4-11-63 | - |
| 10 7001 250 030 | | ○ 250 | 2,0/1,75 | 32 | 72 | 4-9-50 / 4-11-63 | - |
| 10 7001 250 040 | Bewo, Pfeiffner | ○ 250 | 2,0/1,75 | 32 | 80 | 4-9-50 / 4-11-63 | - |
| 10 7001 250 050 | | ○ 250 | 2,0/1,75 | 40 | 54 | 2-8,5-55 / 4-12-64 | - |
| 10 7001 250 060 | | ○ 250 | 2,0/1,75 | 40 | 60 | 2-8,5-55 / 4-12-64 | - |
| 10 7001 250 070 | | ○ 250 | 2,0/1,75 | 40 | 72 | 2-8,5-55 / 4-12-64 | - |
| 10 7001 250 080 | ○ 250 | 2,0/1,75 | 40 | 80 | 2-8,5-55 / 4-12-64 | - | |
| 10 7001 285 010 | Tsune, Kasto, Nijichijima, I.T.E.C, Dualcut | ○ 285 | 2,0/1,75 | 32 | 54 | 4-9-50 / 4-11-63 | - |
| 10 7001 285 020 | | ○ 285 | 2,0/1,75 | 32 | 60 | 4-9-50 / 4-11-63 | - |
| 10 7001 285 030 | | ○ 285 | 2,0/1,75 | 32 | 72 | 4-9-50 / 4-11-63 | - |
| 10 7001 285 040 | Everising, Amada, Bewo, Noritake | ○ 285 | 2,0/1,75 | 32 | 80 | 4-9-50 / 4-11-63 | - |
| 10 7001 285 050 | | ○ 285 | 2,0/1,75 | 40 | 54 | 4-12-64 / 4-11-80 | - |
| 10 7001 285 060 | | ○ 285 | 2,0/1,75 | 40 | 60 | 4-12-64 / 4-11-80 | - |
| 10 7001 285 070 | | ○ 285 | 2,0/1,75 | 40 | 72 | 4-12-64 / 4-11-80 | - |
| 10 7001 285 080 | ○ 285 | 2,0/1,75 | 40 | 80 | 4-12-64 / 4-11-80 | - | |
| 10 7001 315 010 | Kasto, Kentaki | ○ 315 | 2,25/2,0 | 32 | 60 | 4-9-50 | - |
| 10 7001 315 020 | | ○ 315 | 2,25/2,0 | 32 | 72 | 4-9-50 | - |
| 10 7001 315 030 | | ○ 315 | 2,25/2,0 | 32 | 80 | 4-9-50 | - |
| 10 7001 315 040 | Behringer | ○ 315 | 2,25/2,0 | 40 | 80 | 2-15-80 | - |
| 10 7001 360 010 | Everising, Amada, Noritake, Behringer, Mega, Missler | ○ 360 | 2,6/2,25 | 40 | 60 | 4-15-80 / 4-11-90 | - |
| 10 7001 360 020 | | ○ 360 | 2,6/2,25 | 40 | 72 | 4-15-80 / 4-11-90 | - |
| 10 7001 360 030 | | ○ 360 | 2,6/2,25 | 40 | 80 | 4-15-80 / 4-11-90 | - |
| 10 7001 360 040 | Tsune, Kasto, Kaltenbach, Nijichijima, Endo, Rattunde | ○ 360 | 2,6/2,25 | 40 | 100 | 4-15-80 / 4-11-90 | - |
| 10 7001 360 050 | | ○ 360 | 2,6/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | - |
| 10 7001 360 060 | | ○ 360 | 2,6/2,25 | 50 | 72 | 4-15-80 / 4-11-90 | - |
| 10 7001 360 070 | | ○ 360 | 2,6/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | - |
| 10 7001 360 080 | ○ 360 | 2,6/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | - | |
| 10 7001 425 010 | Tsune, Kasto | ○ 425/420 | 2,6/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | - |
| 10 7001 425 020 | | ○ 425/420 | 2,6/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | - |
| 10 7001 425 030 | | ○ 425/420 | 2,6/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | - |
| 10 7001 460 010 | Amada, Everising, Nijichijima, Noritake | ○ 460 | 2,7/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | - |
| 10 7001 460 020 | | ○ 460 | 2,7/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | - |
| 10 7001 460 030 | | ○ 460 | 2,7/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | - |

Weitere Abmessungen auf Anfrage
Other dimensions are available on request

Weitere
Schnittdaten
Additional
cutting data



Film
Movie



1323

887




Index

10 7002

Hartmetall-bestückte Dünnschnitt-Kreissägeblätter TiAlN-beschichtet für Edelstahl
Carbide tipped thin-cut circular saw blades TiAlN-coated for stainless steel

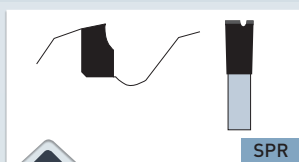
✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|---|-----------|-----------------|
| ✓ |  | Edelstahl | Stainless steel |
|---|---|-----------|-----------------|

ANWENDUNG · APPLICATION

Zum Sägen von Edelstahl

For cutting stainless steel



Hartmetall-Zähne +
TiAlN-beschichtet

Carbide teeth +
TiAlN-coated

SPR

- > Spezialgeometrie mit Spanteilerrillen
- > Special geometry with chip breaker

MASCHINE · MACHINE

Für Kreissägeautomaten mit Sägeblattstabilisator wie: ADIGE, BEHRINGER-EISELE, BEWO, DELTA, EVERISING, EXACT-CUT, FICEP, GERNETTI, ITEC, KALTENBACH, KASTO, MEGA, NISHIJIMA-SIMAX, RATTUNDE, RSA, SINICO, TSUNE






For circular saw machines with saw blade stabilisers, such as: ADIGE, BEHRINGER-EISELE, BEWO, DELTA, EVERISING, EXACT-CUT, FICEP, GERNETTI, ITEC, KALTENBACH, KASTO, MEGA, NISHIJIMA-SIMAX, RATTUNDE, RSA, SINICO, TSUNE

FÜR DIE ABGABE EINES ANGEBOTES BENÖTIGEN WIR FOLGENDE

ANGABEN: Abmessung, Stückzahl, DIN-Normbezeichnung des zu sägenden Materials, die Abmessung des zu sägenden Materials, Vorschub, Maschinentyp. Falls vorhanden Zeichnung der Schneidengeometrie oder Musterblatt.

WE REQUIRE THE FOLLOWING INFORMATION FOR DELIVERY OF AN

ORDER: Dimensions, Quantity, DIN-standard designation of the material to be cut, the dimensions of the material to be cut, Feed, machine type, diagram of the cutting geometry or sample blade, if available.

| Art. | Maschinenhersteller Machine manufacturers |  |  |  |  |  | € |
|-----------------|--|---|---|---|---|---|---|
| 10 7002 250 010 | Tsune, Kasto, Nichijima, Everising | ○ 250 | 2,0/1,75 | 32 | 54 | 4-9-50 / 4-11-63 | - |
| 10 7002 250 020 | | ○ 250 | 2,0/1,75 | 32 | 60 | 4-9-50 / 4-11-63 | - |
| 10 7002 250 030 | | ○ 250 | 2,0/1,75 | 32 | 72 | 4-9-50 / 4-11-63 | - |
| 10 7002 250 040 | Bewo, Pfeiffner | ○ 250 | 2,0/1,75 | 32 | 80 | 4-9-50 / 4-11-63 | - |
| 10 7002 250 050 | | ○ 250 | 2,0/1,75 | 40 | 54 | 2-8,5-55 / 4-12-64 | - |
| 10 7002 250 060 | | ○ 250 | 2,0/1,75 | 40 | 60 | 2-8,5-55 / 4-12-64 | - |
| 10 7002 250 070 | | ○ 250 | 2,0/1,75 | 40 | 72 | 2-8,5-55 / 4-12-64 | - |
| 10 7002 250 080 | | ○ 250 | 2,0/1,75 | 40 | 80 | 2-8,5-55 / 4-12-64 | - |
| 10 7002 285 010 | Tsune, Kasto, Nichijima, I.T.E.C, Dualcut | ○ 285 | 2,0/1,75 | 32 | 54 | 4-9-50 / 4-11-63 | - |
| 10 7002 285 020 | | ○ 285 | 2,0/1,75 | 32 | 60 | 4-9-50 / 4-11-63 | - |
| 10 7002 285 030 | | ○ 285 | 2,0/1,75 | 32 | 72 | 4-9-50 / 4-11-63 | - |
| 10 7002 285 040 | Everising, Amada, Bewo, Noritake | ○ 285 | 2,0/1,75 | 32 | 80 | 4-9-50 / 4-11-63 | - |
| 10 7002 285 050 | | ○ 285 | 2,0/1,75 | 40 | 54 | 4-12-64 / 4-11-80 | - |
| 10 7002 285 060 | | ○ 285 | 2,0/1,75 | 40 | 60 | 4-12-64 / 4-11-80 | - |
| 10 7002 285 070 | | ○ 285 | 2,0/1,75 | 40 | 72 | 4-12-64 / 4-11-80 | - |
| 10 7002 285 080 | | ○ 285 | 2,0/1,75 | 40 | 80 | 4-12-64 / 4-11-80 | - |
| 10 7002 315 010 | Kasto, Kentaki | ○ 315 | 2,25/2,0 | 32 | 60 | 4-9-50 | - |
| 10 7002 315 020 | | ○ 315 | 2,25/2,0 | 32 | 72 | 4-9-50 | - |
| 10 7002 315 030 | | ○ 315 | 2,25/2,0 | 32 | 80 | 4-9-50 | - |
| 10 7002 315 040 | Behringer | ○ 315 | 2,25/2,0 | 40 | 80 | 2-15-80 | - |
| 10 7002 360 010 | Everising, Amada, Noritake, Behringer, Mega, Missler | ○ 360 | 2,6/2,25 | 40 | 60 | 4-15-80 / 4-11-90 | - |
| 10 7002 360 020 | | ○ 360 | 2,6/2,25 | 40 | 72 | 4-15-80 / 4-11-90 | - |
| 10 7002 360 030 | | ○ 360 | 2,6/2,25 | 40 | 80 | 4-15-80 / 4-11-90 | - |
| 10 7002 360 040 | | ○ 360 | 2,6/2,25 | 40 | 100 | 4-15-80 / 4-11-90 | - |
| 10 7002 360 050 | Tsune, Kasto, Kaltenbach, Nichijima, Endo, Rattunde | ○ 360 | 2,6/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | - |
| 10 7002 360 060 | | ○ 360 | 2,6/2,25 | 50 | 72 | 4-15-80 / 4-11-90 | - |
| 10 7002 360 070 | | ○ 360 | 2,6/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | - |
| 10 7002 360 080 | | ○ 360 | 2,6/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | - |
| 10 7002 425 010 | Tsune, Kasto | ○ 425/420 | 2,6/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | - |
| 10 7002 425 020 | | ○ 425/420 | 2,6/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | - |
| 10 7002 425 030 | | ○ 425/420 | 2,6/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | - |
| 10 7002 460 010 | Amada, Everising, Nichijima, Noritake | ○ 460 | 2,7/2,25 | 50 | 60 | 4-15-80 / 4-11-90 | - |
| 10 7002 460 020 | | ○ 460 | 2,7/2,25 | 50 | 80 | 4-15-80 / 4-11-90 | - |
| 10 7002 460 030 | | ○ 460 | 2,7/2,25 | 50 | 100 | 4-15-80 / 4-11-90 | - |

Weitere Abmessungen auf Anfrage
Other dimensions are available on request

Weitere
Schnittdaten
Additional
cutting data

Film
Movie



1323






Hochleistungs-Kreissägeblätter für Stahl, Edelstahl, Schienen
High-Performance circular saw blades for steel, stainless steel, rails

10 7050



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|---|-----------|-----------------|
| ✓ |  | Baustahl | Mild steel |
| ✓ |  | Edelstahl | Stainless steel |
| ✓ |  | Schienen | Rails |

ANWENDUNG · APPLICATION

Zum Sägen von Stahl, Edelstahl, Eisenbahnschienen. Profile und Vollmaterial.
Erhältlich von Durchmesser 250 mm bis 2250 mm.

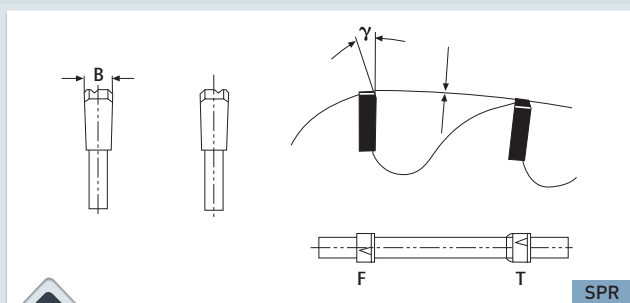
For cutting steel, stainless steel, rails. Profiles and solid material.
Available from diameter 250 mm to 2250 mm.

FÜR DIE ABGABE EINES ANGEBOTES BENÖTIGEN WIR FOLGENDE ANGABEN:

Abmessung, Stückzahl, DIN-Normbezeichnung des zu sägenden Materials, die Abmessung des zu sägenden Materials, Vorschub, Maschinentyp. Falls vorhanden Zeichnung der Schneidengeometrie oder Musterblatt.

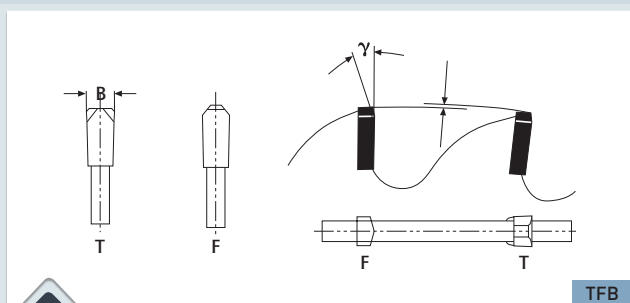
WE REQUIRE THE FOLLOWING INFORMATION FOR DELIVERY OF AN ORDER:

Dimensions, Quantity, DIN standard designation of the material to be cut, the dimensions of the material to be cut, Feed, machine type, diagram of the cutting geometry or sample blade, if available.



SPR

- > Universalverzahnung für Profile und Vollmaterial
- > Universal toothing for profiles and solid material



TFB

- > Spezialverzahnung für Vollmaterial
- > Special toothing for solid material

MASCHINE · MACHINE

Für Kreissägeautomaten / stabile Maschinen wie z.B. FRAMAG, LINSINGER, MFL auf denen HM-Bestückte Kreissägeblätter eingesetzt werden können.

- Material muss vibrationsfrei gespannt sein
- Umfangsgeschwindigkeit für Vollmaterial je nach Materialgüte 80-140 m/min erforderlich
Stufenlos regelbarer Vorschub von 0,2-0,4 m/min
- Umfangsgeschwindigkeit bei Profile: Je nach Profil- oder Rohrstärke 110-160 m/min erforderlich
Stufenlos regelbarer Vorschub von 0,2-0,8 m/min.

For circular saw machines / stable production machines such as FRAMAG, LINSINGER, MFL on which carbide tipped circular saw blades can be installed.

- The material has to be fixed without causing vibrations
- Rotational speed for solid material depending on the material quality 80-140 m/min required
Infinitely adjustable feed rate of 0.2-0.4 m/min
- Rotational speed for profiles: Depending on the profile or tube thickness 110-160 m/min required
Infinitely adjustable feed rate of 0.2-0.8 m/min.

Film
Movie



889

1



2



3



4



5



6



7



8



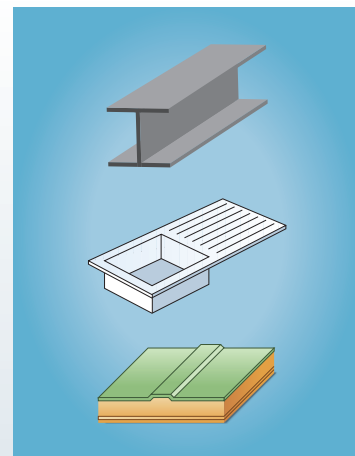
9



Index

Baustahl · Edelstahl · Dünobleche · Sandwichmaterial

Mild steel · Stainless steel · Thin iron sheets, Sandwich material



Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Radialarmsägen, Tisch- und Formatkreissägen, akku-betriebene Maschinen und passend ebenfalls für sogenannte DRY-CUTTER Maschinen mit reduzierten Drehzahlen wie zum Beispiel: JEPSON, RIDGID, ELU, RYOBI...

For portable machines, cross-cut saws, panel and sizing saws, mitre saws, table and radial arms saws, battery-driven saws and suitable also for so-called DRY CUTTER machines with reduced speeds such as: Jepson, RIDGID, ELU, RYOBI...

Schnittwertempfehlungen · Recommended cutting values

| Werkstoffgruppe Material Group | Werkstoffbeispiele Material examples | Vc (m/s) Schnittgeschwindigkeit Cutting speed | m/min Handvorschub Manual feed |
|---|--|---|--------------------------------------|
| Baustähle Structural steels | St 37/42 (1.0037 / 1.0042) St 52/60 (1.0050 / 1.0060) | 20-35 | 2-7 |
| Rost- und säurebeständige Stähle Stainless steel | X 20Cr 13 (14021) X 5CrNi 1810 (14301) | 15-30 | 1.5-4 |

Drehzahl n (U/min) · Revolution per minute n (rpm)

| | 1000 | 1500 | 2000 | 2500 | 2850 | 3000 | 4000 | 4500 | 5000 | 5600 | 6000 | 8000 | 9000 | 10000 | 12000 |
|-------|------|------|------|------|------|------|------|------|------|-------|-------|------|------|-------|-------|
| 80 Ø | 4,5 | 6,5 | 8,5 | 10,5 | 12 | 13 | 17 | 19 | 21 | 23,5 | 26 | 34 | 38 | 42 | 52 |
| 90 Ø | 5 | 7 | 9,5 | 12 | 13,5 | 14 | 19 | 21 | 24 | 26,5 | 28 | 38 | 42 | 48 | 56 |
| 100 Ø | 5,5 | 8 | 10,5 | 13 | 15 | 16 | 21 | 24 | 26 | 29 | 32 | 42 | 48 | 52 | 54 |
| 120 Ø | 6,5 | 9,5 | 13 | 16 | 18 | 19 | 26 | 28 | 32 | 35 | 38 | 52 | 56 | 64 | 76 |
| 125 Ø | 7 | 10 | 13,5 | 16,5 | 18,5 | 19,5 | 27 | 29 | 33 | 36,5 | 39 | 54 | 59 | 66 | 78 |
| 140 Ø | 8 | 11 | 15 | 18 | 21 | 22 | 30 | 33 | 36 | 41 | 44 | 60 | 66 | 72 | 88 |
| 150 Ø | 8,5 | 12 | 15,5 | 19,5 | 22,5 | 23,5 | 31,5 | 33,5 | 39 | 44 | 47 | 63 | 70,5 | 78,5 | 94,5 |
| 160 Ø | 9 | 13 | 17 | 21 | 24 | 26 | 34 | 38 | 42 | 47 | 52 | 68 | 76 | 84 | 104 |
| 180 Ø | 10 | 14 | 19 | 24 | 27 | 28 | 38 | 42,5 | 48 | 53 | 56 | 76 | 85 | 96 | 118 |
| 200 Ø | 11 | 16 | 21 | 26 | 30 | 32 | 42 | 47 | 52 | 58,5 | 64 | 84 | 94 | 104 | 128 |
| 225 Ø | 12 | 18 | 24 | 30 | 33,5 | 36 | 48 | 58 | 60 | 66 | 72 | 96 | 106 | 120 | 144 |
| 250 Ø | 14 | 20 | 26 | 33 | 37 | 40 | 52 | 59 | 66 | 73,5 | 80 | 104 | 118 | 132 | 160 |
| 300 Ø | 17 | 24 | 31,5 | 40 | 45 | 48 | 63 | 71 | 80 | 88 | 96 | 126 | 142 | 160 | 192 |
| 350 Ø | 19 | 28 | 36,5 | 47 | 52 | 56 | 73 | 88 | 94 | 105 | 112 | 146 | 166 | 188 | 224 |
| 400 Ø | 22 | 32 | 42 | 54 | 60 | 64 | 84 | 94 | 108 | 117 | 128 | 168 | 188 | 216 | 256 |
| 450 Ø | 24 | 35,5 | 47 | 59 | 67,5 | 70,5 | 94,5 | 106 | 118 | 132 | 141,6 | 188 | 211 | 236 | 283 |
| 500 Ø | 27 | 40 | 53 | 67 | 74,5 | 80 | 106 | 118 | 134 | 146,5 | 160 | 212 | 236 | 268 | 320 |

Schnittgeschwindigkeit in m/s · Cutting speed in m/s

1 Stahl, Edelstahl
Steel, stainless steel

2 Sicherheitsgrenze
Safety limits

Festlegung der Schnittgeschwindigkeit Vc
Determination of cutting speed Vc

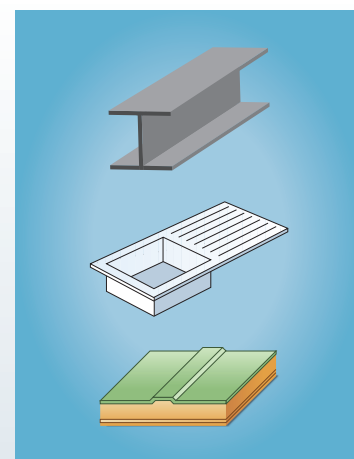
BEMERKUNG · COMMENT

Die Kreissägen in dieser Rubrik sind nicht für die Serienfertigung von Stahlabschnitten konzipiert. Diese Sägen sind ideal um schnell nahezu alle Materialien zu sägen wie: Stahl, Nichteisenmetalle, Kunststoffe, Sandwich und Verbundmaterial. Also ideal als Baustellensäge sowie für den Laden- und Messebauer. Um Stahl in Serie/Produktion zu sägen, empfehlen wir Kreissägen siehe Seiten 886-889

The Circular Saws in this Category are not designed for the mass production of steel sections. These saws are ideal for fast cuts in almost any material such as: Steel, non-ferrous metals, plastics, composites and sandwich material. The perfect saws for the building site as well as for store and stand builders. If steel is to be cut in series / production, we recommend our circular saws see page 886-889

Baustahl · Edelstahl · Dünobleche · Sandwichmaterial

Mild steel · Stainless steel · Thin iron sheets,
Sandwich material

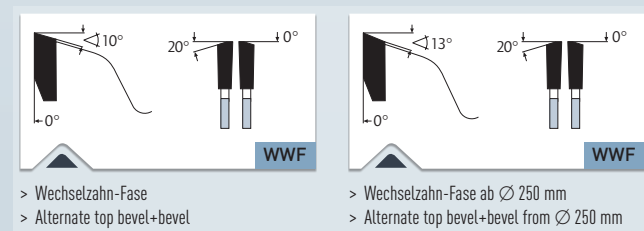


| Art. Ø mm | Type | Anwendung · Application | |
|---|---|---|-----|
| 10 7100 Ø mm 136-500  | Dry-Cutter Baustähle | Schwerpunkt ist das Trennen von Profilmaterial sowie Bleche bis ca. 6 mm Wandstärke | 892 |
| | Dry-Cutter mild steel | The focus is on cutting profile material and sheet metals up to 6 mm wall thickness | |
| 10 7130 Ø mm 136-355  | Dry-Cutter Baustähle "Einweg" | Schwerpunkt ist das Trennen von Profilmaterial sowie Bleche bis ca. 6 mm Wandstärke | 893 |
| | Dry-Cutter mild steel "throw away" BEST SELLER | The focus is on cutting profile material and sheet metals up to 6 mm wall thickness | |
| 10 7150 Ø mm 136-355  | Super Dry-Cutter Baustähle | Schwerpunkt ist das Trennen von Profilmaterial sowie Blechen. Profilmaterial Wandstärke ab 3 mm bis 8 mm sowie Bleche ab 3 mm bis 10 mm. | 894 |
| | Super Dry-Cutter mild steel | The focus is on cutting profile material and sheet metal. Profile material from 3 mm up to 8 mm wall thickness and sheet metal from 3 mm up to 10 mm thickness. | |
| 10 7300 Ø mm 136-500  | Dry-Cutter Edelstahl | Schwerpunkt ist das Trennen von Profilmaterial sowie Bleche aus Edelstahl bis ca. 4 mm Wandstärke | 896 |
| | Dry-Cutter stainless | The focus is cutting of profile material and sheets of stainless steel up to no more than 4 mm wall thickness | |
| 10 7400 Ø mm 136-500  | Dry-Cutter Sandwich | Schwerpunkt ist das Trennen von Dünblech bis ca. 3 mm sowie Sandwichmaterialien, Fassadenprofile u.ä. | 897 |
| | Dry-Cutter sandwich BEST SELLER | The focus is on cutting thin sheet up to approx. 3 mm and sandwich materials, façade profiles, etc. | |
| 10 8055 Ø mm 120-500  | Winkelschleifer + Brutal Einweg-Sägeblätter | Brutal Einweg-Sägeblätter zum Sägen „fast“ aller Materialien. Ideal für Bau und Handwerk | 899 |
| | Angle Grinder + Brutal disposable saw blades BEST SELLER | Brutal disposable saw blades for sawing "almost" any material. Ideal for construction and crafts | |



10 7100

Dry-Cutter Baustähle
Dry-Cutter mild steel



MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Radialarmsägen, Tisch- und Formatkreissägen, akkubetriebene Maschinen und passend ebenfalls für sogenannte DRY-CUTTER Maschinen mit reduzierten Drehzahlen wie zum Beispiel: JEPSON, RIDGID, ELU, RYOBI...

For portable machines, cross-cut saws, panel and sizing saws, mitre saws, table and radial arms saws, battery-driven saws and suitable also for so-called DRY CUTTER machines with reduced speeds such as: Jepson, RIDGID, ELU, RYOBI...

Bei Stahl ist es vorteilhaft mit reduzierten Drehzahlen (min^{-1}) zu arbeiten (siehe Tabelle unten). Die Verwendung von Schneidspray oder Mecutwachs erhöht wesentlich die Standzeit (Schneidöle siehe ab Seite 1144).

For steel, it is beneficial to work at reduced speeds (see table below). Use of cutting spray or Mecut wax increases the service life (coolants see from page 1144)

Ø 136-150 mm = 4000-3600 min^{-1} /rpm

Ø 160-200 mm = 3500-3000 min^{-1} /rpm

Ø 210-250 mm = 2800-1900 min^{-1} /rpm

Ø 260-330 mm = 1800-1500 min^{-1} /rpm

Ø 350-400 mm = 1400-1000 min^{-1} /rpm

Ø 420-500 mm = 900-700 min^{-1} /rpm

Bitte achten Sie unbedingt auf absolut feste und vibrationsfreie Befestigung des Werkstücks. Nichtbeachtung führt zu Zahnbruch/erhöhtem Verschleiß. Empfehlungen hierzu siehe Seite 895.

Please pay attention to absolutely stable/complete and vibration-free clamping of the work piece. Failure to observe leads to tooth breakage/increased wear. Recommendations can be found on page 895.

Trennen von Dünnschicht bis ca. 3 mm Wandstärke sowie Sandwichmaterial siehe Art. 10 7400 Seite 897

Trennen von Edelstahl bis ca. 4 mm siehe Art. 10 7300 Seite 896

Trennen von Aluprofilen/Alublechen siehe Art. 10 8000 Seite 902 / Art. 11 1100 Seite 911 / Art. 11 1120 Seite 913

Trennen von Holz, Kunststoffen, NE-Metallen wie Alu, Baustähle siehe Art. 10 8055 Seite 899

Cutting thin sheet up to approx. 3 mm wall thickness and sandwich material: see item 10 7400 page 897

Cutting stainless steel up to approx. 4 mm: see item 10 7300 page 896

Cutting of aluminum profiles/sheets: see item 10 8000 page 902 / item 11 1100 page 911 / item 11 1120 page 913

Cutting of wood, plastics, non-ferrous metals like aluminum, mild steels: see item 10 8055 page 899

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|--|
| ✓ | | Baustahl | Mild steel |
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Dünnschicht, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Schwerpunkt ist das Trennen von Profilmaterial sowie Bleche bis ca. 6 mm Wandstärke. Die höhere Zähnezahl ist bis ca. 3 mm Wandstärke geeignet. Für noch höhere Standzeiten siehe unsere neuen **Super Dry-Cutter Baustähle** Blätter. (Art. 10 7150 / Seite 894).

Sie suchen ein besondere gutes Preis-Leistungsverhältniss dieser Blätter? Sie haben einen hohen Verbrauch an Blättern und wollen / können die Blätter nicht nachschleifen? Dann ist unsere **BESTSELLER** Reihe das richtige für Sie. Siehe nächste Seite.

The focus is on cutting profile material and sheet metals up to 6 mm wall thickness. The higher number of teeth is suitable up to 3 mm thickness. For higher service lives see our new **Super Dry-Cutter mild steel** blades. (Art. 10 7150 / page 894).

Are you looking for a special price-performance ratio for this blades? You have a high consumption of this blades and do not want or cannot regrind them? Then our **BESTSELLER** series is right for you. See next page.

| Art. | | | | | | | € |
|-----------------|-----------|---------|---------|---------|---------------|---|--------|
| 10 7100 136 010 | • 136 | 1,6/1,2 | 20/10 | 30 WWF | 2-6-32 | - | 36,70 |
| 10 7100 150 010 | • 150 | 1,8/1,4 | 20/16 | 30 WWF | 2-6-32 | - | 36,65 |
| 10 7100 160 010 | • 160 | 1,8/1,4 | 20/16 | 30 WWF | 2-6-32 | - | 37,60 |
| 10 7100 180 010 | • 180 | 1,8/1,4 | 30/20 | 34 WWF | UNI 1 | - | 41,80 |
| 10 7100 185 010 | • 185 | 1,8/1,4 | 20/16 | 34 WWF | 2-6-32 | - | 42,00 |
| 10 7100 190 010 | • 190 | 1,8/1,4 | 30 | 38 WWF | UNI 1 | - | 43,10 |
| 10 7100 200 010 | • 200 | 2,0/1,6 | 30 | 40 WWF | UNI 1 | - | 47,35 |
| 10 7100 210 010 | • 210 | 2,0/1,6 | 30 | 40 WWF | UNI 1 | - | 47,90 |
| 10 7100 216 010 | • 216 | 2,0/1,6 | 30 | 42 WWF | UNI 1 | - | 49,15 |
| 10 7100 230 010 | • 230/235 | 2,0/1,6 | 30/25,4 | 44 WWF | UNI 1 | - | 52,35 |
| 10 7100 250 010 | • 250 | 2,2/1,8 | 30/25,4 | 48 WWF | UNI 1 + UNI 2 | ✓ | 62,50 |
| 10 7100 250 020 | • 250 | 2,2/1,8 | 30/25,4 | 60 WWF | UNI 1 + UNI 2 | ✓ | 79,75 |
| 10 7100 260 010 | • 260 | 2,2/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | ✓ | 85,60 |
| 10 7100 270 010 | • 270 | 2,2/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | ✓ | 87,35 |
| 10 7100 280 010 | • 280 | 2,2/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | ✓ | 44,75 |
| 10 7100 300 010 | • 300 | 2,2/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | ✓ | 90,30 |
| 10 7100 300 020 | • 300 | 2,2/1,8 | 30 | 80 WWF | UNI 1 + UNI 2 | ✓ | 110,35 |
| 10 7100 305 010 | • 305 | 2,2/1,8 | 25,4 | 60 WWF | - | ✓ | 88,45 |
| 10 7100 305 020 | • 305 | 2,2/1,8 | 25,4 | 80 WWF | - | ✓ | 109,65 |
| 10 7100 320 010 | • 320 | 2,2/1,8 | 30/25,4 | 84 WWF | UNI 1 + UNI 2 | ✓ | 112,00 |
| 10 7100 330 010 | • 330 | 2,2/1,8 | 32/30 | 84 WWF | UNI 2 | ✓ | 113,95 |
| 10 7100 350 010 | • 350 | 2,2/1,8 | 30 | 80 WWF | UNI 1 + UNI 2 | ✓ | 114,05 |
| 10 7100 355 010 | • 355 | 2,2/1,8 | 25,4 | 60 WWF | - | ✓ | 99,85 |
| 10 7100 355 020 | • 355 | 2,2/1,8 | 25,4 | 80 WWF | - | ✓ | 114,05 |
| 10 7100 355 030 | • 355 | 2,2/1,8 | 25,4 | 90 WWF | 1-12-55,4 | ✓ | 122,00 |
| 10 7100 400 010 | • 400 | 3,0/2,6 | 30 | 84 WWF | UNI 1 + UNI 2 | ✓ | 145,60 |
| 10 7100 420 010 | • 420 | 3,0/2,6 | 30 | 84 WWF | UNI 1 + UNI 2 | ✓ | 79,10 |
| 10 7100 450 010 | • 450 | 2,8/2,4 | 30 | 90 WWF | UNI 1 + UNI 2 | ✓ | 176,50 |
| 10 7100 500 010 | • 500 | 3,0/2,6 | 30 | 100 WWF | UNI 1 + UNI 2 | ✓ | 210,80 |

UNI 1 = 2-7-42 + 2-9-46,4 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64 • Gefertigt/Manufactured 232,50 mm

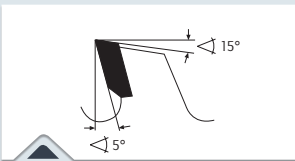
• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Film Movie

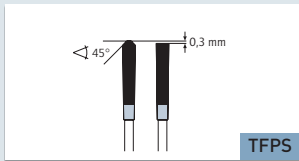


Dry-Cutter Baustähle "Einweg"
Dry-Cutter mild steel "Throw-away"

10 7130



> Trapez-Flachzahn Positiv Sonder
> Triple-chip / flat tooth positive special



TFPS

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Radialarmsägen, Tisch- und Formatkreissägen, akkubetriebene Maschinen und passend ebenfalls für sogenannte DRY-CUTTER Maschinen mit reduzierten Drehzahlen wie zum Beispiel: JEPSON, RIDGID, ELU, RYOBI...

For portable machines, cross-cut saws, panel and sizing saws, mitre saws, table and radial arms saws, battery-driven saws and suitable also for so-called DRY CUTTER machines with reduced speeds such as: Jepson, RIDGID, ELU, RYOBI...

Bei Stahl ist es vorteilhaft mit reduzierten Drehzahlen (min⁻¹) zu arbeiten (siehe Tabelle unten). Die Verwendung von Schneidspray oder Mecutwachs erhöht wesentlich die Standzeit (Schneidöle siehe ab Seite 1144).

For steel, it is beneficial to work at reduced speeds (see table below). Use of cutting spray or Mecut wax increases the service life (coolants see from page 1144)

- Ø 136-150 mm = 4000-3600 min⁻¹/rpm
- Ø 160-200 mm = 3500-3000 min⁻¹/rpm
- Ø 210-250 mm = 2800-1900 min⁻¹/rpm
- Ø 260-330 mm = 1800-1500 min⁻¹/rpm
- Ø 350-400 mm = 1400-1000 min⁻¹/rpm

Bitte achten Sie unbedingt auf absolut feste und vibrationsfreie Befestigung des Werkstücks. Nichtbeachtung führt zu Zahnbruch/erhöhtem Verschleiß. Empfehlungen hierzu siehe Seite 895.

Please pay attention to absolutely stable/complete and vibration-free clamping of the work piece. Failure to observe leads to tooth breakage/increased wear. Recommendations can be found on page 895.

Trennen von Dünnschicht bis ca. 3 mm Wandstärke sowie Sandwichmaterial siehe Art. 10 7400 Seite 897

Cutting thin sheet up to approx. 3 mm wall thickness and sandwich material: see item 10 7400 page 897

Trennen von Edelstahl bis ca. 4 mm siehe Art. 10 7300 Seite 896

Cutting stainless steel up to approx. 4 mm: see item 10 7300 page 896

Trennen von Aluprofilen/Alublechen siehe Art. 10 8000 Seite 902 / Art. 11 1100 Seite 911 / Art. 11 1120 Seite 913

Cutting of aluminum profiles/sheets: see item 10 8000 page 902 / item 11 1100 page 911 / item 11 1120 page 913

Trennen von Holz, Kunststoffen, NE-Metallen wie Alu, Baustähle siehe Art. 10 8055 Seite 899

Cutting of wood, plastics, non-ferrous metals like aluminum, mild steels: see item 10 8055 page 899

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|--|
| ✓ | | Baustahl | Mild steel |
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Dünnschicht, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Schwerpunkt ist das Trennen von Profilmaterial sowie Bleche bis ca. 6 mm Wandstärke. Die höhere Zähnezahl ist bis ca. 3 mm Wandstärke geeignet. Für noch höhere Standzeiten.

Blätter der DRY-CUTTER Serien werden oftmals stark beansprucht. Durch Zahnbruch oder zu starker Abstumpfung ist ein Nachschärfen oftmals nicht mehr möglich. Hier ist unsere BESTSELLER Serie eine Alternative als „EINWEGKREISSÄGEBLÄTTER“.

The focus is on cutting profile material and sheet metals up to 6 mm wall thickness. The higher number of teeth is suitable up to 3 mm thickness. For higher service lives.

Blades of the DRY-CUTTER series are often heavily used. A re-sharpening is due to tooth breakage or excessive blunting often no longer possible. Here is our BESTSELLER series an alternative as "THROW-AWAY" blades

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | | | | | | | € |
|-----------------|-----------|---------|---------|---------|---------------|---|-------|
| 10 7130 136 010 | • 136 | 2,0/1,4 | 20/10 | 30 TFPS | 2-6-32 | - | 25,55 |
| 10 7130 160 010 | • 160 | 2,2/1,6 | 20/16 | 30 TFPS | 2-6-32 | - | 26,50 |
| 10 7130 190 010 | • 190 | 2,2/1,6 | 30 | 38 TFPS | UNI 1 | - | 31,15 |
| 10 7130 230 010 | • 230/235 | 2,2/1,8 | 30/25,4 | 44 TFPS | UNI 1 | - | 39,55 |
| 10 7130 250 010 | • 250 | 2,2/1,8 | 30/25,4 | 48 TFPS | UNI 1 + UNI 2 | ✓ | 46,60 |
| 10 7130 250 020 | • 250 | 2,2/1,8 | 30/25,4 | 60 TFPS | UNI 1 + UNI 2 | ✓ | 55,20 |
| 10 7130 305 010 | • 305 | 2,2/1,8 | 25,4 | 60 TFPS | - | ✓ | 59,80 |
| 10 7130 305 020 | • 305 | 2,2/1,8 | 25,4 | 80 TFPS | - | ✓ | 74,25 |
| 10 7130 355 020 | • 355 | 2,4/2,0 | 25,4 | 80 TFPS | - | ✓ | 82,15 |
| 10 7130 355 030 | • 355 | 2,4/2,0 | 25,4 | 90 TFPS | 1-12-55,4 | ✓ | 89,35 |

UNI 1 = 2-7-42 + 2-9-46,4 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64 • Gefertigt/Manufactured 232,50 mm

Film Movie




10 7150

Super Dry-Cutter Baustähle
Super Dry-Cutter mild steel



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|---|----------|------------|
| ✓ |  | Baustahl | Mild steel |
|---|---|----------|------------|

ANWENDUNG · APPLICATION

Schwerpunkt ist das Trennen von Profilmaterial sowie Blechen. Profilmaterial Wandstärke ab 3 mm bis 8 mm sowie Bleche ab 3 mm bis 10 mm. Hierfür verwenden Sie bitte die Abmessungen 305 mm mit 60 Zähnen, 355 mm mit 80 Zähnen.

Bei den restlichen Abmessungen empfehlen wir Profilmaterial ab 2 mm bis 6 mm Wandstärke, sowie Bleche ab 2 mm bis 8 mm.

Durch **CERMET**-Zähne (Keramik) **verdoppelt sich die Standzeit** gegenüber der DRY-CUTTER BAUSTÄHLE, Ausführung Art. 10 7100 Seite 892.

Speziell bei **CERMET** ist auf absolut feste und vibrationsfreie Befestigung des Werkstückes zu achten. Dies ist ebenfalls wichtig für alle unsere DRY-CUTTER Modelle Art. 10 7100, 10 7130, 10 7300, 10 7400. Siehe hierzu auch nächste Seite „Empfehlungen zum spannen verschiedener Profile.“

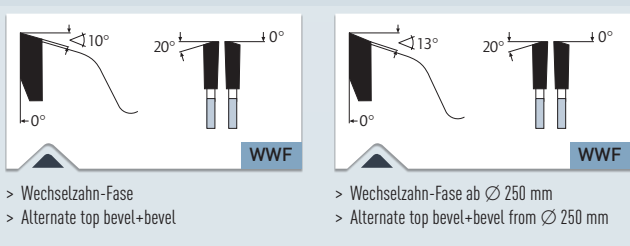
The focus is on cutting profile material and sheet metal. Profile material from 3 mm up to 8 mm wall thickness and sheet metal from 3 mm up to 10 mm thickness. Please use here the dimension 305 mm with 60 teeth and 355 mm with 80 teeth.

For all the remaining dimension we recommend: Profile material from 2 mm up to 6 mm wall thickness and sheet metal from 2 mm up to 8 mm thickness.

CERMET teeth (ceramics) approx. **doubles the service life** as compared to our Dry-Cutter mild steel Art. 10 7100 page 892.

CERMET blades needs stable, complete and vibration-free clamping of the work piece. This is also important for all DRY-CUTTER versions such as Article 10 7100, 10 7130, 10 7300 and 10 7400.

See here our recommendation next page "Tips for cutting different shapes".



> Wechselzahn-Fase
> Alternate top bevel+bevel

> Wechselzahn-Fase ab Ø 250 mm
> Alternate top bevel+bevel from Ø 250 mm

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Radialarmsägen, Tisch- und Formatkreissägen, akkubetriebene Maschinen und passend ebenfalls für sogenannte DRY-CUTTER Maschinen mit reduzierten Drehzahlen wie zum Beispiel: JEPSON, RIDGID, ELU, RYOBI...

For portable machines, cross-cut saws, panel and sizing saws, mitre saws, table and radial arms saws, battery-driven saws and suitable also for so-called DRY CUTTER machines with reduced speeds such as: Jepson, RIDGID, ELU, RYOBI...

Bei Stahl ist es vorteilhaft mit reduzierten Drehzahlen (min⁻¹) zu arbeiten (siehe Tabelle unten). Die Verwendung von Schneidspray oder Mecut-wachs erhöht wesentlich die Standzeit (Schneidöle siehe ab Seite 1144).

For steel, it is beneficial to work at reduced speeds (see table below). Use of cutting spray or Mecut wax increases the service life (coolants see from page 1144)







Ø 136-150 mm = 4000-3600 min⁻¹/rpm

Ø 160-200 mm = 3500-3000 min⁻¹/rpm

Ø 210-250 mm = 2800-1900 min⁻¹/rpm

Ø 260-330 mm = 1800-1500 min⁻¹/rpm

Ø 350-400 mm = 1400-1000 min⁻¹/rpm

| Art. |  |  |  |  |  |  | € |
|-----------------|--|---|---|---|---|---|--------|
| 10 7150 136 010 | ● 136 | 1,6/1,2 | 20/10 | 30 WWF | 2-6-32 | - | 45,05 |
| 10 7150 160 010 | ● 160 | 1,8/1,4 | 20/16 | 32 WWF | 2-6-32 | - | 53,45 |
| 10 7150 180 010 | ● 180 | 1,8/1,4 | 30/20 | 36 WWF | UNI 1 | - | 61,25 |
| 10 7150 190 010 | ● 190 | 1,8/1,4 | 30 | 38 WWF | UNI 1 | - | 58,85 |
| 10 7150 230 010 | ● 230/235 | 2,0/1,6 | 30/25,4 | 48 WWF | UNI 1 | - | 74,45 |
| 10 7150 250 010 | ● 250 | 2,2/1,8 | 30/25,4 | 60 WWF | UNI 1 | - | 108,95 |
| 10 7150 305 010 | ● 305 | 2,2/1,8 | 25,4 | 60 WWF | - | - | 127,85 |
| 10 7150 305 020 | ● 305 | 2,2/1,8 | 25,4 | 80 WWF | - | - | 147,65 |
| 10 7150 355 010 | ● 355 | 2,2/1,8 | 25,4 | 80 WWF | - | - | 159,35 |
| 10 7150 355 020 | ● 355 | 2,2/1,8 | 25,4 | 90 WWF | 1-12-55,4 | - | 169,55 |

UNI 1 = 2-7-42 + 2-9-46,4

Weitere Abmessungen siehe Art. 10 7100 Seite 892

Trennen von Dünnschleif bis ca. 3 mm Wandstärke sowie Sandwichmaterial siehe Art. 10 7400 Seite 897

Trennen von Edelstahl bis ca. 4 mm siehe Art. 10 7300 Seite 896

Trennen von Aluprofilen/ Alublechen siehe Art. 10 8000 Seite 902 / Art. 11 1100 Seite 911 / Art. 11 1120 Seite 913

Trennen von Holz, Kunststoffen, NE-Metallen wie Alu, Baustähle siehe Art. 10 8055 Seite 899

For other sizes, see item 10 7100 page 892

Cutting thin sheet up to approx. 3 mm wall thickness and sandwich material: see item 10 7400 page 897

Cutting stainless steel up to approx. 4 mm: see item 10 7300 page 896

Cutting of aluminum profiles/ sheets: see item 10 8000 page 902 / item 11 1100 page 911 / item 11 1120 page 913

Cutting of wood, plastics, non-ferrous metals like aluminum, mild steels: see item 10 8055 page 899

Film Movie



Empfehlung zum Trennen von Profilen in verschiedenen Formen für alle Dry-Cutter Sägeblätter
Recommendations for cutting different shapes for all Dry-Cutter saw blades

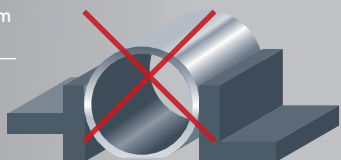
10 7100 10 7130 10 7150
10 7300 10 7400

Dünne Profile welche nur unzureichend befestigt/eingespannt sind fangen an zu vibrieren. Der Schnitt wird unsauber und ungenau. Die Standzeit des Blattes wird wesentlich verringert. Das Blatt kann sogar komplett zerstört werden. Abstützmaterial kann helfen diese Risiken zu vermeiden.

Thin materials and incomplete clamping can cause vibration and deflection which shortens the blade life at a tremendous level. Use of supportive material can reduce these risks.

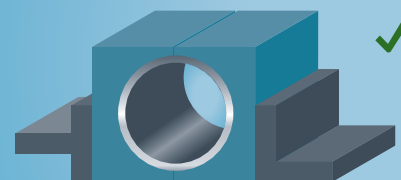
Dünne Rohre · Thin pipes

Nur leicht befestigt/gespannt um das Material nicht zu verbiegen
Clamped lightly so material is not squeezed



Material vibriert während dem sägen
Material vibrates during cutting

Stabilisiert mit Abstützmaterial
Stabilized with supportive material



Abstützmaterial reduziert das Risiko das Blatt zu beschädigen.
Having supportive material can reduce the risk of damaging the blade.

Rundes Vollmaterial oder Rohre · Round bars or pipes

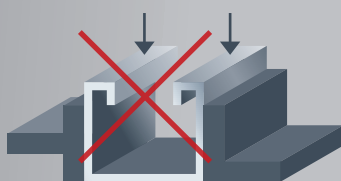


Rundes Vollmaterial oder Rohre können sich während des Sägevorgangs drehen, obwohl sie korrekt befestigt/eingespannt sind. Dies kann kontrolliert werden indem eine Markierung auf das Material angebracht wird. Dreht sich das Material, wird die Standzeit des Blattes erheblich reduziert oder das Blatt kann komplett zerstört werden. Bitte mit Abstützmaterial arbeiten.

Round bars or pipes can move during cutting, even with correct clamping. This can be checked by a "marking" onto the material. If the material is moving, the blade is likely to be damaged.

Dünne Profile eine Seite offen · Thin open ended materials

Keine stabile Befestigung
Unstable clamping

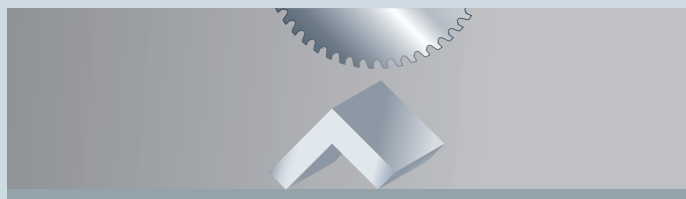


Die mit Pfeilen markierte Stellen fangen an zu vibrieren
The parts below the arrow will vibrate during cutting

Stabilisiert mit 2 Teilen Abstützmaterial
Stabilized with 2 supportive materials



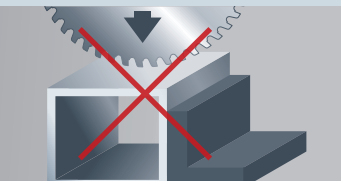
Winkelleisten · Angle bar



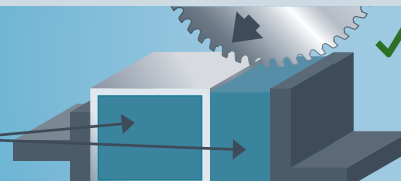
Schenkel nach unten legen und von der Winkelseite anfangen zu sägen.
The material is face down and the cutting starts from the angle side.

Blatteintrittswinkel · Blade entrance

Sägen auf dem flachen Teil
Entering from flat surface



Sägebeginn von der Ecke
Entering from the corner
Abstützmaterial
Supportive material

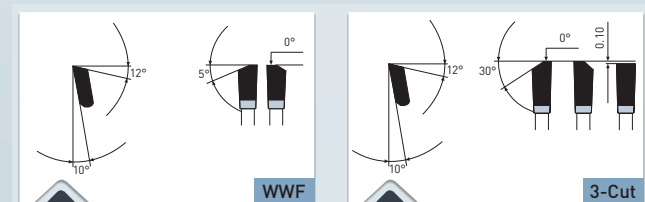


Der Eintrittswinkel des Blattes hat ebenfalls einen starken Einfluss auf die Standzeit. Das Werkstück sowie das Blatt sollten so eingestellt sein, dass der erste Schnitt des Blattes an dem kleinsten Kontaktpunkt des Werkstückes beginnt.
The blade entrance point effects the blade life. The material and blade should be set to consider the best contact point.



10 7300

Dry-Cutter Edelstahl
Dry-Cutter stainless



> Wechselzahn-Fase
> Alternate top bevel+bevel

> 3-Cut
> 3-Cut

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Radialarmsägen, Tisch- und Formatkreissägen, akkubetriebene Maschinen und passend ebenfalls für sogenannte DRY-CUTTER Maschinen mit reduzierten Drehzahlen wie zum Beispiel: JEPSON, RIDGID, ELU, RYOBI...

For portable machines, cross-cut saws, panel and sizing saws, mitre saws, table and radial arms saws, battery-driven saws and suitable also for so-called DRY CUTTER machines with reduced speeds such as: JEPSON, RIDGID, ELU, RYOBI...

- Ø 136-150 mm = 4000-3600 min⁻¹/rpm
- Ø 160-200 mm = 3500-3000 min⁻¹/rpm
- Ø 210-250 mm = 2800-1900 min⁻¹/rpm
- Ø 260-330 mm = 1800-1500 min⁻¹/rpm
- Ø 350-400 mm = 1400-1000 min⁻¹/rpm
- Ø 420-500 mm = 900-700 min⁻¹/rpm

Bei Stahl ist es vorteilhaft mit reduzierten Drehzahlen (min⁻¹) zu arbeiten (siehe Tabelle oben). Die Verwendung von Schneidspray oder Mecutwachs erhöht wesentlich die Standzeit (Schneidöle siehe ab Seite 1144).

Bitte achten Sie unbedingt auf absolut feste und vibrationsfreie Befestigung des Werkstücks. Nichtbeachtung führt zu Zahnbruch/erhöhtem Verschleiß. Empfehlungen hierzu siehe Seite 895.

For steel, it is beneficial to work at reduced speeds (see table above). Use of cutting spray or Mecut wax increases the service life (coolants see from page 1144).

Please pay attention to absolutely stable/complete and vibration-free clamping of the work piece. Failure to observe leads to tooth breakage/increased wear. Recommendations can be found on page 895.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|-----------|-----------------|
| ✓ | | Edelstahl | Stainless steel |
|---|--|-----------|-----------------|

ANWENDUNG · APPLICATION

Schwerpunkt ist das Sägen von Profilen und Blechen aus Edelstahl mit einer Zugfestigkeit von bis zu 700 N/mm² und Wandstärken bis ca. 4 mm

Focus is the sawing of profiles and sheets in stainless steel with a tensile strength up to 700 N/mm² and wall thickness up to 4 mm

| Art. | | | | | | | € |
|-----------------|-----------|----------|---------|-------------|---------------|---|--------|
| 10 7300 136 010 | • 136 | 1,6/1,20 | 20/10 | 36 WWF | 2-6-32 | - | 37,55 |
| 10 7300 160 010 | • 160 | 1,8/1,40 | 20/16 | 40 WWF | 2-6-32 | - | 43,40 |
| 10 7300 180 010 | • 180 | 1,8/1,40 | 30/20 | 44 WWF | UNI 1 | - | 46,45 |
| 10 7300 185 010 | • 185 | 1,8/1,40 | 20/16 | 44 WWF | 2-6-32 | - | 44,90 |
| 10 7300 190 010 | • 190 | 1,8/1,40 | 30/20 | 48 WWF | UNI 1 | - | 49,60 |
| 10 7300 200 010 | • 200 | 2,0/1,6 | 30 | 48 WWF | UNI 1 | - | 51,40 |
| 10 7300 210 010 | • 210 | 2,0/1,6 | 30 | 54 WWF | UNI 1 | - | 65,00 |
| 10 7300 216 010 | • 216 | 2,0/1,6 | 30 | 54 WWF | UNI 1 | - | 63,50 |
| 10 7300 230 010 | • 230/235 | 2,0/1,6 | 30/25,4 | 56 WWF | UNI 1 | - | 70,40 |
| 10 7300 250 010 | • 250 | 2,2/1,8 | 30/25,4 | 60 / 3-Cut | UNI 1 + UNI 2 | ✓ | 86,15 |
| 10 7300 255 010 | • 255 | 2,2/1,8 | 25,4 | 60 / 3-Cut | - | ✓ | 45,25 |
| 10 7300 260 010 | • 260 | 2,2/1,8 | 30 | 72 / 3-Cut | UNI 1 + UNI 2 | ✓ | 106,85 |
| 10 7300 270 005 | • 270 | 2,2/1,8 | 30 | 68 TF | UNI 1 + UNI 2 | ✓ | 66,95 |
| 10 7300 270 010 | • 270 | 2,2/1,8 | 30 | 72 / 3-Cut | UNI 1 + UNI 2 | ✓ | 111,40 |
| 10 7300 300 010 | • 300 | 2,2/1,8 | 30 | 72 / 3-Cut | UNI 1 + UNI 2 | ✓ | 111,95 |
| 10 7300 305 010 | • 305 | 2,2/1,8 | 25,4 | 72 / 3-Cut | - | ✓ | 112,25 |
| 10 7300 320 010 | • 320 | 2,2/1,8 | 30/25,4 | 84 / 3-Cut | UNI 1 + UNI 2 | ✓ | 118,40 |
| 10 7300 330 010 | • 330 | 2,2/1,8 | 32/30 | 84 / 3-Cut | UNI 2 | ✓ | 114,95 |
| 10 7300 350 010 | • 350 | 2,2/1,8 | 30 | 84 / 3-Cut | UNI 1 + UNI 2 | ✓ | 135,85 |
| 10 7300 355 010 | • 355 | 2,2/1,8 | 25,4 | 84 / 3-Cut | - | ✓ | 124,95 |
| 10 7300 400 010 | • 400 | 2,6/2,2 | 30 | 90 / 3-Cut | UNI 1 + UNI 2 | ✓ | 155,45 |
| 10 7300 420 010 | • 420 | 2,6/2,2 | 30 | 96 / 3-Cut | UNI 1 + UNI 2 | ✓ | 90,40 |
| 10 7300 450 010 | • 450 | 2,8/2,4 | 30 | 108 / 3-Cut | UNI 1 + UNI 2 | ✓ | 100,45 |
| 10 7300 500 010 | • 500 | 3,0/2,6 | 30 | 120 / 3-Cut | UNI 1 + UNI 2 | ✓ | 134,55 |

UNI 1 = 2-7-42 + 2-9-46,4 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64 • Gefertigt/Manufactured 232,50 mm

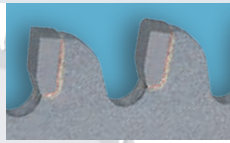
• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Film
Movie

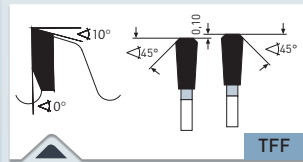


Dry-Cutter Sandwich
Dry-Cutter sandwich

10 7400



BEST
SELLER



- > Trapez-Trapezzahn
- > Triple-chip / triple-chip teeth

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Radial-armsägen, Tisch- und Formatkreissägen, akkubetriebene Maschinen und passend ebenfalls für sogenannte DRY-CUTTER Maschinen mit reduzierten Drehzahlen wie zum Beispiel: JEPSON, RIDGID, ELU, RYOBI...

For portable machines, cross-cut saws, panel and sizing saws, mitre saws, table and radial arms saws, battery-driven saws and suitable also for so-called DRY CUTTER machines with reduced speeds such as: JEPSON, RIDGID, ELU, RYOBI...

- Ø 136-150 mm = 4000-3600 min⁻¹ /rpm
- Ø 160-200 mm = 3500-3000 min⁻¹ /rpm
- Ø 210-250 mm = 2800-1900 min⁻¹ /rpm
- Ø 260-330 mm = 1800-1500 min⁻¹ /rpm
- Ø 350-400 mm = 1400-1000 min⁻¹ /rpm
- Ø 420-500 mm = 900-700 min⁻¹ /rpm

Bei Stahl ist es vorteilhaft mit reduzierten Drehzahlen (min⁻¹) zu arbeiten (siehe Tabelle oben). Die Verwendung von Schneidspray oder Mecutwachs erhöht wesentlich die Standzeit (Schneidöle siehe ab Seite 1144).

Bitte achten Sie unbedingt auf absolut feste und vibrationsfreie Befestigung des Werkstücks. Nichtbeachtung führt zu Zahnbruch/erhöhtem Verschleiß. Empfehlungen hierzu siehe Seite 895.

For steel, it is beneficial to work at reduced speeds (see table above). Use of cutting spray or Mecut wax increases the service life (coolants see from page 1144).

Please pay attention to absolutely stable/complete and vibration-free clamping of the work piece. Failure to observe leads to tooth breakage/increased wear. Recommendations can be found on page 895.

- ✓ OPTIMAL · OPTIMAL
- ✓ GUT · GOOD
- ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|--|
| ✓ | | Dünnscheibe, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Baustahl | Mild steel |
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Schwerpunkt ist das Trennen von dünnwandigen Blechen/Profilen aus Baustahl bis zu 3 mm Wandstärke. Hervorragend für Sandwichmaterialien mit dünnen Deckschichten aus Stahl/Alu/Kunststoffen von ca. 0,2-1 mm.

Weiterhin gut geeignet zum Trennen von Blechen/Profilen aus Ne-Metallen (Alu, Kupfer, Messing) und Kunststoffen bis ca. 5 mm Wandstärke.

Bitte achten Sie unbedingt auf absolut feste und vibrationsfreie Befestigung des Werkstücks. Nichtbeachtung führt zu Zahnbruch/erhöhtem Verschleiß. Empfehlungen hierzu siehe Seite 895.

Focus is on the cutting thin-walled sheet metal/steel profiles up to 3 mm wall thickness. Great for sandwich materials with thin layers of steel/aluminum/plastics of about 0.2-1 mm.

Also highly suitable for cutting sheets/profiles from non-ferrous metals (Aluminum, copper, brass) and plastics up to 5 mm wall thickness.

Please pay attention to absolutely stable/complete and vibration-free clamping of the work piece. Failure to observe leads to tooth breakage/increased wear. Recommendations can be found on page 895.

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | | | | | | | € |
|-----------------|-----------|---------|---------|---------|---------------|---|--------|
| 10 7400 136 010 | • 136 | 1,6/1,2 | 20/10 | 38 TFF | 2-6-32 | - | 29,85 |
| 10 7400 160 010 | • 160 | 1,8/1,4 | 20/16 | 42 TFF | 2-6-32 | - | 34,40 |
| 10 7400 180 010 | • 180 | 1,8/1,4 | 30/20 | 48 TFF | UNI 1 | - | 36,70 |
| 10 7400 185 010 | • 185 | 1,8/1,4 | 20/16 | 48 TFF | 2-6-32 | - | 36,60 |
| 10 7400 190 010 | • 190 | 1,8/1,4 | 30 | 48 TFF | UNI 1 | - | 38,00 |
| 10 7400 200 010 | • 200 | 2,0/1,6 | 30 | 54 TFF | UNI 1 | - | 48,55 |
| 10 7400 210 010 | • 210 | 2,0/1,6 | 30 | 54 TFF | UNI 1 | - | 47,55 |
| 10 7400 216 010 | • 216 | 2,0/1,6 | 30 | 54 TFF | UNI 1 | - | 48,55 |
| 10 7400 230 010 | • 230/235 | 2,0/1,6 | 30/25,4 | 54 TFF | UNI 1 | - | 53,05 |
| 10 7400 250 010 | • 250 | 2,2/1,8 | 30/25,4 | 72 TFF | UNI 1 + UNI 2 | ✓ | 70,10 |
| 10 7400 255 010 | • 255 | 2,2/1,8 | 25,4 | 72 TFF | - | ✓ | 44,35 |
| 10 7400 260 010 | • 260 | 2,2/1,8 | 30 | 72 TFF | UNI 1 + UNI 2 | ✓ | 73,40 |
| 10 7400 270 010 | • 270 | 2,2/1,8 | 30 | 72 TFF | UNI 1 + UNI 2 | ✓ | 73,75 |
| 10 7400 300 010 | • 300 | 2,2/1,8 | 30 | 84 TFF | UNI 1 + UNI 2 | ✓ | 82,50 |
| 10 7400 305 010 | • 305 | 2,2/1,8 | 25,4 | 84 TFF | - | ✓ | 83,05 |
| 10 7400 320 010 | • 320 | 2,2/1,8 | 30/25,4 | 96 TFF | UNI 1 + UNI 2 | ✓ | 100,90 |
| 10 7400 330 010 | • 330 | 2,2/1,8 | 32/30 | 96 TFF | UNI 2 | ✓ | 101,90 |
| 10 7400 350 010 | • 350 | 2,2/1,8 | 30 | 100 TFF | UNI 1 + UNI 2 | ✓ | 102,85 |
| 10 7400 355 010 | • 355 | 2,2/1,8 | 25,4 | 100 TFF | - | ✓ | 102,90 |
| 10 7400 400 010 | • 400 | 2,6/2,0 | 30 | 110 TFF | UNI 1 + UNI 2 | ✓ | 152,50 |
| 10 7400 420 010 | • 420 | 2,6/2,0 | 30 | 110 TFF | UNI 1 + UNI 2 | ✓ | 160,55 |
| 10 7400 450 010 | • 450 | 2,8/2,4 | 30 | 120 TFF | UNI 1 + UNI 2 | ✓ | 188,80 |
| 10 7400 500 010 | • 500 | 3,0/2,6 | 30 | 130 TFF | UNI 1 + UNI 2 | ✓ | 217,60 |

UNI 1 = 2-7-42 + 2-9-46,4 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64 · • Gefertigt/Manufactured 232,50 mm

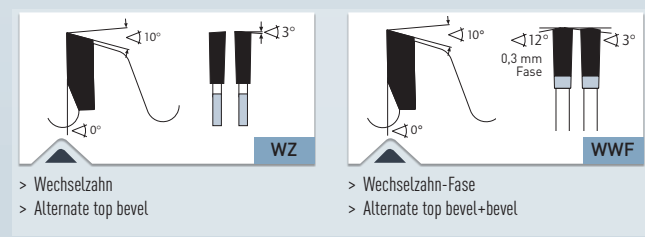
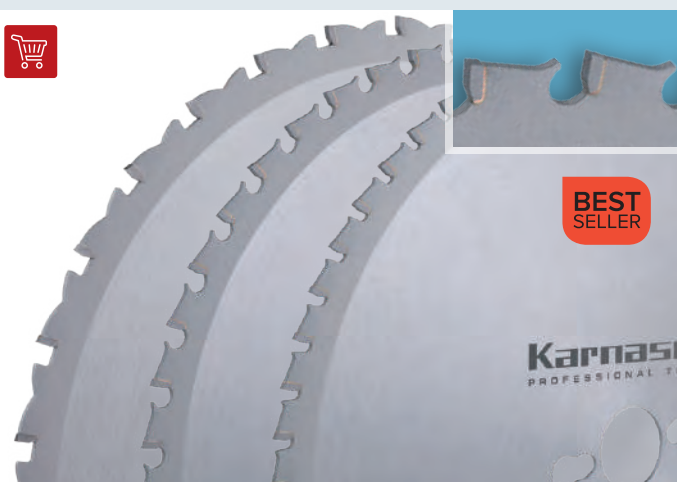
• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Film
Movie



10 8055

Winkelschleifer + Brutal Einweg-Sägeblätter
Angle Grinder + Brutal disposable saw blades



MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Radialarmsägen, Tisch- und Formatkreissägen, akkubetriebene Maschinen und passend ebenfalls für sogenannte DRY-CUTTER Maschinen mit reduzierten Drehzahlen wie zum Beispiel: JEPSON, RIDGID, ELU, RYOBI...

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- Ø 210-250 mm = 2800-1900 min⁻¹ /rpm
- Ø 260-305 mm = 1800-1500 min⁻¹ /rpm
- Ø 350-400 mm = 1500-1000 min⁻¹ /rpm

Bei Stahl ist es vorteilhaft mit reduzierten Drehzahlen (min⁻¹) zu arbeiten (siehe Tabelle oben). Die Verwendung von Schneidspray oder Mecutwachs erhöht wesentlich die Standzeit (Schneidöle siehe ab Seite 1144).

For steel, it is beneficial to work at reduced speeds (see table above). Use of cutting spray or Mecut wax increases the service life (for cutting oils, see from page 1144)

10 8056

€
40,85

Blätter 120 mm passen für Winkelschleifer 115 + 125 mm.

Blade diameter 120 mm suitable for angle grinder diameter 115-125 mm.

Verwendung in Europa nur erlaubt mit Schutzhaube (wird komplett mit Spindelmutter, Stirnlochschlüssel, Absaugstutzen und Bedienungsanleitung geliefert).

Use in Europe only permitted with protection cover (delivered completely with spindle nut, open-faced spanner, exhaust socket and operating instructions).

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Baustahl | Mild steel |
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Dünobleche, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Wood with inclusions like nails, clips, concrete residues |
| ✓ | | Weichholz, Hartholz, Exotenholz Längs | Soft wood, hard wood, and exotic wood along the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Furniere | Veneers |
| ✓ | | Profileleisten | Profiled wood |
| ✓ | | Gasbetonsteine | Autoclaved aerated concrete blocks |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |

ANWENDUNG · APPLICATION

Brutal Einweg-Sägeblätter zum Sägen „fast“ aller Materialien. Ideal für Bau und Handwerk. Durch geringe Schnittbreite wenig Schnittverlust sowie Schnittwiderstand. Daher auch ideal für Akku-Maschinen.

Niedrigste Zähnezahl: Zum schnellen Trennen aller Arten von Hölzern (auch mit Nägeln, Klammern), Kunststoffen, NE-Metallen. Grober Schnitt.

Mittlere Zähnezahl: Zum Trennen aller angegebenen Materialien. Mittlere Schnittgüte (Zum Trennen von Baustählen, NE-Metalle empfehlen wir die höchste Zähnezahl).

Höchste Zähnezahl: Zum Trennen aller angegebenen Materialien. Vorzugsweise für alle Metalle, wie Baustähle, Alu und andere NE-Metalle.

Brutal disposable saw blades for sawing "almost" any material. Ideal for construction and crafts. The low cutting width leads to little cutting wastage and cutting resistance. Therefore also ideal for battery-powered machines.

Lowest tooth number: For fast cutting of all kinds of woods (also with nails, clamps, plastics, non-ferrous metals). Coarse cut.

Medium tooth number: For cutting of all specified materials. Medium cutting quality (for cutting of mild steels, non-ferrous metals, we recommend the highest number of teeth).

Highest tooth number: For cutting of all specified materials. Preferably for all metals like mild steels, aluminum and other non-ferrous metals.

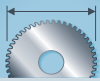




Film
Movie



Winkelschleifer + Brutal Einweg-Sägeblätter
Angle Grinder + Brutal disposable saw blades

10 8055

Bestseller – preisreduziert · Bestseller – price reduced

| Art. |  |  |  |  |  | € |
|----------------------------|---|---|---|--|---|--------|
| 10 8055 120 003 NEW | ● 120 | 2,0/1,4 | 20 | 14 WZ | - | 14,80 |
| 10 8055 120 005 NEW | ● 120 | 2,0/1,4 | 20 | 24 WZ | - | 17,30 |
| 10 8055 120 007 NEW | ● 120 | 2,0/1,4 | 20 | 40 WWF | - | 33,75 |
| 10 8055 120 010 | ● *120 | 2,0/1,4 | 25,4/22 | 14 WZ | - | 15,30 |
| 10 8055 120 020 | ● *120 | 2,0/1,4 | 25,4/22 | 24 WZ | - | 22,60 |
| 10 8055 120 030 | ● *120 | 2,0/1,4 | 25,4/22 | 40 WWF | - | 34,20 |
| 10 8055 136 010 | ● 136 | 2,0/1,4 | 20/10 | 16 WZ | - | 17,50 |
| 10 8055 136 020 | ● 136 | 2,0/1,4 | 20/10 | 30 WZ | - | 27,60 |
| 10 8055 136 030 | ● 136 | 2,0/1,4 | 20/10 | 40 WWF | - | 34,80 |
| 10 8055 160 010 | ● 160 | 2,0/1,4 | 20/16 | 18 WZ | 2-6-32 | 19,50 |
| 10 8055 160 020 | ● 160 | 2,0/1,4 | 20/16 | 30 WZ | 2-6-32 | 28,25 |
| 10 8055 160 030 | ● 160 | 2,0/1,4 | 20/16 | 40 WWF | 2-6-32 | 35,70 |
| 10 8055 165 010 | ● 165 | 2,0/1,4 | 20 | 18 WZ | 2-6-32 | 20,10 |
| 10 8055 165 020 | ● 165 | 2,0/1,4 | 20 | 30 WZ | 2-6-32 | 28,90 |
| 10 8055 165 030 | ● 165 | 2,0/1,4 | 20 | 40 WWF | 2-6-32 | 36,40 |
| 10 8055 180 005 | ● 180 | 2,2/1,6 | 22,22 | 10 WZ | - | 9,58 |
| 10 8055 180 010 | ● 180 | 2,0/1,4 | 30/22/20 | 20 WZ | UNI 1 | 23,45 |
| 10 8055 180 020 | ● 180 | 2,0/1,4 | 30/22/20 | 34 WZ | UNI 1 | 30,75 |
| 10 8055 180 030 | ● 180 | 2,0/1,4 | 30/22/20 | 48 WWF | UNI 1 | 43,75 |
| 10 8055 185 010 | ● 185 | 2,0/1,4 | 20/16 | 20 WZ | 2-6-32 | 22,30 |
| 10 8055 185 020 | ● 185 | 2,0/1,4 | 20/16 | 34 WZ | 2-6-32 | 32,45 |
| 10 8055 185 030 | ● 185 | 2,0/1,4 | 20/16 | 48 WWF | 2-6-32 | 42,65 |
| 10 8055 190 010 | ● 190 | 2,0/1,4 | 30 | 20 WZ | UNI 1 | 21,60 |
| 10 8055 190 020 | ● 190 | 2,0/1,4 | 30 | 34 WZ | UNI 1 | 31,70 |
| 10 8055 190 030 | ● 190 | 2,0/1,4 | 30 | 48 WWF | UNI 1 | 41,95 |
| 10 8055 210 010 | ● 210 | 2,0/1,4 | 30 | 22 WZ | UNI 1 | 24,75 |
| 10 8055 210 020 | ● 210 | 2,0/1,4 | 30 | 36 WZ | UNI 1 | 35,10 |
| 10 8055 210 030 | ● 210 | 2,0/1,4 | 30 | 48 WWF | UNI 1 | 44,00 |
| 10 8055 216 010 | ● 216 | 2,0/1,4 | 30 | 24 WZ | UNI 1 | 27,00 |
| 10 8055 216 020 | ● 216 | 2,0/1,4 | 30 | 36 WZ | UNI 1 | 36,05 |
| 10 8055 216 030 | ● 216 | 2,0/1,4 | 30 | 48 WWF | UNI 1 | 45,00 |
| 10 8055 225 010 | ● 225 | 2,0/1,4 | 30 | 24 WZ | UNI 1 | 27,00 |
| 10 8055 225 020 | ● 225 | 2,0/1,4 | 30 | 36 WZ | UNI 1 | 36,05 |
| 10 8055 225 030 | ● 225 | 2,0/1,4 | 30 | 48 WWF | UNI 1 | 45,00 |
| 10 8055 230 010 | ● 230/235 ● | 2,0/1,4 | 30/22 | 24 WZ | UNI 1 | 28,45 |
| 10 8055 230 020 | ● 230/235 ● | 2,0/1,4 | 30/22 | 36 WZ | UNI 1 | 37,20 |
| 10 8055 230 030 | ● 230/235 ● | 2,0/1,4 | 30/22 | 48 WWF | UNI 1 | 45,90 |
| 10 8055 250 010 | ● 250 | 2,4/1,8 | 30/25,4 | 28 WZ | UNI 1 + UNI 2 | 35,55 |
| 10 8055 250 020 | ● 250 | 2,4/1,8 | 30/25,4 | 44 WZ | UNI 1 + UNI 2 | 47,20 |
| 10 8055 250 030 | ● 250 | 2,4/1,8 | 30/25,4 | 60 WWF | UNI 1 + UNI 2 | 58,80 |
| 10 8055 260 010 | ● 260 | 2,4/1,8 | 30 | 28 WZ | UNI 1 + UNI 2 | 35,55 |
| 10 8055 260 020 | ● 260 | 2,4/1,8 | 30 | 44 WZ | UNI 1 + UNI 2 | 47,20 |
| 10 8055 260 030 | ● 260 | 2,4/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | 58,85 |
| 10 8055 270 010 | ● 270 | 2,4/1,8 | 30 | 30 WZ | UNI 1 + UNI 2 | 37,85 |
| 10 8055 270 020 | ● 270 | 2,4/1,8 | 30 | 46 WZ | UNI 1 + UNI 2 | 49,45 |
| 10 8055 270 030 | ● 270 | 2,4/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | 59,70 |
| 10 8055 280 010 | ● 280 | 2,4/1,8 | 30 | 32 WZ | UNI 1 + UNI 2 | 40,30 |
| 10 8055 280 020 | ● 280 | 2,4/1,8 | 30 | 48 WZ | UNI 1 + UNI 2 | 52,10 |
| 10 8055 280 030 | ● 280 | 2,4/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | 60,95 |
| 10 8055 300 010 | ● 300 | 2,4/1,8 | 30 | 32 WZ | UNI 1 + UNI 2 | 42,80 |
| 10 8055 300 020 | ● 300 | 2,4/1,8 | 30 | 48 WZ | UNI 1 + UNI 2 | 54,65 |
| 10 8055 300 030 | ● 300 | 2,4/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | 63,65 |
| 10 8055 305 010 | ● 305 | 2,4/1,8 | 30/25,4 | 32 WZ | UNI 1 + UNI 2 | 43,95 |
| 10 8055 305 020 | ● 305 | 2,4/1,8 | 30/25,4 | 48 WZ | UNI 1 + UNI 2 | 55,50 |
| 10 8055 305 030 | ● 305 | 2,4/1,8 | 30/25,4 | 60 WWF | UNI 1 + UNI 2 | 64,35 |
| 10 8055 320 010 | ● 320 | 2,4/1,8 | 30/25,4 | 32 WZ | UNI 1 + UNI 2 | 45,50 |
| 10 8055 320 020 | ● 320 | 2,4/1,8 | 30/25,4 | 48 WZ | UNI 1 + UNI 2 | 57,50 |
| 10 8055 320 030 | ● 320 | 2,4/1,8 | 30/25,4 | 60 WWF | UNI 1 + UNI 2 | 66,50 |
| 10 8055 330 010 | ● 330 | 2,6/2,0 | 32/30 | 36 WZ | - | 49,90 |
| 10 8055 330 020 | ● 330 | 2,6/2,0 | 32/30 | 54 WZ | UNI 2 | 63,30 |
| 10 8055 330 030 | ● 330 | 2,6/2,0 | 32/30 | 72 WWF | - | 76,35 |
| 10 8055 350 010 | ● 350 | 2,6/2,0 | 30 | 36 WZ | UNI 1 + UNI 2 | 54,50 |
| 10 8055 350 020 | ● 350 | 2,6/2,0 | 30 | 54 WZ | UNI 1 + UNI 2 | 67,85 |
| 10 8055 350 030 | ● 350 | 2,6/2,0 | 30 | 72 WWF | UNI 1 + UNI 2 | 81,20 |
| 10 8055 355 010 | ● 355 | 2,6/2,0 | 30/25,4 | 36 WZ | UNI 1 + UNI 2 | 54,80 |
| 10 8055 355 020 | ● 355 | 2,6/2,0 | 30/25,4 | 54 WZ | UNI 1 + UNI 2 | 67,95 |
| 10 8055 355 030 | ● 355 | 2,6/2,0 | 30/25,4 | 72 WWF | UNI 1 + UNI 2 | 81,40 |
| 10 8055 400 010 | ● 400 | 2,8/2,2 | 30 | 42 WZ | UNI 1 + UNI 2 | 77,45 |
| 10 8055 400 020 | ● 400 | 2,8/2,2 | 30 | 60 WZ | UNI 1 + UNI 2 | 94,05 |
| 10 8055 400 030 | ● 400 | 2,8/2,2 | 30 | 84 WWF | UNI 1 + UNI 2 | 116,45 |
| 10 8055 420 010 | ● 420 | 2,8/2,2 | 30 | 42 WZ | UNI 1 + UNI 2 | 79,45 |
| 10 8055 420 020 | ● 420 | 2,8/2,2 | 30 | 60 WZ | UNI 1 + UNI 2 | 96,30 |
| 10 8055 420 030 | ● 420 | 2,8/2,2 | 30 | 84 WWF | UNI 1 + UNI 2 | 118,40 |
| 10 8055 450 010 | ● 450 | 3,2/2,5 | 30 | 48 WZ | UNI 1 + UNI 2 | 96,10 |
| 10 8055 450 020 | ● 450 | 3,2/2,5 | 30 | 72 WZ | UNI 1 + UNI 2 | 118,20 |
| 10 8055 450 030 | ● 450 | 3,2/2,5 | 30 | 96 WWF | UNI 1 + UNI 2 | 140,25 |
| 10 8055 500 010 | ● 500 | 3,4/2,8 | 30 | 54 WZ | UNI 1 + UNI 2 | 119,35 |
| 10 8055 500 020 | ● 500 | 3,4/2,8 | 30 | 84 WZ | UNI 1 + UNI 2 | 146,65 |
| 10 8055 500 030 | ● 500 | 3,4/2,8 | 30 | 108 WWF | UNI 1 + UNI 2 | 168,70 |

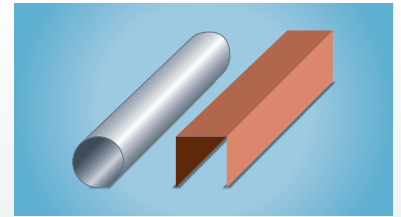
UNI 1 = 2-7-42 + 2-9-46,4 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64 ● Gefertigt/Manufactured 232,50 mm

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.



Aluminium · Kupfer · Messing · Bronze

Aluminum · Copper · Brass · Bronze



Schnittwertempfehlungen · Recommended cutting values

| Werkstoffgruppe Material Group | Werkstoffbeispiele Material examples | Vc (m/s) Schnittgeschwindigkeit Cutting speed | fz (mm/z) Vorschub pro Zahn Feed per tooth |
|---|---|---|---|
| Al-Knetlegierungen Al wrought alloy | AlMn (AlMn1Cu) (3003), AlMg (AlMg2) (5251), AlCuMg (AlZnMg3Cu) (7022) | 30-80 30-70 | Profil · Profile Voll · Solid 0,005-0,03 0,02-0,07 |
| Al-Gusslegierungen Al cast alloy | AlMg3 (51300), AlMg5Si (51400) | 30-70 | Profil · Profile Voll · Solid 0,005-0,03 0,02-0,07 |
| Al-Gusslegierungen SI Al cast alloy SI | AlSi12 | 30-40 | Profil · Profile Voll · Solid 0,005-0,02 0,01-0,05 |
| Mg-Knetlegierungen Mg wrought alloy | MgMn2 (3.3520), MgAl3Zn (3.5312) | 30-60 | Profil · Profile Voll · Solid 0,005-0,02 0,01-0,05 |
| Mg-Gusslegierungen Mg wrought alloy | MgAl8Zn1 (MC 2111 0), MgAl4Si | 30-60 30-50 | Profil · Profile Voll · Solid 0,005-0,02 0,01-0,05 |
| Kupfer Copper | Cu58 | 7-14 | Profil · Profile Voll · Solid 0,01-0,02 0,03-0,05 |
| Messing Brass | CuZn40Pb, CuZn30 | 5-9 | Profil · Profile Voll · Solid 0,01 0,03-0,05 |
| Bronze Bronze | CuSn6, CuSn6Zn | 3-7 | Profil · Profile Voll · Solid 0,01-0,02 0,04-0,08 |

Drehzahl n (U/min) · Revolution per minute n (rpm)

| | 1500 | 2000 | 2500 | 2850 | 3000 | 4000 | 4500 | 5000 | 5600 | 6000 | 8000 | 9000 | 10000 | 12000 | 18000 |
|-------|------|------|------|------|------|------|------|------|-------|-------|------|------|-------|-------|-------|
| 80 Ø | 6,5 | 8,5 | 10,5 | 12 | 13 | 17 | 19 | 21 | 23,5 | 26 | 34 | 38 | 42 | 52 | 76 |
| 90 Ø | 7 | 9,5 | 12 | 13,5 | 14 | 19 | 21 | 24 | 26,5 | 28 | 38 | 42 | 48 | 56 | 84 |
| 100 Ø | 8 | 10,5 | 13 | 15 | 16 | 21 | 24 | 26 | 29 | 32 | 42 | 48 | 52 | 54 | 96 |
| 120 Ø | 9,5 | 13 | 16 | 18 | 19 | 26 | 28 | 32 | 35 | 38 | 52 | 56 | 64 | 76 | 112 |
| 125 Ø | 10 | 13,5 | 16,5 | 18,5 | 19,5 | 27 | 29 | 33 | 36,5 | 39 | 54 | 59 | 66 | 78 | 118 |
| 140 Ø | 11 | 15 | 18 | 21 | 22 | 30 | 33 | 36 | 41 | 44 | 60 | 66 | 72 | 88 | 132 |
| 150 Ø | 12 | 15,5 | 19,5 | 22,5 | 23,5 | 31,5 | 33,5 | 39 | 44 | 47 | 63 | 70,5 | 78,5 | 94,5 | 141,5 |
| 160 Ø | 13 | 17 | 21 | 24 | 26 | 34 | 38 | 42 | 47 | 52 | 68 | 76 | 84 | 104 | 152 |
| 180 Ø | 14 | 19 | 24 | 27 | 28 | 38 | 42,5 | 48 | 53 | 56 | 76 | 85 | 96 | 118 | 170 |
| 200 Ø | 16 | 21 | 26 | 30 | 32 | 42 | 47 | 52 | 58,5 | 64 | 84 | 94 | 104 | 128 | 188 |
| 225 Ø | 18 | 24 | 30 | 33,5 | 36 | 48 | 58 | 60 | 66 | 72 | 96 | 106 | 120 | 144 | 212 |
| 250 Ø | 20 | 26 | 33 | 37 | 40 | 52 | 59 | 66 | 73,5 | 80 | 104 | 118 | 132 | 160 | 236 |
| 300 Ø | 24 | 31,5 | 40 | 45 | 48 | 63 | 71 | 80 | 88 | 96 | 126 | 142 | 160 | 192 | 284 |
| 350 Ø | 28 | 36,5 | 47 | 52 | 56 | 73 | 88 | 94 | 105 | 112 | 146 | 166 | 188 | 224 | 332 |
| 400 Ø | 32 | 42 | 54 | 60 | 64 | 84 | 94 | 108 | 117 | 128 | 168 | 188 | 216 | 256 | 376 |
| 450 Ø | 35,5 | 47 | 59 | 67,5 | 70,5 | 94,5 | 106 | 118 | 132 | 141,6 | 188 | 211 | 236 | 283 | 424 |
| 500 Ø | 40 | 53 | 67 | 74,5 | 80 | 106 | 118 | 134 | 146,5 | 160 | 212 | 236 | 268 | 320 | 472 |

Schnittgeschwindigkeit in m/s · Cutting speed in m/s

① NE-Metalle
Non ferrous metals

② Sicherheitsgrenze
Safety limits

Festlegung der Schnittgeschwindigkeit Vc
Determination of cutting speed Vc

$$Vc (m/s) = \frac{D \cdot \pi \cdot n}{60 \cdot 1000}$$

Festlegung der Vorschubgeschwindigkeit Vf
Determination of feed rate Vf

$$Vf (m/min) = \frac{fz \cdot n \cdot Z}{1000}$$

Festlegung der Drehzahl n
Determination of revolution speed n

$$n (min^{-1}) = \frac{Vc \cdot 1000 \cdot 60}{D \cdot \pi}$$

Vc (m/s) = Schnittgeschwindigkeit · Cutting speed

Vf (m/min) = Vorschubgeschwindigkeit · Feed rate

fz (mm/z) = Vorschub pro Zahn · Feed per tooth

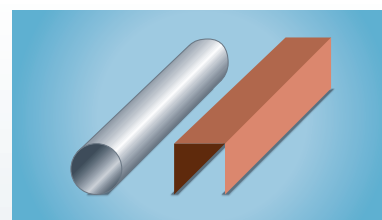
D (mm) = Sägendurchmesser · Saw blade diameter

n (min⁻¹) = Drehzahl · rpm

Z = Anzahl der Zähne · Number of teeth

Aluminium · Kupfer · Messing · Bronze

Aluminum · Copper · Brass · Bronze



| Art. Ø mm | Type | Anwendung · Application | |
|---|---|--|-----|
| 10 8000 Ø mm 120-300  | Aluminium Universal | Universalblatt für das Bauhandwerk, Ladenbau, Messebau, Renovierungsarbeiten | 902 |
| | Aluminum universal | Universal blade for the building trade, shop fitting, booth builder, renovations | |
| 11 1000 Ø mm 200-600  | Aluminium Positiv | Plattenaufteilung und Kappschnitte in Profile, Platten, Blöcke, Stangen | 905 |
| | Aluminum positive | Sizing and cross cuts in profiles, plates, blocks and rods | |
| 11 1050 Ø mm 250-550  | Aluminium Positiv Dünnschnitt | Plattenaufteilung und Kappschnitte in Profile, Platten, Blöcke, Stangen | 907 |
| | Aluminum positive thin-cut | Sizing and cross cuts in profiles, plates, blocks and rods | |
| 11 1430 Ø mm 120-500  | Aluminium Positiv Dünnschnitt/Fertigschnitt | Plattenaufteilung und Kappschnitte in Profile, Platten, Blöcke, Stangen | 909 |
| | Aluminum positive thin-cut/finishing-cut | Sizing and cross cuts in profiles, plates, blocks and rods | |
| 11 1100 Ø mm 250-600  | Aluminium Negativ | Plattenaufteilung und Kappschnitte in dünnwandiges Profil und Vollmaterial | 911 |
| | Aluminum negative | Sizing and cross cuts in thin-walled profiles and solid materials | |
| 11 1120 Ø mm 120-550  | Aluminium Negativ Dünnschnitt | Plattenaufteilung und Kappschnitte in dünnwandiges Profil und Vollmaterial | 913 |
| | Aluminum negative thin-cut | Sizing and cross cuts in thin-walled profiles and solid materials | |
| 11 1130 Ø mm 120-500  | Aluminium Negativ Dünnschnitt/Fertigschnitt | Plattenaufteilung und Kappschnitte in dünnwandiges Profil und Vollmaterial | 914 |
| | Aluminum negative thin-cut/finishing-cut | Sizing and cross cuts in thin-walled profiles and solid materials | |

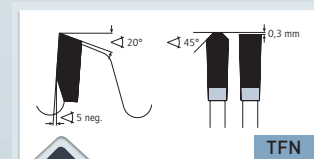
**BEST
SELLER**

**neu
new**



10 8000

Aluminium Universal
Aluminum universal



> Trapez-Flachzahn Negativ
> Triple-chip / flat tooth

MASCHINE · MACHINE

Für Elektro Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Radialarmsägen, Tisch- und Formatkreissägen, Akkubetriebene Maschinen.

For portable circular saws, cross-cut saws, panel saws, sizing and mitre saws, table and radial arm saws, battery-driven saws.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Dünnbleche, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Wood with inclusions like nails, clips, concrete residues |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Gasbetonsteine | Autoclaved aerated concrete blocks |

ANWENDUNG · APPLICATION

Das ideale Blatt für den Ladenbau, Messebau, Renovierungsarbeiten. Für eine Vielzahl von Materialien wie: Ne-Metalle, Kunststoffe, Plexiglas, Spanplatten, Thermofassadenplatten.

Weitere Alu-Negativ Blätter siehe Art. 11 1100 Seite 911, Art. 11 1120 Seite 913 sowie Art. 11 1130 Seite 915.

The ideal blade for shop construction, trade fair construction, renovation work. For many materials such as: non-ferrous metals, plastics, plexiglas, chipboard, thermo façade plates.

Other aluminum negative sheets: see item 11 1100 page 911, item 11 1120 page 913, and item 11 1130 page 915.

| Art. | | | | | | | € |
|-----------------|-----------|---------|-------|---------|---------------|---|--------|
| 10 8000 120 010 | ● 120 | 2,8/2,0 | 20 | 34 TFN | - | - | 37,40 |
| 10 8000 136 010 | ● 136 | 2,8/2,0 | 20/10 | 40 TFN | 2-6-32 | - | 43,65 |
| 10 8000 150 010 | ● 150 | 2,8/2,0 | 20/16 | 42 TFN | 2-6-32 | - | 44,95 |
| 10 8000 160 010 | ● 160 | 2,8/2,0 | 20/16 | 42 TFN | 2-6-32 | - | 45,50 |
| 10 8000 165 010 | ● 165 | 2,8/2,0 | 20 | 48 TFN | 2-6-32 | - | 49,10 |
| 10 8000 170 010 | ● 170 | 2,8/2,0 | 30 | 48 TFN | - | - | 49,25 |
| 10 8000 180 010 | ● 180 | 2,8/2,0 | 30 | 48 TFN | UNI 1 | - | 49,85 |
| 10 8000 185 010 | ● 185 | 2,8/2,0 | 20/16 | 48 TFN | 2-6-32 | - | 51,70 |
| 10 8000 190 010 | ● 190 | 2,8/2,0 | 30 | 54 TFN | UNI 1 | - | 55,00 |
| 10 8000 200 010 | ● 200 | 2,8/2,0 | 30 | 54 TFN | UNI 1 | - | 56,15 |
| 10 8000 210 010 | ● 210 | 2,8/2,0 | 30 | 54 TFN | UNI 1 | - | 56,95 |
| 10 8000 216 010 | ● 216 | 2,8/2,0 | 30 | 60 TFN | UNI 1 | - | 62,70 |
| 10 8000 216 020 | ● 216 | 2,8/2,0 | 30 | 80 TFN | UNI 1 | - | 75,25 |
| 10 8000 220 010 | ● 220 | 2,8/2,0 | 30 | 54 TFN | UNI 1 | - | 60,15 |
| 10 8000 230 010 | ● 230/235 | 2,8/2,0 | 30 | 64 TFN | UNI 1 | - | 63,05 |
| 10 8000 240 010 | ● 240 | 2,8/2,0 | 30 | 64 TFN | UNI 1 | - | 63,05 |
| 10 8000 250 010 | ● 250 | 3,2/2,5 | 30 | 60 TFN | UNI 1 + UNI 2 | ✓ | 78,50 |
| 10 8000 250 020 | ● 250 | 3,2/2,5 | 30 | 80 TFN | UNI 1 + UNI 2 | ✓ | 87,40 |
| 10 8000 250 030 | ● 250 | 2,8/2,2 | 30 | 100 TFN | UNI 1 + UNI 2 | ✓ | 108,15 |
| 10 8000 260 010 | ● 260 | 3,2/2,5 | 30 | 80 TFN | UNI 1 + UNI 2 | ✓ | 94,50 |
| 10 8000 270 010 | ● 270 | 3,2/2,5 | 30 | 88 TFN | UNI 1 + UNI 2 | ✓ | 96,60 |
| 10 8000 280 010 | ● 280 | 3,2/2,5 | 30 | 88 TFN | UNI 1 + UNI 2 | ✓ | 99,00 |
| 10 8000 300 010 | ● 300 | 3,2/2,5 | 30 | 72 TFN | UNI 1 + UNI 2 | ✓ | 93,95 |
| 10 8000 300 020 | ● 300 | 3,2/2,5 | 30 | 96 TFN | UNI 1 + UNI 2 | ✓ | 98,35 |
| 10 8000 300 030 | ● 300 | 2,8/2,2 | 30 | 120 TFN | UNI 1 + UNI 2 | ✓ | 128,25 |

UNI 1 = 2-7-42 + 2-9-46,40 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64
● Gefertigt/Manufactured 232,50 mm

Film
Movie



Qualitätsprodukte für die Metallbearbeitung.
Quality products for metalworking.

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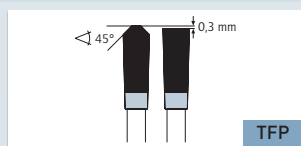
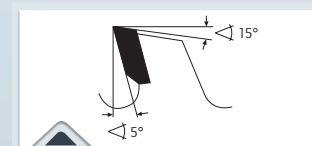


9



11 1000

Aluminium Positiv
Aluminum positive



- > Trapez-Flachzahn Positiv
- > Triple-chip / flat tooth positive

MASCHINE - MACHINE

Tisch- und Formatkreissägen, Doppelgehrungssägen, Automatische Kappkreissägen, CNC-Bearbeitungszentren.

Double mitre saws, automatic cross-cut saws, sizing saws, CNC machining centers

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |

ANWENDUNG · APPLICATION

Plattenaufteilung und Kappschnitte in Profile, Platten, Blöcke, Stangen aus NE-Metalle wie Aluminium, Messing, Kupfer sowie Kunststoffe (z.B. Fensterprofile).

Durch positiven Schnittwinkel vorzugsweise für automatischen Vorschub und dickere Wandstärken. (Auch manueller Vorschub möglich)

Sie wünschen:
Höhere Schnittwerte?
Weniger Verschleiß?
Weniger Verschleiß/Energieverbrauch der Maschine?
Bei Handgeführten Maschinen sowie manuellem Vorschub wesentlich weniger Kraftaufwand?
Siehe Aluminium Positiv Dünnschnitt. Artikel 11 1050 Seite 907.

Spezialausführungen für eloxiertes oder lackiertes Aluminium auf Anfrage.

Sizing and cross cutting profiles, plates, blocks and rods made of aluminum, brass, copper and plastics (e.g. window profiles).

Due to positive cutting angle preferably for automatic feed and thicker walls. (Manual feed is also possible)

You want:
Higher cutting values?
Less waste?
Less wear/energy consumption of the machine?
With hand-held machines and manual feed much less effort?
See aluminum positive thin-cut. Type 11 1050 page 907.

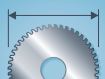






Special design for anodized or lacquered aluminum on request.

Film
Movie



Aluminium Positiv
Aluminum positive

11 1000

| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|--|---|---|--------|
| 11 1000 200 010 | • 200 | 3,2/2,5 | 30 | 54 TFP | UNI 1+UNI 2 | - | - | 74,55 |
| 11 1000 200 020 | • 200 | 2,8/2,2 | 30 | 72 TFP | UNI 1+UNI 2 | - | - | 87,85 |
| 11 1000 225 010 | • 225 | 2,5/1,8 | 30 | 68 TFP | UNI 1+UNI 2 | - | - | 83,10 |
| 11 1000 250 010 | • 250 | 3,2/2,5 | 30 | 60 TFP | UNI 1+UNI 2 | ✓ | - | 82,05 |
| 11 1000 250 020 | • 250 | 3,2/2,5 | 30 | 80 TFP | UNI 1+UNI 2 | ✓ | - | 90,40 |
| 11 1000 250 030 | • 250 | 3,2/2,5 | 32 | 80 TFP | UNI 2 | ✓ | - | 91,95 |
| 11 1000 275 010 | • 275 | 3,2/2,5 | 40 | 72 TFP | 2-9-55+4-12-64 | ✓ | - | 98,30 |
| 11 1000 280 010 | • 280 | 3,2/2,5 | 30 | 68 TFP | UNI 1+UNI 2 | ✓ | - | 99,20 |
| 11 1000 280 020 | • 280 | 3,2/2,5 | 30 | 96 TFP | UNI 1+UNI 2 | ✓ | - | 104,10 |
| 11 1000 300 010 | • 300 | 3,2/2,5 | 30 | 72 TFP | UNI 1+UNI 2 | ✓ | - | 99,20 |
| 11 1000 300 020 | • 300 | 3,2/2,5 | 30 | 96 TFP | UNI 1+UNI 2 | ✓ | - | 99,80 |
| 11 1000 300 030 | • 300 | 3,2/2,5 | 32 | 72 TFP | UNI 2 | ✓ | - | 99,20 |
| 11 1000 300 040 | • 300 | 3,2/2,5 | 32 | 96 TFP | UNI 2 | ✓ | - | 104,10 |
| 11 1000 300 050 | • 300 | 3,2/2,5 | 40 | 96 TFP | 2-9-55+4-12-64 | ✓ | - | 119,40 |
| 11 1000 320 010 | • 320 | 3,2/2,5 | 30 | 84 TFP | UNI 1+UNI 2 | ✓ | - | 116,10 |
| 11 1000 330 010 | • 330 | 3,2/2,5 | 32/30 | 72 TFP | UNI 2 | ✓ | - | 106,15 |
| 11 1000 330 020 | • 330 | 3,2/2,5 | 32/30 | 96 TFP | UNI 2 | ✓ | - | 128,70 |
| 11 1000 350 020 | • 350 | 3,4/2,8 | 30 | 72 TFP | UNI 1+UNI 2 | ✓ | - | 112,00 |
| 11 1000 350 030 | • 350 | 3,4/2,8 | 30 | 92 TFP | UNI 1+UNI 2 | ✓ | - | 129,65 |
| 11 1000 350 040 | • 350 | 3,4/2,8 | 30 | 108 TFP | UNI 1+UNI 2 | ✓ | - | 144,15 |
| 11 1000 350 050 | • 350 | 3,4/2,8 | 32 | 92 TFP | UNI 2 | ✓ | - | 129,65 |
| 11 1000 350 060 | • 350 | 3,4/2,8 | 32 | 108 TFP | UNI 2 | ✓ | - | 137,00 |
| 11 1000 350 070 | • 350 | 3,4/2,8 | 40 | 92 TFP | 2-9-55+4-12-64 | ✓ | - | 129,65 |
| 11 1000 350 080 | • 350 | 3,4/2,8 | 40 | 108 TFP | 2-9-55+4-12-64 | ✓ | - | 144,15 |
| 11 1000 370 010 | • 370 | 3,6/3,0 | 30 | 96 TFP | UNI 1+UNI 2 | ✓ | - | 149,90 |
| 11 1000 400 010 | • 400 | 3,8/3,2 | 30 | 72 TFP | UNI 1+UNI 2 | ✓ | ✓ | 153,40 |
| 11 1000 400 020 | • 400 | 3,8/3,2 | 30 | 96 TFP | UNI 1+UNI 2 | ✓ | ✓ | 176,50 |
| 11 1000 400 030 | • 400 | 3,8/3,2 | 30 | 120 TFP | UNI 1+UNI 2 | ✓ | ✓ | 199,65 |
| 11 1000 400 040 | • 400 | 3,8/3,2 | 32 | 96 TFP | UNI 2 | ✓ | ✓ | 170,00 |
| 11 1000 400 050 | • 400 | 3,8/3,2 | 40 | 96 TFP | 4-12-64+2-15-80 | ✓ | ✓ | 176,50 |
| 11 1000 400 060 | • 400 | 3,8/3,2 | 40 | 120 TFP | 4-12-64+2-15-80 | ✓ | ✓ | 199,65 |
| 11 1000 400 070 | • 400 | 3,8/3,2 | 50 | 96 TFP | 4-15-80 | ✓ | ✓ | 176,50 |
| 11 1000 400 080 | • 400 | 3,8/3,2 | 50 | 120 TFP | 4-15-80 | ✓ | ✓ | 199,65 |
| 11 1000 420 010 | • 420 | 4,0/3,2 | 30 | 72 TFP | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 168,20 |
| 11 1000 420 020 | • 420 | 4,0/3,2 | 30 | 96 TFP | | ✓ | ✓ | 177,90 |
| 11 1000 420 030 | • 420 | 4,0/3,2 | 30 | 120 TFP | | ✓ | ✓ | 199,60 |
| 11 1000 430 010 | • 430 | 4,0/3,2 | 30 | 96 TFP | | ✓ | ✓ | 69,14 |
| 11 1000 450 010 | • 450 | 4,0/3,2 | 30 | 72 TFP | UNI 1+UNI 2 + 2-10,5-70 | ✓ | ✓ | 171,40 |
| 11 1000 450 020 | • 450 | 4,0/3,2 | 30 | 108 TFP | UNI 1+UNI 2 + 2-10,5-70 | ✓ | ✓ | 187,95 |
| 11 1000 450 030 | • 450 | 4,0/3,2 | 30 | 120 TFP | UNI 1+UNI 2 + 2-10,5-70 | ✓ | ✓ | 206,35 |
| 11 1000 450 040 | • 450 | 4,0/3,2 | 32 | 96 TFP | UNI 2 | ✓ | ✓ | 179,55 |
| 11 1000 450 050 | • 450 | 4,0/3,2 | 32 | 120 TFP | UNI 2 | ✓ | ✓ | 206,35 |
| 11 1000 500 010 | • 500 | 4,2/3,6 | 30 | 72 TFP | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 181,20 |
| 11 1000 500 020 | • 500 | 4,2/3,6 | 30 | 96 TFP | | ✓ | ✓ | 203,60 |
| 11 1000 500 030 | • 500 | 4,2/3,6 | 30 | 120 TFP | | ✓ | ✓ | 229,55 |
| 11 1000 500 040 | • 500 | 4,2/3,6 | 30 | 144 TFP | | ✓ | ✓ | 258,45 |
| 11 1000 500 050 | • 500 | 4,2/3,6 | 32 | 120 TFP | UNI 2 | ✓ | ✓ | 229,55 |
| 11 1000 500 060 | • 500 | 4,2/3,6 | 32 | 144 TFP | UNI 2 | ✓ | ✓ | 258,45 |
| 11 1000 550 010 | • 550 | 4,4/3,8 | 30 | 72 TFP | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 282,20 |
| 11 1000 550 020 | • 550 | 4,4/3,8 | 30 | 110 TFP | | ✓ | ✓ | 313,70 |
| 11 1000 550 030 | • 550 | 4,4/3,8 | 30 | 144 TFP | | ✓ | ✓ | 374,10 |
| 11 1000 550 040 | • 550 | 4,4/3,8 | 32 | 96 TFP | UNI 2 | ✓ | ✓ | 291,60 |
| 11 1000 550 050 | • 550 | 4,4/3,8 | 32 | 128 TFP | UNI 2 | ✓ | ✓ | 330,95 |
| 11 1000 550 060 | • 550 | 4,4/3,8 | 80 | 128 TFP | 6-9-100 | ✓ | ✓ | 337,75 |
| 11 1000 600 010 | • 600 | 4,6/4,0 | 30 | 140 TFP | UNI 1+UNI 2 | ✓ | ✓ | 420,20 |
| - | ○ 1000 | - | - | - | - | bis Ø 1000 mm auf Anfrage erhältlich up to Ø 1000 mm available on request | | |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

UNI 1 = 2-7-42+2-9-46,4 UNI 2 = 2-10-60+2-11-63+2-12-64

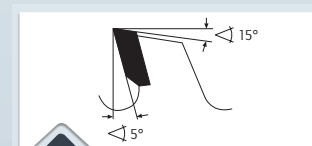
Sie wünschen: Höhere Schnittwerte? Weniger Verschnitt? Weniger Verschleiß/Energieverbrauch der Maschine? Bei Handgeführten Maschinen sowie manuellem Vorschub wesentlich weniger Kraftaufwand? Siehe Aluminium Positiv Dünnschnitt. Artikel 11 1050 Seite 907.

You want: Higher cutting values? Less waste? Less wear/energy consumption of the machine? With hand-held machines and manual feed much less effort? See aluminum positive thin-cut. Type 11 1050 page 907.

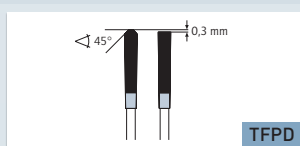


11 1050

Aluminium Positiv Dünnschnitt
Aluminum positive thin-cut



> Trapez-Flachzahn Positiv dünn
> Triple-chip / flat tooth thin positive



TFPD

MASCHINE · MACHINE

Akkubetriebene Sägemaschinen, Tisch- und Formatkreissägen, automatische Kappkreissägen, CNC-Bearbeitungszentren.

Battery-driven saws, table and sizing saws, automatic cross-cut saws, CNC machining centers, bench saws.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |

ANWENDUNG · APPLICATION

Plattenaufteilung und Kappschnitte in Profile, Platten, Blöcke, Stangen aus NE-Metalle wie Aluminium, Messing, Kupfer sowie Kunststoffe.

Durch dünne Schnittbreite:

- Höhere Schnittwerte
- Weniger Verschnitt
- Weniger Verschleiß/Energieverbrauch der Maschine
- Bei Handgeführten Maschinen sowie manuellem Vorschub wesentlich weniger Kraftaufwand

Durch positiven Schnittwinkel vorzugsweise für automatischen Vorschub. (Auch manueller Vorschub möglich)

Sie wünschen:

- Nahezu gratfreie Fertigschnittqualität auch an der Unterseite (Austritt) des Werkstücks?
- Hervorragende Schnittgüte an den Schnittflächen (nahezu Spiegelfinish)?
- Noch bessere Standzeiten?

Siehe Aluminium Positiv Dünnschnitt-Fertigschnitt. Artikel 11 1430 Seite 908

Spezialausführungen für eloxiertes oder lackiertes Aluminium auf Anfrage.

Sizing and cross cuts profiles, plates, blocks and rods made of aluminum, brass, copper and plastics.

Due to thin cutting width:

- Higher cutting values
- Less waste
- Less wear/energy consumption of the machine
- With hand-held machines and manual feed much less effort

Due to positive cutting angle preferably for automatic feed. (Manual feed is also possible)

You want:

- Almost burr-free finishing-cut quality also at the lower side/exit of the workpiece?
- Excellent cutting quality at the cut surface (almost mirror finish)?
- Even better lifetime?

See aluminum positive thin-cut/finishing cut. Type 11 1430 page 908

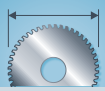


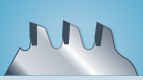



Special design for anodized or lacquered aluminum on request.

Film
Movie



Aluminium Positiv Dünnschnitt
Aluminum positive thin-cut

11 1050

| Art. |  |  |  |  |  |  |  | € |
|----------------------------|---|---|---|---|--|---|---|--------|
| NEW 11 1050 250 003 | • 250 | 2,2/1,8 | 30 | 60 TFPD | UNI 1 + UNI 2 | ✓ | - | 82,05 |
| NEW 11 1050 250 005 | • 250 | 2,2/1,8 | 30 | 80 TFPD | UNI 1 + UNI 2 | ✓ | - | 91,95 |
| 11 1050 250 010 | • 250 | 2,2/1,8 | 30 | 100 TFPD | UNI 1 + UNI 2 | ✓ | - | 108,20 |
| NEW 11 1050 250 020 | • 250 | 2,2/1,8 | 30 | 120 TFPD | UNI 2 | ✓ | - | 131,85 |
| NEW 11 1050 300 003 | • 300 | 2,4/1,8 | 30 | 72 TFPD | UNI 1 + UNI 2 | ✓ | - | 99,20 |
| NEW 11 1050 300 005 | • 300 | 2,4/1,8 | 30 | 96 TFPD | UNI 1 + UNI 2 | ✓ | - | 119,40 |
| 11 1050 300 010 | • 300 | 2,4/1,8 | 30 | 120 TFPD | UNI 1 + UNI 2 | ✓ | - | 128,25 |
| NEW 11 1050 350 003 | • 350 | 2,4/1,8 | 30 | 72 TFPD | UNI 1 + UNI 2 | ✓ | - | 112,00 |
| NEW 11 1050 350 005 | • 350 | 2,4/1,8 | 30 | 108 TFPD | UNI 1 + UNI 2 | ✓ | - | 144,15 |
| 11 1050 350 010 | • 350 | 2,4/1,8 | 30 | 120 TFPD | UNI 1 + UNI 2 | ✓ | - | 151,95 |
| NEW 11 1050 400 005 | • 400 | 3,1/2,5 | 30 | 96 TFPD | UNI 1 + UNI 2 | ✓ | ✓ | 176,50 |
| 11 1050 400 010 | • 400 | 3,1/2,5 | 30 | 128 TFPD | UNI 1 + UNI 2 | ✓ | ✓ | 170,40 |
| NEW 11 1050 420 005 | • 420 | 3,4/2,8 | 30 | 96 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 177,90 |
| 11 1050 420 010 | • 420 | 3,4/2,8 | 30 | 132 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 195,35 |
| NEW 11 1050 450 005 | • 450 | 3,4/2,8 | 32 | 92 TFPD | UNI 2 | ✓ | ✓ | 179,55 |
| 11 1050 450 010 | • 450 | 3,4/2,8 | 30 | 138 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 202,85 |
| NEW 11 1050 500 003 | • 500 | 3,4/2,8 | 30 | 72 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 181,20 |
| NEW 11 1050 500 005 | • 500 | 3,4/2,8 | 30 | 120 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 218,05 |
| 11 1050 500 010 | • 500 | 3,4/2,8 | 30 | 144 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 224,50 |
| NEW 11 1050 550 005 | • 550 | 3,6/3,0 | 30 | 110 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 298,55 |
| 11 1050 550 010 | • 550 | 3,6/3,0 | 30 | 160 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 309,80 |
| NEW - | ○ 1000 | - | - | - | - | bis Ø 1000 mm auf Anfrage erhältlich up to Ø 1000 mm available on request | | |

UNI 1 = 2-7-42 + 2-9-46,40 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64

Sie wünschen: Nahezu gratfreie Fertigschnittqualität auch an der Unterseite (Austritt) des Werkstücks? Hervorragende Schnittgüte an den Schnittflächen (nahezu Spiegelfinish)?
 Noch bessere Standzeiten? Siehe Aluminium Positiv Dünnschnitt-Fertigschnitt. Artikel 11 1430 Seite 908.
 You want: Almost burr-free finishing-cut quality also at the lower side/exit of the workpiece? Excellent cutting quality at the cut surface (almost mirror finish)? Even better lifetime?
 See aluminum positive thin-cut/finishing cut. Type 11 1340 page 908.

Für den perfekten Schnitt
gibt es nur einen Versuch.

There is only one trial for
the perfect cut.



POWER.
PRECISION.
PERFORMANCE.



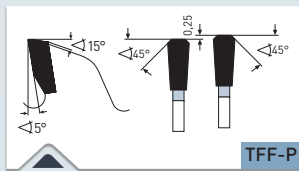
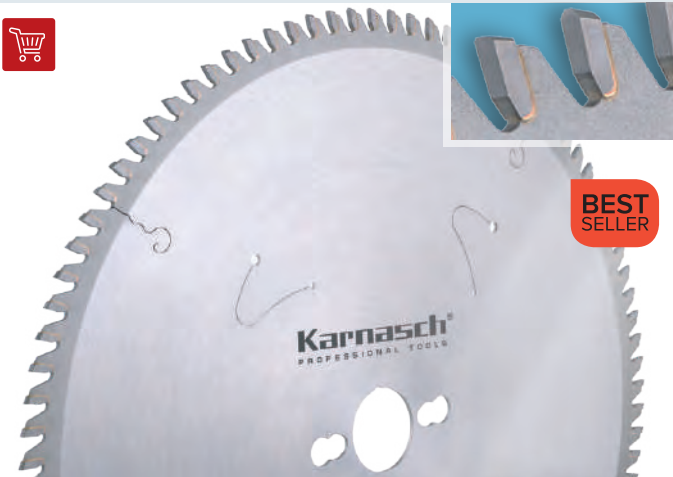
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11 1430

Aluminium Positiv · Dünnschnitt/Fertigschnitt
Aluminum Positive · Thin-cut/Finishing-cut



> Trapez Flach Fase Positiv
> Triple-chip/triple-chip teeth

MASCHINE · MACHINE

Akkubetriebene Sägemaschinen, Tisch- und Formatkreissägen, automatische Kappkreissägen, CNC-Bearbeitungszentren.

Battery-driven saws, table and sizing saws, automatic cross-cut saws, CNC machining centers, bench saws.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |

ANWENDUNG · APPLICATION

Plattenaufteilung und Kappschnitte in Profile, Platten, Blöcke, Stangen aus NE-Metalle wie Aluminium, Messing, Kupfer sowie Kunststoffe.

Durch TFF-P Verzahnung:

- Nahezu gratfreie Fertigschnittqualität auch an der Unterseite (Austritt) des Werkstücks
- Hervorragende Schnittgüte an den Schnittflächen (nahezu Spiegelfinish)
- Noch bessere Standzeiten

Durch dünne Schnittbreite:

- Weniger Verschnitt
- Weniger Verschleiß/Energieverbrauch der Maschine
- Bei Handgeführten Maschinen sowie manuellem Vorschub wesentlich weniger Kraftaufwand

Durch positiven Schnittwinkel vorzugsweise für automatischen Vorschub. (Auch manueller Vorschub möglich)

Spezialausführungen für eloxiertes oder lackiertes Aluminium auf Anfrage.

Sizing and cross cuts profiles, plates, blocks and rods made of aluminum, brass, copper and plastics.

Because of TFF-P cut:

- Almost burr-free finishing-cut quality also at the lower side/exit of the workpiece
- Excellent cutting quality at the cut surface (almost mirror finish)
- Even better lifetime

Due to thin cutting width:

- Less waste
- Less wear/energy consumption of the machine
- With hand-held machines and manual feed much less effort

Due to positive cutting angle preferably for automatic feed. (Manual feed is also possible)

Special design for anodized or lacquered aluminum on request.

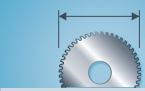
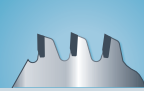
Film
Movie



Aluminium Positiv · Dünnschnitt/Fertigschnitt
Aluminum Positive · Thin-cut/Finishing-cut

11 1430

Bestseller – preisreduziert · Bestseller – price reduced

| Art. |  |  |  |  |  |  | € |
|----------------------------|---|---|---|---|---|---|--------|
| 11 1430 120 010 | • 120 | 1,8/1,2 | 20 | 40 TFF-P | - | - | 37,30 |
| 11 1430 136 010 NEW | • 136 | 1,8/1,2 | 20/10 | 48 TFF-P | - | - | 43,00 |
| 11 1430 160 010 | • 160 | 1,8/1,2 | 20/16 | 56 TFF-P | 2-6-32 | - | 45,30 |
| 11 1430 180 010 | • 180 | 1,8/1,2 | 20/16 | 60 TFF-P | 2-6-32 | - | 50,55 |
| 11 1430 190 010 | • 190 | 1,8/1,2 | 30/20 | 60 TFF-P | 2-7-42 | - | 51,15 |
| 11 1430 200 010 | • 200 | 2,0/1,4 | 30 | 64 TFF-P | 2-7-42 | - | 52,15 |
| 11 1430 210 010 | • 210 | 2,0/1,4 | 30 | 64 TFF-P | 2-7-42 | - | 53,00 |
| 11 1430 225 010 | • 225 | 2,0/1,4 | 30 | 68 TFF-P | 2-7-42 | - | 58,45 |
| 11 1430 230 010 | • 230/235 ● | 2,0/1,4 | 30 | 68 TFF-P | 2-7-42 | - | 59,15 |
| 11 1430 250 010 | • 250 | 2,4/1,8 | 30 | 80 TFF-P | UNI | ✓ | 70,05 |
| 11 1430 250 020 NEW | • 250 | 2,2/1,8 | 30 | 120 TFF-P | UNI | ✓ | 113,00 |
| 11 1430 300 010 | • 300 | 2,4/1,8 | 30 | 96 TFF-P | UNI | ✓ | 84,85 |
| 11 1430 300 020 NEW | • 300 | 2,4/1,8 | 30 | 128 TFF-P | UNI | ✓ | 125,50 |
| 11 1430 350 010 | • 350 | 2,4/1,8 | 30 | 108 TFF-P | UNI | ✓ | 98,85 |
| 11 1430 350 020 NEW | • 350 | 2,4/1,8 | 30 | 132 TFF-P | UNI | ✓ | 150,55 |
| 11 1430 400 010 | • 400 | 3,2/2,5 | 30 | 120 TFF-P | UNI | ✓ | 117,35 |
| 11 1430 400 020 NEW | • 400 | 3,1/2,5 | 30 | 138 TFF-P | UNI | ✓ | 172,80 |
| 11 1430 450 010 | • 450 | 3,5/2,8 | 30 | 132 TFF-P | UNI | ✓ | 181,25 |
| 11 1430 450 020 NEW | • 450 | 3,4/2,8 | 30 | 144 TFF-P | UNI | ✓ | 218,60 |
| 11 1430 500 010 | • 500 | 3,5/2,8 | 30 | 144 TFF-P | UNI | ✓ | 234,00 |

● Gefertigt/Manufactured 232,50 mm · UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Einblicke in die Karnasch High-Tech Produktion.

Insights into the Karnasch high-tech production.

Rauheitsmessung

Roughness measurement



POWER.
PRECISION.
PERFORMANCE.

100 % Kontrolle
100 % monitoring

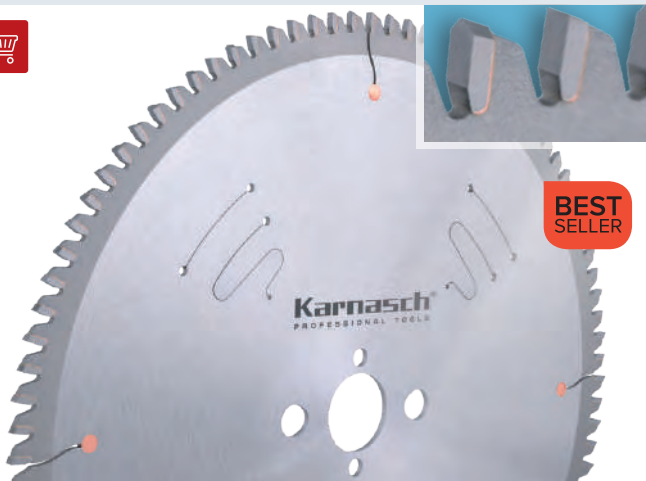


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11 1100

Aluminium Negativ
Aluminum negative



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|--|
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Plattenaufteilung und Kappschnitte in dünnwandiges Profil und Vollmaterial aus NE-Metalle wie Aluminium, Kupfer, Messing sowie Kunststoffe (z.B. Fensterprofile).

Minimalmengenschmierung empfohlen.

Durch negativen Spanwinkel vorzugsweise manueller Vorschub.

Automatischer Vorschub ebenfalls möglich.

Sie wünschen:

- Höhere Schnittwerte?
- Weniger Verschnitt?
- Weniger Verschleiß/Energieverbrauch der Maschine?
- Bei Handgeführten Maschinen sowie manuellem Vorschub wesentlich weniger Kraftaufwand?

Siehe Aluminium Negativ Dünnschnitt. Artikel 11 1120 Seite 912

Spezialausführungen für eloxiertes oder lackiertes Aluminium auf Anfrage.

Sizing and cross cuts in thin-walled profiles, plates, blocks and rods made of aluminum, brass, copper and plastics (e.g. window profiles).

Minimum Lubrication recommended.

Because of negative hook angle preferably for manual feed.

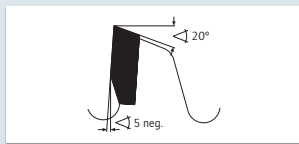
Automatic feed also possible.

You want:

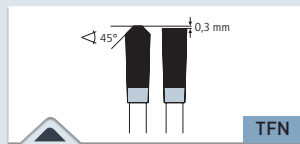
- Higher cutting values?
- Less waste?
- Less wear/energy consumption of the machine?
- With hand-held machines and manual feed much less effort?

See aluminum negative thin-cut. Article 11 1120 page 912

Special design for anodized or lacquered aluminum on request.



> Trapez-Flachzahn Negativ
> Triple-chip / flat tooth negative



TFN




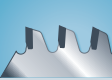



MASCHINE · MACHINE

Abläng- und Kappsägen, Tisch- und Formatkreissägen, Gehrungs- und Doppelgehrungssägen, Kappkreissägen, CNC-Bearbeitungszentren, Radialarmsägen.

Mitre and double mitre saws, table and sizing saws, cross-cut saws, CNC machining centers, Radial arm saws.



Bestseller – preisreduziert · Bestseller – price reduced

| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|---|--|---|--------|
| 11 1100 250 010 | ● 250 | 3,2/2,5 | 30 | 60 TFN | UNI 1 + UNI 2 | ✓ | - | 70,35 |
| 11 1100 250 020 | ● 250 | 3,2/2,5 | 30 | 80 TFN | UNI 1 + UNI 2 | ✓ | - | 70,95 |
| 11 1100 250 030 | ● 250 | 2,8/2,2 | 30 | 80 TFN | UNI 1 + UNI 2 | ✓ | - | 70,25 |
| 11 1100 250 040 | ● 250 | 2,8/2,2 | 30 | 100 TFN | UNI 1 + UNI 2 | ✓ | - | 84,45 |
| 11 1100 250 050 | ● 250 | 3,2/2,5 | 32 | 60 TFN | UNI 2 | ✓ | - | 70,10 |
| 11 1100 250 060 | ● 250 | 3,2/2,5 | 32 | 80 TFN | UNI 2 | ✓ | - | 78,80 |
| 11 1100 250 070 | ● 250 | 3,2/2,5 | 32 | 100 TFN | UNI 2 | ✓ | - | 102,50 |
| 11 1100 275 010 | ● 275 | 3,2/2,5 | 40 | 88 TFN | 2-9-55+4-12-64 | ✓ | - | 96,15 |
| 11 1100 275 020 | ● 275 | 3,2/2,5 | 40 | 110 TFN | 2-9-55+4-12-64 | ✓ | - | 120,80 |
| 11 1100 280 010 | ● 280 | 3,2/2,5 | 30 | 88 TFN | UNI 1 + UNI 2 | ✓ | - | 96,15 |
| 11 1100 300 010 | ● 300 | 3,2/2,5 | 30 | 72 TFN | UNI 1 + UNI 2 | ✓ | - | 85,05 |
| 11 1100 300 020 | ● 300 | 3,2/2,5 | 30 | 96 TFN | UNI 1 + UNI 2 | ✓ | - | 80,30 |
| 11 1100 300 030 | ● 300 | 2,8/2,2 | 30 | 120 TFN | UNI 1 + UNI 2 | ✓ | - | 117,75 |
| 11 1100 300 040 | ● 300 | 3,2/2,5 | 32 | 72 TFN | UNI 2 | ✓ | - | 85,05 |
| 11 1100 300 050 | ● 300 | 3,2/2,5 | 32 | 96 TFN | UNI 2 | ✓ | - | 93,60 |
| 11 1100 300 060 | ● 300 | 2,8/2,2 | 32 | 120 TFN | UNI 2 | ✓ | - | 117,75 |
| 11 1100 300 070 | ● 300 | 3,2/2,5 | 40 | 72 TFN | 2-9-55+4-12-64 | ✓ | - | 85,05 |
| 11 1100 300 080 | ● 300 | 3,2/2,5 | 40 | 96 TFN | 2-9-55+4-12-64 | ✓ | - | 102,35 |
| 11 1100 305 010 | ● 305 | 3,2/2,5 | 30 | 96 TFN | UNI 1 + UNI 2 | ✓ | - | 103,40 |
| 11 1100 330 010 | ● 330 | 3,2/2,5 | 30 | 72 TFN | UNI 1 + UNI 2 | ✓ | - | 94,35 |
| 11 1100 330 020 | ● 330 | 3,2/2,5 | 30 | 96 TFN | UNI 1 + UNI 2 | ✓ | - | 108,00 |
| 11 1100 330 030 | ● 330 | 2,8/2,2 | 30 | 120 TFN | UNI 1 + UNI 2 | ✓ | - | 127,20 |
| 11 1100 330 040 | ⊗ 330 | 3,2/2,5 | 32 | 72 TFN | UNI 2 | ✓ | - | 40,96 |
| 11 1100 330 050 | ● 330 | 3,2/2,5 | 32 | 96 TFN | UNI 2 | ✓ | - | 108,00 |
| 11 1100 330 060 | ⊗ 330 | 2,8/2,2 | 32 | 120 TFN | UNI 2 | ✓ | - | 55,26 |
| 11 1100 350 010 | ● 350 | 3,4/2,8 | 30 | 90 TFN | UNI 1 + UNI 2 | ✓ | - | 109,70 |
| 11 1100 350 020 | ● 350 | 3,4/2,8 | 30 | 108 TFN | UNI 1 + UNI 2 | ✓ | - | 108,00 |
| 11 1100 350 030 | ● 350 | 3,2/2,5 | 30 | 140 TFN | UNI 1 + UNI 2 | ✓ | - | 141,35 |
| 11 1100 350 040 | ● 350 | 3,4/2,8 | 32 | 90 TFN | UNI 2 | ✓ | - | 110,50 |
| 11 1100 350 050 | ● 350 | 3,4/2,8 | 32 | 108 TFN | UNI 2 | ✓ | - | 113,70 |
| 11 1100 350 060 | ● 350 | 3,4/2,8 | 40 | 84 TFN | 2-9-55+4-12-64 | ✓ | - | 104,65 |
| 11 1100 350 070 | ● 350 | 3,4/2,8 | 40 | 108 TFN | 2-9-55+4-12-64 | ✓ | - | 123,60 |
| 11 1100 350 080 | ● 350 | 3,4/2,8 | 50 | 84 TFN | 4-15-80 | ✓ | - | 104,65 |
| 11 1100 350 090 | ● 350 | 3,4/2,8 | 50 | 108 TFN | 4-15-80 | ✓ | - | 121,45 |
| 11 1100 370 010 | ● 370 | 3,6/3,0 | 30 | 90 TFN | UNI 1 + UNI 2 | ✓ | - | 131,00 |
| 11 1100 370 020 | ● 370 | 3,6/3,0 | 30 | 108 TFN | UNI 1 + UNI 2 | ✓ | - | 142,15 |
| 11 1100 380 010 | ● 380 | 3,8/3,2 | 32 | 90 TFN | UNI 2 | ✓ | - | 131,00 |
| 11 1100 380 020 | ● 380 | 3,8/3,2 | 32 | 110 TFN | UNI 2 | ✓ | - | 130,75 |
| 11 1100 380 030 | ● 380 | 3,8/3,2 | 32 | 132 TFN | UNI 2 | ✓ | - | 172,95 |
| 11 1100 400 010 | ● 400 | 3,8/3,2 | 30 | 96 TFN | UNI 1 + UNI 2 | ✓ | ✓ | 151,30 |
| 11 1100 400 020 | ● 400 | 3,8/3,2 | 30 | 108 TFN | UNI 1 + UNI 2 | ✓ | ✓ | 163,90 |
| 11 1100 400 030 | ● 400 | 3,8/3,2 | 30 | 120 TFN | UNI 1 + UNI 2 | ✓ | ✓ | 171,15 |
| 11 1100 400 040 | ● 400 | 3,8/3,2 | 32 | 96 TFN | UNI 2 | ✓ | ✓ | 140,70 |
| 11 1100 400 050 | ● 400 | 3,8/3,2 | 32 | 108 TFN | UNI 2 | ✓ | ✓ | 163,90 |
| 11 1100 400 060 | ● 400 | 3,8/3,2 | 32 | 120 TFN | UNI 2 | ✓ | ✓ | 171,15 |
| 11 1100 400 070 | ● 400 | 3,8/3,2 | 40 | 96 TFN | 4-12-64+2-15-80 | ✓ | ✓ | 151,30 |
| 11 1100 400 080 | ● 400 | 3,8/3,2 | 40 | 120 TFN | 4-12-64+2-15-80 | ✓ | ✓ | 171,15 |
| 11 1100 400 090 | ● 400 | 3,8/3,2 | 50 | 96 TFN | 4-15-80 | ✓ | ✓ | 151,30 |
| 11 1100 400 100 | ● 400 | 3,8/3,2 | 50 | 120 TFN | 4-15-80 | ✓ | ✓ | 171,15 |
| 11 1100 420 010 | ● 420 | 4,0/3,2 | 30 | 96 TFN | | ✓ | ✓ | 152,50 |
| 11 1100 420 020 | ● 420 | 4,0/3,2 | 30 | 108 TFN | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 162,35 |
| 11 1100 420 030 | ● 420 | 4,0/3,2 | 30 | 120 TFN | | ✓ | ✓ | 160,25 |
| 11 1100 420 040 | ● 420 | 4,0/3,2 | 40 | 96 TFN | 4-12-64+2-15-80 | ✓ | ✓ | 141,80 |
| 11 1100 420 050 | ● 420 | 4,0/3,2 | 40 | 108 TFN | 4-12-64+2-15-80 | ✓ | ✓ | 162,35 |
| 11 1100 420 060 | ● 420 | 4,0/3,2 | 40 | 120 TFN | 4-12-64+2-15-80 | ✓ | ✓ | 172,30 |
| 11 1100 450 010 | ● 450 | 4,0/3,2 | 30 | 108 TFN | | ✓ | ✓ | 161,10 |
| 11 1100 450 020 | ● 450 | 4,0/3,2 | 30 | 128 TFN | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 180,30 |
| 11 1100 500 010 | ● 500 | 4,2/3,6 | 30 | 120 TFN | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 186,90 |
| 11 1100 500 020 | ● 500 | 4,2/3,6 | 30 | 140 TFN | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 215,40 |
| 11 1100 520 010 | ● 520 | 4,2/3,6 | 30 | 120 TFN | - | ✓ | ✓ | 263,55 |
| 11 1100 550 010 | ● 550 | 4,4/3,8 | 30 | 108 TFN | | ✓ | ✓ | 255,90 |
| 11 1100 550 020 | ● 550 | 4,4/3,8 | 30 | 132 TFN | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 286,60 |
| 11 1100 600 010 | ● 600 | 4,6/4,0 | 30 | 140 TFN | UNI 1 + UNI 2 | ✓ | ✓ | 360,15 |
| - | ○ 1000 | - | - | - | - | | | |

bis Ø 1000 mm auf Anfrage erhältlich
up to Ø 1000 mm available on request

⊗ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

UNI 1 = 2-7-42 + 2-9-46,40 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64

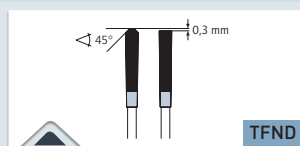
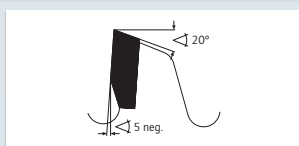
Sie wünschen: Höhere Schnittwerte? Weniger Verschnitt? Weniger Verschleiß/Energieverbrauch der Maschine? Bei Handgeführten Maschinen sowie manuellem Vorschub wesentlich weniger Kraftaufwand?
Siehe Aluminium Negativ Dünnschnitt. Artikel 11 1120 Seite 912

You want: Higher cutting values? Less waste? Less wear/energy consumption of the machine? With hand-held machines and manual feed much less effort? See aluminum negative thin-cut. Article 11 1120 page 912



11 1120

Aluminium Negativ Dünnschnitt
Aluminum negative thin-cut



> Trapez-Flachzahn Negativ Dünn
> Triple chip / flat tooth thin negative

MASCHINE · MACHINE

Abläng- und Kappsägen, Tisch- und Formatkreissägen, Gehrungs- und Doppelgehrungssägen, Kappkreissägen, CNC-Bearbeitungszentren, Radialarmsägen, Handkreissägen, Tauchsägen, Akkubetriebene Säge-
maschinen

Mitre and double mitre saws, table and sizing saws, cross-cut saws, CNC machining centers, portable circular saws, battery-driven saws

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|--|
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Plattenaufteilung und Kappschnitte in dünnwandige Profile und Vollmaterial aus NE-Metallen wie Aluminium, Kupfer, Messing sowie Kunststoffe (z.B. Fensterprofile).

Minimalmengenschmierung empfohlen.

Durch dünne Schnittbreite:

- Höhere Schnittwerte
- Weniger Verschnitt
- Weniger Verschleiß/Energieverbrauch der Maschine
- Bei Handgeführten Maschinen sowie manuellem Vorschub wesentlich weniger Kraftaufwand

Durch negativen Spanwinkel vorzugsweise manueller Vorschub. Automatischer Vorschub ebenfalls möglich.

Sie wünschen:

- Nahezu gratfreie Fertigschnittqualität auch an der Unterseite (Austritt) des Werkstücks?
- Hervorragende Schnittgüte an den Schnittflächen (nahezu Spiegelfinish)?
- Noch bessere Standzeiten
- Siehe Aluminium Negativ Dünnschnitt-Fertigschnitt. Artikel 11 1130 Seite 914

Spezialausführungen für eloxiertes oder lackiertes Aluminium auf Anfrage.

Sizing and cross cuts in thin-walled profiles, plates, blocks and rods made of aluminum, brass, copper and plastics (e.g. window profiles).

Minimum Lubrication recommended.

Due to thin cutting width:

- Higher cutting values
- Less waste
- Less wear/energy consumption of the machine
- With hand-held machines and manual feed much less effort

Due to negative cutting angle preferably for manual feed. Automatic feed also possible.

You want:

- Almost burr-free finishing-cut quality also at the lower side/exit of the workpiece?
- Excellent cutting quality at the cut surface (almost mirror finish)?
- Even better lifetime?
- See aluminum negative thin-cut/finishing-cut. Article 11 1130 page 914




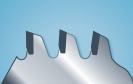



Special design for anodized or lacquered aluminum on request.

Film
Movie



Aluminium Negativ Dünnschnitt
Aluminum negative thin-cut

11 1120

| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|--|---|---|--------|
| 11 1120 120 010 | • 120 | 2,2/1,6 | 20 | 36 TFND | - | - | - | 42,35 |
| 11 1120 136 010 | • 136 | 2,2/1,6 | 20/10 | 40 TFND | 2-6-32 | - | - | 43,50 |
| 11 1120 150 010 | • 150 | 2,4/1,6 | 20/16 | 42 TFND | 2-6-32 | - | - | 44,05 |
| 11 1120 160 010 | • 160 | 2,4/1,8 | 20/16 | 42 TFND | 2-6-32 | - | - | 45,50 |
| 11 1120 160 020 | • 160 | 2,2/1,6 | 20/16 | 60 TFND | 2-6-32 | - | - | 60,50 |
| 11 1120 160 030 | • 160 | 2,4/1,8 | 30 | 42 TFND | UNI 1 | - | - | 44,65 |
| 11 1120 170 010 | • 170 | 2,4/1,8 | 30 | 48 TFND | UNI 1 | - | - | 49,55 |
| 11 1120 180 010 | • 180 | 2,4/1,8 | 30 | 48 TFND | UNI 1 | - | - | 49,55 |
| 11 1120 180 020 | • 180 | 2,2/1,6 | 30 | 64 TFND | UNI 1 | - | - | 64,50 |
| 11 1120 185 010 | % 185 | 2,2/1,6 | 20/16 | 64 TFND | 2-6-32 | ✓ | - | 24,36 |
| 11 1120 190 010 | • 190 | 2,4/1,8 | 30 | 54 TFND | UNI 1 | - | - | 54,40 |
| 11 1120 190 020 | • 190 | 2,2/1,6 | 30 | 68 TFND | UNI 1 | - | - | 68,65 |
| - | • 200 | 2,2/1,8 | 20 | 100 TFND | Siehe/See Art. 11 1150, Seite/Page 1039 | | - | - |
| 11 1120 200 010 | • 200 | 2,4/1,8 | 30 | 54 TFND | UNI 1 | - | - | 54,90 |
| 11 1120 200 020 | • 200 | 2,2/1,6 | 30 | 68 TFND | UNI 1 | ✓ | - | 69,60 |
| - | • 200 | 2,2/1,8 | 30 | 100 TFND | Siehe/See Art. 11 1150, Seite/Page 1039 | | - | - |
| - | • 200 | 2,2/1,8 | 32 | 100 TFND | Siehe/See Art. 11 1150, Seite/Page 1039 | | - | - |
| 11 1120 210 010 | • 210 | 2,4/1,8 | 30 | 54 TFND | UNI 1 | - | - | 55,60 |
| 11 1120 210 020 | • 210 | 2,2/1,6 | 30 | 72 TFND | UNI 1 | - | - | 74,05 |
| 11 1120 216 010 | • 216 | 2,4/1,8 | 30 | 60 TFND | UNI 1 | - | - | 61,25 |
| 11 1120 216 020 | • 216 | 2,2/1,6 | 30 | 80 TFND | UNI 1 | - | - | 81,75 |
| 11 1120 220 010 | • 220 | 2,4/1,8 | 30 | 64 TFND | UNI 1 | - | - | 63,05 |
| 11 1120 220 020 | • 220 | 2,2/1,6 | 30 | 80 TFND | UNI 1 | - | - | 81,75 |
| 11 1120 225 010 | • 225 | 2,4/1,8 | 30 | 64 TFND | UNI 1 | - | - | 63,05 |
| 11 1120 225 020 | • 225 | 2,2/1,6 | 30 | 80 TFND | UNI 1 | - | - | 81,75 |
| 11 1120 230 010 | • 230/235 ● | 2,4/1,8 | 30 | 64 TFND | UNI 1 | - | - | 63,05 |
| 11 1120 230 020 | • 230/235 ● | 2,2/1,6 | 30 | 80 TFND | UNI 1 | - | - | 81,75 |
| 11 1120 240 010 | % 240 | 2,2/1,8 | 30 | 80 TFND | UNI 1 | - | - | 30,44 |
| 11 1120 250 010 | • 250 | 2,8/2,2 | 30 | 80 TFND | UNI 1 + UNI 2 | ✓ | - | 81,95 |
| 11 1120 250 020 | • 250 | 2,2/1,8 | 30 | 100 TFND | UNI 1 + UNI 2 | ✓ | - | 108,20 |
| 11 1120 250 030 | • 250 | 2,2/1,8 | 32/30 | 120 TFND | UNI 2 | ✓ | - | 149,00 |
| 11 1120 260 010 | • 260 | 2,4/1,8 | 30 | 68 TFND | UNI 1 + UNI 2 | ✓ | - | 82,60 |
| 11 1120 260 020 | • 260 | 2,4/1,8 | 30 | 100 TFND | UNI 1 + UNI 2 | ✓ | - | 117,05 |
| 11 1120 270 010 | • 270 | 2,4/1,8 | 30 | 80 TFND | UNI 1 + UNI 2 | ✓ | - | 88,35 |
| 11 1120 270 020 | % 270 | 2,4/1,8 | 30 | 100 TFND | UNI 1 + UNI 2 | ✓ | - | 44,50 |
| 11 1120 300 010 | • 300 | 2,4/1,8 | 30 | 120 TFND | UNI 1 + UNI 2 | ✓ | - | 128,25 |
| 11 1120 305 010 | • 305 | 2,6/2,0 | 30 | 80 TFND | UNI 1 + UNI 2 | ✓ | - | 98,50 |
| 11 1120 305 020 | • 305 | 2,4/1,8 | 30 | 120 TFND | UNI 1 + UNI 2 | ✓ | - | 128,25 |
| 11 1120 330 010 | • 330 | 2,4/1,8 | 30 | 96 TFND | UNI 1 + UNI 2 | ✓ | - | 136,25 |
| 11 1120 330 020 | % 330 | 2,4/1,8 | 30 | 120 TFND | UNI 1 + UNI 2 | ✓ | - | 54,28 |
| 11 1120 330 030 | • 330 | 2,4/1,8 | 32 | 96 TFND | UNI 2 | ✓ | - | 136,25 |
| 11 1120 330 040 | % 330 | 2,4/1,8 | 32 | 120 TFND | UNI 2 | ✓ | - | 54,28 |
| 11 1120 350 010 | • 350 | 2,4/1,8 | 30 | 120 TFND | UNI 1 + UNI 2 | ✓ | - | 151,95 |
| 11 1120 400 010 | • 400 | 3,1/2,5 | 30 | 130 TFND | UNI 1 + UNI 2 | ✓ | ✓ | 170,40 |
| 11 1120 420 010 | • 420 | 3,4/2,8 | 30 | 132 TFND | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 195,35 |
| 11 1120 450 010 | • 450 | 3,4/2,8 | 30 | 138 TFND | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 202,85 |
| 11 1120 500 010 | • 500 | 3,4/2,8 | 30 | 144 TFND | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 224,50 |
| 11 1120 550 010 | • 550 | 3,6/3,0 | 30 | 160 TFND | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 309,80 |
| - | ○ 1000 | - | - | - | - | bis Ø 1000 mm auf Anfrage erhältlich up to Ø 1000 mm available on request | | - |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

● Gefertigt/Manufactured 232,50 mm

UNI 1 = 2-7-42 + 2-9-46,40 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64

Sie wünschen:

- Nahezu gratfreie Fertigschnittqualität auch an der Unterseite (Austritt) des Werkstücks?
- Hervorragende Schnittgüte an den Schnittflächen (nahezu Spiegelfinish)?
- Noch bessere Standzeiten
- Siehe Aluminium Negativ Dünnschnitt-Fertigschnitt. Artikel 11 1130 Seite 914

You want:

- Almost burr-free finishing-cut quality also at the lower side/exit of the workpiece?
- Excellent cutting quality at the cut surface (almost mirror finish)?
- Even better lifetime?
- See aluminum negative thin-cut/finishing-cut. Article 11 1130 page 914

1



2



3



4



5



6



7



8



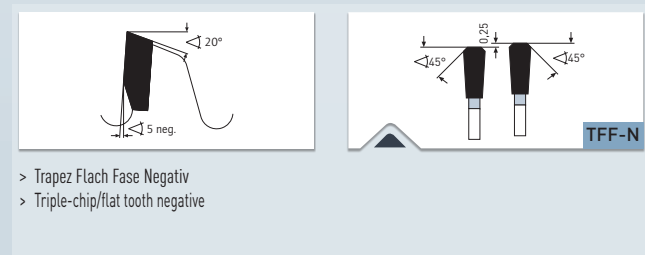
9



Index

11 1130

Aluminium Negativ Dünnschnitt/Fertigschnitt
Aluminum negative thin-cut/finishing-cut



> Trapez Flach Fase Negativ
> Triple-chip/flat tooth negative

MASCHINE · MACHINE

Abläng- und Kappsägen, Tisch- und Formatkreissägen, Gehrungs- und Doppelgehrungssägen, Kappkreissägen, CNC-Bearbeitungszentren, Radialarmsägen, Handkreissägen, Tauchsägen, Akkubetriebene Sägemaschinen

Mitre and double mitre saws, table and sizing saws, cross-cut saws, CNC machining centers, portable circular saws, battery-driven saws

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|--|
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Plattenaufteilung und Kappschnitte in dünnwandige Profile und Vollmaterial aus NE-Metallen wie Aluminium, Kupfer, Messing sowie Kunststoffe (z.B. Fensterprofile).

Minimalmengenschmierung empfohlen.

Durch TFF-N Verzahnung:

- Nahezu gratfreie Fertigschnittqualität auch an der Unterseite (Austritt) des Werkstücks
- Hervorragende Schnittgüte an den Schnittflächen (nahezu Spiegelfinish)
- Noch bessere Standzeiten

Durch dünne Schnittbreite:

- Weniger Verschnitt
- Weniger Verschleiß/Energieverbrauch der Maschine
- Bei Handgeführten Maschinen sowie manuellem Vorschub wesentlich weniger Kraftaufwand

Durch negativen Spanwinkel vorzugsweise manueller Vorschub. Automatischer Vorschub ebenfalls möglich.

Spezialausführungen für eloxiertes oder lackiertes Aluminium auf Anfrage.

Sizing and cross cuts in thin-walled profiles, plates, blocks and rods made of aluminum, brass, copper and plastics (e.g. window profiles).

Minimum Lubrication recommended.

Because of TFF-N cut:

- Almost burr-free finishing-cut quality also at the lower side/exit of the workpiece
- Excellent cutting quality at the cut surface (almost mirror finish)
- Even better lifetime

Due to thin cutting width:

- Less waste
- Less wear/energy consumption of the machine
- With hand-held machines and manual feed much less effort

Due to negative cutting angle preferably for manual feed. Automatic feed also possible.



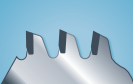



Special design for anodized or lacquered aluminum on request.

Film
Movie



Aluminium Negativ Dünnschnitt
Aluminum negative thin-cut/finishing-cut

11 1130

| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|--|---|---|--------|
| 11 1130 120 010 | • 120 | 1,8/1,2 | 20 | 48 TFF-N | - | - | - | 50,90 |
| 11 1130 136 010 | • 136 | 1,8/1,2 | 20/10 | 56 TFF-N | 2-6-32 | - | - | 59,35 |
| 11 1130 160 010 | • 160 | 1,8/1,2 | 20/16 | 64 TFF-N | 2-6-32 | - | - | 68,65 |
| 11 1130 190 010 | • 190 | 1,8/1,2 | 30 | 72 TFF-N | UNI 1 | - | - | 77,35 |
| 11 1130 200 010 | • 200 | 2,0/1,4 | 30 | 100 TFF-N | UNI 1 | - | - | 101,25 |
| 11 1130 210 010 | • 210 | 2,0/1,4 | 30 | 100 TFF-N | UNI 1 | - | - | 106,05 |
| 11 1130 216 010 | • 216 | 2,0/1,4 | 30 | 100 TFF-N | UNI 1 | - | - | 107,40 |
| 11 1130 230 010 | • 230/235 | 2,0/1,4 | 30 | 108 TFF-N | UNI 1 | - | - | 115,75 |
| 11 1130 250 010 | • 250 | 2,2/1,8 | 30 | 120 TFF-N | UNI 1 + UNI 2 | ✓ | - | 131,85 |
| 11 1130 260 010 | • 260 | 2,2/1,8 | 30 | 120 TFF-N | UNI 1 + UNI 2 | ✓ | - | 129,55 |
| 11 1130 300 010 | • 300 | 2,4/1,8 | 30 | 128 TFF-N | UNI 1 + UNI 2 | ✓ | - | 146,40 |
| 11 1130 305 010 | • 305 | 2,4/1,8 | 30 | 128 TFF-N | UNI 1 + UNI 2 | ✓ | - | 146,85 |
| 11 1130 330 010 | • 330 | 2,4/1,8 | 30 | 132 TFF-N | UNI 1 + UNI 2 | ✓ | - | 174,95 |
| 11 1130 350 010 | • 350 | 2,4/1,8 | 30 | 132 TFF-N | UNI 1 + UNI 2 | ✓ | - | 175,65 |
| 11 1130 350 020 | • 350 | 2,4/1,8 | 32 | 132 TFF-N | UNI 2 | ✓ | - | 175,65 |
| 11 1130 380 010 | • 380 | 2,4/1,8 | 32 | 132 TFF-N | UNI 2 | ✓ | - | 180,25 |
| 11 1130 400 010 | • 400 | 3,1/2,5 | 30 | 138 TFF-N | UNI 1 + UNI 2 | ✓ | ✓ | 201,60 |
| 11 1130 400 020 | • 400 | 3,1/2,5 | 32 | 138 TFF-N | UNI 2 | ✓ | ✓ | 201,60 |
| 11 1130 420 010 | • 420 | 3,4/2,8 | 30 | 138 TFF-N | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 225,50 |
| 11 1130 420 020 | • 420 | 3,4/2,8 | 40 | 138 TFF-N | 4-12-64 + 2-15-80 | ✓ | ✓ | 225,50 |
| 11 1130 450 010 | • 450 | 3,4/2,8 | 30 | 144 TFF-N | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 255,05 |
| 11 1130 500 010 | • 500 | 3,4/2,8 | 30 | 148 TFF-N | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 285,10 |

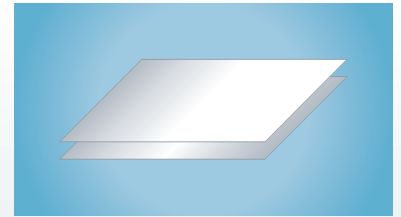
• Gefertigt/Manufactured 232,50 mm

UNI 1 = 2-7-42 + 2-9-46,40 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64



Kunststoffe

Plastics



Drehzahl **n** (U/min) • Revolution per minute **n** (rpm)

| | 1500 | 2000 | 2500 | 2850 | 3000 | 4000 | 4500 | 5000 | 5600 | 6000 | 8000 | 9000 | 10000 | 12000 | 18000 |
|-------|------|------|------|------|------|------|------|------|-------|-------|------|------|-------|-------|-------|
| 80 Ø | 6,5 | 8,5 | 10,5 | 12 | 13 | 17 | 19 | 21 | 23,5 | 26 | 34 | 38 | 42 | 52 | 76 |
| 90 Ø | 7 | 9,5 | 12 | 13,5 | 14 | 19 | 21 | 24 | 26,5 | 28 | 38 | 42 | 48 | 56 | 84 |
| 100 Ø | 8 | 10,5 | 13 | 15 | 16 | 21 | 24 | 26 | 29 | 32 | 42 | 48 | 52 | 54 | 96 |
| 120 Ø | 9,5 | 13 | 16 | 18 | 19 | 26 | 28 | 32 | 35 | 38 | 52 | 56 | 64 | 76 | 112 |
| 125 Ø | 10 | 13,5 | 16,5 | 18,5 | 19,5 | 27 | 29 | 33 | 36,5 | 39 | 54 | 59 | 66 | 78 | 118 |
| 140 Ø | 11 | 15 | 18 | 21 | 22 | 30 | 33 | 36 | 41 | 44 | 60 | 66 | 72 | 88 | 132 |
| 150 Ø | 12 | 15,5 | 19,5 | 22,5 | 23,5 | 31,5 | 33,5 | 39 | 44 | 47 | 63 | 70,5 | 78,5 | 94,5 | 141,5 |
| 160 Ø | 13 | 17 | 21 | 24 | 26 | 34 | 38 | 42 | 47 | 52 | 68 | 76 | 84 | 104 | 152 |
| 180 Ø | 14 | 19 | 24 | 27 | 28 | 38 | 42,5 | 48 | 53 | 56 | 76 | 85 | 96 | 118 | 170 |
| 200 Ø | 16 | 21 | 26 | 30 | 32 | 42 | 47 | 52 | 58,5 | 64 | 84 | 94 | 104 | 128 | 188 |
| 225 Ø | 18 | 24 | 30 | 33,5 | 36 | 48 | 58 | 60 | 66 | 72 | 96 | 106 | 120 | 144 | 212 |
| 250 Ø | 20 | 26 | 33 | 37 | 40 | 52 | 59 | 66 | 73,5 | 80 | 104 | 118 | 132 | 160 | 236 |
| 300 Ø | 24 | 31,5 | 40 | 45 | 48 | 63 | 71 | 80 | 88 | 96 | 126 | 142 | 160 | 192 | 284 |
| 350 Ø | 28 | 36,5 | 47 | 52 | 56 | 73 | 88 | 94 | 105 | 112 | 146 | 166 | 188 | 224 | 332 |
| 400 Ø | 32 | 42 | 54 | 60 | 64 | 84 | 94 | 108 | 117 | 128 | 168 | 188 | 216 | 256 | 376 |
| 450 Ø | 35,5 | 47 | 59 | 67,5 | 70,5 | 94,5 | 106 | 118 | 132 | 141,6 | 188 | 211 | 236 | 283 | 424 |
| 500 Ø | 40 | 53 | 67 | 74,5 | 80 | 106 | 118 | 134 | 146,5 | 160 | 212 | 236 | 268 | 320 | 472 |

Schnittgeschwindigkeit in m/s · Cutting speed in m/s

1 Kunststoffe
Plastics

2 Sicherheitsgrenze
Safety limits

Festlegung der Schnittgeschwindigkeit Vc
Determination of cutting speed Vc

$$Vc (m/s) = \frac{D \cdot \pi \cdot n}{60 \cdot 1000}$$

Festlegung der Vorschubgeschwindigkeit Vf
Determination of feed rate Vf

$$Vf (m/min) = \frac{fz \cdot n \cdot Z}{1000}$$

Festlegung der Drehzahl n
Determination of revolution speed n

$$n (min^{-1}) = \frac{Vc \cdot 1000 \cdot 60}{D \cdot \pi}$$

Vc (m/s) = Schnittgeschwindigkeit · Cutting speed

Vf (m/min) = Vorschubgeschwindigkeit · Feed rate

fz (mm/z) = Vorschub pro Zahn · Feed per tooth

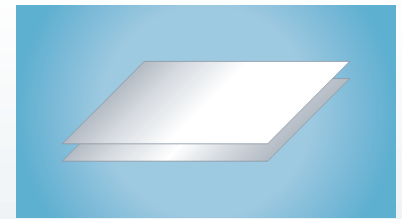
D (mm) = Sägendurchmesser · Saw blade diameter

n (min⁻¹) = Drehzahl · rpm

Z = Anzahl der Zähne · Number of teeth

Kunststoffe

Plastics



Schnittwertempfehlungen · Recommended cutting values

| Werkstoffgruppe Material Group | Werkstoffbeispiele Material examples | Vc (m/s) Schnittgeschwindigkeit Cutting speed | fz (mm/z) Vorschub pro Zahn Feed per tooth |
|---|---|---|--|
| Harte Thermoplaste | PA Polyamid, PE Polyäthylen, PS Polystyrol, POM Polyoxymethylen, ABS Acrylnitril-Butadien-Styrol | 60-70 | 0,06-0,10 |
| | PVC Polyvinylchlorid | 55-60 | 0,06-0,10 |
| | PC Polycarbonat | 70-75 | 0,03-0,06 |
| Hard Thermoplastics | PA Polyamide, PE Polyethylene, PS Polystyrene, POM polyoxymethylene, ABS acrylonitrile-butadiene-styrene | 60-70 | 0,06-0,10 |
| | PVC Polyvinyl chloride | 55-60 | 0,06-0,10 |
| | PC Polycarbonat | 70-75 | 0,03-0,06 |
| Leicht schmelzende Thermoplaste | PP Polypropylen, PA6 Polyamid-6 | 60-70 | 0,08-0,18 |
| Easily melting thermoplastics | PP polypropylene, PA6 polyamide-6 | | |
| Thermoplaste mit Sichtflächen | PC Polycarbonat | 70-75 | 0,03-0,06 |
| | PMMA Acrylglas | 60-65 | 0,06-0,09 |
| Thermoplastics with visible surface | PC polycarbonate | 70-75 | 0,03-0,06 |
| | PMMA acrylic glass | 60-65 | 0,06-0,09 |
| Duroplaste | HPL-Schichtstoffplatten (Trespa®, Resopal®, Wodego®, Duropal®, Formica®, Unilin®, Kronospan®, Homapal®, Decodur®, Abet®) PUR Polyurethan, Melamin, HP-Hartpapier | 50-70 | 0,01-0,08 |
| Duroplastic | HPL High-Pressure-Laminate (Trespa®, Resopal®, Wodego®, Duropal®, Formica®, Unilin®, Kronospan®, Homapal®, Decodur®, Abet®) PUR Polyurethan, Melamine, HP Hardpaper | | |
| | Glasfaserverstärkte und Kohlefaserverstärkte Kunststoffe GFK/CFK Aramidfaserkunststoffe AFK (Kevlar, Nomex, Carbolan, Rigator, Durostone) | 20-50 | 0,01-0,03 |
| | Glass fibre and carbon fibre reinforced plastic GFK/CFK Aramid fibre plastik AFK (Kevlar, Nomex, Carbolan, Rigator, Durostone) | | |
| Mineralisch-Acrylgebundene Materialien z.B. Küchenplatten/Waschbecken | Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | 50-70 | 0,02-0,04 |
| Mineral-Acrylic bound materials e.g. Kitchen worktops/sink | | | |

1



2



3



4



5



6



7



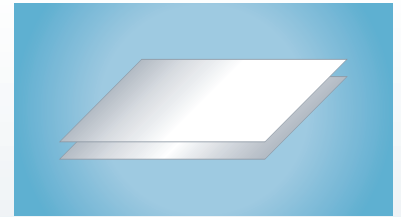
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9

Kunststoffe

Plastics



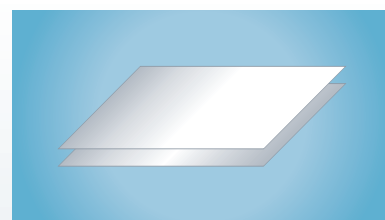
| Art. Ø mm | Type | Anwendung · Application | |
|--|--|--|-----|
| 10 8000 Ø mm 120-300  | Kunststoff Universal | Universalblatt für das Bauhandwerk, Ladenbau, Messebau, Renovierungsarbeiten | 921 |
| | Plastic universal | Universal blade for construction, shop fitting, booth builder, renovations | |
| 10 9050 Ø mm 250-350  | Acrylglas (Plexiglas) Klarsichtschnitt | Für Fertigschnitte, Klarsichtschnitte in homogene Werkstoffe, Thermoplaste wie Acrylglas (Plexiglas) PC, PMMA | 923 |
| | Acrylic (Plexiglas) clear cut view | For finishing cut, clear cut view in homogenous material, thermoplastics such as acrylic (plexiglass), PC, PMMA | |
| 11 1000 Ø mm 200-600  | Fensterprofile & Kunststoffe, positiver Spanwinkel | Für Trenn- und Gehrungsschnitte in dick- bis dünnwandigen Platten und Hohlprofilen z.B. Fensterprofile aus PVC | 925 |
| | Window profiles & plastics, positive hook angle | For sizing cuts and mitre cuts in thin and thick-walled boards and hollow profiles, e.g. window profiles made of PVC | |
| 11 1050 Ø mm 250-550  | Fensterprofile & Kunststoffe, positiver Spanwinkel / Dünnschnitt | Für Trenn- und Gehrungsschnitte in dünnwandigen Platten und Hohlprofilen z.B. Fensterprofile aus PVC | 927 |
| | Window profiles & plastics, positive hook angle / Thin-cut | For sizing cuts and mitre cuts in thin-walled boards and hollow profiles, e.g. window profiles made of PVC | |
| 11 1100 Ø mm 250-600  | Fensterprofile & Kunststoffe, negativer Spanwinkel | Für Trenn- und Gehrungsschnitte in dünn- bis mittelwandige Platten und Hohlprofile, z.B. Fensterprofile aus PVC | 929 |
| | Window profiles & plastics, negative hook angle | For sizing cuts and mitre cuts in thin/medium-walled boards and hollow profiles, e.g. window profiles made of PVC | |

BEST SELLER

- 1 
- 2 
- 3 
- 4 
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- 6 
- 7 
- 8 
- 9 

Kunststoffe

Plastics

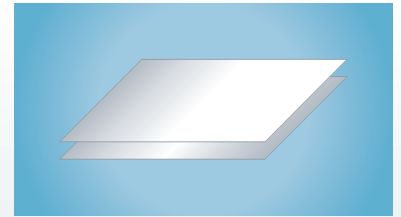


| Art. Ø mm | Type | Anwendung · Application | |
|--|--|---|-----|
| 11 1120 Ø mm 120-550  | Fensterprofile & Kunststoffe, negativer Spanwinkel / Dünnschnitt Window profiles & plastics, negative hook angle / Thin-cut | Für Trenn- und Gehrungsschnitte in dünnwandige Platten und Hohlprofile, z.B. Fensterprofile aus PVC For sizing cuts and mitre cuts in thin-walled boards and hollow profiles, e.g. window profiles made of PVC | 931 |
| 11 1130 Ø mm 120-500  | Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt / Dünnschnitt · Negativ Hard plastics · Abrasive materials · Finishing-cut / Thin-cut · Negative | Ideal für Fertigschnitte in allen Kunststoffen. Exzellent für Hohlkammerplatten aus PMMA (Acrylglas). Ebenfalls gut bei abrasiven, zu hohem Schneidenverschleiß führenden Materialien wie: GFK, CFK, Zementplatten, Gipsfaserplatten, Eternit. Ideal for finishing cuts in all plastics. Excellent for hollow section boards for PMMA (acrylic glass). Also good for abrasive, heavy machining and abrading materials such as: GFK, CFK, fibre cement panels, gypsum, fibre boards, eternit. | 933 |
| 11 1320 Ø mm 120-500  | Fensterprofile mit Gummidichtung & Kunststoffe Window profiles with rubber seal & plastics | Hervorragende Schnittqualität bei Trenn- und Gehrungs- schnitten in dünnwandige Platten und Hohlprofile, z.B. Fens- terprofile speziell mit eingezogener Gummidichtung. Excellent cutting quality for sizing cuts and mitre cuts in thin-walled boards and hollow profiles, e.g. window profiles made of PVC especially with rubber seal. | 935 |
| 11 1350  Ø mm 160-350  | Diamant Universal Diamond Universal | Speziell für Duroplaste wie: Glasfaserverstärkte sowie Kohlefaserverstärkte Kunststoffe (GFK, CFK), Carbon, Aramidfaserkunststoffe (AFK) HP, HPL, PUR. Excellent for Duroplastic materials such as: Glas fibre plastic (GFK), Carbon fibre plastic (CFK), Carbon, Aramid fibre plastic (AFK), HP, HPL, PUR. | 937 |
| 11 1370  Ø mm 250-350  | Diamant · Formatieren · Fertigschnitt · Harte Kunststoffe · Abrasive Werkstoffe Diamond · Panel-sizing · Finishing cut · Hard plastics · Abrasive materials | Durch DP (Polykristalliner Diamant) Bestückung ideal zum Trennen extrem abrasiver, zu hohem Schneidenverschleiß führenden Materialien in Fertigschnitt Qualität. Due to DP (Polychristalline Diamond) teeth excellent for cutting extreme abrasive, heavy machining and abrading materials in finishing-cut quality. | 939 |



Kunststoffe

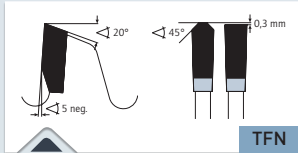
Plastics



| Art. Ø mm | Type | Anwendung · Application | |
|--|--|--|---------------------------|
| 11 1425 Ø mm 120-500  | Kunststoffe · Profile · Furniere / Dünnschnitt Plastics · Profiles · Veneers / Thin-cut | Ideal für Fertigschnitte in dünnwandige Holz- und Kunststoffteile (Leisten, Bilderrahmen) sowie Furniere und harte Thermoplaste wie PC, PMMA (Acrylglas, Plexiglas) Ideal for finishing-cuts in thin-walled wood and plastic parts e.g. strips, picture frames. Excellent also for veneers and hard thermoplastics such as PC, PMMA (acrylic, plexiglas) | 941 BEST SELLER |
| | | | |
| 11 1430 Ø mm 120-500  | Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/ Dünnschnitt Hard plastics · abrasive materials · Finishing-cut / Thin-cut | Ideal für Fertigschnitte in dünnen Platten und Profilmaterial aus harten Kunststoffen (Thermoplaste) wie: PVC, PE, PA, ABS, POM PC, PMMA (Acrylglas) sowie generell abrasive Werkstoffe wie Faserzementplatten, Eternit, Corian, Trespa ... Excellent for finishing-cuts in thin-walled boards and profiles of hard plastics (thermoplastics) such as: PVC, PE, PA, ABS, POM, PC, PMMA (acrylics). In general also excellent for abrasive materials such as gypsum and cemented boards, Eternit, Corian, Trespa ... | 943 BEST SELLER |
| | | | |
| 11 1450 Ø mm 210-600  | Kapp- und Gehrungs-Kreissägeblätter · Wechselzahn/negativ Chop- and mitre circular saws · alternate top bevel tooth/negative | Spezialprogramm für Kapp- und Gehrungssägen. Hohe Zähnezahl hervorragend für nahezu alle Kunststoffe und Plattenwerkstoffe/Profile furniert oder beschichtet. Special selection for chop- and mitre saws. High number of teeth excellent for almost all kind of plastics and veneered/coated boards/ profiles. | 945 |
| | | | |
| 11 1460 Ø mm 250-400  | Formatieren · Fertigschnitt · Harte Kunststoffe · Abrasive Werkstoffe Panel-sizing · Finishing cut · Hard plastics · Abrasive Materials | Zum Formatieren von Platten/Profilen in verschiedenen Dicken aus Thermoplaste wie PVC, PE, PA, ABS usw. Ebenfalls ideal bei Duroplasten und Mineralwerkstoffe wie HPL (Trespa, Resopal), Corian, Noblan und Abrasive Werkstoffe wie GFK, CFK For sizing panels/profiles of thermoplastics in various thicknesses made of: PVC, PE, PA, ABS ... Also ideal for duroplastics and mineral materials such as HPL (Trespa, Resopal) Corian, Noblan and abrasive materials such as GFK, CFK. | 947 |
| | | | |
| 11 1470 Ø mm 220-400  | Formatieren · Fertigschnitt · Trapez/ Flachzahn Panel-sizing · Finishing cut · Triple chip/flat tooth | Zum Formatieren von Platten/Profilen in verschiedenen Dicken. Für nahezu alle Kunststoffe (Duroplasten und Thermoplasten) geeignet. Ideal auch bei beidseitig mit Kunststoff beschichtete Platten. For sizing panels/profiles in various thicknesses. For almost all kinds of plastics (duro- and thermoplastics). Ideal also for double-side plastic coated boards. | 949 |
| | | | |

Kunststoff Universal
Plastic universal

10 8000



- > Trapez-Flachzahn Negativ
- > Triple-chip / flat tooth negative

MASCHINE · MACHINE

Für Elektro Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Radialarmsägen, Tisch- und Formatkreissägen, Akkubetriebene Maschinen.

For portable circular saws, cross-cut saws, panel saws, sizing and mitre saws, table and radial arm saws, battery-driven saws.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Dünnscheibe, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Weichholz, Hartholz, Exotenzholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Wood with inclusions like nails, clips, concrete residues |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Gasbetonsteine | Autoclaved aerated concrete blocks |

ANWENDUNG · APPLICATION

Das ideale Blatt für den Ladenbau, Messebau, Renovierungsarbeiten. Für eine Vielzahl von Materialien wie: Ne-Metalle, Kunststoffe, Plexiglas, Spanplatten, Thermofassadenplatten.

Weitere Alu-Negativ Blätter siehe Art. 11 1100 Seite 929, Art. 11 1120 Seite 931 sowie Art. 11 1130 Seite 915.

The ideal blade for shop construction, trade fair construction, renovation work. For many materials such as: non-ferrous metals, plastics, plexiglas, chipboard, thermo façade plates.

Other aluminum negative sheets: see item 11 1100 page 929, item 11 1120 page 931, and item 11 1130 page 915.

| Art. | | | | | | | € |
|-----------------|-----------|---------|-------|---------|---------------|---|--------|
| 10 8000 120 010 | • 120 | 2,8/2,0 | 20 | 34 TFN | - | - | 37,40 |
| 10 8000 136 010 | • 136 | 2,8/2,0 | 20/10 | 40 TFN | 2-6-32 | - | 43,65 |
| 10 8000 150 010 | • 150 | 2,8/2,0 | 20/16 | 42 TFN | 2-6-32 | - | 44,95 |
| 10 8000 160 010 | • 160 | 2,8/2,0 | 20/16 | 42 TFN | 2-6-32 | - | 45,50 |
| 10 8000 165 010 | • 165 | 2,8/2,0 | 20 | 48 TFN | 2-6-32 | - | 49,10 |
| 10 8000 170 010 | • 170 | 2,8/2,0 | 30 | 48 TFN | - | - | 49,25 |
| 10 8000 180 010 | • 180 | 2,8/2,0 | 30 | 48 TFN | UNI 1 | - | 49,85 |
| 10 8000 185 010 | • 185 | 2,8/2,0 | 20/16 | 48 TFN | 2-6-32 | - | 51,70 |
| 10 8000 190 010 | • 190 | 2,8/2,0 | 30 | 54 TFN | UNI 1 | - | 55,00 |
| 10 8000 200 010 | • 200 | 2,8/2,0 | 30 | 54 TFN | UNI 1 | - | 56,15 |
| 10 8000 210 010 | • 210 | 2,8/2,0 | 30 | 54 TFN | UNI 1 | - | 56,95 |
| 10 8000 216 010 | • 216 | 2,8/2,0 | 30 | 60 TFN | UNI 1 | - | 62,70 |
| 10 8000 216 020 | • 216 | 2,8/2,0 | 30 | 80 TFN | UNI 1 | - | 75,25 |
| 10 8000 220 010 | • 220 | 2,8/2,0 | 30 | 54 TFN | UNI 1 | - | 60,15 |
| 10 8000 230 010 | • 230/235 | 2,8/2,0 | 30 | 64 TFN | UNI 1 | - | 63,05 |
| 10 8000 240 010 | • 240 | 2,8/2,0 | 30 | 64 TFN | UNI 1 | - | 63,05 |
| 10 8000 250 010 | • 250 | 3,2/2,5 | 30 | 60 TFN | UNI 1 + UNI 2 | ✓ | 78,50 |
| 10 8000 250 020 | • 250 | 3,2/2,5 | 30 | 80 TFN | UNI 1 + UNI 2 | ✓ | 87,40 |
| 10 8000 250 030 | • 250 | 2,8/2,2 | 30 | 100 TFN | UNI 1 + UNI 2 | ✓ | 108,15 |
| 10 8000 260 010 | • 260 | 3,2/2,5 | 30 | 80 TFN | UNI 1 + UNI 2 | ✓ | 94,50 |
| 10 8000 270 010 | • 270 | 3,2/2,5 | 30 | 88 TFN | UNI 1 + UNI 2 | ✓ | 96,60 |
| 10 8000 280 010 | • 280 | 3,2/2,5 | 30 | 88 TFN | UNI 1 + UNI 2 | ✓ | 99,00 |
| 10 8000 300 010 | • 300 | 3,2/2,5 | 30 | 72 TFN | UNI 1 + UNI 2 | ✓ | 93,95 |
| 10 8000 300 020 | • 300 | 3,2/2,5 | 30 | 96 TFN | UNI 1 + UNI 2 | ✓ | 98,35 |
| 10 8000 300 030 | • 300 | 2,8/2,2 | 30 | 120 TFN | UNI 1 + UNI 2 | ✓ | 128,25 |

UNI 1 = 2-7-42 + 2-9-46,40 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64
 • Gefertigt/Manufactured 232,50 mm

Film
Movie



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<https://shop.karnasch.tools>

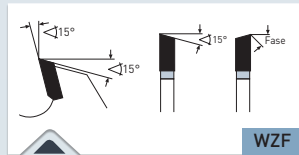
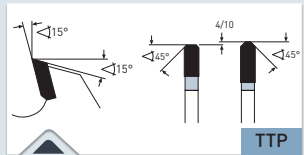


EINFACH SCANNEN UND REGISTRIEREN
EASILY SCAN AND REGISTER

Karnasch®
PROFESSIONAL TOOLS

Acrylglas (Plexiglas) Klarschnitt
Acrylic (Plexiglas) clear cut view

10 9050



> Trapez Flach Positiv
> Triple-chip / flat tooth positive

> Wechselzahn-Fase
> Alternate top bevel+bevel

MASCHINE · MACHINE

Für Tischkreissägen, Formatsägen, Plattenaufteilsägen

For table-mounted circular saws, final trimming saws, panel sizing saws

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Minerale/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |

ANWENDUNG · APPLICATION

Für Fertigschnitte, Klarschnitt in homogene Werkstoffe, Thermoplaste wie Acrylglas (Plexiglas) PC, PMMA.

Wenigzahn Ausführung (TTP): Thermoplast im Paketschnitt. Zugfestigkeit > 50 N/mm².

Vielzahn Ausführung (WZF): Thermoplast dünnwandig. Zugfestigkeit max. 50 N/mm².

Empfehlung: Kühlung mit Emulsion, siehe ab Seite 1144.

For finishing cut, clear cut view in homogenous material, thermoplastics such as acrylic (plexiglass), PC, PMMA.

Low tooth number (TTP): Thermoplastics, for stacks of material. Tensile strength > 50 N/mm².

High tooth number (WZF): Thermoplastics, thin-walled. Tensile strength max. 50 N/mm².

Recommendation: Use emulsion as a coolant, see from page 1144.

| Art. | | | | | | | € |
|-----------------|-------|---------|----|---------|-----|---|--------|
| 10 9050 250 010 | ● 250 | 3,2/2,2 | 30 | 48 TTP | UNI | ✓ | 91,65 |
| 10 9050 250 020 | ● 250 | 3,2/2,2 | 30 | 80 WZF | UNI | ✓ | 125,25 |
| 10 9050 300 010 | ● 300 | 3,2/2,2 | 30 | 60 TTP | UNI | ✓ | 111,95 |
| 10 9050 300 020 | ● 300 | 3,2/2,2 | 30 | 96 WZF | UNI | ✓ | 146,85 |
| 10 9050 350 010 | ● 350 | 3,5/2,5 | 30 | 72 TTP | UNI | ✓ | 143,55 |
| 10 9050 350 020 | ● 350 | 3,5/2,5 | 30 | 108 WZF | UNI | ✓ | 180,75 |

UNI = 2-10-60 + 2-9-46,4 + 2-7-42

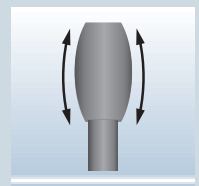
Weitere Abmessungen auf Anfrage
Other dimensions are available on request

Bombierter Flankenstil

Bossed edge style

Bitte nur Zahnbrust nachschleifen. Nicht den Umfang (Freifläche Zahnrückten). Ca. 5x nachschleifbar bei normaler Abstumpfung.

Please only regrind the face, but never the top. Approximately five times regrindable with normal blunting.



Film
Movie



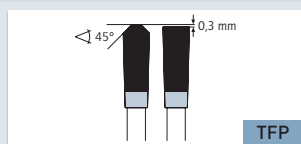
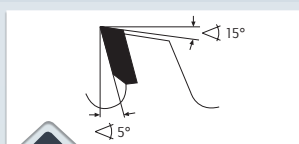
11 1000

Fensterprofile & Kunststoffe. Positiver Spanwinkel
Window profiles & plastics. Positive hook angle



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |



- > Trapez-Flachzahn Positiv
- > Triple-chip / flat tooth positive

ANWENDUNG · APPLICATION

Für Trenn- und Gehrungsschnitte in dick- bis dünnwandigen Platten und (je nach Zähnezahl) Hohlprofilen z.B. Fensterprofile aus PVC, auch Glasfaserverstärkt mit und ohne Gummidichtung. (Durch positiven Schnittwinkel vorzugsweise für automatischen Vorschub. Auch manueller Vorschub möglich).

Achswinkel-Blätter für nahezu gratfreie, sauberste Schnitte und höchste Standzeiten in Fensterprofilen aus PVC (auch glasfaserverstärkt-GFK)

SPEZIELL MIT GUMMIDICHTUNG siehe Art. 11 1320, Seite 935

For sizing cuts and mitre cuts in thin and thick-walled boards and (depending on the number of teeth) hollow profiles, e.g. window profiles made of PVC, also glass fibre reinforced (GRP) with and without rubber seal. (Positive hook angle preferably for automatic feed. Manual feed also possible).

Axial-Angle blades for virtually burr-free, cleanset cuts and longest service life in window profiles made of PVC (also glass fibre reinforced-GRP)

SPECIFICALLY WITH RUBBER SEAL see Art. 11 1320, Page 935

MASCHINE · MACHINE

Tisch- und Formatkreissägen, Doppelgehrungssägen, automatische Kappkreissägen, CNC-Bearbeitungszentren.

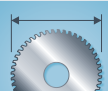


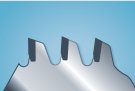



Table and sizing saws, double mitre saws, automatic cross-cut saws, CNC machining centers.

Film
Movie



Fensterprofile & Kunststoffe. Positiver Spanwinkel
Window profiles & plastics. Positive hook angle

11 1000

| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|--|---|---|--------|
| 11 1000 200 010 | • 200 | 3,2/2,5 | 30 | 54 TFP | UNI 1+UNI 2 | - | - | 74,55 |
| 11 1000 200 020 | • 200 | 2,8/2,2 | 30 | 72 TFP | UNI 1+UNI 2 | - | - | 87,85 |
| 11 1000 225 010 | • 225 | 2,5/1,8 | 30 | 68 TFP | UNI 1+UNI 2 | - | - | 83,10 |
| 11 1000 250 010 | • 250 | 3,2/2,5 | 30 | 60 TFP | UNI 1+UNI 2 | ✓ | - | 82,05 |
| 11 1000 250 020 | • 250 | 3,2/2,5 | 30 | 80 TFP | UNI 1+UNI 2 | ✓ | - | 90,40 |
| 11 1000 250 030 | • 250 | 3,2/2,5 | 32 | 80 TFP | UNI 2 | ✓ | - | 91,95 |
| 11 1000 275 010 | • 275 | 3,2/2,5 | 40 | 72 TFP | 2-9-55+4-12-64 | ✓ | - | 98,30 |
| 11 1000 280 010 | • 280 | 3,2/2,5 | 30 | 68 TFP | UNI 1+UNI 2 | ✓ | - | 99,20 |
| 11 1000 280 020 | • 280 | 3,2/2,5 | 30 | 96 TFP | UNI 1+UNI 2 | ✓ | - | 104,10 |
| 11 1000 300 010 | • 300 | 3,2/2,5 | 30 | 72 TFP | UNI 1+UNI 2 | ✓ | - | 99,20 |
| 11 1000 300 020 | • 300 | 3,2/2,5 | 30 | 96 TFP | UNI 1+UNI 2 | ✓ | - | 99,80 |
| 11 1000 300 030 | • 300 | 3,2/2,5 | 32 | 72 TFP | UNI 2 | ✓ | - | 99,20 |
| 11 1000 300 040 | • 300 | 3,2/2,5 | 32 | 96 TFP | UNI 2 | ✓ | - | 104,10 |
| 11 1000 300 050 | • 300 | 3,2/2,5 | 40 | 96 TFP | 2-9-55+4-12-64 | ✓ | - | 119,40 |
| 11 1000 320 010 | • 320 | 3,2/2,5 | 30 | 84 TFP | UNI 1+UNI 2 | ✓ | - | 116,10 |
| 11 1000 330 010 | • 330 | 3,2/2,5 | 32/30 | 72 TFP | UNI 2 | ✓ | - | 106,15 |
| 11 1000 330 020 | • 330 | 3,2/2,5 | 32/30 | 96 TFP | UNI 2 | ✓ | - | 128,70 |
| 11 1000 350 020 | • 350 | 3,4/2,8 | 30 | 72 TFP | UNI 1+UNI 2 | ✓ | - | 112,00 |
| 11 1000 350 030 | • 350 | 3,4/2,8 | 30 | 92 TFP | UNI 1+UNI 2 | ✓ | - | 129,65 |
| 11 1000 350 040 | • 350 | 3,4/2,8 | 30 | 108 TFP | UNI 1+UNI 2 | ✓ | - | 144,15 |
| 11 1000 350 050 | • 350 | 3,4/2,8 | 32 | 92 TFP | UNI 2 | ✓ | - | 129,65 |
| 11 1000 350 060 | • 350 | 3,4/2,8 | 32 | 108 TFP | UNI 2 | ✓ | - | 137,00 |
| 11 1000 350 070 | • 350 | 3,4/2,8 | 40 | 92 TFP | 2-9-55+4-12-64 | ✓ | - | 129,65 |
| 11 1000 350 080 | • 350 | 3,4/2,8 | 40 | 108 TFP | 2-9-55+4-12-64 | ✓ | - | 144,15 |
| 11 1000 370 010 | • 370 | 3,6/3,0 | 30 | 96 TFP | UNI 1+UNI 2 | ✓ | - | 149,90 |
| 11 1000 400 010 | • 400 | 3,8/3,2 | 30 | 72 TFP | UNI 1+UNI 2 | ✓ | ✓ | 153,40 |
| 11 1000 400 020 | • 400 | 3,8/3,2 | 30 | 96 TFP | UNI 1+UNI 2 | ✓ | ✓ | 176,50 |
| 11 1000 400 030 | • 400 | 3,8/3,2 | 30 | 120 TFP | UNI 1+UNI 2 | ✓ | ✓ | 199,65 |
| 11 1000 400 040 | • 400 | 3,8/3,2 | 32 | 96 TFP | UNI 2 | ✓ | ✓ | 170,00 |
| 11 1000 400 050 | • 400 | 3,8/3,2 | 40 | 96 TFP | 4-12-64+2-15-80 | ✓ | ✓ | 176,50 |
| 11 1000 400 060 | • 400 | 3,8/3,2 | 40 | 120 TFP | 4-12-64+2-15-80 | ✓ | ✓ | 199,65 |
| 11 1000 400 070 | • 400 | 3,8/3,2 | 50 | 96 TFP | 4-15-80 | ✓ | ✓ | 176,50 |
| 11 1000 400 080 | • 400 | 3,8/3,2 | 50 | 120 TFP | 4-15-80 | ✓ | ✓ | 199,65 |
| 11 1000 420 010 | • 420 | 4,0/3,2 | 30 | 72 TFP | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 168,20 |
| 11 1000 420 020 | • 420 | 4,0/3,2 | 30 | 96 TFP | | ✓ | ✓ | 177,90 |
| 11 1000 420 030 | • 420 | 4,0/3,2 | 30 | 120 TFP | | ✓ | ✓ | 199,60 |
| 11 1000 430 010 | • 430 | 4,0/3,2 | 30 | 96 TFP | | ✓ | ✓ | 69,14 |
| 11 1000 450 010 | • 450 | 4,0/3,2 | 30 | 72 TFP | UNI 1+UNI 2 + 2-10,5-70 | ✓ | ✓ | 171,40 |
| 11 1000 450 020 | • 450 | 4,0/3,2 | 30 | 108 TFP | UNI 1+UNI 2 + 2-10,5-70 | ✓ | ✓ | 187,95 |
| 11 1000 450 030 | • 450 | 4,0/3,2 | 30 | 120 TFP | UNI 1+UNI 2 + 2-10,5-70 | ✓ | ✓ | 206,35 |
| 11 1000 450 040 | • 450 | 4,0/3,2 | 32 | 96 TFP | UNI 2 | ✓ | ✓ | 179,55 |
| 11 1000 450 050 | • 450 | 4,0/3,2 | 32 | 120 TFP | UNI 2 | ✓ | ✓ | 206,35 |
| 11 1000 500 010 | • 500 | 4,2/3,6 | 30 | 72 TFP | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 181,20 |
| 11 1000 500 020 | • 500 | 4,2/3,6 | 30 | 96 TFP | | ✓ | ✓ | 203,60 |
| 11 1000 500 030 | • 500 | 4,2/3,6 | 30 | 120 TFP | | ✓ | ✓ | 229,55 |
| 11 1000 500 040 | • 500 | 4,2/3,6 | 30 | 144 TFP | | ✓ | ✓ | 258,45 |
| 11 1000 500 050 | • 500 | 4,2/3,6 | 32 | 120 TFP | UNI 2 | ✓ | ✓ | 229,55 |
| 11 1000 500 060 | • 500 | 4,2/3,6 | 32 | 144 TFP | UNI 2 | ✓ | ✓ | 258,45 |
| 11 1000 550 010 | • 550 | 4,4/3,8 | 30 | 72 TFP | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 282,20 |
| 11 1000 550 020 | • 550 | 4,4/3,8 | 30 | 110 TFP | | ✓ | ✓ | 313,70 |
| 11 1000 550 030 | • 550 | 4,4/3,8 | 30 | 144 TFP | | ✓ | ✓ | 374,10 |
| 11 1000 550 040 | • 550 | 4,4/3,8 | 32 | 96 TFP | UNI 2 | ✓ | ✓ | 291,60 |
| 11 1000 550 050 | • 550 | 4,4/3,8 | 32 | 128 TFP | UNI 2 | ✓ | ✓ | 330,95 |
| 11 1000 550 060 | • 550 | 4,4/3,8 | 80 | 128 TFP | 6-9-100 | ✓ | ✓ | 337,75 |
| 11 1000 600 010 | • 600 | 4,6/4,0 | 30 | 140 TFP | UNI 1+UNI 2 | ✓ | ✓ | 420,20 |
| - | ○ 1000 | - | - | - | - | bis Ø 1000 mm auf Anfrage erhältlich up to Ø 1000 mm available on request | | |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

UNI 1 = 2-7-42+2-9-46,4 UNI 2 = 2-10-60+2-11-63+2-12-64

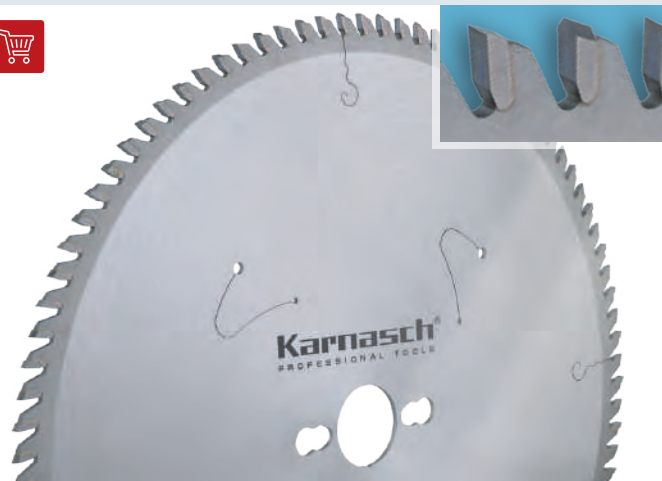
Weitere Alu-Positiv-Blätter S. 927 · More Alu-Positive blades page 927

Film
Movie



11 1050

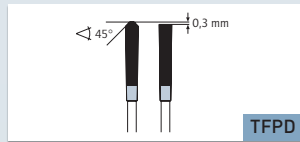
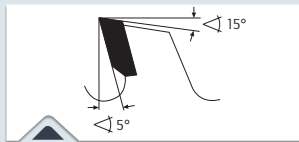
Fensterprofile & Kunststoffe. Positiver Spanwinkel / Dünnschnitt
Window profiles & plastics. Positive hook angle / Thin-cut



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |

- 1
- 2
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- 7
- 8
- 9



- > Trapez-Flachzahn Positiv dünn
- > Triple-chip / flat tooth thin positive

MASCHINE · MACHINE

Tisch- und Formatkreissägen, Doppelgehrungssägen, automatische Kappkreissägen, CNC-Bearbeitungszentren, akkubetriebene Sägemaschinen.

Table and sizing saws, double mitre saws, automatic cross-cut saws, CNC machining centers, battery-Driven saws.

ANWENDUNG · APPLICATION

Für Trenn- und Gehrungsschnitte in dünnwandigen Platten und Hohlprofilen z.B. Fensterprofile aus PVC, auch Glasfaserverstärkt mit und ohne Gummidichtung. (Durch positiven Schnittwinkel vorzugsweise für automatischen Vorschub. Auch manueller Vorschub möglich).

Durch dünne Schnittbreite wenig Kraftaufwand und Verschnitt. Daher ideal auch für akkubetriebenen Maschinen.

Achswinkel-Blätter für nahezu gratfreie, sauberste Schnitte und höchste Standzeiten in Fensterprofile aus PVC (auch glasfaserverstärkt-GFK)

SPEZIELL MIT GUMMIDICHTUNG siehe Art. 11 1320, Seite 935

For sizing cuts and mitre cuts in thin-walled boards and hollow profiles, e.g. window profiles made of PVC, also glass fibre reinforced (GRP) with and without rubber seal. (Positive hook angle preferably for automatic feed. Manual feed also possible).

Due to the small cutting width less cutting pressure and waste. Therefore ideal also for battery-powered machines.

Axial-Angle blades for virtually burr-free, cleanset cuts and longest service life in window profiles made of PVC (also glass fibre reinforced-GRP)

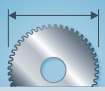


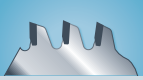



SPECIFICALLY WITH RUBBER SEAL see Art. 11 1320, Page 935

Film
Movie



Fensterprofile & Kunststoffe. Positiver Spanwinkel / Dünnschnitt
Window profiles & plastics. Positive hook angle / Thin-cut

11 1050

| Art. |  |  |  |  |  |  |  | € |
|----------------------------|---|---|---|---|--|---|---|--------|
| NEW 11 1050 250 003 | • 250 | 2,2/1,8 | 30 | 60 TFPD | UNI 1 + UNI 2 | ✓ | - | 82,05 |
| NEW 11 1050 250 005 | • 250 | 2,2/1,8 | 30 | 80 TFPD | UNI 1 + UNI 2 | ✓ | - | 91,95 |
| 11 1050 250 010 | • 250 | 2,2/1,8 | 30 | 100 TFPD | UNI 1 + UNI 2 | ✓ | - | 108,20 |
| NEW 11 1050 250 020 | • 250 | 2,2/1,8 | 30 | 120 TFPD | UNI 2 | ✓ | - | 131,85 |
| NEW 11 1050 300 003 | • 300 | 2,4/1,8 | 30 | 72 TFPD | UNI 1 + UNI 2 | ✓ | - | 99,20 |
| NEW 11 1050 300 005 | • 300 | 2,4/1,8 | 30 | 96 TFPD | UNI 1 + UNI 2 | ✓ | - | 119,40 |
| 11 1050 300 010 | • 300 | 2,4/1,8 | 30 | 120 TFPD | UNI 1 + UNI 2 | ✓ | - | 128,25 |
| NEW 11 1050 350 003 | • 350 | 2,4/1,8 | 30 | 72 TFPD | UNI 1 + UNI 2 | ✓ | - | 112,00 |
| NEW 11 1050 350 005 | • 350 | 2,4/1,8 | 30 | 108 TFPD | UNI 1 + UNI 2 | ✓ | - | 144,15 |
| 11 1050 350 010 | • 350 | 2,4/1,8 | 30 | 120 TFPD | UNI 1 + UNI 2 | ✓ | - | 151,95 |
| NEW 11 1050 400 005 | • 400 | 3,1/2,5 | 30 | 96 TFPD | UNI 1 + UNI 2 | ✓ | ✓ | 176,50 |
| 11 1050 400 010 | • 400 | 3,1/2,5 | 30 | 128 TFPD | UNI 1 + UNI 2 | ✓ | ✓ | 170,40 |
| NEW 11 1050 420 005 | • 420 | 3,4/2,8 | 30 | 96 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 177,90 |
| 11 1050 420 010 | • 420 | 3,4/2,8 | 30 | 132 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 195,35 |
| NEW 11 1050 450 005 | • 450 | 3,4/2,8 | 32 | 92 TFPD | UNI 2 | ✓ | ✓ | 179,55 |
| 11 1050 450 010 | • 450 | 3,4/2,8 | 30 | 138 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 202,85 |
| NEW 11 1050 500 003 | • 500 | 3,4/2,8 | 30 | 72 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 181,20 |
| NEW 11 1050 500 005 | • 500 | 3,4/2,8 | 30 | 120 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 218,05 |
| 11 1050 500 010 | • 500 | 3,4/2,8 | 30 | 144 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 224,50 |
| NEW 11 1050 550 005 | • 550 | 3,6/3,0 | 30 | 110 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 298,55 |
| 11 1050 550 010 | • 550 | 3,6/3,0 | 30 | 160 TFPD | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 309,80 |
| NEW - | ○ 1000 | - | - | - | - | bis Ø 1000 mm auf Anfrage erhältlich up to Ø 1000 mm available on request | | |

UNI 1 = 2-7-42 + 2-9-46,40 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64

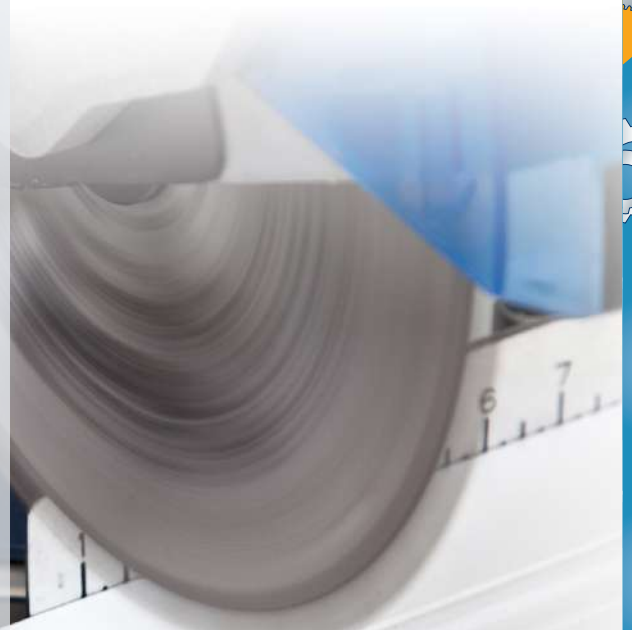
Dünnschnitt für höchste Schnittgüte mit wenig Schnittdruck und Materialverbrauch

Verwenden Sie daher bei der Bearbeitung von Kunststoffen, wertvollen Hölzern sowie NE-Metalle wie Alu, Kupfer und Messing Dünnschnitt-Kreissägen Art. 11 1120 Seite 931, 11 1150 Seite 1039, 11 1050 Seite 927, 11 1425 Seite 941, und 11 1430 Seite 943.

Thin-cut blades for highest cutting quality with little cutting pressure and a minimum of material waste

Thin-cut blades are therefore perfect for cutting plastics, precious wood and non ferrous metals such as aluminum, copper and brass. See Art. 11 1120 page 931, 11 1150 page 1039, 11 1050 page 927, 11 1425 page 941 and 11 1430 page 943

POWER.
PRECISION.
PERFORMANCE.

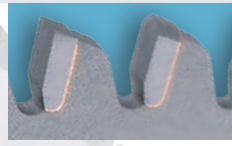


Karnasch®
PROFESSIONAL TOOLS



11 1100

Fensterprofile & Kunststoffe. Negativer Spanwinkel
Window profiles & plastics. Negative hook angle



**BEST
SELLER**

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |

ANWENDUNG · APPLICATION

Für Trenn- und Gehrungsschnitte in dünn- bis mittelwandige Hohlprofile, z.B. Fensterprofile aus PVC, glasfaserverstärkt mit und ohne Gummidichtung. (Durch negativen Spanwinkel vorzugsweise für manuellen Vorschub. Auch automatischer Vorschub möglich).

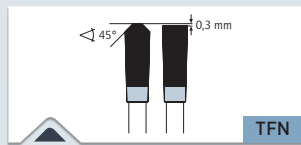
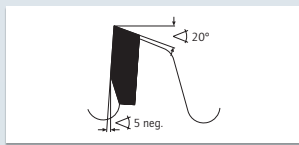
Achswinkel-Blätter für nahezu gratfreie, sauberste Schnitte und höchste Standzeiten in Fensterprofile aus PVC (auch glasfaserverstärkt-GFK)

SPEZIELL MIT GUMMIDICHTUNG siehe Art 11 1320, Seite 935

For sizing cuts and mitre cuts in thin/medium-walled hollow profiles, e.g. window profiles made of PVC, also glass fibre reinforced (GRP) with and without rubber seal. (Negative hook angle preferably for manual feed. Automatic feed also possible).

Axial-Angle blades for virtually burr-free, cleanest cuts and longest service life in window profiles made of PVC (also glass fiber reinforced-GRP)

SPECIFICALLY WITH RUBBER SEAL see Art. 11 1320, Page 935



- > Trapez-Flachzahn Negativ
- > Triple-chip / flat tooth negative

MASCHINE · MACHINE

Kappkreissägen, Gehrungs- und Doppelgehrungssägen, CNC-Bearbeitungszentren, Radialarmsägen, Tisch- und Formatkreissägen, Abläng- und Kappsägen.

Automatic cross-cut saws, Mitre and double mitre saws, CNC-machining centers, Table and sizing saws, Panel saws, Radial arm saws

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Film
Movie



Fensterprofile & Kunststoffe. Negativer Spanwinkel
Window profiles & plastics. Negative hook angle

11 1100

Bestseller – preisreduziert · Bestseller – price reduced

| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|--|---|---|--------|
| 11 1100 250 010 | ● 250 | 3,2/2,5 | 30 | 60 TFN | UNI 1 + UNI 2 | ✓ | - | 70,35 |
| 11 1100 250 020 | ● 250 | 3,2/2,5 | 30 | 80 TFN | UNI 1 + UNI 2 | ✓ | - | 70,95 |
| 11 1100 250 030 | ● 250 | 2,8/2,2 | 30 | 80 TFN | UNI 1 + UNI 2 | ✓ | - | 70,25 |
| 11 1100 250 040 | ● 250 | 2,8/2,2 | 30 | 100 TFN | UNI 1 + UNI 2 | ✓ | - | 84,45 |
| 11 1100 250 050 | ● 250 | 3,2/2,5 | 32 | 60 TFN | UNI 2 | ✓ | - | 70,10 |
| 11 1100 250 060 | ● 250 | 3,2/2,5 | 32 | 80 TFN | UNI 2 | ✓ | - | 78,80 |
| 11 1100 250 070 | ● 250 | 3,2/2,5 | 32 | 100 TFN | UNI 2 | ✓ | - | 102,50 |
| 11 1100 275 010 | ● 275 | 3,2/2,5 | 40 | 88 TFN | 2-9-55+4-12-64 | ✓ | - | 96,15 |
| 11 1100 275 020 | ● 275 | 3,2/2,5 | 40 | 110 TFN | 2-9-55+4-12-64 | ✓ | - | 120,80 |
| 11 1100 280 010 | ● 280 | 3,2/2,5 | 30 | 88 TFN | UNI 1 + UNI 2 | ✓ | - | 96,15 |
| 11 1100 300 010 | ● 300 | 3,2/2,5 | 30 | 72 TFN | UNI 1 + UNI 2 | ✓ | - | 85,05 |
| 11 1100 300 020 | ● 300 | 3,2/2,5 | 30 | 96 TFN | UNI 1 + UNI 2 | ✓ | - | 80,30 |
| 11 1100 300 030 | ● 300 | 2,8/2,2 | 30 | 120 TFN | UNI 1 + UNI 2 | ✓ | - | 117,75 |
| 11 1100 300 040 | ● 300 | 3,2/2,5 | 32 | 72 TFN | UNI 2 | ✓ | - | 85,05 |
| 11 1100 300 050 | ● 300 | 3,2/2,5 | 32 | 96 TFN | UNI 2 | ✓ | - | 93,60 |
| 11 1100 300 060 | ● 300 | 2,8/2,2 | 32 | 120 TFN | UNI 2 | ✓ | - | 117,75 |
| 11 1100 300 070 | ● 300 | 3,2/2,5 | 40 | 72 TFN | 2-9-55+4-12-64 | ✓ | - | 85,05 |
| 11 1100 300 080 | ● 300 | 3,2/2,5 | 40 | 96 TFN | 2-9-55+4-12-64 | ✓ | - | 102,35 |
| 11 1100 305 010 | ● 305 | 3,2/2,5 | 30 | 96 TFN | UNI 1 + UNI 2 | ✓ | - | 103,40 |
| 11 1100 330 010 | ● 330 | 3,2/2,5 | 30 | 72 TFN | UNI 1 + UNI 2 | ✓ | - | 94,35 |
| 11 1100 330 020 | ● 330 | 3,2/2,5 | 30 | 96 TFN | UNI 1 + UNI 2 | ✓ | - | 108,00 |
| 11 1100 330 030 | ● 330 | 2,8/2,2 | 30 | 120 TFN | UNI 1 + UNI 2 | ✓ | - | 127,20 |
| 11 1100 330 040 | ● 330 | 3,2/2,5 | 32 | 72 TFN | UNI 2 | ✓ | - | 40,96 |
| 11 1100 330 050 | ● 330 | 3,2/2,5 | 32 | 96 TFN | UNI 2 | ✓ | - | 108,00 |
| 11 1100 330 060 | ● 330 | 2,8/2,2 | 32 | 120 TFN | UNI 2 | ✓ | - | 55,26 |
| 11 1100 350 010 | ● 350 | 3,4/2,8 | 30 | 90 TFN | UNI 1 + UNI 2 | ✓ | - | 109,70 |
| 11 1100 350 020 | ● 350 | 3,4/2,8 | 30 | 108 TFN | UNI 1 + UNI 2 | ✓ | - | 108,00 |
| 11 1100 350 030 | ● 350 | 3,2/2,5 | 30 | 140 TFN | UNI 1 + UNI 2 | ✓ | - | 141,35 |
| 11 1100 350 040 | ● 350 | 3,4/2,8 | 32 | 90 TFN | UNI 2 | ✓ | - | 110,50 |
| 11 1100 350 050 | ● 350 | 3,4/2,8 | 32 | 108 TFN | UNI 2 | ✓ | - | 113,70 |
| 11 1100 350 060 | ● 350 | 3,4/2,8 | 40 | 84 TFN | 2-9-55+4-12-64 | ✓ | - | 104,65 |
| 11 1100 350 070 | ● 350 | 3,4/2,8 | 40 | 108 TFN | 2-9-55+4-12-64 | ✓ | - | 123,60 |
| 11 1100 350 080 | ● 350 | 3,4/2,8 | 50 | 84 TFN | 4-15-80 | ✓ | - | 104,65 |
| 11 1100 350 090 | ● 350 | 3,4/2,8 | 50 | 108 TFN | 4-15-80 | ✓ | - | 121,45 |
| 11 1100 370 010 | ● 370 | 3,6/3,0 | 30 | 90 TFN | UNI 1 + UNI 2 | ✓ | - | 131,00 |
| 11 1100 370 020 | ● 370 | 3,6/3,0 | 30 | 108 TFN | UNI 1 + UNI 2 | ✓ | - | 142,15 |
| 11 1100 380 010 | ● 380 | 3,8/3,2 | 32 | 90 TFN | UNI 2 | ✓ | - | 131,00 |
| 11 1100 380 020 | ● 380 | 3,8/3,2 | 32 | 110 TFN | UNI 2 | ✓ | - | 130,75 |
| 11 1100 380 030 | ● 380 | 3,8/3,2 | 32 | 132 TFN | UNI 2 | ✓ | - | 172,95 |
| 11 1100 400 010 | ● 400 | 3,8/3,2 | 30 | 96 TFN | UNI 1 + UNI 2 | ✓ | ✓ | 151,30 |
| 11 1100 400 020 | ● 400 | 3,8/3,2 | 30 | 108 TFN | UNI 1 + UNI 2 | ✓ | ✓ | 163,90 |
| 11 1100 400 030 | ● 400 | 3,8/3,2 | 30 | 120 TFN | UNI 1 + UNI 2 | ✓ | ✓ | 171,15 |
| 11 1100 400 040 | ● 400 | 3,8/3,2 | 32 | 96 TFN | UNI 2 | ✓ | ✓ | 140,70 |
| 11 1100 400 050 | ● 400 | 3,8/3,2 | 32 | 108 TFN | UNI 2 | ✓ | ✓ | 163,90 |
| 11 1100 400 060 | ● 400 | 3,8/3,2 | 32 | 120 TFN | UNI 2 | ✓ | ✓ | 171,15 |
| 11 1100 400 070 | ● 400 | 3,8/3,2 | 40 | 96 TFN | 4-12-64+2-15-80 | ✓ | ✓ | 151,30 |
| 11 1100 400 080 | ● 400 | 3,8/3,2 | 40 | 120 TFN | 4-12-64+2-15-80 | ✓ | ✓ | 171,15 |
| 11 1100 400 090 | ● 400 | 3,8/3,2 | 50 | 96 TFN | 4-15-80 | ✓ | ✓ | 151,30 |
| 11 1100 400 100 | ● 400 | 3,8/3,2 | 50 | 120 TFN | 4-15-80 | ✓ | ✓ | 171,15 |
| 11 1100 420 010 | ● 420 | 4,0/3,2 | 30 | 96 TFN | | ✓ | ✓ | 152,50 |
| 11 1100 420 020 | ● 420 | 4,0/3,2 | 30 | 108 TFN | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 162,35 |
| 11 1100 420 030 | ● 420 | 4,0/3,2 | 30 | 120 TFN | | ✓ | ✓ | 160,25 |
| 11 1100 420 040 | ● 420 | 4,0/3,2 | 40 | 96 TFN | 4-12-64+2-15-80 | ✓ | ✓ | 141,80 |
| 11 1100 420 050 | ● 420 | 4,0/3,2 | 40 | 108 TFN | 4-12-64+2-15-80 | ✓ | ✓ | 162,35 |
| 11 1100 420 060 | ● 420 | 4,0/3,2 | 40 | 120 TFN | 4-12-64+2-15-80 | ✓ | ✓ | 172,30 |
| 11 1100 450 010 | ● 450 | 4,0/3,2 | 30 | 108 TFN | | ✓ | ✓ | 161,10 |
| 11 1100 450 020 | ● 450 | 4,0/3,2 | 30 | 128 TFN | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 180,30 |
| 11 1100 500 010 | ● 500 | 4,2/3,6 | 30 | 120 TFN | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 186,90 |
| 11 1100 500 020 | ● 500 | 4,2/3,6 | 30 | 140 TFN | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 215,40 |
| 11 1100 520 010 | ● 520 | 4,2/3,6 | 30 | 120 TFN | - | ✓ | ✓ | 263,55 |
| 11 1100 550 010 | ● 550 | 4,4/3,8 | 30 | 108 TFN | | ✓ | ✓ | 255,90 |
| 11 1100 550 020 | ● 550 | 4,4/3,8 | 30 | 132 TFN | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 286,60 |
| 11 1100 600 010 | ● 600 | 4,6/4,0 | 30 | 140 TFN | UNI 1 + UNI 2 | ✓ | ✓ | 360,15 |
| - | ○ 1000 | - | - | - | - | bis Ø 1000 mm auf Anfrage erhältlich up to Ø 1000 mm available on request | | |

● Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

UNI 1 = 2-7-42 + 2-9-46,40 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64

Weitere Aluminium Negativ-Blätter siehe S. 921/931 · More Aluminum Negativ blades see page 921/931



11 1120

Fensterprofile & Kunststoffe. Negativer Spanwinkel / Dünnschnitt
Window profiles & plastics. Negative hook angle / Thin-cut



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |

ANWENDUNG · APPLICATION

Für Trenn- und Gehrungsschnitte in dünnwandige Platten und Hohlprofile, z.B. Fensterprofile aus PVC, glasfaserverstärkt mit und ohne Gummidichtung. (Durch negativen Spanwinkel vorzugsweise für manuellen Vorschub. Auch automatischer Vorschub möglich).

Durch dünne Schnittbreite wenig Kraftaufwand und Verschnitt. Daher auch ideal für Akku-Maschinen.

Achswinkel-Blätter für nahezu gratfreie, sauberste Schnitte und höchste Standzeiten in Fensterprofile aus PVC (auch glasfaserverstärkt-GFK)

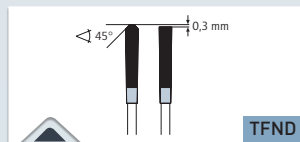
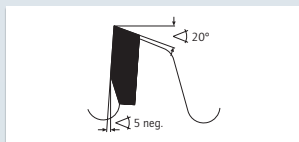
SPEZIELL MIT GUMMIDICHTUNG siehe Art 11 1320, Seite 935

For sizing cuts and mitre cuts in thin-walled boards and hollow profiles, e.g. window profiles made of PVC, also glass fibre reinforced (GRP) with and without rubber seal. (Negative hook angle preferably for manual feed. Automatic feed also possible).

Due to the small cutting width less cutting pressure and waste. Therefore ideal also for Battery-Powered machines.

Axial-Angle blades for virtually burr-free, cleanest cuts and longest service life in window profiles made of PVC (also glass fiber reinforced-GRP)

SPECIFICALLY WITH RUBBER SEAL see Art. 11 1320, Page 935



- > Trapez-Flachzahn Negativ Dünn
- > Triple-chip / flat tooth negative thin-cut

MASCHINE · MACHINE




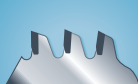



Kappkreissägen, Gehrungs- und Doppelgehrungssägen, CNC-Bearbeitungszentren, Radialarmsägen, Tisch- und Formatkreissägen, Abläng- und Kappsägen, Handkreissägen, Tauchsägen, akkubetriebene Maschinen.

Automatic cross-cut saws, Mitre and double mitre saws, CNC-machining centers, Table and sizing saws, Panel saws, Radial arm saws, Portable machines, Battery-driven saws.



Fensterprofile & Kunststoffe. Negativer Spanwinkel / Dünnschnitt
Window profiles & plastics. Negative hook angle / Thin-cut

11 1120

| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|--|---|---|--------|
| 11 1120 120 010 | • 120 | 2,2/1,6 | 20 | 36 TFND | - | - | - | 42,35 |
| 11 1120 136 010 | • 136 | 2,2/1,6 | 20/10 | 40 TFND | 2-6-32 | - | - | 43,50 |
| 11 1120 150 010 | • 150 | 2,4/1,6 | 20/16 | 42 TFND | 2-6-32 | - | - | 44,05 |
| 11 1120 160 010 | • 160 | 2,4/1,8 | 20/16 | 42 TFND | 2-6-32 | - | - | 45,50 |
| 11 1120 160 020 | • 160 | 2,2/1,6 | 20/16 | 60 TFND | 2-6-32 | - | - | 60,50 |
| 11 1120 160 030 | • 160 | 2,4/1,8 | 30 | 42 TFND | UNI 1 | - | - | 44,65 |
| 11 1120 170 010 | • 170 | 2,4/1,8 | 30 | 48 TFND | UNI 1 | - | - | 49,55 |
| 11 1120 180 010 | • 180 | 2,4/1,8 | 30 | 48 TFND | UNI 1 | - | - | 49,55 |
| 11 1120 180 020 | • 180 | 2,2/1,6 | 30 | 64 TFND | UNI 1 | - | - | 64,50 |
| 11 1120 185 010 | % 185 | 2,2/1,6 | 20/16 | 64 TFND | 2-6-32 | ✓ | - | 24,36 |
| 11 1120 190 010 | • 190 | 2,4/1,8 | 30 | 54 TFND | UNI 1 | - | - | 54,40 |
| 11 1120 190 020 | • 190 | 2,2/1,6 | 30 | 68 TFND | UNI 1 | - | - | 68,65 |
| - | • 200 | 2,2/1,8 | 20 | 100 TFND | Siehe/See Art. 11 1150, Seite/Page 1039 | | - | - |
| 11 1120 200 010 | • 200 | 2,4/1,8 | 30 | 54 TFND | UNI 1 | - | - | 54,90 |
| 11 1120 200 020 | • 200 | 2,2/1,6 | 30 | 68 TFND | UNI 1 | ✓ | - | 69,60 |
| - | • 200 | 2,2/1,8 | 30 | 100 TFND | Siehe/See Art. 11 1150, Seite/Page 1039 | | - | - |
| - | • 200 | 2,2/1,8 | 32 | 100 TFND | Siehe/See Art. 11 1150, Seite/Page 1039 | | - | - |
| 11 1120 210 010 | • 210 | 2,4/1,8 | 30 | 54 TFND | UNI 1 | - | - | 55,60 |
| 11 1120 210 020 | • 210 | 2,2/1,6 | 30 | 72 TFND | UNI 1 | - | - | 74,05 |
| 11 1120 216 010 | • 216 | 2,4/1,8 | 30 | 60 TFND | UNI 1 | - | - | 61,25 |
| 11 1120 216 020 | • 216 | 2,2/1,6 | 30 | 80 TFND | UNI 1 | - | - | 81,75 |
| 11 1120 220 010 | • 220 | 2,4/1,8 | 30 | 64 TFND | UNI 1 | - | - | 63,05 |
| 11 1120 220 020 | • 220 | 2,2/1,6 | 30 | 80 TFND | UNI 1 | - | - | 81,75 |
| 11 1120 225 010 | • 225 | 2,4/1,8 | 30 | 64 TFND | UNI 1 | - | - | 63,05 |
| 11 1120 225 020 | • 225 | 2,2/1,6 | 30 | 80 TFND | UNI 1 | - | - | 81,75 |
| 11 1120 230 010 | • 230/235 ● | 2,4/1,8 | 30 | 64 TFND | UNI 1 | - | - | 63,05 |
| 11 1120 230 020 | • 230/235 ● | 2,2/1,6 | 30 | 80 TFND | UNI 1 | - | - | 81,75 |
| 11 1120 240 010 | % 240 | 2,2/1,8 | 30 | 80 TFND | UNI 1 | - | - | 30,44 |
| 11 1120 250 010 | • 250 | 2,8/2,2 | 30 | 80 TFND | UNI 1 + UNI 2 | ✓ | - | 81,95 |
| 11 1120 250 020 | • 250 | 2,2/1,8 | 30 | 100 TFND | UNI 1 + UNI 2 | ✓ | - | 108,20 |
| 11 1120 250 030 | • 250 | 2,2/1,8 | 32/30 | 120 TFND | UNI 2 | ✓ | - | 149,00 |
| 11 1120 260 010 | • 260 | 2,4/1,8 | 30 | 68 TFND | UNI 1 + UNI 2 | ✓ | - | 82,60 |
| 11 1120 260 020 | • 260 | 2,4/1,8 | 30 | 100 TFND | UNI 1 + UNI 2 | ✓ | - | 117,05 |
| 11 1120 270 010 | • 270 | 2,4/1,8 | 30 | 80 TFND | UNI 1 + UNI 2 | ✓ | - | 88,35 |
| 11 1120 270 020 | % 270 | 2,4/1,8 | 30 | 100 TFND | UNI 1 + UNI 2 | ✓ | - | 44,50 |
| 11 1120 300 010 | • 300 | 2,4/1,8 | 30 | 120 TFND | UNI 1 + UNI 2 | ✓ | - | 128,25 |
| 11 1120 305 010 | • 305 | 2,6/2,0 | 30 | 80 TFND | UNI 1 + UNI 2 | ✓ | - | 98,50 |
| 11 1120 305 020 | • 305 | 2,4/1,8 | 30 | 120 TFND | UNI 1 + UNI 2 | ✓ | - | 128,25 |
| 11 1120 330 010 | • 330 | 2,4/1,8 | 30 | 96 TFND | UNI 1 + UNI 2 | ✓ | - | 136,25 |
| 11 1120 330 020 | % 330 | 2,4/1,8 | 30 | 120 TFND | UNI 1 + UNI 2 | ✓ | - | 54,28 |
| 11 1120 330 030 | • 330 | 2,4/1,8 | 32 | 96 TFND | UNI 2 | ✓ | - | 136,25 |
| 11 1120 330 040 | % 330 | 2,4/1,8 | 32 | 120 TFND | UNI 2 | ✓ | - | 54,28 |
| 11 1120 350 010 | • 350 | 2,4/1,8 | 30 | 120 TFND | UNI 1 + UNI 2 | ✓ | - | 151,95 |
| 11 1120 400 010 | • 400 | 3,1/2,5 | 30 | 130 TFND | UNI 1 + UNI 2 | ✓ | ✓ | 170,40 |
| 11 1120 420 010 | • 420 | 3,4/2,8 | 30 | 132 TFND | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 195,35 |
| 11 1120 450 010 | • 450 | 3,4/2,8 | 30 | 138 TFND | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 202,85 |
| 11 1120 500 010 | • 500 | 3,4/2,8 | 30 | 144 TFND | - | ✓ | ✓ | 224,50 |
| 11 1120 550 010 | • 550 | 3,6/3,0 | 30 | 160 TFND | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 309,80 |
| - | ○ 1000 | - | - | - | - | bis Ø 1000 mm auf Anfrage erhältlich up to Ø 1000 mm available on request | | - |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

● Gefertigt/Manufactured 232,50 mm

UNI 1 = 2-7-42 + 2-9-46,40 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64

1



2



3



4



5



6



7



8



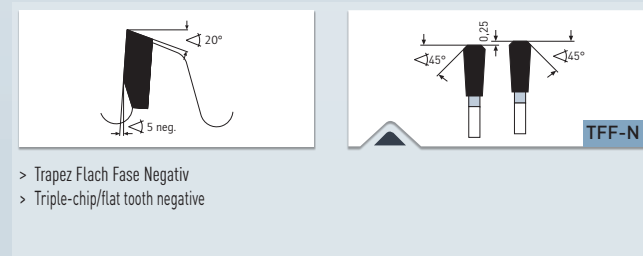
9



Index

11 1130

Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/Dünnschnitt · Negativ
Hard plastics · Abrasive materials · Finishing-cut/Thin-cut · Negative



MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Tisch- und Formatkreissägen, Plattenaufteilsägen, Kappsägen, Akkusägen

For portable circular saws, bench- and sizing saws, panel sizing saws, cross-cut saws, cordless saws.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Dünnebleche, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Dünne Profile aus Ne-Metall wie Alu, Messing, Kupfer | Thin profiles made of non ferrous materials like alu, copper, brass |

ANWENDUNG · APPLICATION

Durch spezielles Hartmetall/Zahnform ideal für Fertigschnitte in dünnen Platten und Profilmaterial aus harten Kunststoffen (Thermoplaste) wie: PVC, PE, PA, ABS, PS, POM PC, PMMA (Acrylglas). z.B. Hohlkammerplatten aus PMMA (Acrylglas).

Ebenfalls gut bei abrasiven, zu hohen Schneidenverschleiß führenden Materialien wie: GFK, CFK, Zementplatten, Gipsfaserplatten, Eternit.

Ebenfalls exzellent geeignet für Sandwichmaterialien mit dünnen Deckschichten. Maximale Deckschichtdicke Nicht-Eisen-Metalle / Kunststoffe = 1,0 mm
Maximale Deckschichtdicke Eisenblech = 0,3 mm
Hervorragend auch für dünne Profile bis 1 mm Wandstärke aus Nicht-Eisen-Metalle, wie Alu, Kupfer, Messing.

Durch dünne Schnittbreite wenig Kraftaufwand und Verschnitt. Daher auch ideal für Akku-Maschinen.

Due to special carbide / tooth geometry excellent for finishing cuts in thin plates and profiles made of hard plastics (thermoplastics) such as: PVC, PE, PA, ABS, PS, POM PC, PMMA e.g. hollow section boards of PMMA (acrylic glass).

Also good for abrasive, heavy machining and abrading materials such as: GFK, CFK, fibre cement panels, gypsum, fibre boards, eternit.

Also excellent for sandwich materials with thin layers. Maximum layer thickness for non-ferrous-metals / plastics = 1,0 mm
Maximum layer thickness iron sheet metal = 0,3 mm
Excellent also for thin profiles up to 1 mm thickness made of non-ferrous metal such as aluminum, copper, brass.




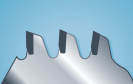


Due to thin cutting width little cutting pressure and waste of material. Therefore also ideal for cordless machines.

Film
Movie



Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/Dünnschnitt · Negativ
Hard plastics · Abrasive materials · Finishing-cut/Thin-cut · Negative

11 1130

| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|--|---|---|--------|
| 11 1130 120 010 | • 120 | 1,8/1,2 | 20 | 48 TFF-N | - | - | - | 50,90 |
| 11 1130 136 010 | • 136 | 1,8/1,2 | 20/10 | 56 TFF-N | 2-6-32 | - | - | 59,35 |
| 11 1130 160 010 | • 160 | 1,8/1,2 | 20/16 | 64 TFF-N | 2-6-32 | - | - | 68,65 |
| 11 1130 190 010 | • 190 | 1,8/1,2 | 30 | 72 TFF-N | UNI 1 | - | - | 77,35 |
| 11 1130 200 010 | • 200 | 2,0/1,4 | 30 | 100 TFF-N | UNI 1 | - | - | 101,25 |
| 11 1130 210 010 | • 210 | 2,0/1,4 | 30 | 100 TFF-N | UNI 1 | - | - | 106,05 |
| 11 1130 216 010 | • 216 | 2,0/1,4 | 30 | 100 TFF-N | UNI 1 | - | - | 107,40 |
| 11 1130 230 010 | • 230/235 | 2,0/1,4 | 30 | 108 TFF-N | UNI 1 | - | - | 115,75 |
| 11 1130 250 010 | • 250 | 2,2/1,8 | 30 | 120 TFF-N | UNI 1 + UNI 2 | ✓ | - | 131,85 |
| 11 1130 260 010 | • 260 | 2,2/1,8 | 30 | 120 TFF-N | UNI 1 + UNI 2 | ✓ | - | 129,55 |
| 11 1130 300 010 | • 300 | 2,4/1,8 | 30 | 128 TFF-N | UNI 1 + UNI 2 | ✓ | - | 146,40 |
| 11 1130 305 010 | • 305 | 2,4/1,8 | 30 | 128 TFF-N | UNI 1 + UNI 2 | ✓ | - | 146,85 |
| 11 1130 330 010 | • 330 | 2,4/1,8 | 30 | 132 TFF-N | UNI 1 + UNI 2 | ✓ | - | 174,95 |
| 11 1130 350 010 | • 350 | 2,4/1,8 | 30 | 132 TFF-N | UNI 1 + UNI 2 | ✓ | - | 175,65 |
| 11 1130 350 020 | • 350 | 2,4/1,8 | 32 | 132 TFF-N | UNI 2 | ✓ | - | 175,65 |
| 11 1130 380 010 | • 380 | 2,4/1,8 | 32 | 132 TFF-N | UNI 2 | ✓ | - | 180,25 |
| 11 1130 400 010 | • 400 | 3,1/2,5 | 30 | 138 TFF-N | UNI 1 + UNI 2 | ✓ | ✓ | 201,60 |
| 11 1130 400 020 | • 400 | 3,1/2,5 | 32 | 138 TFF-N | UNI 2 | ✓ | ✓ | 201,60 |
| 11 1130 420 010 | • 420 | 3,4/2,8 | 30 | 138 TFF-N | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 225,50 |
| 11 1130 420 020 | • 420 | 3,4/2,8 | 40 | 138 TFF-N | 4-12-64 + 2-15-80 | ✓ | ✓ | 225,50 |
| 11 1130 450 010 | • 450 | 3,4/2,8 | 30 | 144 TFF-N | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 255,05 |
| 11 1130 500 010 | • 500 | 3,4/2,8 | 30 | 148 TFF-N | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 285,10 |

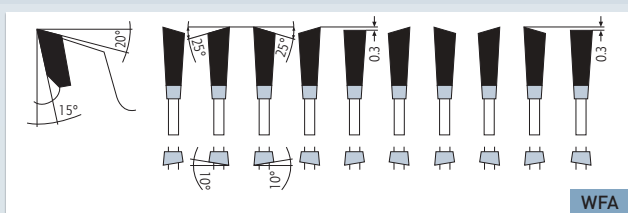
• Gefertigt/Manufactured 232,50 mm

UNI 1 = 2-7-42 + 2-9-46,40 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64



11 1320

Fensterprofile mit Gummidichtung & Kunststoffe
Window profiles with rubber seal & plastics



- > Wechselzahn/Flachzahn mit Achswinkel
- > Alternate top bevel / flat tooth with axial angle

MASCHINE · MACHINE

Plattenaufteilsägen vertikal, Formatkreissägen, Doppelgehrungssägen, BAZ mit Sägeaggregat, mechanische Kappsägemaschinen, Unterflurkappsägemaschinen, CNC-Bearbeitungszentren.

Vertical panel sizing saws, trimming saws, double mitre saws, mechanical chop saws, under frame mounted chop saws, machining centers with saw aggregate.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Furniere | Veneers |
| ✓ | | Profileleisten | Profiled wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |

ANWENDUNG · APPLICATION

Für **hervorragende, ausrissfreie Schnittqualität** bei Trenn- und Gehrungsschnitten in dünnwandige Hohlprofile und Platten aus Kunststoff, z.B. Fensterprofile aus PVC (Polyvinylchlorid). Durch die aggressive Spezialgeometrie werden selbst die eingezogenen Gummidichtungen bei Fensterprofilen **ohne auszufransen** sauber durchtrennt.

Hervorragende und ausrissfreie Schnittqualität ebenfalls bei kunststoffummantelte oder furnierte Leisten und Türzagen, Folien aus PVC auf Rollen, bedruckte Dekorpaneele, Dekor Finish Folien, Holzwerkstoffe auch mit dicken Deckschichten, Massivholz quer. Auch gute Ergebnisse beim Sägen von Kunststoffen mit hohen Glasfaser-/Kohlefaseranteile (GFK/CFK)

Hervorragende Ergebnisse auch bei Fensterprofilen aus Faserverbundstoffe. Z.B. von Firma REHAU Geneo-Fenster aus RAU-RIBRO®

Excellent, splinter-free finishing-cut quality. For sizing and mitre cuts in thin-walled hollow profiles and boards of plastic, e.g. window profiles of PVC (Polyvinyl Chloride). Due to the aggressive cutting geometry even the rubber seals in window profiles will be **cut without fraying**.

Excellent and splinter-free finishing-cut quality also in plastic profiles/door frames veneered of foil-sheathed, sizing films on rolls of PVC, printed decorative (AC) paper, decor finish films, wooden based materials including material with very thick top layers and solid wood across the grain. Also good cutting results in glass fibre and carbon fibre reinforced plastics (GRP, CFK)

Excellent results in window profiles made of fiber composites. For example from company REHAU Geneo-windows made of RAU-FIBRO®

Film
Movie



Fensterprofile mit Gummidichtung & Kunststoffe
Window profiles with rubber seal & plastics

11 1320

| Art. |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|--|---|--------|
| 11 1320 200 010 | • 200 | 3,0/2,2 | 30 | 60 WFA | 2-6,2-42 + 4-6-52 + 4-6,6-60 | - | 136,20 |
| 11 1320 220 010 | • 220 | 3,0/2,2 | 30 | 70 WFA | UNI | - | 54,04 |
| 11 1320 250 010 | • 250 | 3,0/2,2 | 30 | 80 WFA | UNI | ✓ | 157,05 |
| 11 1320 303 010 | • 303 | 3,0/2,2 | 30 | 100 WFA | UNI | ✓ | 190,45 |
| 11 1320 350 010 | • 350 | 3,0/2,2 | 30 | 100 WFA | UNI | ✓ | 209,65 |
| 11 1320 400 010 | • 400 | 3,0/2,2 | 30 | 120 WFA | UNI | ✓ | 255,05 |
| 11 1320 450 010 | • 450 | 3,6/2,8 | 30 | 130 WFA | UNI | ✓ | 285,00 |
| 11 1320 500 010 | • 500 | 3,6/2,8 | 30 | 140 WFA | UNI | ✓ | 315,90 |

🏷️ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.
UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Kunststoffe, Massivholz und Gummidichtungen ausrissfrei Sägen.

(Siehe Art. 11 1320)

Splinter and fraying free cutting in plastics, solid wood and window rubber seals.

(See Art. 11 1320)



POWER.
PRECISION.
PERFORMANCE.

11 1320



Karnasch®
PROFESSIONAL TOOLS

1



2



3



4



5



6



7



8

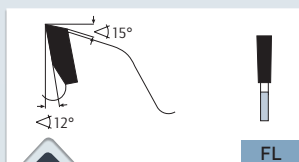


9

Index

11 1350

Diamant Universal
Diamond Universal



> Flachzahn
> Flat tooth

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Tisch- und Formatkreissägen

For hand-held circular saws, mitre saws, cross-cut saws, table and sizing saws

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Gasbetonsteine | Autoclaved aerated concrete blocks |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |

ANWENDUNG · APPLICATION

Durch DP (Polykristalliner Diamant) Zähne ideal für Zuschnitte sowie Formatschnitte in extrem abrasive, zu hohen Schneidenverschleiß führenden Materialien wie: Corian, Trespa, Laminat, MDF, Gips- und Zementgebundene Platten (Faserzement), Steinwollplatten, Heraklith, Eternit.

Blätter mit niedriger Zahnzahl wie: 160 mm mit 4 Zähnen, 190 mm mit 6 Zähnen, 230 mm mit 6 Zähnen, 250 mm mit 6 Zähnen und 300 mm mit 8 Zähnen, sind speziell geeignet für Gips- und Zementgebundene Platten. (Faserzement)

Speziell hervorragend ebenfalls für Duroplaste wie: Glasfaserverstärkte sowie Kohlefaserverstärkte Kunststoffe (GFK, CFK), Carbon, Aramidfaserkunststoffe (AFK) HP, HPL, PUR.

Niedere Zahnreihe für Zuschnitte, höhere Zahnreihe für Formatschnitte. Achtung: Kein Fertigschnitt-Blatt (DP-Bestückung = 4 mm). Fertigschnitt-Blätter siehe Art. 11 1370 Seite 939

Due to DP (Polycrystalline Diamond) teeth excellent for sizing, formatting, cross cuts in extreme abrasive, heavy machining and abrading materials such as: Corian, Trespa, laminates, MDF, gypsum and cement-bonded boards (fiber cement), Rockwool boards, Heraklith products, Eternit.

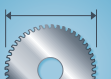





Circular saws with the lowest number of teeth as: 160 mm with 4 teeth, 190 mm with 6 teeth, 230 mm with 6 teeth, 250 mm with 6 teeth and 300 mm with 8 teeth, are specially designed for gypsum and cement-bonded panels (fiber cement).

Also excellent for Duroplastic materials such as: Glas fibre plastic (GFK), Carbon fibre plastic (CFK), Carbon, Aramid fibre plastic (AFK), HP, HPL, PUR.

Lower tooth row for sizing, higher tooth row for format cuts. Attention: no finishing cut blade (DP-Tip height = 4 mm). Finishing cut-blades see Art. 11 1370 page 939

Film
Movie



| Art. |  |  |  |  |  |  | € |
|----------------------------|---|---|---|---|---|---|--------|
| NEW 11 1350 120 010 | • 120 | 2,2/1,6 | 20 | 6 FL | - | ✓ | 44,15 |
| NEW 11 1350 136 010 | • 136 | 2,2/1,6 | 20 | 6 FL | 2-6-32 | ✓ | 47,00 |
| 11 1350 160 005 | • 160 | 2,2/1,6 | 20/16 | 4 FL | 2-6-32,5 | ✓ | 39,70 |
| 11 1350 160 010 | • 160 | 2,2/1,6 | 20/16 | 8 FL | 2-6-32,5 | ✓ | 78,05 |
| 11 1350 160 020 | • 160 | 2,2/1,6 | 20/16 | 30 FL | 2-6-32,5 | ✓ | 231,50 |
| 11 1350 180 010 | • 180 | 2,2/1,6 | 30/20 | 8 FL | 2-7-42 | ✓ | 78,55 |
| 11 1350 190 005 | • 190 | 2,2/1,6 | 30/20 | 6 FL | 2-7-42 | ✓ | 27,45 |
| 11 1350 190 010 | • 190 | 2,2/1,6 | 30/20 | 8 FL | 2-7-42 | ✓ | 79,10 |
| NEW 11 1350 190 015 | • 190 | 2,2/1,6 | 30/20 | 12 FL | 2-7-42 | ✓ | 86,35 |
| 11 1350 190 020 | • 190 | 2,2/1,6 | 30/20 | 30 FL | 2-7-42 | ✓ | 249,60 |
| NEW 11 1350 210 005 | • 210 | 2,2/1,6 | 30 | 8 FL | UNI | ✓ | 81,15 |
| 11 1350 210 010 | • 210 | 2,2/1,6 | 30 | 12 FL | UNI | ✓ | 111,10 |
| 11 1350 210 020 | • 210 | 2,2/1,6 | 30 | 30 FL | UNI | ✓ | 279,05 |
| 11 1350 216 005 | • 216 | 2,2/1,6 | 30 | 8 FL | UNI | ✓ | 81,25 |
| 11 1350 216 010 | • 216 | 2,2/1,6 | 30 | 12 FL | UNI | ✓ | 113,25 |
| 11 1350 216 020 | • 216 | 2,2/1,6 | 30 | 30 FL | UNI | ✓ | 279,05 |
| 11 1350 230 005 | • 230 | 2,4/1,8 | 30 | 6 FL | UNI | ✓ | 32,20 |
| NEW 11 1350 230 007 | • 230 | 2,4/1,8 | 30 | 8 FL | UNI | ✓ | 84,00 |
| 11 1350 230 010 | • 230 | 2,4/1,8 | 30 | 15 FL | UNI | ✓ | 148,30 |
| 11 1350 230 020 | • 230 | 2,4/1,8 | 30 | 30 FL | UNI | ✓ | 279,05 |
| 11 1350 250 005 | • 250 | 2,4/1,8 | 30 | 6 FL | UNI | ✓ | 32,95 |
| NEW 11 1350 250 007 | • 250 | 2,4/1,8 | 30 | 8 FL | UNI | ✓ | 91,65 |
| 11 1350 250 010 | • 250 | 2,4/1,8 | 30 | 16 FL | UNI | ✓ | 164,85 |
| NEW 11 1350 250 015 | • 250 | 2,4/1,8 | 30 | 28 FL | UNI | ✓ | 172,00 |
| 11 1350 250 020 | • 250 | 2,4/1,8 | 30 | 40 FL | UNI | ✓ | 375,65 |
| NEW 11 1350 250 030 | • 250 | 2,4/1,8 | 30 | 48 FL | UNI | ✓ | 382,65 |
| 11 1350 300 005 | • 300 | 2,6/2,0 | 30 | 8 FL | UNI | ✓ | 88,25 |
| NEW 11 1350 300 015 | • 300 | 2,6/1,8 | 30 | 18 FL | UNI | ✓ | 140,30 |
| 11 1350 300 020 | • 300 | 2,6/2,0 | 30 | 36 FL | UNI | ✓ | 360,15 |
| 11 1350 300 030 | • 300 | 2,6/2,0 | 30 | 48 FL | UNI | ✓ | 468,15 |
| 11 1350 300 040 | • 300 | 2,6/2,0 | 30 | 60 FL | UNI | ✓ | 609,20 |
| NEW 11 1350 350 002 | • 350 | 2,8/2,2 | 30 | 10 FL | UNI | ✓ | 122,15 |
| NEW 11 1350 350 004 | • 350 | 2,8/2,2 | 30 | 24 FL | UNI | ✓ | 222,15 |
| NEW 11 1350 350 006 | • 350 | 2,8/2,2 | 30 | 36 FL | UNI | ✓ | 367,95 |
| NEW 11 1350 350 008 | • 350 | 2,8/2,2 | 30 | 48 FL | UNI | ✓ | 390,00 |
| 11 1350 350 010 | • 350 | 2,8/2,2 | 30 | 60 FL | UNI | ✓ | 649,50 |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last. · UNI = 2-7-42 + 2-9-46,40 + 2-10-60



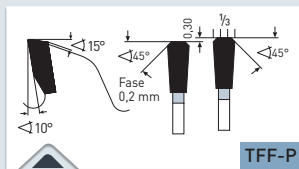
11 1370

Diamant · Formatieren · Fertigschnitt · Harte Kunststoffe · Abrasive Werkstoffe
Diamond · Panel-sizing · Finishing cut · Hard plastics · Abrasive Materials



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|---|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoff- platten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineral- werkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |



TFF-P

- > Trapez-Flachzahn (mit beidseitiger Schutzfase)
- > Triple-chip/flat tooth (with protective chamfer on both sides)

MASCHINE · MACHINE

Für Formatkreissägen, Plattensägen, Tischkreissägen

For sizing saws, panel saws, bench saws



ANWENDUNG · APPLICATION

Durch DP (Polykristalliner Diamant) Zähne extrem lange Standzeiten gegenüber Hartmetall-bestückte Kreissägeblätter. Ideal für Zuschnitte sowie Formatschnitte in extrem abrasive, zu hohen Schneidenschleiß führenden Materialien wie: Corian, Trespa, Laminat, MDF, Gips- und Zementgebundene Platten, Steinwollplatten, Heraklith, Eternit.

Speziell hervorragend ebenfalls für Duroplaste wie: Glasfaserverstärkte sowie Kohlefaserverstärkte Kunststoffe (GFK, CFK), Carbon, Aramidfaserkunststoffe (AFK) HP, HPL, PUR.

Weiterhin hervorragend für Fertigschnitte in thermoplastische Vollplatten (Acrylglas, PMMA, Polyäthylen, Polyamid usw.) sowie duroplastische Vollplatten (Schichtstoffe, HPL, Hartpapier, Trespa, Resopal, Multiplex). Weiterhin für Polymergebundene Kunststoffe, Mineralwerkstoffe wie Corian, Noblan, Hi-Macs, Staron, Rausolid usw.

Hervorragend ebenfalls für Fertigschnitte in beidseitig kunststoffbeschichteten Plattenwerkstoffe, vorzugsweise in Verbindung mit Vorritzer. Ideal auch zum Schneiden von Kunststoff-Profilen.

Due to DP (Polycrystalline Diamond) teeth extremely long tool life compared to carbide tipped circular saws. Excellent for sizing, formatting, cross cuts in extreme abrasive, heavy machining and abrading materials such as: Corian, Trespa, laminates, MDF, gypsum and cement-bonded boards, Rockwool boards, Heraklith products, Eternit.

Also excellent for Duroplastic materials such as: Glas fibre plastic (GFK), Carbon fibre plastic (CFK), Carbon, Aramid fibre plastic (AFK), HP, HPL, PUR.

For finishing cuts in solid thermoplastic boards (PMMA, acrylic glass, polyethylene, polyamide etc.) and solid duroplastic boards (HPL-high-pressure-laminate, HP-Hardpaper, phenolic resin bonded paper, phenolic laminated cotton sheets, Trespa, Resopal, Multiplex). Also for polymerbound plastics, mineral materials such as Corian, Noblan, Hi-Macs, Staron, Rausolid etc.




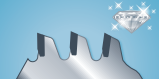


Excellent also for finishing cuts in double-side plastic coated boards, preferably in combination with coring sawblades. Ideal also for cutting plastic profiles.

Film
Movie



Diamant · Formatieren · Fertigschnitt · Harte Kunststoffe · Abrasive Werkstoffe
Diamond · Panel-sizing · Finishing cut · Hard plastics · Abrasive Materials

11 1370

| Art. |  |  |  |  |  |  | DP-Bestückungshöhe DP-Tip high | € |
|-----------------|---|---|---|---|--|---|-----------------------------------|--------|
| 11 1370 250 020 | 250 | 3,2/2,2 | 30 | 80 TFF-P | UNI | ✓ | 5 mm | 465,02 |
| 11 1370 303 030 | 303 | 3,2/2,2 | 30 | 96 TFF-P | UNI | ✓ | 4 mm | 553,68 |

⊘ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

UNI = 2-7-42 + 2-9-46,40 + 2-10-60



Bei Kunststoff/Melamin beschichtete Plattenwerkstoffe Vorritzen empfohlen. Ritzer siehe Seite 983/1037. Sägen von beschichteten/furnierten Plattenwerkstoffe ohne Vorritzer siehe Seite 935, 1005, 1007, 1009, 1011, 1012

For plastic coated/melamine boards scoring recommended. Scorer see page 983/1037. Cutting of coated/veneered boards without scorer see page 935, 1005, 1007, 1009, 1011, 1012

1



2



3



4



5



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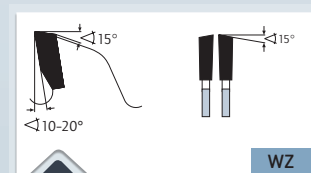
9



Index

11 1425

Kunststoffe · Profile · Furniere/Dünnschnitt
Plastics · Profiles · Veneers/Thin-cut



- > Wechselzahn
- > Alternative top bevel

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Tisch- und Formatkreissägen, Plattenaufteilsägen, Kappsägen, Akkusägen

For portable circular saws, table- and sizing saws, panel sizing saws, cross-cut saws, cordless saws.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Furniere | Veneers |
| ✓ | | Profileleisten | Profiled wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |

ANWENDUNG · APPLICATION

Durch dünne Schnittbreite ideal auch für Akkumaschinen und für teure Edelhölzer, Furniere und Leisten, da wenig Verschnitt und Schnittdruck/Akkuverbrauch.

Niedere Zähnezahl: Grobe bis mittlere Schnittqualität in alle Holzwerkstoffe, Edelhölzer und Massivholz längs und quer, Plattenwerkstoffe einseitig furniert oder Kunststoff beschichtet, Hartgewebe, Hartpapier, dickere Kunststoffprofile und Platten (Thermoplaste) hoher Vorschub möglich.

Mittlere Zähnezahl: Gute Schnittqualität in alle Holzwerkstoffe, Edelhölzer, Massivholz und Leisten längs und quer, Plattenwerkstoffe einseitig/zweiseitig furniert oder Kunststoff beschichtet, Hartgewebe, Hartpapier, Furnier und Furnierpakete sowie Kunststoffprofile und Platten (Thermoplaste, Duroplaste).

Hohe Zähnezahl: Sehr gute Schnittqualität in alle Holzwerkstoffe, Edelhölzer, Massivholz und Leisten vorzugsweise Querschnitte. Plattenwerkstoffe zweiseitig furniert oder Kunststoff beschichtet, Hartgewebe, Hartpapier, Furnier und Furnierpakete sowie Kunststoffprofile und Platten (Thermoplaste, Duroplaste).

Durch spezielles Hartmetall sehr gut zum Sägen harter Thermoplaste wie z.B. dünne Platten, Hohlkammerplatten aus PC (Polycarbonat), PMMA (Acrylglas-Plexiglas) Siehe hierzu auch Artikel 11 1430 Seite 943

Due to thin-cut also ideal for battery machines and for cutting expensive precious wood, veneer, strips because of less waste/battery consumption.

Low number of teeth: Coarse to medium cutting quality in all wooden materials, precious wood and solid wood across and along the grain, panel and boards one-side plastic coated/veneered, paper-based laminate, thicker plastic profiles and plates (Thermoplastics). High feed rate possible

Medium number of teeth: Good cutting quality in all wooden materials, precious wood, solid wood and strips across and along the grain, panel and boards one-side/two side plastic coated/veneered, paper-based laminate, veneer and veneer packages, plastic profiles/plates (Thermoplastics, Duroplastics)

High number of teeth: Very good cutting quality in all wooden materials, precious wood, solid wood and strips preferably across the grain, panel and boards two side plastic coated/veneered, paper-based laminate, veneer and veneer packages, plastic profiles/plates (Thermoplastics, Duroplastics)

Due to special carbide also excellent for cutting hard thermoplastics such as thin panels, hollow section boards Made of PC (Polycarbonate), PMMA (Acrylic-glass/Plexiglass). See here also article 11 1430, page 943

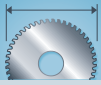


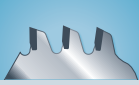
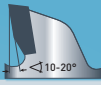


Film
Movie



Kunststoffe · Profile · Furniere/Dünnschnitt
Plastics · Profiles · Veneers/Thin-cut

11 1425

Bestseller – preisreduziert · Bestseller – price reduced

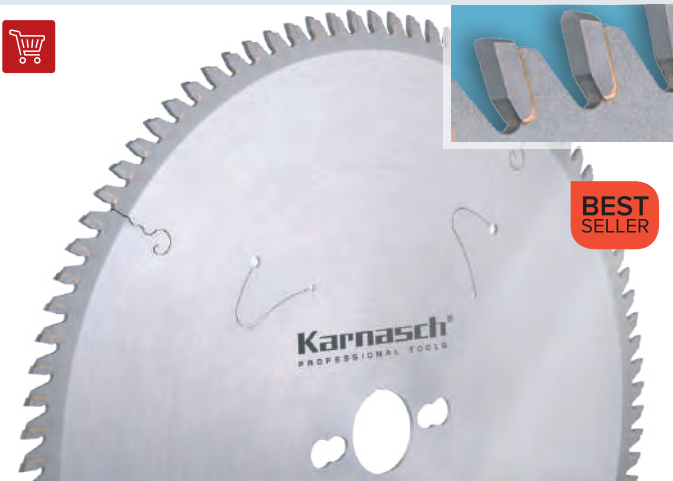
| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|--|---|---|--------|
| 11 1425 120 010 | ● 120 | 1,8/1,2 | 20 | 12 WZ | 20 | - | - | 22,95 |
| 11 1425 120 020 | ● 120 | 1,8/1,2 | 20 | 28 WZ | 15 | - | - | 30,35 |
| 11 1425 120 030 | ● 120 | 1,8/1,2 | 20 | 44 WZ | 10 | - | - | 39,30 |
| 11 1425 136 010 | ● 136 | 1,8/1,2 | 20/10 | 14 WZ | 20 | - | - | 23,90 |
| 11 1425 136 020 | ● 136 | 1,8/1,2 | 20/10 | 30 WZ | 15 | - | - | 30,60 |
| 11 1425 136 030 | ● 136 | 1,8/1,2 | 20/10 | 48 WZ | 10 | - | - | 43,15 |
| 11 1425 160 010 | ● 160 | 1,8/1,2 | 20/16 | 16 WZ | 20 | 2-6-32 | - | 23,60 |
| 11 1425 160 020 | ● 160 | 1,8/1,2 | 20/16 | 32 WZ | 15 | 2-6-32 | - | 32,55 |
| 11 1425 160 030 | ● 160 | 1,8/1,2 | 20/16 | 54 WZ | 10 | 2-6-32 | - | 44,10 |
| 11 1425 160 040 | ● 160 | 1,8/1,2 | 20/16 | 68 WZ | 10 | 2-6-32 | - | 53,15 |
| 11 1425 165 010 | ● 165 | 1,8/1,2 | 20 | 16 WZ | 20 | 2-6-32 | - | 23,90 |
| 11 1425 165 020 | ● 165 | 1,8/1,2 | 20 | 32 WZ | 15 | 2-6-32 | - | 32,90 |
| 11 1425 165 030 | ● 165 | 1,8/1,2 | 20 | 54 WZ | 10 | 2-6-32 | - | 44,55 |
| 11 1425 165 040 | ● 165 | 1,8/1,2 | 20 | 68 WZ | 10 | 2-6-32 | - | 53,15 |
| 11 1425 180 010 | ● 180 | 1,8/1,2 | 20/16 | 18 WZ | 20 | 2-6-32 | - | 24,20 |
| 11 1425 180 020 | ● 180 | 1,8/1,2 | 20/16 | 40 WZ | 15 | 2-6-32 | - | 36,95 |
| 11 1425 180 030 | ● 180 | 1,8/1,2 | 20/16 | 60 WZ | 10 | 2-6-32 | - | 50,55 |
| 11 1425 180 040 | ● 180 | 1,8/1,2 | 20/16 | 76 WZ | 10 | 2-6-32 | - | 64,95 |
| 11 1425 190 010 | ● 190 | 1,8/1,2 | 30/20 | 18 WZ | 20 | 2-7-42 | - | 26,05 |
| 11 1425 190 020 | ● 190 | 1,8/1,2 | 30/20 | 42 WZ | 15 | 2-7-42 | - | 40,85 |
| 11 1425 190 030 | ● 190 | 1,8/1,2 | 30/20 | 60 WZ | 10 | 2-7-42 | - | 51,15 |
| 11 1425 190 040 | ● 190 | 1,8/1,2 | 30/20 | 76 WZ | 10 | 2-7-42 | - | 65,65 |
| 11 1425 200 010 | ● 200 | 2,0/1,4 | 30 | 18 WZ | 20 | 2-7-42 | - | 27,60 |
| 11 1425 200 020 | ● 200 | 2,0/1,4 | 30 | 42 WZ | 15 | 2-7-42 | - | 41,40 |
| 11 1425 200 030 | ● 200 | 2,0/1,4 | 30 | 64 WZ | 10 | 2-7-42 | - | 52,15 |
| 11 1425 200 040 | ● 200 | 2,0/1,4 | 30 | 80 WZ | 10 | 2-7-42 | - | 67,45 |
| 11 1425 210 010 | ● 210 | 2,0/1,4 | 30 | 20 WZ | 20 | 2-7-42 | - | 29,05 |
| 11 1425 210 020 | ● 210 | 2,0/1,4 | 30 | 48 WZ | 15 | 2-7-42 | - | 42,15 |
| 11 1425 210 030 | ● 210 | 2,0/1,4 | 30 | 64 WZ | 10 | 2-7-42 | - | 53,00 |
| 11 1425 210 040 | ● 210 | 2,0/1,4 | 30 | 80 WZ | 10 | - | - | 68,45 |
| 11 1425 216 010 | ● 216 | 2,0/1,4 | 30 | 20 WZ | 20 | 2-7-42 | - | 30,00 |
| 11 1425 216 020 | ● 216 | 2,0/1,4 | 30 | 48 WZ | 15 | 2-7-42 | - | 42,90 |
| 11 1425 216 030 | ● 216 | 2,0/1,4 | 30 | 64 WZ | 10 | 2-7-42 | - | 53,80 |
| 11 1425 216 040 | ● 216 | 2,0/1,4 | 30 | 80 WZ | 10 | 2-7-42 | - | 69,25 |
| 11 1425 220 010 | ● 220 | 2,0/1,4 | 30 | 48 WZ | 20 | 2-7-42 | - | 42,90 |
| 11 1425 225 010 | ● 225 | 2,0/1,4 | 30 | 24 WZ | 20 | 2-7-42 | - | 30,15 |
| 11 1425 225 020 | ● 225 | 2,0/1,4 | 30 | 48 WZ | 15 | 2-7-42 | - | 43,70 |
| 11 1425 225 030 | ● 225 | 2,0/1,4 | 30 | 68 WZ | 10 | 2-7-42 | - | 58,45 |
| 11 1425 225 040 | ● 225 | 2,0/1,4 | 30 | 88 WZ | 10 | 2-7-42 | - | 75,80 |
| 11 1425 230 010 | ● 230/235 ● | 2,0/1,4 | 30 | 24 WZ | 20 | 2-7-42 | - | 30,90 |
| 11 1425 230 020 | ● 230/235 ● | 2,0/1,4 | 30 | 48 WZ | 15 | 2-7-42 | - | 44,40 |
| 11 1425 230 030 | ● 230/235 ● | 2,0/1,4 | 30 | 68 WZ | 10 | 2-7-42 | - | 59,15 |
| 11 1425 230 040 | ● 230/235 ● | 2,0/1,4 | 30 | 88 WZ | 10 | 2-7-42 | - | 76,50 |
| 11 1425 250 010 | ● 250 | 2,2/1,6 | 30 | 30 WZ | 20 | UNI | ✓ | 43,70 |
| 11 1425 250 020 | ● 250 | 2,2/1,6 | 30 | 56 WZ | 15 | UNI | ✓ | 62,70 |
| 11 1425 250 030 | ● 250 | 2,2/1,6 | 30 | 80 WZ | 10 | UNI | ✓ | 70,05 |
| 11 1425 250 040 | ● 250 | 2,2/1,6 | 30 | 100 WZ | 10 | UNI | ✓ | 83,90 |
| 11 1425 260 010 | ● 260 | 2,2/1,6 | 30 | 30 WZ | 20 | UNI | ✓ | 45,10 |
| 11 1425 260 020 | ● 260 | 2,2/1,6 | 30 | 56 WZ | 15 | UNI | ✓ | 64,00 |
| 11 1425 260 030 | ● 260 | 2,2/1,6 | 30 | 80 WZ | 10 | UNI | ✓ | 71,00 |
| 11 1425 270 010 | ● 270 | 2,2/1,6 | 30 | 30 WZ | 20 | UNI | ✓ | 45,30 |
| 11 1425 270 020 | ● 270 | 2,2/1,6 | 30 | 56 WZ | 15 | UNI | ✓ | 64,25 |
| 11 1425 270 030 | ● 270 | 2,2/1,6 | 30 | 80 WZ | 10 | UNI | ✓ | 72,80 |
| 11 1425 300 010 | ● 300 | 2,2/1,6 | 30 | 36 WZ | 20 | UNI | ✓ | 53,45 |
| 11 1425 300 020 | ● 300 | 2,2/1,6 | 30 | 60 WZ | 15 | UNI | ✓ | 70,50 |
| 11 1425 300 030 | ● 300 | 2,2/1,6 | 30 | 96 WZ | 10 | UNI | ✓ | 84,85 |
| 11 1425 300 040 | ● 300 | 2,2/1,6 | 30 | 120 WZ | 10 | UNI | ✓ | 103,70 |
| 11 1425 350 010 | ● 350 | 2,4/1,8 | 30 | 42 WZ | 20 | UNI | ✓ | 65,40 |
| 11 1425 350 020 | ● 350 | 2,4/1,8 | 30 | 72 WZ | 15 | UNI | ✓ | 86,75 |
| 11 1425 350 030 | ● 350 | 2,4/1,8 | 30 | 108 WZ | 10 | UNI | ✓ | 98,85 |
| 11 1425 350 040 | ● 350 | 2,4/1,8 | 30 | 140 WZ | 10 | UNI | ✓ | 143,40 |
| 11 1425 400 010 | ● 400 | 2,8/2,2 | 30 | 60 WZ | 15 | UNI | ✓ | 102,15 |
| 11 1425 400 020 | ● 400 | 2,8/2,2 | 30 | 96 WZ | 10 | UNI | ✓ | 136,10 |
| 11 1425 400 030 | ● 400 | 2,8/2,2 | 30 | 120 WZ | 10 | UNI | ✓ | 158,85 |
| 11 1425 450 010 | ● 450 | 3,1/2,5 | 30 | 66 WZ | 15 | UNI | ✓ | 118,60 |
| 11 1425 450 020 | ● 450 | 3,1/2,5 | 30 | 108 WZ | 10 | UNI | ✓ | 153,10 |
| 11 1425 450 030 | ● 450 | 3,1/2,5 | 30 | 130 WZ | 10 | UNI | ✓ | 177,15 |
| 11 1425 500 010 | ● 500 | 3,4/2,8 | 30 | 72 WZ | 15 | UNI+2-10-80 | ✓ | 153,35 |
| 11 1425 500 020 | ● 500 | 3,4/2,8 | 30 | 120 WZ | 10 | UNI+2-10-80 | ✓ | 203,15 |
| 11 1425 500 030 | ● 500 | 3,4/2,8 | 30 | 144 WZ | 10 | UNI+2-10-80 | ✓ | 228,65 |

● Gefertigt/Manufactured 232,50 mm · UNI = 2-7-42 + 2-9-46,40 + 2-10-60



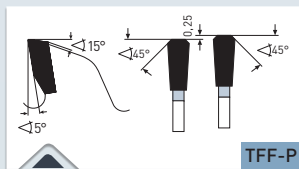
11 1430

Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/Dünnschnitt
Hard plastics · Abrasive materials · Finishing-cut/Thin-cut



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Dünnbleche, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Dünne Profile aus Ne-Metall wie Alu, Messing, Kupfer | Thin profiles made of non ferrous materials like alu, copper, brass |



> Trapez Flach Fase Positiv
> Triple-chip/triple-chip teeth

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Tisch- und Formatkreissägen, Plattenaufteilsägen, Kappsägen, Akkusägen

For portable circular saws, bench- and sizing saws, panel sizing saws, cross-cut saws, cordless saws.

ANWENDUNG · APPLICATION

Durch spezielles Hartmetall/Zahnform ideal für Fertigschnitte in dünnen Platten und Profilmaterial aus harten Kunststoffen (Thermoplaste) wie: PVC, PE, PA, ABS, PS, POM PC, PMMA (Acrylglas). z.B. Hohlkammerplatten aus PMMA (Acrylglas).

Ebenfalls gut bei abrasiven, zu hohen Schneidenverschleiß führenden Materialien wie: GFK, CFK, Zementplatten, Gipsfaserplatten, Eternit.

Sie wünschen:

- Eine noch höhere Zähnezahl um die Schnittgüte/Standzeit zu verbessern?
 - Durch negativen Spanwinkel verbesserte Kontrolle bei Handvorschub?
 - Durch negativen Spanwinkel höhere Unempfindlichkeit gegen Zahnbruch?
- Siehe Art: 11 1130, Seite 963

Durch dünne Schnittbreite wenig Kraftaufwand und Verschnitt. Daher auch ideal für Akku-Maschinen.

Due to special carbide / tooth geometry excellent for finishing cuts in thin plates and profiles made of hard plastics (thermoplastics) such as: PVC, PE, PA, ABS, PS, POM PC, PMMA e.g. hollow section boards of PMMA (acrylic glass).

Also good for abrasive, heavy machining and abrading materials such as: GFK, CFK, fibre cement panels, gypsum, fibre boards, eternit.

You want:

- Even higher number of teeth to improve the cutting quality/tool life?
 - Due to negative rake angle improves control with manual feed?
 - Due to negative rake angle higher insensitivity to tooth breakage?
- See Art. 11 1130, page 963

Due to thin cutting width little cutting pressure and waste of material. Therefore also ideal for cordless machines.




Film
Movie



Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/Dünnschnitt
Hard plastics · Abrasive materials · Finishing-cut/Thin-cut

11 1430

Bestseller – preisreduziert · Bestseller – price reduced

| Art. |  |  |  |  |  |  | € |
|----------------------------|---|---|---|---|---|---|--------|
| 11 1430 120 010 | • 120 | 1,8/1,2 | 20 | 40 TFF-P | - | - | 37,30 |
| 11 1430 136 010 NEW | • 136 | 1,8/1,2 | 20/10 | 48 TFF-P | - | - | 43,00 |
| 11 1430 160 010 | • 160 | 1,8/1,2 | 20/16 | 56 TFF-P | 2-6-32 | - | 45,30 |
| 11 1430 180 010 | • 180 | 1,8/1,2 | 20/16 | 60 TFF-P | 2-6-32 | - | 50,55 |
| 11 1430 190 010 | • 190 | 1,8/1,2 | 30/20 | 60 TFF-P | 2-7-42 | - | 51,15 |
| 11 1430 200 010 | • 200 | 2,0/1,4 | 30 | 64 TFF-P | 2-7-42 | - | 52,15 |
| 11 1430 210 010 | • 210 | 2,0/1,4 | 30 | 64 TFF-P | 2-7-42 | - | 53,00 |
| 11 1430 225 010 | • 225 | 2,0/1,4 | 30 | 68 TFF-P | 2-7-42 | - | 58,45 |
| 11 1430 230 010 | • 230/235 ● | 2,0/1,4 | 30 | 68 TFF-P | 2-7-42 | - | 59,15 |
| 11 1430 250 010 | • 250 | 2,4/1,8 | 30 | 80 TFF-P | UNI | ✓ | 70,05 |
| 11 1430 250 020 NEW | • 250 | 2,2/1,8 | 30 | 120 TFF-P | UNI | ✓ | 113,00 |
| 11 1430 300 010 | • 300 | 2,4/1,8 | 30 | 96 TFF-P | UNI | ✓ | 84,85 |
| 11 1430 300 020 NEW | • 300 | 2,4/1,8 | 30 | 128 TFF-P | UNI | ✓ | 125,50 |
| 11 1430 350 010 | • 350 | 2,4/1,8 | 30 | 108 TFF-P | UNI | ✓ | 98,85 |
| 11 1430 350 020 NEW | • 350 | 2,4/1,8 | 30 | 132 TFF-P | UNI | ✓ | 150,55 |
| 11 1430 400 010 | • 400 | 3,2/2,5 | 30 | 120 TFF-P | UNI | ✓ | 117,35 |
| 11 1430 400 020 NEW | • 400 | 3,1/2,5 | 30 | 138 TFF-P | UNI | ✓ | 172,80 |
| 11 1430 450 010 | • 450 | 3,5/2,8 | 30 | 132 TFF-P | UNI | ✓ | 181,25 |
| 11 1430 450 020 NEW | • 450 | 3,4/2,8 | 30 | 144 TFF-P | UNI | ✓ | 218,60 |
| 11 1430 500 010 | • 500 | 3,5/2,8 | 30 | 144 TFF-P | UNI | ✓ | 234,00 |

● Gefertigt/Manufactured 232,50 mm · UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Einblicke in die Karnasch High-Tech Produktion.

Insights into the Karnasch high-tech production.

POWER.
PRECISION.
PERFORMANCE.

Rauheitsmessung

Roughness measurement



100 % Kontrolle
100 % monitoring

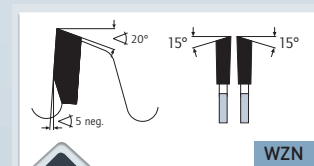


Karnasch®
PROFESSIONAL TOOLS



11 1450

Kapp- und Gehrungskreissägeblätter Wechselzahn/negativ
Chop- and mitre circular saws alternate top bevel tooth/negative



> Wechselzahn Negativ
> Alternate top bevel negative

MASCHINE · MACHINE

Spezialprogramm für Kapp- und Gehrungssägen, Radialkreissägen, Pendelkreissägen, oben liegende Kappkreissägen, Tischkreissägen, Abbundanlagen.

Special selection for chop- and mitre saws, radial saws, pendulum saws, top clipping saws, table saws, trimming saws.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Furniere | Veneers |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Profileleisten | Profiled wood |

ANWENDUNG · APPLICATION

Für Querschnitte in Weich- und Hartholz, Holzmischwerkstoffe, Leimholz, Schichtholz, Plattenwerkstoffe furniert oder beschichtet.

Durch spezielles Hartmetall auch hervorragend für Kunststoffe wie kunststoffbeschichtete Profile, dünnes Acrylglas, Duroplast-Profil und Leisten (hohe Zähnezahl wählen) geeignet.

Ebenfalls für harte Thermoplaste wie PA, PE, PS, POM, ABS.

Durch die negative Zahnform ist das Sägeblatt besser von Hand zu führen und wird nicht in das Schnittgut gezogen.

For cross cuts in soft and hard wood, wooden materials, glued wood, plywood, veneered or coated boards.

Due to special carbide also excellent for plastics such as: plastic laminated profiles, thin acrylic glass, duroplast profiles and strips (high number of teeth recommended).

Also for hard thermoplastics such as PA, PE, PS, POM, ABS.




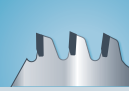


Due to the negative tooth shape, that saw blade can be guided easier by hand and is not pulled into the material to be cut.

Film
Movie



Kapp- und Gehrungskreissägeblätter Wechselzahn/negativ
Chop- and mitre circular saws alternate top bevel tooth/negative

11 1450

| Art. |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|---|---|--------|
| 11 1450 210 010 | • 210 | 2,8/1,8 | 30 | 24 WZN | 2-7-42 | - | 29,95 |
| 11 1450 210 020 | • 210 | 2,8/1,8 | 30 | 48 WZN | 2-7-42 | - | 45,75 |
| 11 1450 210 030 | • 210 | 2,8/1,8 | 30 | 80 WZN | 2-7-42 | - | 64,15 |
| 11 1450 216 010 | • 216 | 2,8/1,8 | 30 | 24 WZN | 2-7-42 | - | 33,15 |
| 11 1450 216 020 | • 216 | 2,8/1,8 | 30 | 48 WZN | 2-7-42 | - | 45,75 |
| 11 1450 216 030 | • 216 | 2,8/1,8 | 30 | 60 WZN | 2-7-42 | - | 50,75 |
| 11 1450 216 040 | • 216 | 2,8/1,8 | 30 | 80 WZN | 2-7-42 | - | 64,15 |
| 11 1450 250 010 | • 250 | 3,2/2,2 | 30 | 24 WZN | UNI | ✓ | 38,50 |
| 11 1450 250 020 | • 250 | 3,2/2,2 | 30 | 40 WZN | UNI | ✓ | 51,85 |
| 11 1450 250 030 | • 250 | 3,2/2,2 | 30 | 60 WZN | UNI | ✓ | 64,80 |
| 11 1450 250 040 | • 250 | 3,2/2,2 | 30 | 80 WZN | UNI | ✓ | 74,70 |
| 11 1450 260 010 | • 260 | 2,5/1,8 | 30 | 48 WZN | UNI | ✓ | 62,65 |
| 11 1450 260 020 | • 260 | 2,5/1,8 | 30 | 60 WZN | UNI | ✓ | 79,35 |
| 11 1450 260 030 | • 260 | 2,5/1,8 | 30 | 80 WZN | UNI | ✓ | 85,50 |
| 11 1450 300 010 | • 300 | 3,2/2,2 | 30 | 72 WZN | UNI | ✓ | 77,95 |
| 11 1450 305 010 | • 305 | 2,6/1,8 | 30 | 32 WZN | UNI | ✓ | 60,60 |
| 11 1450 305 020 | • 305 | 2,6/1,8 | 30 | 48 WZN | UNI | ✓ | 63,75 |
| 11 1450 305 030 | • 305 | 2,6/1,8 | 30 | 60 WZN | UNI | ✓ | 72,90 |
| 11 1450 305 040 | • 305 | 2,6/1,8 | 30 | 72 WZN | UNI | ✓ | 79,90 |
| 11 1450 305 050 | • 305 | 2,6/1,8 | 30 | 96 WZN | UNI | ✓ | 95,00 |
| 11 1450 350 010 | • 350 | 4,4/2,8 | 30 | 42 WZN | UNI | ✓ | 104,45 |
| 11 1450 400 010 | • 400 | 4,4/2,8 | 30 | 48 WZN | UNI | ✓ | 119,10 |
| 11 1450 420 010 | • 420 | 4,2/2,8 | 40/30 | 48 WZN | 2-10-60+2-11-63+2-12-64 | ✓ | 128,05 |
| 11 1450 420 020 | • 420 | 3,5/2,5 | 40/30 | 84 WZN | 2-10-60+2-11-63+2-12-64 | ✓ | 173,60 |
| 11 1450 450 010 | • 450 | 4,4/2,8 | 30 | 54 WZN | UNI | ✓ | 136,55 |
| 11 1450 500 010 | • 500 | 4,4/2,8 | 30 | 60 WZN | UNI | ✓ | 159,85 |
| 11 1450 550 010 | • 550 | 4,8/3,4 | 30 | 64 WZN | UNI | ✓ | 202,80 |
| 11 1450 600 010 | • 600 | 5,4/4,0 | 30 | 72 WZN | UNI | ✓ | 253,70 |

UNI = 2-7-42 + 2-9-46,40 + 2-10-60

1



2



3



4



5



6



7



8



9



Qualitätsprodukte für die Metallbearbeitung.
Quality products for metalworking.

Karnasch®
PROFESSIONAL TOOLS

LEISTUNGSFÄHIGKEIT
FÜR DEN TÄGLICHEN EINSATZ

Reliable performance in everyday service

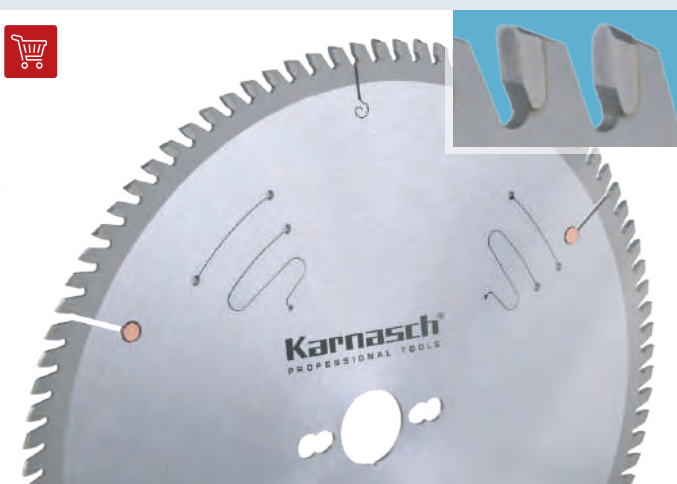
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THE KARNASCH PRODUCT RANGE ONLINE!

 <https://shop.karnasch.tools>

Index

11 1460

Formatieren · Fertigschnitt · Harte Kunststoffe · Abrasive Werkstoffe
Panel-sizing · Finishing cut · Hard plastics · Abrasive materials



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|---|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoff- platten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineral- werkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |

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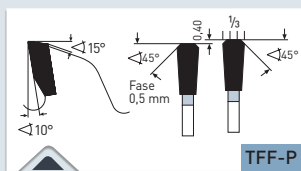
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9

Index



TFF-P

- > Trapez-Flachzahn (Flachzahn mit Fase)
- > Triple-chip/flat tooth (flat tooth with chamfer on both sides)

MASCHINE · MACHINE

Für Formatkreissägen, Plattensägen, Tischkreissägen

For sizing saws, panel saws, bench saws

ANWENDUNG · APPLICATION

Zum Formatieren von Platten in verschiedenen Dicken, Paketschnitte aus Thermoplaste wie: PVC, PE, PA, ABS, PS, POM.

Hervorragend auch zum Schneiden von Kunststoffprofilen sowie für Fertigschnitte in beidseitig kunststoffbeschichtete Span- und Faserwerkstoffe/Platten vorzugsweise in Verbindung mit Ritzer.

Durch spezielles Hartmetall auch gut bei abrasiven zu schnellem Schneidenverschleiß führenden Verbundstoffen wie faserverstärkte Gipskartonplatten, GFK, CFK.

Ebenfalls ideal für Duroplaste wie HPL Schichtstoff (Trespa, Resopal) und Mineralwerkstoffe wie Corian, Noblan, Staron usw.

For sizing panels of various thicknesses, cutting stacks made of thermoplastics such as: PVC, PE, PA, ABS, PS, POM.

Excellent also for cutting plastic profiles and finishing cuts in double-side plastic coated chip- and hard fibre materials/boards in combination with scoring sawblades.

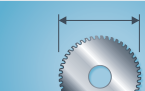




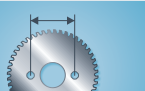
Due to special carbide teeth also good for cutting abrasive, heavy machining and abrading materials such as HPL, high-pressure-laminate (Trespa, Resopal) and mineral materials such as corian, noblan, staron etc.

Film
Movie



Formatieren · Fertigschnitt · Harte Kunststoffe · Abrasive Werkstoffe
Panel-sizing · Finishing cut · Hard plastics · Abrasive materials

11 1460

| Art. |  |  |  |  |  |  | € |
|----------------------------|---|---|---|---|--|---|--------|
| 11 1460 250 010 | • 250 | 3,2/2,2 | 30 | 60 TFF-P | UNI | ✓ | 81,75 |
| 11 1460 250 020 | • 250 | 3,2/2,2 | 30 | 80 TFF-P | UNI | ✓ | 102,55 |
| 11 1460 300 010 | • 300 | 3,2/2,2 | 30 | 72 TFF-P | UNI | ✓ | 99,75 |
| 11 1460 300 020 | • 300 | 3,2/2,2 | 30 | 96 TFF-P | UNI | ✓ | 120,00 |
| 11 1460 303 010 | • 303 | 3,2/2,2 | 30 | 60 TFF-P | UNI | ✓ | 32,54 |
| 11 1460 303 020 | • 303 | 3,2/2,2 | 30 | 72 TFF-P | UNI | ✓ | 99,75 |
| 11 1460 303 030 | • 303 | 3,2/2,2 | 30 | 96 TFF-P | UNI | ✓ | 120,00 |
| 11 1460 350 010 | • 350 | 3,2/2,2 | 30 | 84 TFF-P | UNI | ✓ | 118,55 |
| 11 1460 350 020 | • 350 | 3,2/2,2 | 30 | 108 TFF-P | UNI | ✓ | 143,20 |
| 11 1460 400 010 | • 400 | 3,5/2,5 | 30 | 120 TFF-P | UNI | ✓ | 158,80 |
| NEW 11 1460 450 010 | • 450 | 3,5/2,5 | 30 | 132 TFF-P | UNI | ✓ | 187,35 |
| NEW 11 1460 500 010 | • 500 | 3,8/2,8 | 30 | 144 TFF-P | UNI | ✓ | 219,55 |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

UNI = 2-7-42 + 2-9-46,40 + 2-10-60



Bei Kunststoff/Melamin beschichtete Plattenwerkstoffe Vorritzen empfohlen. Ritzer siehe Seite 1037. Sägen von beschichteten/furnierten Plattenwerkstoffe ohne Vorritzer siehe Seite 983

For plastic coated/melamine boards scoring recommended. Scorer see page 1037. Cutting of coated/veneered boards without scorer see page 983

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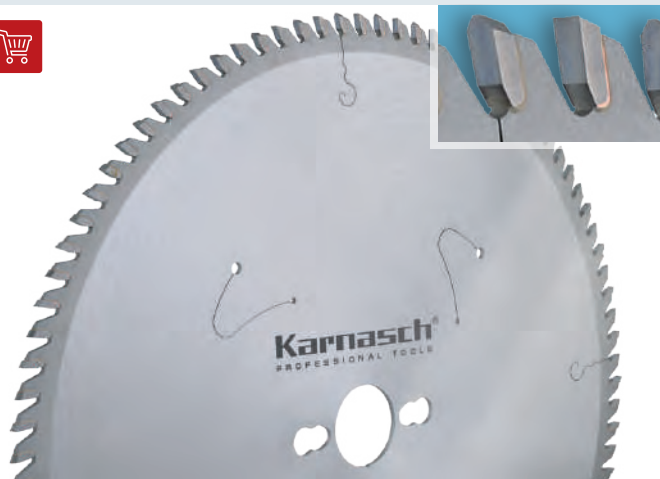
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Index

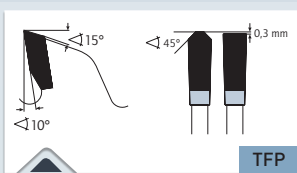
11 1470

Formatieren · Fertigschnitt Trapez-Flachzahn
Panel-sizing · Finishing cut trapez-flat tooth



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |



TFP

- > Trapez-Flachzahn Positiv
- > Triple-chip/flat tooth positive

ANWENDUNG · APPLICATION

Für Fertigschnitte in thermoplastische Vollplatten (Acrylglas, PMMA, Polyäthylen, Polyamid usw.) sowie duroplastische Vollplatten (Schichtstoffe, HPL, Hartpapier, Trespa, Resopal, Multiplex).

Weiterhin für polymergebundene Kunststoffe, Mineralwerkstoffe wie Corian, Noblan, Hi-Macs, Staron, Rausolid usw.

Hervorragend ebenfalls für Fertigschnitte in beidseitig kunststoffbeschichteten Plattenwerkstoffe, vorzugsweise in Verbindung mit Vorritzer.

Ideal auch zum Schneiden von Kunststoff-Profilen.

For finishing cuts in solid thermoplastic boards (PMMA, acrylic glass, polyethylene, polyamide etc.) and solid duroplastic boards (HPL-high-pressure-laminate, HP-Hardpaper, phenolic resin bonded paper, phenolic laminated cotton sheets, Trespa, Resopal, Multiplex).

Also for polymer-bound plastics, mineral materials such as: Corian, Noblan, Hi-Macs, Staron, Rausolid etc.

Excellent also for finishing cuts in double-side plastic coated boards, preferably in combination with coring sawblades.

Ideal also for cutting plastic profiles.

MASCHINE · MACHINE

Für Formatkreissägen, Plattensägen, Tischkreissägen




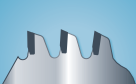


For sizing saws, panel saws, bench saws

Film
Movie

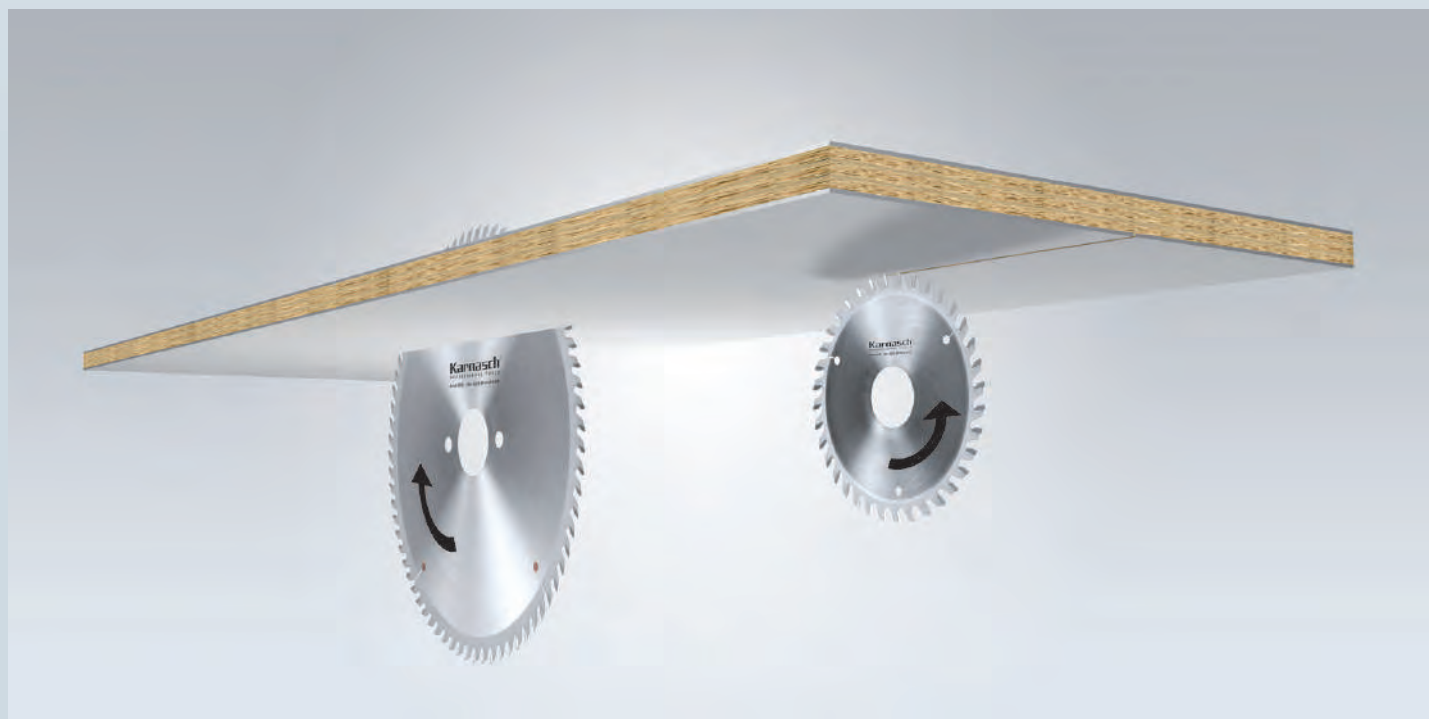


Formatieren · Fertigschnitt Trapez-Flachzahn
Panel-sizing · Finishing cut triple chip/flat tooth

11 1470

| Art. |  |  |  |  |  |  | € |
|----------------------------|---|---|---|---|---|---|--------|
| 11 1470 220 010 | • 220 | 3,2/2,2 | 30 | 64 TFP | 2-7-42 | - | 67,45 |
| 11 1470 250 010 | • 250 | 3,2/2,2 | 30 | 60 TFP | UNI | ✓ | 73,50 |
| 11 1470 250 020 | • 250 | 3,2/2,2 | 30 | 80 TFP | UNI | ✓ | 84,60 |
| 11 1470 300 010 | • 300 | 3,2/2,2 | 30 | 72 TFP | UNI | ✓ | 84,55 |
| 11 1470 300 020 | • 300 | 3,2/2,2 | 30 | 96 TFP | UNI | ✓ | 98,30 |
| 11 1470 303 010 | • 303 | 3,2/2,2 | 30 | 60 TFP | UNI | ✓ | 80,35 |
| 11 1470 303 020 | • 303 | 3,2/2,2 | 30 | 72 TFP | UNI | ✓ | 84,55 |
| 11 1470 303 030 | • 303 | 3,2/2,2 | 30 | 96 TFP | UNI | ✓ | 98,30 |
| 11 1470 350 010 | • 350 | 3,5/2,5 | 30 | 84 TFP | UNI | ✓ | 110,55 |
| 11 1470 350 020 | • 350 | 3,5/2,5 | 30 | 108 TFP | UNI | ✓ | 117,30 |
| 11 1470 400 010 | • 400 | 3,5/2,5 | 30 | 120 TFP | UNI | ✓ | 136,90 |
| NEW 11 1470 450 010 | • 450 | 3,5/2,5 | 30 | 132 TFP | UNI | ✓ | 160,45 |
| NEW 11 1470 500 010 | • 500 | 3,8/2,8 | 30 | 144 TFP | UNI | ✓ | 188,00 |

UNI = 2-7-42 + 2-9-46,40 + 2-10-60



Bei Kunststoff/Melamin beschichtete Plattenwerkstoffe Vorritzen empfohlen. Ritzter siehe Seite 1037. Sägen von beschichteten/furnierten Plattenwerkstoffe ohne Vorritzer siehe Seite 983

For plastic coated/melamine boards scoring recommended. Scorer see page 1037. Cutting of coated/veneered boards without scorer see page 983

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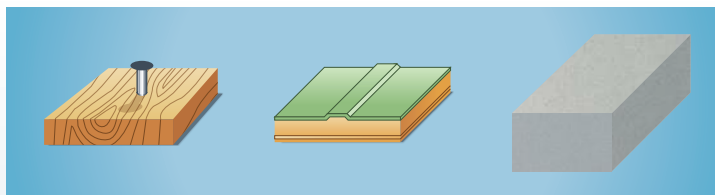
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9

Index

Bau · Universal
Construction · Universal



Die Berechnung von Vc und fz für handgeführte Maschinen bei denen in der Regel die Drehzahl nicht einstellbar ist macht wenig Sinn. Weiterhin werden mit Universalblättern oftmals weiche und harte Werkstoffe in einem Werkstück kombiniert gesägt. Zum Beispiel Holz mit Nägeln, Kunststoffe mit Stahleinlage, Bleche mit PU/Schaum-Füllung usw.

The calculation of Vc and Fz for handheld machines is mostly pointless as the mobile machines are normally operated with manual feed and the parameter (e.g. rpm) are not adjustable.

Furthermore, soft and hard materials are often combined in one workpiece.

Hier ist Fingerspitzengefühl und "herantasten" gefragt. Auf der untenstehenden Tabelle geben wir grobe Richtwerte der empfohlenen Drehzahlen in gängige Materialien.

For example, wood with nails, plastic materials combined with inside steel frame (window frames), sheet material with PU / foam filling, etc. In this case you have to test and follow your "feeling".

In the table below we give a rough guide to the recommended speed in common materials.

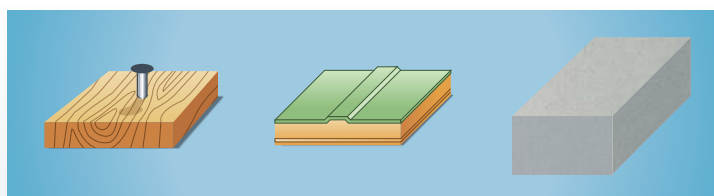
Drehzahl **n** (U/min) • Revolution per minute **n** (rpm)

| | 1000 | 1500 | 2000 | 2500 | 2850 | 3000 | 4000 | 4500 | 5000 | 5600 | 6000 | 8000 | 9000 | 10000 | 12000 | 18000 |
|-------|------|------|------|------|------|------|------|------|------|-------|-------|------|------|-------|-------|-------|
| 80 Ø | 4,5 | 6,5 | 8,5 | 10,5 | 12 | 13 | 17 | 19 | 21 | 23,5 | 26 | 34 | 38 | 42 | 52 | 76 |
| 90 Ø | 5 | 7 | 9,5 | 12 | 13,5 | 14 | 19 | 21 | 24 | 26,5 | 28 | 38 | 42 | 48 | 56 | 84 |
| 100 Ø | 5,5 | 8 | 10,5 | 13 | 15 | 16 | 21 | 24 | 26 | 29 | 32 | 42 | 48 | 52 | 54 | 96 |
| 120 Ø | 6,5 | 9,5 | 13 | 16 | 18 | 19 | 26 | 28 | 32 | 35 | 38 | 52 | 56 | 64 | 76 | 112 |
| 125 Ø | 7 | 10 | 13,5 | 16,5 | 18,5 | 19,5 | 27 | 29 | 33 | 36,5 | 39 | 54 | 59 | 66 | 78 | 118 |
| 140 Ø | 8 | 11 | 15 | 18 | 21 | 22 | 30 | 33 | 36 | 41 | 44 | 60 | 66 | 72 | 88 | 132 |
| 150 Ø | 8,5 | 12 | 15,5 | 19,5 | 22,5 | 23,5 | 31,5 | 33,5 | 39 | 44 | 47 | 63 | 70,5 | 78,5 | 94,5 | 141,5 |
| 160 Ø | 9 | 13 | 17 | 21 | 24 | 26 | 34 | 38 | 42 | 47 | 52 | 68 | 76 | 84 | 104 | 152 |
| 180 Ø | 10 | 14 | 19 | 24 | 27 | 28 | 38 | 42,5 | 48 | 53 | 56 | 76 | 85 | 96 | 118 | 170 |
| 200 Ø | 11 | 16 | 21 | 26 | 30 | 32 | 42 | 47 | 52 | 58,5 | 64 | 84 | 94 | 104 | 128 | 188 |
| 225 Ø | 12 | 18 | 24 | 30 | 33,5 | 36 | 48 | 58 | 60 | 66 | 72 | 96 | 106 | 120 | 144 | 212 |
| 250 Ø | 14 | 20 | 26 | 33 | 37 | 40 | 52 | 59 | 66 | 73,5 | 80 | 104 | 118 | 132 | 160 | 236 |
| 300 Ø | 17 | 24 | 31,5 | 40 | 45 | 48 | 63 | 71 | 80 | 88 | 96 | 126 | 142 | 160 | 192 | 284 |
| 350 Ø | 19 | 28 | 36,5 | 47 | 52 | 56 | 73 | 88 | 94 | 105 | 112 | 146 | 166 | 188 | 224 | 332 |
| 400 Ø | 22 | 32 | 42 | 54 | 60 | 64 | 84 | 94 | 108 | 117 | 128 | 168 | 188 | 216 | 256 | 376 |
| 450 Ø | 24 | 35,5 | 47 | 59 | 67,5 | 70,5 | 94,5 | 106 | 118 | 132 | 141,6 | 188 | 211 | 236 | 283 | 424 |
| 500 Ø | 27 | 40 | 53 | 67 | 74,5 | 80 | 106 | 118 | 134 | 146,5 | 160 | 212 | 236 | 268 | 320 | 472 |

Schnittgeschwindigkeit in m/s · Cutting speed in m/s

- 1 Baustahl, Edelstahl, Dünnbleche, Sandwichmaterial
Mild steel, stainless steel, thin iron sheets, sandwich material
- 2 NE-Metalle, Kunststoffe, Holzwerkstoffe
Non ferrous metals, plastics, wooden materials

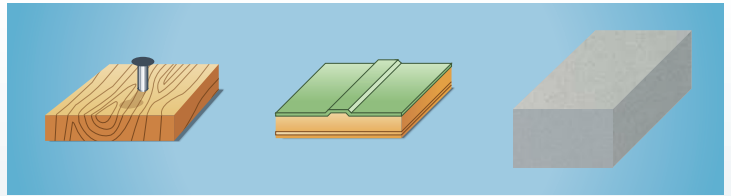
Bau · Universal
Construction · Universal




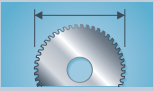
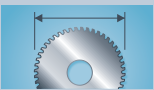
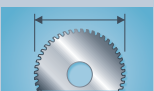
| Art. Ø mm | Type | Anwendung · Application | |
|---|---|--|-----|
| 10 7100 Ø mm 136-500  | Universal/Stahl · NE-Metalle · Kunststoffe · Sandwich | Schwerpunkt ist das Trennen von Blechen/Profilen aus Baustahl bis zu 6 mm Wandstärke. Auch gut zum Trennen von NE-Metallen, Kunststoffen, Sandwichmaterial. | 954 |
| | Universal/Steel · Non-ferrous metals · Plastics · Sandwich | Focus is on the cutting of sheet metals/profiles of mild steel up to 6 mm wall thickness. Also excellent for cutting non-ferrous metals, plastics, sandwich materials. | |
| 10 7130 Ø mm 136-355  | Dry-Cutter Baustähle "Einweg" | Schwerpunkt ist das Trennen von Profilmaterial sowie Bleche bis ca. 6 mm Wandstärke | 955 |
| | Dry-Cutter mild steel "throw away" BEST SELLER | The focus is on cutting profile material and sheet metals up to 6 mm wall thickness | |
| 10 7150 Ø mm 136-355  | Super Dry-Cutter Baustähle | Schwerpunkt ist das Trennen von Profilmaterial sowie Blechen. Profilmaterial Wandstärke ab 3 mm bis 8 mm sowie Bleche ab 3 mm bis 10 mm. | 956 |
| | Super Dry-Cutter mild steel | The focus is on cutting profile material and sheet metal. Profile material from 3 mm up to 8 mm wall thickness and sheet metal from 3 mm up to 10 mm thickness. | |
| 10 7400 Ø mm 136-500  | Universal/Dünnbleche · Sandwich · NE-Metalle · Kunststoffe | Schwerpunkt ist das Trennen von dünnwandigen Blechen/Profilen aus Baustahl bis ca. 3 mm. Sandwichmaterialien mit dünnen Deckschichten 0,2-1 mm, sowie dünne NE-Metalle und Kunststoffe. | 958 |
| | Universal/Thin sheets · Sandwich · Non-ferrous metals · Plastics BEST SELLER | Focus is on the cutting of thin-walled sheet metals/profiles up to 3 mm. Excellent for sandwich materials within layers 0,2-1 mm and thin walled non-ferrous metals and plastic materials. | |
| 10 8000 Ø mm 136-500  | Universal/NE-Metalle · Kunststoffe · Sandwich | Universalblatt für das Bauhandwerk, Ladenbau, Messebau, Renovierungsarbeiten. | 959 |
| | Universal/Non-ferrous metals · Plastics · Sandwich | Universal blade for construction, shop fitting, booth building, renovation. | |
| 10 8055 Ø mm 120-500  | Winkelschleifer + Brutal Einweg-Sägeblätter | Universalblatt zum Trennen "fast" aller Materialien. Sogar mit dem Winkelschleifer. | 961 |
| | Angle Grinder + Brutal disposable saw blades BEST SELLER | Universal blade for cutting "almost" any material. Even with the angle grinder. | |



Bau · Universal
Construction · Universal



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- 3
- 4
- 5
- 6
- 7
- 8
- 9

| Art. Ø mm | Type | Anwendung · Application | |
|--|---|--|-----|
| 11 1130 Ø mm 120-500  | Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/ Dünnschnitt · Negativ | Exzellent für alle Sandwichmaterialien mit dünnen Deckschichten. Für alle Kunststoffe in Fertigschnitt- qualität. Abrasive Materialien wie: GFK, CFK, Eternit. | 962 |
| | Hard plastics · Abrasive materials · Finishing-cut/Thin-cut · Negative | Excellent for sandwich materials with thin layers. For all plastics in finishing cut quality. Abrasive materials as: GFK, CFK, eternit. | |
| 11 1250 Ø mm 136-700  | Bausäge | Für den harten Allroundeinsatz auf der Baustelle. | 964 |
| | Construction saw BEST SELLER | For hard, all-round application on the building site. | |
| 11 1260 Ø mm 136-700  | Super Bausäge | Für den extrem harten Allroundeinsatz auf der Baustelle. Das Bausägeblatt mit höchster Standzeit und guter Schnittqualität. | 965 |
| | Super construction saw | For extreme tough all-round application on the building site. The construction blade with the highest service life and good cutting quality. | |
| 11 1350 Ø mm 160-350  | Diamant Universal | Durch DP (Polykristalliner Diamant) ideal zum Trennen extrem abrasiver, zu hohem Schneidenschleiß führender Materialien. | 966 |
| | Diamond Universal | Due to DP (polycrystalline diamond) excellent for cutting extreme abrasive, heavy machining and abrading materials. | |

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Die Karnasch High-Performance Qualitätssicherung
für Werkzeuge mit herausragenden Eigenschaften.

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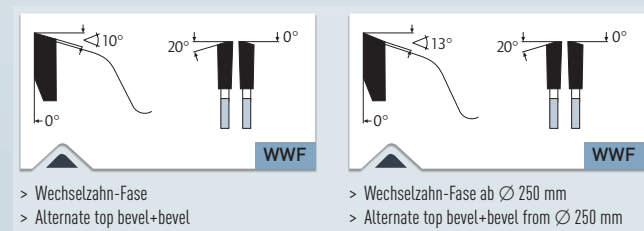
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10 7100

Universal/Stahl · NE-Metalle · Kunststoffe · Sandwich
Universal/Steel · Non-ferrous metals · Plastics · Sandwich



> Wechselzahn-Fase
> Alternate top bevel+bevel

> Wechselzahn-Fase ab Ø 250 mm
> Alternate top bevel+bevel from Ø 250 mm

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Radialarmsägen, Tisch- und Formatkreissägen, akkubetriebene Maschinen und passend ebenfalls für sogenannte DRY-CUTTER Maschinen mit reduzierten Drehzahlen wie zum Beispiel: JEPSON, RIDGID, ELU, RYOBI...

For portable machines, cross-cut saws, panel and sizing saws, mitre saws, table and radial arms saws, battery-driven saws and suitable also for so-called DRY CUTTER machines with reduced speeds such as: Jepson, RIDGID, ELU, RYOBI...

Bei Stahl ist es vorteilhaft mit reduzierten Drehzahlen (min⁻¹) zu arbeiten (siehe Tabelle unten). Die Verwendung von Schneidspray oder Mecutwachs erhöht wesentlich die Standzeit (Schneidöle siehe ab Seite 1144).

For steel, it is beneficial to work at reduced speeds (see table below). Use of cutting spray or Mecut wax increases the service life (coolants see from page 1144)

Ø 136-150 mm = 4000-3600 min⁻¹/rpm

Ø 160-200 mm = 3500-3000 min⁻¹/rpm

Ø 210-250 mm = 2800-1900 min⁻¹/rpm

Ø 260-330 mm = 1800-1500 min⁻¹/rpm

Ø 350-400 mm = 1400-1000 min⁻¹/rpm

Ø 420-500 mm = 900-700 min⁻¹/rpm

Bitte achten Sie unbedingt auf absolut feste und vibrationsfreie Befestigung des Werkstücks. Nichtbeachtung führt zu Zahnbruch/erhöhtem Verschleiß. Empfehlungen hierzu siehe Seite 957.

Please pay attention to absolutely stable/complete and vibration-free clamping of the work piece. Failure to observe leads to tooth breakage/increased wear. Recommendations can be found on page 957.

Trennen von Dünnschicht bis ca. 3 mm Wandstärke sowie Sandwichmaterial siehe Art. 10 7400 Seite 897

Trennen von Edelstahl bis ca. 4 mm siehe Art. 10 7300 Seite 896

Trennen von Aluprofilen/Alublechen siehe Art. 10 8000 Seite 902 / Art. 11 1100 Seite 911 / Art. 11 1120 Seite 913

Trennen von Holz, Kunststoffen, NE-Metallen wie Alu, Baustähle siehe Art. 10 8055 Seite 899

Cutting thin sheet up to approx. 3 mm wall thickness and sandwich material: see item 10 7400 page 897

Cutting stainless steel up to approx. 4 mm: see item 10 7300 page 896

Cutting of aluminum profiles/sheets: see item 10 8000 page 902 / item 11 1100 page 911 / item 11 1120 page 913

Cutting of wood, plastics, non-ferrous metals like aluminum, mild steels: see item 10 8055 page 899

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|--|
| ✓ | | Baustahl | Mild steel |
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Dünnschicht, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Schwerpunkt ist das Trennen von Profilmaterial sowie Bleche bis ca. 6 mm Wandstärke. Die höhere Zähnezahl ist bis ca. 3 mm Wandstärke geeignet. Für noch höhere Standzeiten siehe unsere neuen **Super Dry-Cutter Baustähle** Blätter. (Art. 10 7150 / Seite 956).

Sie suchen ein besondere gutes Preis-Leistungsverhältnis dieser Blätter? Sie haben einen hohen Verbrauch an Blättern und wollen / können die Blätter nicht nachschleifen? Dann ist unsere BESTSELLER Reihe das richtige für Sie. Siehe nächste Seite.

The focus is on cutting profile material and sheet metals up to 6 mm wall thickness. The higher number of teeth is suitable up to 3 mm thickness. For higher service lives see our new **Super Dry-Cutter mild steel** blades. (Art. 10 7150 / page 956).

Are you looking for a special price-performance ratio for this blades? You have a high consumption of this blades and do not want or cannot regrind them? Then our BESTSELLER series is right for you. See next page.

| Art. | | | | | | | € |
|-----------------|-----------|---------|---------|---------|---------------|---|--------|
| 10 7100 136 010 | • 136 | 1,6/1,2 | 20/10 | 30 WWF | 2-6-32 | - | 36,70 |
| 10 7100 150 010 | • 150 | 1,8/1,4 | 20/16 | 30 WWF | 2-6-32 | - | 36,65 |
| 10 7100 160 010 | • 160 | 1,8/1,4 | 20/16 | 30 WWF | 2-6-32 | - | 37,60 |
| 10 7100 180 010 | • 180 | 1,8/1,4 | 30/20 | 34 WWF | UNI 1 | - | 41,80 |
| 10 7100 185 010 | • 185 | 1,8/1,4 | 20/16 | 34 WWF | 2-6-32 | - | 42,00 |
| 10 7100 190 010 | • 190 | 1,8/1,4 | 30 | 38 WWF | UNI 1 | - | 43,10 |
| 10 7100 200 010 | • 200 | 2,0/1,6 | 30 | 40 WWF | UNI 1 | - | 47,35 |
| 10 7100 210 010 | • 210 | 2,0/1,6 | 30 | 40 WWF | UNI 1 | - | 47,90 |
| 10 7100 216 010 | • 216 | 2,0/1,6 | 30 | 42 WWF | UNI 1 | - | 49,15 |
| 10 7100 230 010 | • 230/235 | 2,0/1,6 | 30/25,4 | 44 WWF | UNI 1 | - | 52,35 |
| 10 7100 250 010 | • 250 | 2,2/1,8 | 30/25,4 | 48 WWF | UNI 1 + UNI 2 | ✓ | 62,50 |
| 10 7100 250 020 | • 250 | 2,2/1,8 | 30/25,4 | 60 WWF | UNI 1 + UNI 2 | ✓ | 79,75 |
| 10 7100 260 010 | • 260 | 2,2/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | ✓ | 85,60 |
| 10 7100 270 010 | • 270 | 2,2/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | ✓ | 87,35 |
| 10 7100 280 010 | • 280 | 2,2/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | ✓ | 44,75 |
| 10 7100 300 010 | • 300 | 2,2/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | ✓ | 90,30 |
| 10 7100 300 020 | • 300 | 2,2/1,8 | 30 | 80 WWF | UNI 1 + UNI 2 | ✓ | 110,35 |
| 10 7100 305 010 | • 305 | 2,2/1,8 | 25,4 | 60 WWF | - | ✓ | 88,45 |
| 10 7100 305 020 | • 305 | 2,2/1,8 | 25,4 | 80 WWF | - | ✓ | 109,65 |
| 10 7100 320 010 | • 320 | 2,2/1,8 | 30/25,4 | 84 WWF | UNI 1 + UNI 2 | ✓ | 112,00 |
| 10 7100 330 010 | • 330 | 2,2/1,8 | 32/30 | 84 WWF | UNI 2 | ✓ | 113,95 |
| 10 7100 350 010 | • 350 | 2,2/1,8 | 30 | 80 WWF | UNI 1 + UNI 2 | ✓ | 114,05 |
| 10 7100 355 010 | • 355 | 2,2/1,8 | 25,4 | 60 WWF | - | ✓ | 99,85 |
| 10 7100 355 020 | • 355 | 2,2/1,8 | 25,4 | 80 WWF | - | ✓ | 114,05 |
| 10 7100 355 030 | • 355 | 2,2/1,8 | 25,4 | 90 WWF | 1-12-55,4 | ✓ | 122,00 |
| 10 7100 400 010 | • 400 | 3,0/2,6 | 30 | 84 WWF | UNI 1 + UNI 2 | ✓ | 145,60 |
| 10 7100 420 010 | • 420 | 3,0/2,6 | 30 | 84 WWF | UNI 1 + UNI 2 | ✓ | 79,10 |
| 10 7100 450 010 | • 450 | 2,8/2,4 | 30 | 90 WWF | UNI 1 + UNI 2 | ✓ | 176,50 |
| 10 7100 500 010 | • 500 | 3,0/2,6 | 30 | 100 WWF | UNI 1 + UNI 2 | ✓ | 210,80 |

UNI 1 = 2-7-42 + 2-9-46,4 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64 • Gefertigt/Manufactured 232,50 mm

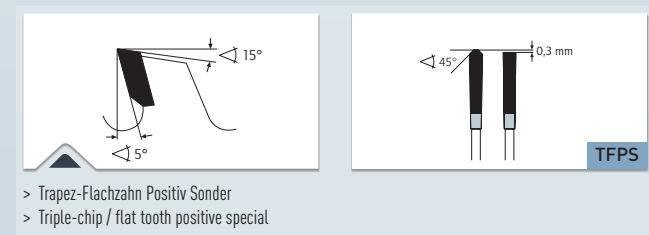
• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Film Movie



Universal/Stahl · NE-Metalle · Kunststoffe · Sandwich "Einweg"
 Universal/Steel · Non-ferrous metals · Plastics · Sandwich "Throw-away"

10 7130



> Trapez-Flachzahn Positiv Sonder
 > Triple-chip / flat tooth positive special

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Radial-armsägen, Tisch- und Formatkreissägen, akkubetriebene Maschinen und passend ebenfalls für sogenannte DRY-CUTTER Maschinen mit reduzierten Drehzahlen wie zum Beispiel: JEPSON, RIDGID, ELU, RYOBI...

For portable machines, cross-cut saws, panel and sizing saws, mitre saws, table and radial arms saws, battery-driven saws and suitable also for so-called DRY CUTTER machines with reduced speeds such as: Jepson, RIDGID, ELU, RYOBI...

Bei Stahl ist es vorteilhaft mit reduzierten Drehzahlen (min⁻¹) zu arbeiten (siehe Tabelle unten). Die Verwendung von Schneidspray oder Mecut-wachs erhöht wesentlich die Standzeit (Schneidöle siehe ab Seite 1144).

For steel, it is beneficial to work at reduced speeds (see table below). Use of cutting spray or Mecut wax increases the service life (coolants see from page 1144)

- Ø 136-150 mm = 4000-3600 min⁻¹/rpm
- Ø 160-200 mm = 3500-3000 min⁻¹/rpm
- Ø 210-250 mm = 2800-1900 min⁻¹/rpm
- Ø 260-330 mm = 1800-1500 min⁻¹/rpm
- Ø 350-400 mm = 1400-1000 min⁻¹/rpm

Bitte achten Sie unbedingt auf absolut feste und vibrationsfreie Befestigung des Werkstücks. Nichtbeachtung führt zu Zahnbruch/erhöhtem Verschleiß. Empfehlungen hierzu siehe Seite 957.

Please pay attention to absolutely stable/complete and vibration-free clamping of the work piece. Failure to observe leads to tooth breakage/increased wear. Recommendations can be found on page 957.

Trennen von Dünnschicht bis ca. 3 mm Wandstärke sowie Sandwichmaterial siehe Art. 10 7400 Seite 897

Cutting thin sheet up to approx. 3 mm wall thickness and sandwich material: see item 10 7400 page 897

Trennen von Edelstahl bis ca. 4 mm siehe Art. 10 7300 Seite 896

Cutting stainless steel up to approx. 4 mm: see item 10 7300 page 896

Trennen von Aluprofilen/Alublechen siehe Art. 10 8000 Seite 902 / Art. 11 1100 Seite 911 / Art. 11 1120 Seite 913

Cutting of aluminum profiles/sheets: see item 10 8000 page 902 / item 11 1100 page 911 / item 11 1120 page 913

Trennen von Holz, Kunststoffen, NE-Metallen wie Alu, Baustähle siehe Art. 10 8055 Seite 899

Cutting of wood, plastics, non-ferrous metals like aluminum, mild steels: see item 10 8055 page 899

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|--|
| ✓ | | Baustahl | Mild steel |
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Dünnschicht, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Schwerpunkt ist das Trennen von Profilmaterial sowie Bleche bis ca. 6 mm Wandstärke. Die höhere Zähnezahl ist bis ca. 3 mm Wandstärke geeignet. Für noch höhere Standzeiten.

Blätter der DRY-CUTTER Serien werden oftmals stark beansprucht. Durch Zahnbruch oder zu starker Abstumpfung ist ein Nachschärfen oftmals nicht mehr möglich. Hier ist unsere BESTSELLER Serie eine Alternative als „EINWEGKREISSÄGEBLÄTTER“.

The focus is on cutting profile material and sheet metals up to 6 mm wall thickness. The higher number of teeth is suitable up to 3 mm thickness. For higher service lives.

Blades of the DRY-CUTTER series are often heavily used. A re-sharpening is due to tooth breakage or excessive blunting often no longer possible. Here is our BESTSELLER series an alternative as "THROW-AWAY" blades

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | | | | | | | € |
|-----------------|-----------|---------|---------|---------|---------------|---|-------|
| 10 7130 136 010 | • 136 | 2,0/1,4 | 20/10 | 30 TFPS | 2-6-32 | - | 25,55 |
| 10 7130 160 010 | • 160 | 2,2/1,6 | 20/16 | 30 TFPS | 2-6-32 | - | 26,50 |
| 10 7130 190 010 | • 190 | 2,2/1,6 | 30 | 38 TFPS | UNI 1 | - | 31,15 |
| 10 7130 230 010 | • 230/235 | 2,2/1,8 | 30/25,4 | 44 TFPS | UNI 1 | - | 39,55 |
| 10 7130 250 010 | • 250 | 2,2/1,8 | 30/25,4 | 48 TFPS | UNI 1 + UNI 2 | ✓ | 46,60 |
| 10 7130 250 020 | • 250 | 2,2/1,8 | 30/25,4 | 60 TFPS | UNI 1 + UNI 2 | ✓ | 55,20 |
| 10 7130 305 010 | • 305 | 2,2/1,8 | 25,4 | 60 TFPS | - | ✓ | 59,80 |
| 10 7130 305 020 | • 305 | 2,2/1,8 | 25,4 | 80 TFPS | - | ✓ | 74,25 |
| 10 7130 355 020 | • 355 | 2,4/2,0 | 25,4 | 80 TFPS | - | ✓ | 82,15 |
| 10 7130 355 030 | • 355 | 2,4/2,0 | 25,4 | 90 TFPS | 1-12-55,4 | ✓ | 89,35 |

UNI 1 = 2-7-42 + 2-9-46,4 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64 • Gefertigt/Manufactured 232,50 mm

Film Movie

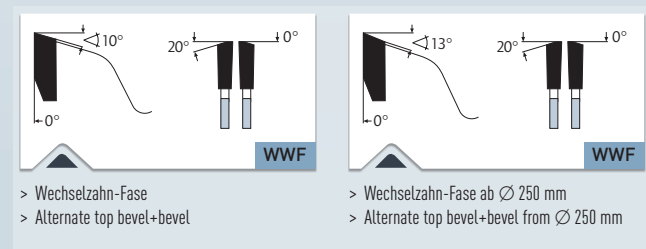


- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

10 7150

Super Dry-Cutter Baustähle
Super Dry-Cutter mild steel



MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Radialarmsägen, Tisch- und Formatkreissägen, akkubetriebene Maschinen und passend ebenfalls für sogenannte DRY-CUTTER Maschinen mit reduzierten Drehzahlen wie zum Beispiel: JEPSON, RIDGID, ELU, RYOBI...

For portable machines, cross-cut saws, panel and sizing saws, mitre saws, table and radial arms saws, battery-driven saws and suitable also for so-called DRY CUTTER machines with reduced speeds such as: Jepson, RIDGID, ELU, RYOBI...

Bei Stahl ist es vorteilhaft mit reduzierten Drehzahlen (min⁻¹) zu arbeiten (siehe Tabelle unten). Die Verwendung von Schneidspray oder Mecut-wachs erhöht wesentlich die Standzeit (Schneidöle siehe ab Seite 1144).

For steel, it is beneficial to work at reduced speeds (see table below). Use of cutting spray or Mecut wax increases the service life (coolants see from page 1144)

- Ø 136-150 mm = 4000-3600 min⁻¹/rpm
- Ø 160-200 mm = 3500-3000 min⁻¹/rpm
- Ø 210-250 mm = 2800-1900 min⁻¹/rpm
- Ø 260-330 mm = 1800-1500 min⁻¹/rpm
- Ø 350-400 mm = 1400-1000 min⁻¹/rpm

Weitere Abmessungen siehe Art. 10 7100 Seite 892

Trennen von Dünnschleif bis ca. 3 mm Wandstärke sowie Sandwichmaterial siehe Art. 10 7400 Seite 897

Trennen von Edelstahl bis ca. 4 mm siehe Art. 10 7300 Seite 896

Trennen von Aluprofilen/ Alublechen siehe Art. 10 8000 Seite 902 / Art. 11 1100 Seite 911 / Art. 11 1120 Seite 913

Trennen von Holz, Kunststoffen, NE-Metallen wie Alu, Baustähle siehe Art. 10 8055 Seite 899

For other sizes, see item 10 7100 page 892

Cutting thin sheet up to approx. 3 mm wall thickness and sandwich material: see item 10 7400 page 897

Cutting stainless steel up to approx. 4 mm: see item 10 7300 page 896

Cutting of aluminum profiles/ sheets: see item 10 8000 page 902 / item 11 1100 page 911 / item 11 1120 page 913

Cutting of wood, plastics, non-ferrous metals like aluminum, mild steels: see item 10 8055 page 899

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|----------|------------|
| ✓ | | Baustahl | Mild steel |
|---|--|----------|------------|

ANWENDUNG · APPLICATION

Schwerpunkt ist das Trennen von Profilmaterial sowie Blechen. Profilmaterial Wandstärke ab 3 mm bis 8 mm sowie Bleche ab 3 mm bis 10 mm. Hierfür verwenden Sie bitte die Abmessungen 305 mm mit 60 Zähnen, 355 mm mit 80 Zähnen.

Bei den restlichen Abmessungen empfehlen wir Profilmaterial ab 2 mm bis 6 mm Wandstärke, sowie Bleche ab 2 mm bis 8 mm.

Durch CERMET-Zähne (Keramik) **verdoppelt sich die Standzeit** gegenüber der DRY-CUTTER BAUSTÄHLE, Ausführung Art. 10 7100 Seite 892.

Speziell bei CERMET ist auf absolut feste und vibrationsfreie Befestigung des Werkstückes zu achten. Dies ist ebenfalls wichtig für alle unsere DRY-CUTTER Modelle Art. 10 7100, 10 7130, 10 7300, 10 7400. Siehe hierzu auch nächste Seite „Empfehlungen zum spannen verschiedener Profile.“

The focus is on cutting profile material and sheet metal. Profile material from 3 mm up to 8 mm wall thickness and sheet metal from 3 mm up to 10 mm thickness. Please use here the dimension 305 mm with 60 teeth and 355 mm with 80 teeth.

For all the remaining dimension we recommend: Profile material from 2 mm up to 6 mm wall thickness and sheet metal from 2 mm up to 8 mm thickness.

CERMET teeth (ceramics) approx. **doubles the service life** as compared to our Dry-Cutter mild steel Art. 10 7100 page 892.

CERMET blades needs stable, complete and vibration-free clamping of the work piece. This is also important for all DRY-CUTTER versions such as Article 10 7100, 10 7130, 10 7300 and 10 7400.

See here our recommendation next page "Tips for cutting different shapes".

| Art. | | | | | | | € |
|-----------------|-------|---------|---------|----|-----------|---|--------|
| 10 7150 136 010 | ● 136 | 1,6/1,2 | 20/10 | 30 | 2-6-32 | - | 45,05 |
| 10 7150 160 010 | ● 160 | 1,8/1,4 | 20/16 | 32 | 2-6-32 | - | 53,45 |
| 10 7150 180 010 | ● 180 | 1,8/1,4 | 30/20 | 36 | UNI 1 | - | 61,25 |
| 10 7150 190 010 | ● 190 | 1,8/1,4 | 30 | 38 | UNI 1 | - | 58,85 |
| 10 7150 230 010 | ● 230 | 2,0/1,6 | 30/25,4 | 48 | UNI 1 | - | 74,45 |
| 10 7150 250 010 | ● 250 | 2,2/1,8 | 30/25,4 | 60 | UNI 1 | - | 108,95 |
| 10 7150 305 010 | ● 305 | 2,2/1,8 | 25,4 | 60 | - | - | 127,85 |
| 10 7150 305 020 | ● 305 | 2,2/1,8 | 25,4 | 80 | - | - | 147,65 |
| 10 7150 355 010 | ● 355 | 2,2/1,8 | 25,4 | 80 | - | - | 159,35 |
| 10 7150 355 020 | ● 355 | 2,2/1,8 | 25,4 | 90 | 1-12-55,4 | - | 169,55 |

UNI 1 = 2-7-42 + 2-9-46,4

Film Movie



Empfehlung zum Trennen von Profilen in verschiedenen Formen
Tips for cutting different shapes

10 7150

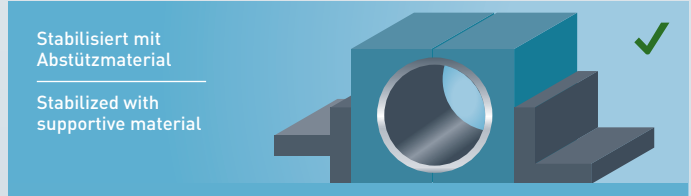
Dünne Profile welche nur unzureichend befestigt/eingespannt sind fangen an zu vibrieren. Der Schnitt wird unsauber und ungenau. Die Standzeit des Blattes wird wesentlich verringert. Das Blatt kann sogar komplett zerstört werden. Abstützmaterial kann helfen diese Risiken zu vermeiden.

Thin materials and incomplete clamping can cause vibration and deflection which shortens the blade life at a tremendous level. Use of supportive material can reduce these risks.

Dünne Rohre · Thin Pipes



Material vibriert während dem sägen
Material vibrates during cut



Abstützmaterial reduziert das Risiko das Blatt zu beschädigen.
Having supportive material can reduce these risk of damage to the blade.

Rundes Vollmaterial oder Rohre · Round Bars or Pipes



Rundes Vollmaterial oder Rohre können sich während des Sägevorgangs drehen, obwohl sie korrekt befestigt/eingespannt sind. Dies kann kontrolliert werden indem eine Markierung auf das Material angebracht wird. Dreht sich das Material, wird die Standzeit des Blattes erheblich reduziert oder das Blatt kann komplett zerstört werden. Bitte mit Abstützmaterial arbeiten.

Round Bars or Pipes can move during cut, even with correct clamping. This can be checked by a "marking" onto the material. If the material is moving, the blade is likely to be damaged.

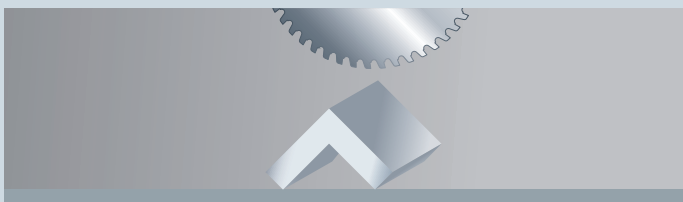
Dünne Profile eine Seite offen · Thin open ended materials



Die mit Pfeilen markierte Stellen fangen an zu vibrieren
The parts below the arrow will vibrate during cut

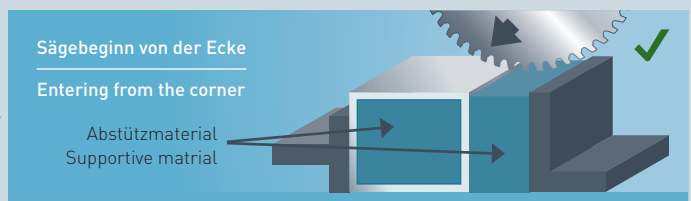
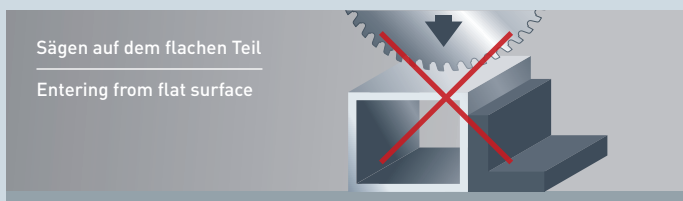


Winkelleisten · Angel bar



Schenkel nach unten legen und von der Winkelseite anfangen zu sägen
Face down and start cutting from the angel side

Blatteintrittswinkel · Blade entrance

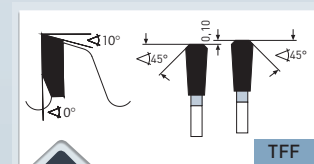


Der Eintrittswinkel des Blattes hat ebenfalls einen starken Einfluss auf die Standzeit. Das Werkstück sowie das Blatt sollten so eingestellt sein, dass der erste Schnitt des Blattes an dem kleinsten Kontaktpunkt des Werkstückes beginnt. Blade entrance point also effect the blade life. Material and Blade should be set considering the minimum contact pont.



10 7400

Universal/Dünobleche · Sandwich · NE-Metalle · Kunststoffe
Universal/Thin sheets · Sandwich · Non-ferrous metals · Plastics



> Trapez-Trapezzahn
> Triple-chip / triple-chip teeth

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Radialarmsägen, Tisch- und Formatkreissägen, akkubetriebene Maschinen und passend ebenfalls für sogenannte DRY-CUTTER Maschinen mit reduzierten Drehzahlen wie zum Beispiel: JEPSON, RIDGID, ELU, RYOBI...

For portable machines, cross-cut saws, panel and sizing saws, mitre saws, table and radial arms saws, battery-driven saws and suitable also for so-called DRY CUTTER machines with reduced speeds such as: Jepson, RIDGID, ELU, RYOBI...

| | |
|--------------|------------------------------------|
| Ø 136-150 mm | = 4000-3600 min ⁻¹ /rpm |
| Ø 160-200 mm | = 3500-3000 min ⁻¹ /rpm |
| Ø 210-250 mm | = 2800-1900 min ⁻¹ /rpm |
| Ø 260-330 mm | = 1800-1500 min ⁻¹ /rpm |
| Ø 350-400 mm | = 1400-1000 min ⁻¹ /rpm |
| Ø 420-500 mm | = 900-700 min ⁻¹ /rpm |

Bei Stahl ist es vorteilhaft mit reduzierten Drehzahlen (min⁻¹) zu arbeiten (siehe Tabelle oben). Die Verwendung von Schneidspray oder Mecutwachs erhöht wesentlich die Standzeit (Schneidöle siehe ab Seite 1144).

Bitte achten Sie unbedingt auf absolut feste und vibrationsfreie Befestigung des Werkstücks. Nichtbeachtung führt zu Zahnbruch/erhöhtem Verschleiß. Empfehlungen hierzu siehe Seite 895.

For steel, it is beneficial to work at reduced speeds (see table above). Use of cutting spray or Mecut wax increases the service life (coolants see from page 1144).

Please pay attention to absolutely stable/complete and vibration-free clamping of the work piece. Failure to observe leads to tooth breakage/increased wear. Recommendations can be found on page 895.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|--|
| ✓ | | Dünobleche, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Baustahl | Mild steel |
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Schwerpunkt ist das Trennen von dünnwandigen Blechen/Profilen aus Baustahl bis zu 3 mm Wandstärke. Hervorragend für Sandwichmaterialien mit dünnen Deckschichten aus Stahl/Alu/Kunststoffen von ca. 0,2-1 mm.

Weiterhin gut geeignet zum Trennen von Blechen/Profilen aus Ne-Metallen (Alu, Kupfer, Messing) und Kunststoffen bis ca. 5 mm Wandstärke.

Bitte achten Sie unbedingt auf absolut feste und vibrationsfreie Befestigung des Werkstücks. Nichtbeachtung führt zu Zahnbruch/erhöhtem Verschleiß. Empfehlungen hierzu siehe Seite 957.

Focus is on the cutting thin-walled sheet metal/steel profiles up to 3 mm wall thickness. Great for sandwich materials with thin layers of steel/aluminum/plastics of about 0.2-1 mm.

Also highly suitable for cutting sheets/profiles from non-ferrous metals (Aluminum, copper, brass) and plastics up to 5 mm wall thickness.

Please pay attention to absolutely stable/complete and vibration-free clamping of the work piece. Failure to observe leads to tooth breakage/ increased wear. Recommendations can be found on page 957.

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | | | | | | | | € |
|-----------------|-----------|---------|---------|---------|---------------|---|---|--------|
| 10 7400 136 010 | • 136 | 1,6/1,2 | 20/10 | 38 TFF | 2-6-32 | - | - | 29,85 |
| 10 7400 160 010 | • 160 | 1,8/1,4 | 20/16 | 42 TFF | 2-6-32 | - | - | 34,40 |
| 10 7400 180 010 | • 180 | 1,8/1,4 | 30/20 | 48 TFF | UNI 1 | - | - | 36,70 |
| 10 7400 185 010 | • 185 | 1,8/1,4 | 20/16 | 48 TFF | 2-6-32 | - | - | 36,60 |
| 10 7400 190 010 | • 190 | 1,8/1,4 | 30 | 48 TFF | UNI 1 | - | - | 38,00 |
| 10 7400 200 010 | • 200 | 2,0/1,6 | 30 | 54 TFF | UNI 1 | - | - | 48,55 |
| 10 7400 210 010 | • 210 | 2,0/1,6 | 30 | 54 TFF | UNI 1 | - | - | 47,55 |
| 10 7400 216 010 | • 216 | 2,0/1,6 | 30 | 54 TFF | UNI 1 | - | - | 48,55 |
| 10 7400 230 010 | • 230/235 | 2,0/1,6 | 30/25,4 | 54 TFF | UNI 1 | - | - | 53,05 |
| 10 7400 250 010 | • 250 | 2,2/1,8 | 30/25,4 | 72 TFF | UNI 1 + UNI 2 | ✓ | ✓ | 70,10 |
| 10 7400 255 010 | % 255 | 2,2/1,8 | 25,4 | 72 TFF | - | ✓ | ✓ | 44,35 |
| 10 7400 260 010 | • 260 | 2,2/1,8 | 30 | 72 TFF | UNI 1 + UNI 2 | ✓ | ✓ | 73,40 |
| 10 7400 270 010 | • 270 | 2,2/1,8 | 30 | 72 TFF | UNI 1 + UNI 2 | ✓ | ✓ | 73,75 |
| 10 7400 300 010 | • 300 | 2,2/1,8 | 30 | 84 TFF | UNI 1 + UNI 2 | ✓ | ✓ | 82,50 |
| 10 7400 305 010 | • 305 | 2,2/1,8 | 25,4 | 84 TFF | - | ✓ | ✓ | 83,05 |
| 10 7400 320 010 | • 320 | 2,2/1,8 | 30/25,4 | 96 TFF | UNI 1 + UNI 2 | ✓ | ✓ | 100,90 |
| 10 7400 330 010 | • 330 | 2,2/1,8 | 32/30 | 96 TFF | UNI 2 | ✓ | ✓ | 101,90 |
| 10 7400 350 010 | • 350 | 2,2/1,8 | 30 | 100 TFF | UNI 1 + UNI 2 | ✓ | ✓ | 102,85 |
| 10 7400 355 010 | • 355 | 2,2/1,8 | 25,4 | 100 TFF | - | ✓ | ✓ | 102,90 |
| 10 7400 400 010 | • 400 | 2,6/2,0 | 30 | 110 TFF | UNI 1 + UNI 2 | ✓ | ✓ | 152,50 |
| 10 7400 420 010 | • 420 | 2,6/2,0 | 30 | 110 TFF | UNI 1 + UNI 2 | ✓ | ✓ | 160,55 |
| 10 7400 450 010 | • 450 | 2,8/2,4 | 30 | 120 TFF | UNI 1 + UNI 2 | ✓ | ✓ | 188,80 |
| 10 7400 500 010 | • 500 | 3,0/2,6 | 30 | 130 TFF | UNI 1 + UNI 2 | ✓ | ✓ | 217,60 |

UNI 1 = 2-7-42 + 2-9-46,4 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64 • Gefertigt/Manufactured 232,50 mm

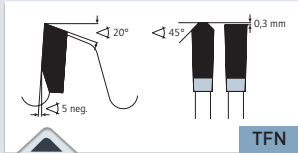
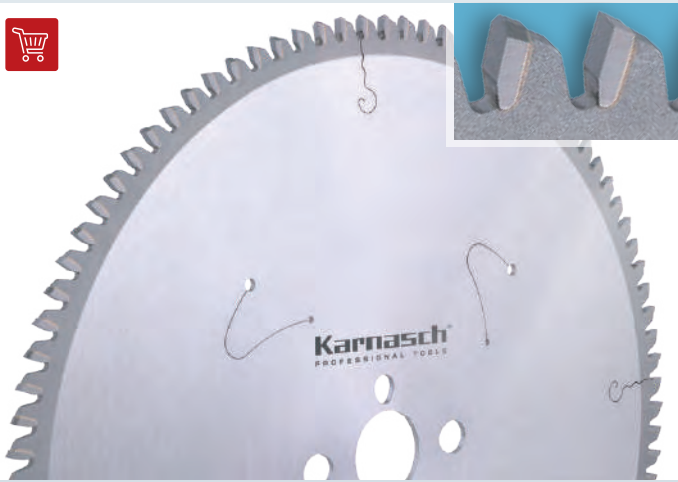
% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Film
Movie



Universal/Dünnbleche · Sandwich · NE-Metalle · Kunststoffe
Universal/Thin sheets · Sandwich · Non-ferrous metals · Plastics

10 8000



- > Trapez-Flachzahn Negativ
- > Triple-chip / flat tooth negative

MASCHINE · MACHINE

Für Elektro Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Radialarmsägen, Tisch- und Formatkreissägen, Akkubetriebene Maschinen.

For portable circular saws, cross-cut saws, panel saws, sizing and mitre saws, table and radial arm saws, battery-driven saws.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Dünnbleche, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Wood with inclusions like nails, clips, concrete residues |
| ✓ | | Gips-Zement-Steinwoolplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Gasbetonsteine | Autoclaved aerated concrete blocks |

ANWENDUNG · APPLICATION

Das ideale Blatt für den Ladenbau, Messebau, Renovierungsarbeiten. Für eine Vielzahl von Materialien wie: Ne-Metalle, Kunststoffe, Plexiglas, Spanplatten, Thermofassadenplatten. Weitere Alu-Negativ Blätter siehe Art. 11 1100 Seite 911, Art. 11 1120 Seite 913 sowie Art. 11 1130 Seite 915.

The ideal blade for shop construction, trade fair construction, renovation work. For many materials such as: non-ferrous metals, plastics, plexiglas, chipboard, thermo façade plates. Other aluminum negative sheets: see item 11 1100 page 911, item 11 1120 page 913, and item 11 1130 page 915.

| Art. | | | | | | | € |
|-----------------|-----------|---------|-------|---------|---------------|---|--------|
| 10 8000 120 010 | ● 120 | 2,8/2,0 | 20 | 34 TFN | - | - | 37,40 |
| 10 8000 136 010 | ● 136 | 2,8/2,0 | 20/10 | 40 TFN | 2-6-32 | - | 43,65 |
| 10 8000 150 010 | ● 150 | 2,8/2,0 | 20/16 | 42 TFN | 2-6-32 | - | 44,95 |
| 10 8000 160 010 | ● 160 | 2,8/2,0 | 20/16 | 42 TFN | 2-6-32 | - | 45,50 |
| 10 8000 165 010 | ● 165 | 2,8/2,0 | 20 | 48 TFN | 2-6-32 | - | 49,10 |
| 10 8000 170 010 | ● 170 | 2,8/2,0 | 30 | 48 TFN | - | - | 49,25 |
| 10 8000 180 010 | ● 180 | 2,8/2,0 | 30 | 48 TFN | UNI 1 | - | 49,85 |
| 10 8000 185 010 | ● 185 | 2,8/2,0 | 20/16 | 48 TFN | 2-6-32 | - | 51,70 |
| 10 8000 190 010 | ● 190 | 2,8/2,0 | 30 | 54 TFN | UNI 1 | - | 55,00 |
| 10 8000 200 010 | ● 200 | 2,8/2,0 | 30 | 54 TFN | UNI 1 | - | 56,15 |
| 10 8000 210 010 | ● 210 | 2,8/2,0 | 30 | 54 TFN | UNI 1 | - | 56,95 |
| 10 8000 216 010 | ● 216 | 2,8/2,0 | 30 | 60 TFN | UNI 1 | - | 62,70 |
| 10 8000 216 020 | ● 216 | 2,8/2,0 | 30 | 80 TFN | UNI 1 | - | 75,25 |
| 10 8000 220 010 | ● 220 | 2,8/2,0 | 30 | 54 TFN | UNI 1 | - | 60,15 |
| 10 8000 230 010 | ● 230/235 | 2,8/2,0 | 30 | 64 TFN | UNI 1 | - | 63,05 |
| 10 8000 240 010 | ● 240 | 2,8/2,0 | 30 | 64 TFN | UNI 1 | - | 63,05 |
| 10 8000 250 010 | ● 250 | 3,2/2,5 | 30 | 60 TFN | UNI 1 + UNI 2 | ✓ | 78,50 |
| 10 8000 250 020 | ● 250 | 3,2/2,5 | 30 | 80 TFN | UNI 1 + UNI 2 | ✓ | 87,40 |
| 10 8000 250 030 | ● 250 | 2,8/2,2 | 30 | 100 TFN | UNI 1 + UNI 2 | ✓ | 108,15 |
| 10 8000 260 010 | ● 260 | 3,2/2,5 | 30 | 80 TFN | UNI 1 + UNI 2 | ✓ | 94,50 |
| 10 8000 270 010 | ● 270 | 3,2/2,5 | 30 | 88 TFN | UNI 1 + UNI 2 | ✓ | 96,60 |
| 10 8000 280 010 | ● 280 | 3,2/2,5 | 30 | 88 TFN | UNI 1 + UNI 2 | ✓ | 99,00 |
| 10 8000 300 010 | ● 300 | 3,2/2,5 | 30 | 72 TFN | UNI 1 + UNI 2 | ✓ | 93,95 |
| 10 8000 300 020 | ● 300 | 3,2/2,5 | 30 | 96 TFN | UNI 1 + UNI 2 | ✓ | 98,35 |
| 10 8000 300 030 | ● 300 | 2,8/2,2 | 30 | 120 TFN | UNI 1 + UNI 2 | ✓ | 128,25 |

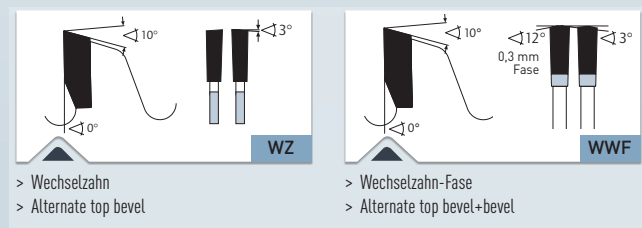
UNI 1 = 2-7-42 + 2-9-46,40 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64
● Gefertigt/Manufactured 232,50 mm

Film
Movie



10 8055

Winkelschleifer + Brutal Einweg-Sägeblätter
Angle Grinder + Brutal disposable saw blades



MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Radialarmsägen, Tisch- und Formatkreissägen, akkubetriebene Maschinen und passend ebenfalls für sogenannte DRY-CUTTER Maschinen mit reduzierten Drehzahlen wie zum Beispiel: JEPSON, RIDGID, ELU, RYOBI...

For portable machines, cross-cut saws, panel and sizing saws, mitre saws, table and radial arms saws, battery-driven saws and suitable also for so-called DRY CUTTER machines with reduced speeds such as: JEPSON, RIDGID, ELU, RYOBI...

- Ø 160-200 mm = 3500-3000 min⁻¹ /rpm
- Ø 210-250 mm = 2800-1900 min⁻¹ /rpm
- Ø 260-305 mm = 1800-1500 min⁻¹ /rpm
- Ø 350-400 mm = 1500-1000 min⁻¹ /rpm

Bei Stahl ist es vorteilhaft mit reduzierten Drehzahlen (min⁻¹) zu arbeiten (siehe Tabelle oben). Die Verwendung von Schneidspray oder Mecutwachs erhöht wesentlich die Standzeit (Schneidöle siehe ab Seite 1144).

For steel, it is beneficial to work at reduced speeds (see table above). Use of cutting spray or Mecut wax increases the service life (for cutting oils, see from page 1144)

10 8056

€
38,00

Blätter 120 mm passen für Winkelschleifer 115 + 125 mm.

Blade diameter 120 mm suitable for angle grinder diameter 115-125 mm.

Verwendung in Europa nur erlaubt mit Schutzhaube (wird komplett mit Spindelmutter, Stirnlochschlüssel, Absaugstutzen und Bedienungsanleitung geliefert).

Use in europe only permitted with protection cover (delivered completely with spindle nut, open-faced spanner, exhaust socket and operating instructions).

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Baustahl | Mild steel |
| ✓ | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| ✓ | | Dünobleche, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Wood with inclusions like nails, clips, concrete residues |
| ✓ | | Weichholz, Hartholz, Exotenholz Längs | Soft wood, hard wood, and exotic wood along the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Furniere | Veneers |
| ✓ | | Profileleisten | Profiled wood |
| ✓ | | Gasbetonsteine | Autoclaved aerated concrete blocks |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |

ANWENDUNG · APPLICATION

Brutal Einweg-Sägeblätter zum Sägen „fast“ aller Materialien. Ideal für Bau und Handwerk. Durch geringe Schnittbreite wenig Schnittverlust sowie Schnittwiderstand. Daher auch ideal für Akku-Maschinen.

Niedrigste Zähnezahl: Zum schnellen Trennen aller Arten von Hölzern (auch mit Nägeln, Klammern), Kunststoffen, NE-Metallen. Grober Schnitt.

Mittlere Zähnezahl: Zum Trennen aller angegebenen Materialien. Mittlere Schnittgüte (Zum Trennen von Baustählen, NE-Metalle empfehlen wir die höchste Zähnezahl).

Höchste Zähnezahl: Zum Trennen aller angegebenen Materialien. Vorzugsweise für alle Metalle, wie Baustähle, Alu und andere NE-Metalle.

Brutal disposable saw blades for sawing "almost" any material. Ideal for construction and crafts. The low cutting width leads to little cutting wastage and cutting resistance. Therefore also ideal for battery-powered machines.

Lowest tooth number: For fast cutting of all kinds of woods (also with nails, clamps, plastics, non-ferrous metals). Coarse cut.

Medium tooth number: For cutting of all specified materials. Medium cutting quality (for cutting of mild steels, non-ferrous metals, we recommend the highest number of teeth).

Highest tooth number: For cutting of all specified materials. Preferably for all metals like mild steels, aluminum and other non-ferrous metals.

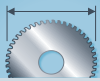




Film
Movie



Winkelschleifer + Brutal Einweg-Sägeblätter
Angle Grinder + Brutal disposable saw blades

10 8055

Bestseller – preisreduziert · Bestseller – price reduced

| Art. |  |  |  |  |  | € |
|----------------------------|---|---|---|--|---|--------|
| 10 8055 120 003 NEW | ● 120 | 2,0/1,4 | 20 | 14 WZ | - | 14,80 |
| 10 8055 120 005 NEW | ● 120 | 2,0/1,4 | 20 | 24 WZ | - | 17,30 |
| 10 8055 120 007 NEW | ● 120 | 2,0/1,4 | 20 | 40 WWF | - | 33,75 |
| 10 8055 120 010 | ● *120 | 2,0/1,4 | 25,4/22 | 14 WZ | - | 15,30 |
| 10 8055 120 020 | ● *120 | 2,0/1,4 | 25,4/22 | 24 WZ | - | 22,60 |
| 10 8055 120 030 | ● *120 | 2,0/1,4 | 25,4/22 | 40 WWF | - | 34,20 |
| 10 8055 136 010 | ● 136 | 2,0/1,4 | 20/10 | 16 WZ | - | 17,50 |
| 10 8055 136 020 | ● 136 | 2,0/1,4 | 20/10 | 30 WZ | - | 27,60 |
| 10 8055 136 030 | ● 136 | 2,0/1,4 | 20/10 | 40 WWF | - | 34,80 |
| 10 8055 160 010 | ● 160 | 2,0/1,4 | 20/16 | 18 WZ | 2-6-32 | 19,50 |
| 10 8055 160 020 | ● 160 | 2,0/1,4 | 20/16 | 30 WZ | 2-6-32 | 28,25 |
| 10 8055 160 030 | ● 160 | 2,0/1,4 | 20/16 | 40 WWF | 2-6-32 | 35,70 |
| 10 8055 165 010 | ● 165 | 2,0/1,4 | 20 | 18 WZ | 2-6-32 | 20,10 |
| 10 8055 165 020 | ● 165 | 2,0/1,4 | 20 | 30 WZ | 2-6-32 | 28,90 |
| 10 8055 165 030 | ● 165 | 2,0/1,4 | 20 | 40 WWF | 2-6-32 | 36,40 |
| 10 8055 180 005 | ● 180 | 2,2/1,6 | 22,22 | 10 WZ | - | 9,58 |
| 10 8055 180 010 | ● 180 | 2,0/1,4 | 30/22/20 | 20 WZ | UNI 1 | 23,45 |
| 10 8055 180 020 | ● 180 | 2,0/1,4 | 30/22/20 | 34 WZ | UNI 1 | 30,75 |
| 10 8055 180 030 | ● 180 | 2,0/1,4 | 30/22/20 | 48 WWF | UNI 1 | 43,75 |
| 10 8055 185 010 | ● 185 | 2,0/1,4 | 20/16 | 20 WZ | 2-6-32 | 22,30 |
| 10 8055 185 020 | ● 185 | 2,0/1,4 | 20/16 | 34 WZ | 2-6-32 | 32,45 |
| 10 8055 185 030 | ● 185 | 2,0/1,4 | 20/16 | 48 WWF | 2-6-32 | 42,65 |
| 10 8055 190 010 | ● 190 | 2,0/1,4 | 30 | 20 WZ | UNI 1 | 21,60 |
| 10 8055 190 020 | ● 190 | 2,0/1,4 | 30 | 34 WZ | UNI 1 | 31,70 |
| 10 8055 190 030 | ● 190 | 2,0/1,4 | 30 | 48 WWF | UNI 1 | 41,95 |
| 10 8055 210 010 | ● 210 | 2,0/1,4 | 30 | 22 WZ | UNI 1 | 24,75 |
| 10 8055 210 020 | ● 210 | 2,0/1,4 | 30 | 36 WZ | UNI 1 | 35,10 |
| 10 8055 210 030 | ● 210 | 2,0/1,4 | 30 | 48 WWF | UNI 1 | 44,00 |
| 10 8055 216 010 | ● 216 | 2,0/1,4 | 30 | 24 WZ | UNI 1 | 27,00 |
| 10 8055 216 020 | ● 216 | 2,0/1,4 | 30 | 36 WZ | UNI 1 | 36,05 |
| 10 8055 216 030 | ● 216 | 2,0/1,4 | 30 | 48 WWF | UNI 1 | 45,00 |
| 10 8055 225 010 | ● 225 | 2,0/1,4 | 30 | 24 WZ | UNI 1 | 27,00 |
| 10 8055 225 020 | ● 225 | 2,0/1,4 | 30 | 36 WZ | UNI 1 | 36,05 |
| 10 8055 225 030 | ● 225 | 2,0/1,4 | 30 | 48 WWF | UNI 1 | 45,00 |
| 10 8055 230 010 | ● 230/235 ● | 2,0/1,4 | 30/22 | 24 WZ | UNI 1 | 28,45 |
| 10 8055 230 020 | ● 230/235 ● | 2,0/1,4 | 30/22 | 36 WZ | UNI 1 | 37,20 |
| 10 8055 230 030 | ● 230/235 ● | 2,0/1,4 | 30/22 | 48 WWF | UNI 1 | 45,90 |
| 10 8055 250 010 | ● 250 | 2,4/1,8 | 30/25,4 | 28 WZ | UNI 1 + UNI 2 | 35,55 |
| 10 8055 250 020 | ● 250 | 2,4/1,8 | 30/25,4 | 44 WZ | UNI 1 + UNI 2 | 47,20 |
| 10 8055 250 030 | ● 250 | 2,4/1,8 | 30/25,4 | 60 WWF | UNI 1 + UNI 2 | 58,80 |
| 10 8055 260 010 | ● 260 | 2,4/1,8 | 30 | 28 WZ | UNI 1 + UNI 2 | 35,55 |
| 10 8055 260 020 | ● 260 | 2,4/1,8 | 30 | 44 WZ | UNI 1 + UNI 2 | 47,20 |
| 10 8055 260 030 | ● 260 | 2,4/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | 58,85 |
| 10 8055 270 010 | ● 270 | 2,4/1,8 | 30 | 30 WZ | UNI 1 + UNI 2 | 37,85 |
| 10 8055 270 020 | ● 270 | 2,4/1,8 | 30 | 46 WZ | UNI 1 + UNI 2 | 49,45 |
| 10 8055 270 030 | ● 270 | 2,4/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | 59,70 |
| 10 8055 280 010 | ● 280 | 2,4/1,8 | 30 | 32 WZ | UNI 1 + UNI 2 | 40,30 |
| 10 8055 280 020 | ● 280 | 2,4/1,8 | 30 | 48 WZ | UNI 1 + UNI 2 | 52,10 |
| 10 8055 280 030 | ● 280 | 2,4/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | 60,95 |
| 10 8055 300 010 | ● 300 | 2,4/1,8 | 30 | 32 WZ | UNI 1 + UNI 2 | 42,80 |
| 10 8055 300 020 | ● 300 | 2,4/1,8 | 30 | 48 WZ | UNI 1 + UNI 2 | 54,65 |
| 10 8055 300 030 | ● 300 | 2,4/1,8 | 30 | 60 WWF | UNI 1 + UNI 2 | 63,65 |
| 10 8055 305 010 | ● 305 | 2,4/1,8 | 30/25,4 | 32 WZ | UNI 1 + UNI 2 | 43,95 |
| 10 8055 305 020 | ● 305 | 2,4/1,8 | 30/25,4 | 48 WZ | UNI 1 + UNI 2 | 55,50 |
| 10 8055 305 030 | ● 305 | 2,4/1,8 | 30/25,4 | 60 WWF | UNI 1 + UNI 2 | 64,35 |
| 10 8055 320 010 | ● 320 | 2,4/1,8 | 30/25,4 | 32 WZ | UNI 1 + UNI 2 | 45,50 |
| 10 8055 320 020 | ● 320 | 2,4/1,8 | 30/25,4 | 48 WZ | UNI 1 + UNI 2 | 57,50 |
| 10 8055 320 030 | ● 320 | 2,4/1,8 | 30/25,4 | 60 WWF | UNI 1 + UNI 2 | 66,50 |
| 10 8055 330 010 | ● 330 | 2,6/2,0 | 32/30 | 36 WZ | - | 49,90 |
| 10 8055 330 020 | ● 330 | 2,6/2,0 | 32/30 | 54 WZ | UNI 2 | 63,30 |
| 10 8055 330 030 | ● 330 | 2,6/2,0 | 32/30 | 72 WWF | - | 76,35 |
| 10 8055 350 010 | ● 350 | 2,6/2,0 | 30 | 36 WZ | UNI 1 + UNI 2 | 54,50 |
| 10 8055 350 020 | ● 350 | 2,6/2,0 | 30 | 54 WZ | UNI 1 + UNI 2 | 67,85 |
| 10 8055 350 030 | ● 350 | 2,6/2,0 | 30 | 72 WWF | UNI 1 + UNI 2 | 81,20 |
| 10 8055 355 010 | ● 355 | 2,6/2,0 | 30/25,4 | 36 WZ | UNI 1 + UNI 2 | 54,80 |
| 10 8055 355 020 | ● 355 | 2,6/2,0 | 30/25,4 | 54 WZ | UNI 1 + UNI 2 | 67,95 |
| 10 8055 355 030 | ● 355 | 2,6/2,0 | 30/25,4 | 72 WWF | UNI 1 + UNI 2 | 81,40 |
| 10 8055 400 010 | ● 400 | 2,8/2,2 | 30 | 42 WZ | UNI 1 + UNI 2 | 77,45 |
| 10 8055 400 020 | ● 400 | 2,8/2,2 | 30 | 60 WZ | UNI 1 + UNI 2 | 94,05 |
| 10 8055 400 030 | ● 400 | 2,8/2,2 | 30 | 84 WWF | UNI 1 + UNI 2 | 116,45 |
| 10 8055 420 010 | ● 420 | 2,8/2,2 | 30 | 42 WZ | UNI 1 + UNI 2 | 79,45 |
| 10 8055 420 020 | ● 420 | 2,8/2,2 | 30 | 60 WZ | UNI 1 + UNI 2 | 96,30 |
| 10 8055 420 030 | ● 420 | 2,8/2,2 | 30 | 84 WWF | UNI 1 + UNI 2 | 118,40 |
| 10 8055 450 010 | ● 450 | 3,2/2,5 | 30 | 48 WZ | UNI 1 + UNI 2 | 96,10 |
| 10 8055 450 020 | ● 450 | 3,2/2,5 | 30 | 72 WZ | UNI 1 + UNI 2 | 118,20 |
| 10 8055 450 030 | ● 450 | 3,2/2,5 | 30 | 96 WWF | UNI 1 + UNI 2 | 140,25 |
| 10 8055 500 010 | ● 500 | 3,4/2,8 | 30 | 54 WZ | UNI 1 + UNI 2 | 119,35 |
| 10 8055 500 020 | ● 500 | 3,4/2,8 | 30 | 84 WZ | UNI 1 + UNI 2 | 146,65 |
| 10 8055 500 030 | ● 500 | 3,4/2,8 | 30 | 108 WWF | UNI 1 + UNI 2 | 168,70 |

UNI 1 = 2-7-42 + 2-9-46,4 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64 ● Gefertigt/Manufactured 232,50 mm

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.



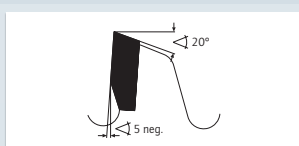
11 1130

Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/Dünnschnitt · Negativ
Hard plastics · Abrasive materials · Finishing-cut/Thin-cut · Negative

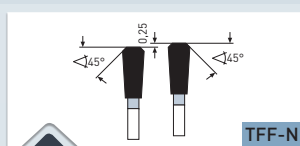


✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|---|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/ façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Dünnscheibe, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Dünne Profile aus Ne-Metall wie Alu, Messing, Kupfer | Thin profiles made of non ferrous materials like alu, copper, brass |



> Trapez Flach Fase Negativ
> Triple-chip/flat tooth negative



TFF-N

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Tisch- und Formatkreissägen, Plattenaufteilsägen, Kappsägen, Akkusägen

For portable circular saws, bench- and sizing saws, panel sizing saws, cross-cut saws, cordless saws.

ANWENDUNG · APPLICATION

Durch spezielles Hartmetall/Zahnform ideal für Fertigschnitte in dünnen Platten und Profilmaterial aus harten Kunststoffen (Thermoplaste) wie: PVC, PE, PA, ABS, PS, POM PC, PMMA (Acrylglas). z.B. Hohlkammerplatten aus PMMA (Acrylglas).

Ebenfalls gut bei abrasiven, zu hohen Schneidenverschleiß führenden Materialien wie: GFK, CFK, Zementplatten, Gipsfaserplatten, Eternit.

Ebenfalls exzellent geeignet für Sandwichmaterialien mit dünnen Deckschichten. Maximale Deckschichtdicke Nicht-Eisen-Metalle / Kunststoffe = 1,0 mm
Maximale Deckschichtdicke Eisenblech = 0,3 mm
Hervorragend auch für dünne Profile bis 1 mm Wandstärke aus Nicht-Eisen-Metalle, wie Alu, Kupfer, Messing.

Durch dünne Schnittbreite wenig Kraftaufwand und Verschnitt. Daher auch ideal für Akku-Maschinen.

Due to special carbide / tooth geometry excellent for finishing cuts in thin plates and profiles made of hard plastics (thermoplastics) such as: PVC, PE, PA, ABS, PS, POM PC, PMMA e.g. hollow section boards of PMMA (acrylic glass).

Also good for abrasive, heavy machining and abrading materials such as: GFK, CFK, fibre cement panels, gypsum, fibre boards, eternit.

Also excellent for sandwich materials with thin layers. Maximum layer thickness for non-ferrous-metals / plastics = 1,0 mm
Maximum layer thickness iron sheet metal = 0,3 mm
Excellent also for thin profiles up to 1 mm thickness made of non-ferrous metal such as aluminum, copper, brass.




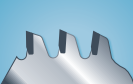



Due to thin cutting width little cutting pressure and waste of material. Therefore also ideal for cordless machines.

Film
Movie



Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/Dünnschnitt · Negativ
Hard plastics · Abrasive materials · Finishing-cut/Thin-cut · Negative

11 1130

| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|--|---|---|--------|
| 11 1130 120 010 | • 120 | 1,8/1,2 | 20 | 48 TFF-N | - | - | - | 50,90 |
| 11 1130 136 010 | • 136 | 1,8/1,2 | 20/10 | 56 TFF-N | 2-6-32 | - | - | 59,35 |
| 11 1130 160 010 | • 160 | 1,8/1,2 | 20/16 | 64 TFF-N | 2-6-32 | - | - | 68,65 |
| 11 1130 190 010 | • 190 | 1,8/1,2 | 30 | 72 TFF-N | UNI 1 | - | - | 77,35 |
| 11 1130 200 010 | • 200 | 2,0/1,4 | 30 | 100 TFF-N | UNI 1 | - | - | 101,25 |
| 11 1130 210 010 | • 210 | 2,0/1,4 | 30 | 100 TFF-N | UNI 1 | - | - | 106,05 |
| 11 1130 216 010 | • 216 | 2,0/1,4 | 30 | 100 TFF-N | UNI 1 | - | - | 107,40 |
| 11 1130 230 010 | • 230/235 | 2,0/1,4 | 30 | 108 TFF-N | UNI 1 | - | - | 115,75 |
| 11 1130 250 010 | • 250 | 2,2/1,8 | 30 | 120 TFF-N | UNI 1 + UNI 2 | ✓ | - | 131,85 |
| 11 1130 260 010 | • 260 | 2,2/1,8 | 30 | 120 TFF-N | UNI 1 + UNI 2 | ✓ | - | 129,55 |
| 11 1130 300 010 | • 300 | 2,4/1,8 | 30 | 128 TFF-N | UNI 1 + UNI 2 | ✓ | - | 146,40 |
| 11 1130 305 010 | • 305 | 2,4/1,8 | 30 | 128 TFF-N | UNI 1 + UNI 2 | ✓ | - | 146,85 |
| 11 1130 330 010 | • 330 | 2,4/1,8 | 30 | 132 TFF-N | UNI 1 + UNI 2 | ✓ | - | 174,95 |
| 11 1130 350 010 | • 350 | 2,4/1,8 | 30 | 132 TFF-N | UNI 1 + UNI 2 | ✓ | - | 175,65 |
| 11 1130 350 020 | • 350 | 2,4/1,8 | 32 | 132 TFF-N | UNI 2 | ✓ | - | 175,65 |
| 11 1130 380 010 | • 380 | 2,4/1,8 | 32 | 132 TFF-N | UNI 2 | ✓ | - | 180,25 |
| 11 1130 400 010 | • 400 | 3,1/2,5 | 30 | 138 TFF-N | UNI 1 + UNI 2 | ✓ | ✓ | 201,60 |
| 11 1130 400 020 | • 400 | 3,1/2,5 | 32 | 138 TFF-N | UNI 2 | ✓ | ✓ | 201,60 |
| 11 1130 420 010 | • 420 | 3,4/2,8 | 30 | 138 TFF-N | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 225,50 |
| 11 1130 420 020 | • 420 | 3,4/2,8 | 40 | 138 TFF-N | 4-12-64 + 2-15-80 | ✓ | ✓ | 225,50 |
| 11 1130 450 010 | • 450 | 3,4/2,8 | 30 | 144 TFF-N | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 255,05 |
| 11 1130 500 010 | • 500 | 3,4/2,8 | 30 | 148 TFF-N | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 285,10 |

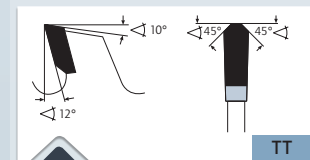
• Gefertigt/Manufactured 232,50 mm

UNI 1 = 2-7-42 + 2-9-46,40 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64

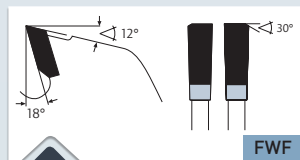


11 1250

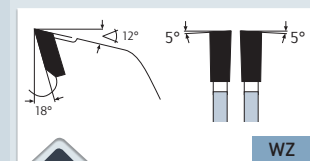
Bausäge
Construction saw



> Trapez-Trapezzahn
> Triple-chip/triple-chip teeth



> Flachzahn Wechsel-Fase
> Flat tooth alternating bevel



> Wechselzahn
> Alternate top bevel

MASCHINE · MACHINE

Für Tischkreissägen, Baukreissägen, Handkreissägen, Tauchsägen

For table circular saws, construction circular saws, portable saws

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Wood with inclusions like nails, clips, concrete residues |
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Weichholz, Hartholz, Exotenholz Längs | Soft wood, hard wood, and exotic wood along the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Gasbetonsteine | Autoclaved aerated concrete blocks |

ANWENDUNG · APPLICATION

Für den harten Allroundeinsatz auf der Baustelle. Schneidet sämtliche Bauhölzer längs und quer. Schalttafeln mit Mörtel, bzw. Blechummantelung, Paletten, Gasbetonsteine, Heraklith, Zementgebundene Faserplatten u.ä. Für höchste Standzeit + sauberen Schnitt siehe Superbausäge Art. 11 1260 auf Seite 965.

For tough all-round application on the building site. Makes longitudinal and cross-cuts in all construction wood. Form-work boards with mortar or sheet metal casing, pallets, aerated concrete, Heraklith products, cemented fibreboard, and similar material. For the highest service life + clean cuts see the super construction saw blades, item 11 1260, on page 965.

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | | | | | | € |
|-----------------|-----------|---------|-------|--------|--------|--------|
| 11 1250 136 010 | % 136 | 2,6/1,6 | 20/10 | 10 TT | 2-6-32 | 6,54 |
| 11 1250 160 010 | • 160 | 2,6/1,6 | 20/16 | 12 TT | 2-6-32 | 17,05 |
| 11 1250 180 010 | % 180 | 2,8/1,8 | 30/20 | 12 TT | 2-7-42 | 8,04 |
| 11 1250 185 010 | % 185 | 2,8/1,8 | 20/16 | 12 TT | 2-6-32 | 8,08 |
| 11 1250 190 010 | • 190 | 2,8/1,8 | 30 | 14 TT | 2-7-42 | 20,25 |
| 11 1250 210 010 | % 210 | 2,8/1,8 | 30 | 14 TT | 2-7-42 | 9,68 |
| 11 1250 216 010 | % 216 | 2,8/1,8 | 30 | 14 TT | 2-7-42 | 9,68 |
| 11 1250 230 010 | • 230/235 | 2,8/1,8 | 30 | 16 TT | 2-7-42 | 24,85 |
| 11 1250 250 010 | • 250 | 3,2/2,2 | 30 | 20 TT | UNI | 29,00 |
| 11 1250 300 010 | • 300 | 3,2/2,2 | 30 | 24 FWF | UNI | 33,30 |
| 11 1250 315 010 | • 315 | 3,2/2,2 | 30 | 24 FWF | UNI | 34,10 |
| 11 1250 350 010 | • 350 | 3,5/2,5 | 30 | 28 FWF | UNI | 42,15 |
| 11 1250 400 010 | • 400 | 4,2/2,8 | 30 | 28 FWF | UNI | 45,60 |
| 11 1250 450 010 | • 450 | 4,2/2,8 | 30 | 32 FWF | UNI | 58,35 |
| 11 1250 500 010 | • 500 | 4,2/2,8 | 30 | 36 FWF | UNI | 71,40 |
| 11 1250 600 010 | • 600 | 4,2/3,0 | 30 | 40 WZ | UNI | 112,95 |
| 11 1250 700 010 | • 700 | 4,4/3,2 | 30 | 46 WZ | UNI | 146,25 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.

Special price / sale article. While stocks last.

UNI = 2-7-42 + 2-9-46,40 + 2-10-60

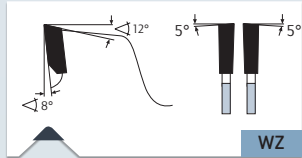
• Gefertigt / Manufactured 232,50 mm

Film
Movie



Super Bausäge
Super construction saw

11 1260



- > Wechselzahn
- > Alternate top bevel

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Tischkreissägen, Formatkreissägen, Baukreissägen, Brennholzkreissägen, Pendelkreissägen, Zugkreissägen.

For portable circular saws, cutting and mitre saws, table circular saws, format circular saws, construction circular saws, firewood saws, pendulum saws, course saws.

ANWENDUNG · APPLICATION

Extrem robustes Blatt für das Bauhandwerk, Schreinereien, Palettenbauer, Dachdecker u.ä.

Höchste Standzeit und saubere Schnitte in: Bauhölzern längs und quer, Schalltafeln mit Mörtel bzw. Blechummantelung, Paletten, Gasbetonsteine, Heraklith- und zementgebundenen Faserplatten, Kunststoffen, Hartfaser- und Spanplatten, Leimholz, Corian, Eternit.

Sogar zum Trennen vom Ne-Profilmaterial wie Alu, Messing, Kupfer.

Extremely durable blade for the building trade, carpenter's workshops, pallet manufacturers, roofers, and similar professions.

For the highest service life and clean cuts in: construction wood, formwork boards with mortar or sheet metal casing, pallets, aerated concrete, Heraklith products and cemented fibreboard, plastics, hard fibreboard and chipboard, laminated wood, Corian, Eternit.

Also for coarse cutting non-ferrous profiled metals, such as aluminum, brass and copper.

- ✓ OPTIMAL · OPTIMAL
- ✓ GUT · GOOD
- ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Holz mit Einschlüssen wie Nägel, Klammern, Beton- und Mörtelreste | Wood with inclusions like nails, clips, concrete residues |
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Gips-Zement-Steinwoolplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Gasbetonsteine | Autoclaved aerated concrete blocks |
| ✓ | | Weichholz, Hartholz, Exotenholz Längs | Soft wood, hard wood, and exotic wood along the grain |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Furniere | Veneers |
| ✓ | | Profilleisten | Profiled wood |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/face panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Dünobleche, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |

| Art. | | | | | | € |
|-----------------|-----------|---------|-------|-------|--------|--------|
| 11 1260 136 010 | ● 136 | 2,8/1,8 | 20/10 | 20 WZ | 2-6-32 | 25,60 |
| 11 1260 150 010 | ● 150 | 2,8/1,6 | 20/16 | 24 WZ | 2-6-32 | 29,20 |
| 11 1260 160 010 | ● 160 | 2,8/1,6 | 20/16 | 24 WZ | 2-6-32 | 29,70 |
| 11 1260 180 010 | ● 180 | 2,8/1,8 | 30/20 | 30 WZ | 2-7-42 | 33,15 |
| 11 1260 185 010 | ● 185 | 2,8/1,8 | 20/16 | 30 WZ | 2-6-32 | 34,75 |
| 11 1260 190 010 | ● 190 | 2,8/1,8 | 30 | 30 WZ | 2-7-42 | 34,75 |
| 11 1260 200 010 | ● 200 | 2,8/1,8 | 30 | 30 WZ | 2-7-42 | 36,35 |
| 11 1260 210 010 | ● 210 | 2,8/1,8 | 30 | 34 WZ | 2-7-42 | 37,70 |
| 11 1260 216 010 | ● 216 | 2,8/1,8 | 30 | 34 WZ | 2-7-42 | 39,25 |
| 11 1260 225 010 | ● 225 | 2,8/1,8 | 30 | 34 WZ | 2-7-42 | 14,62 |
| 11 1260 230 010 | ● 230/235 | 2,8/1,8 | 30 | 34 WZ | 2-7-42 | 39,25 |
| 11 1260 250 010 | ● 250 | 3,0/2,0 | 30 | 42 WZ | UNI | 50,20 |
| 11 1260 260 010 | ● 260 | 3,0/2,0 | 30 | 42 WZ | UNI | 56,30 |
| 11 1260 270 010 | ● 270 | 3,0/2,0 | 30 | 42 WZ | UNI | 21,22 |
| 11 1260 300 010 | ● 300 | 3,2/2,2 | 30 | 48 WZ | UNI | 57,60 |
| 11 1260 315 010 | ● 315 | 3,2/2,2 | 30 | 48 WZ | UNI | 59,20 |
| 11 1260 350 010 | ● 350 | 3,2/2,2 | 30 | 54 WZ | UNI | 74,05 |
| 11 1260 355 010 | ● 355 | 3,2/2,2 | 30 | 54 WZ | UNI | 80,55 |
| 11 1260 400 010 | ● 400 | 3,5/2,5 | 30 | 60 WZ | UNI | 82,70 |
| 11 1260 450 010 | ● 450 | 3,5/2,5 | 30 | 66 WZ | UNI | 97,55 |
| 11 1260 500 010 | ● 500 | 4,0/2,8 | 30 | 72 WZ | UNI | 128,70 |
| 11 1260 600 010 | ● 600 | 4,2/3,0 | 30 | 78 WZ | UNI | 177,90 |
| 11 1260 700 010 | ● 700 | 4,2/3,2 | 30 | 84 WZ | UNI | 217,55 |

● Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

UNI = 2-7-42 + 2-9-46,40 + 2-10-60

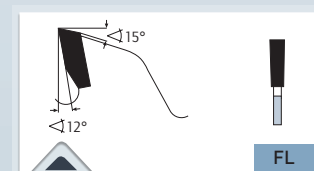
● Getertigt / Manufactured 232,50 mm

Film
Movie



11 1350

Diamant Universal
Diamond Universal



> Flachzahn
> Flat tooth

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Tisch- und Formatkreissägen

For hand-held circular saws, mitre saws, cross-cut saws, table and sizing saws

ANWENDUNG · APPLICATION

Durch DP (Polykristalliner Diamant) Zähne ideal für Zuschnitte sowie Formatschnitte in extrem abrasive, zu hohen Schneidenschleiß führenden Materialien wie: Corian, Trespa, Laminat, MDF, Gips- und Zementgebundene Platten (Faserzement), Steinwollplatten, Heraklith, Eternit.

Blätter mit niedriger Zähnezahl wie: 160 mm mit 4 Zähnen, 190 mm mit 6 Zähnen, 230 mm mit 6 Zähnen, 250 mm mit 6 Zähnen und 300 mm mit 8 Zähnen, sind speziell geeignet für gips- und zementgebundene Platten. (Faserzement)

Speziell hervorragend ebenfalls für Duroplaste wie: Glasfaserverstärkte sowie Kohlefaserverstärkte Kunststoffe (GFK, CFK), Carbon, Aramidfaserkunststoffe (AFK) HP, HPL, PUR.

Niedere Zahnreihe für Zuschnitte, höhere Zahnreihe für Formatschnitte. Achtung: Keine Fertigschnitt-Blatt (DP-Bestückung = 4 mm). Fertigschnitt-Blätter siehe Art. 11 1370 Seite 939

Due to DP (Polycrystalline Diamond) teeth excellent for sizing, formatting, cross cuts in extreme abrasive, heavy machining and abrading materials such as: Corian, Trespa, laminates, MDF, gypsum and cement-bonded boards (fiber cement), Rockwool boards, Heraklith products, Eternit.

Circular saws with the lowest number of teeth as: 160 mm with 4 teeth, 190 mm with 6 teeth, 230 mm with 6 teeth, 250 mm with 6 teeth and 300 mm with 8 teeth, are specially designed for gypsum and cement-bonded panels (fiber cement).

Also excellent for Duroplastic materials such as: Glas fibre plastic (GFK), Carbon fibre plastic (CFK), Carbon, Aramid fibre plastic (AFK), HP, HPL, PUR.

Lower tooth row for sizing, higher tooth row for format cuts. Attention: no finishing cut blade (DP-Tip height = 4 mm). Finishing cut-blades see Art. 11 3070 page 939

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Gasbetonsteine | Autoclaved aerated concrete blocks |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |

| Art. | | | | | | | € |
|----------------------------|-------|---------|-------|-------|----------|---|--------|
| NEW 11 1350 120 010 | • 120 | 2,2/1,6 | 20 | 6 FL | - | ✓ | 44,15 |
| NEW 11 1350 136 010 | • 136 | 2,2/1,6 | 20 | 6 FL | 2-6-32 | ✓ | 47,00 |
| 11 1350 160 005 | • 160 | 2,2/1,6 | 20/16 | 4 FL | 2-6-32,5 | ✓ | 39,70 |
| 11 1350 160 010 | • 160 | 2,2/1,6 | 20/16 | 8 FL | 2-6-32,5 | ✓ | 78,05 |
| 11 1350 160 020 | • 160 | 2,2/1,6 | 20/16 | 30 FL | 2-6-32,5 | ✓ | 231,50 |
| 11 1350 180 010 | • 180 | 2,2/1,6 | 30/20 | 8 FL | 2-7-42 | ✓ | 78,55 |
| 11 1350 190 005 | • 190 | 2,2/1,6 | 30/20 | 6 FL | 2-7-42 | ✓ | 27,45 |
| 11 1350 190 010 | • 190 | 2,2/1,6 | 30/20 | 8 FL | 2-7-42 | ✓ | 79,10 |
| NEW 11 1350 190 015 | • 190 | 2,2/1,6 | 30/20 | 12 FL | 2-7-42 | ✓ | 86,35 |
| 11 1350 190 020 | • 190 | 2,2/1,6 | 30/20 | 30 FL | 2-7-42 | ✓ | 249,60 |
| NEW 11 1350 210 005 | • 210 | 2,2/1,6 | 30 | 8 FL | UNI | ✓ | 81,15 |
| 11 1350 210 010 | • 210 | 2,2/1,6 | 30 | 12 FL | UNI | ✓ | 111,10 |
| 11 1350 210 020 | • 210 | 2,2/1,6 | 30 | 30 FL | UNI | ✓ | 279,05 |
| 11 1350 216 005 | • 216 | 2,2/1,6 | 30 | 8 FL | UNI | ✓ | 81,25 |
| 11 1350 216 010 | • 216 | 2,2/1,6 | 30 | 12 FL | UNI | ✓ | 113,25 |
| 11 1350 216 020 | • 216 | 2,2/1,6 | 30 | 30 FL | UNI | ✓ | 279,05 |
| 11 1350 230 005 | • 230 | 2,4/1,8 | 30 | 6 FL | UNI | ✓ | 32,20 |
| NEW 11 1350 230 007 | • 230 | 2,4/1,8 | 30 | 8 FL | UNI | ✓ | 84,00 |
| 11 1350 230 010 | • 230 | 2,4/1,8 | 30 | 15 FL | UNI | ✓ | 148,30 |
| 11 1350 230 020 | • 230 | 2,4/1,8 | 30 | 30 FL | UNI | ✓ | 279,05 |
| 11 1350 250 005 | • 250 | 2,4/1,8 | 30 | 6 FL | UNI | ✓ | 32,95 |
| NEW 11 1350 250 007 | • 250 | 2,4/1,8 | 30 | 8 FL | UNI | ✓ | 91,65 |
| 11 1350 250 010 | • 250 | 2,4/1,8 | 30 | 16 FL | UNI | ✓ | 164,85 |
| NEW 11 1350 250 015 | • 250 | 2,4/1,8 | 30 | 28 FL | UNI | ✓ | 172,00 |
| 11 1350 250 020 | • 250 | 2,4/1,8 | 30 | 40 FL | UNI | ✓ | 375,65 |
| NEW 11 1350 250 030 | • 250 | 2,4/1,8 | 30 | 48 FL | UNI | ✓ | 382,65 |
| 11 1350 300 005 | • 300 | 2,6/2,0 | 30 | 8 FL | UNI | ✓ | 88,25 |
| NEW 11 1350 300 015 | • 300 | 2,6/1,8 | 30 | 18 FL | UNI | ✓ | 140,30 |
| 11 1350 300 020 | • 300 | 2,6/2,0 | 30 | 36 FL | UNI | ✓ | 360,15 |
| 11 1350 300 030 | • 300 | 2,6/2,0 | 30 | 48 FL | UNI | ✓ | 468,15 |
| 11 1350 300 040 | • 300 | 2,6/2,0 | 30 | 60 FL | UNI | ✓ | 609,20 |
| NEW 11 1350 350 002 | • 350 | 2,8/2,2 | 30 | 10 FL | UNI | ✓ | 122,15 |
| NEW 11 1350 350 004 | • 350 | 2,8/2,2 | 30 | 24 FL | UNI | ✓ | 222,15 |
| NEW 11 1350 350 006 | • 350 | 2,8/2,2 | 30 | 36 FL | UNI | ✓ | 367,95 |
| NEW 11 1350 350 008 | • 350 | 2,8/2,2 | 30 | 48 FL | UNI | ✓ | 390,00 |
| 11 1350 350 010 | • 350 | 2,8/2,2 | 30 | 60 FL | UNI | ✓ | 649,50 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.
UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Film
Movie



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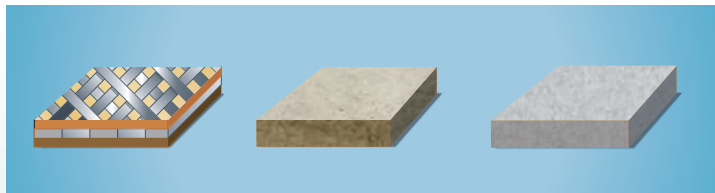


9

Index

Abrasiv

Abrasive



Dieses Kapitel hebt besonders die Bearbeitung von Werkstoffen hervor, die schwierig zu bearbeiten sind und zu hohem Schneidenschleiß führen

This chapter focuses on the machining of materials difficult to machine and causing high cutting edge wear.

Schnittwertempfehlungen · Recommended cutting values

| Werkstoffgruppe Material Group | Werkstoffbeispiele Material examples | Vc (m/s) Schnittgeschwindigkeit Cutting speed | fz (mm/z) Vorschub pro Zahn Feed per tooth | |
|---|--|--|--|-----------|
| Gipsgebunden Gypsum bound | Gipsfaserplatten, Gipsfaserplatten mit MDF/Funier, Gipskartonplatten Gypsum fibre board, gypsum fibre board with MDF/Veneer, gypsum plaster board | 40–65 | 0,1–0,25 | |
| Zementgebunden Cement bound | Zementfaserplatten, Eternit Fibre cement board, Eternit | 40–60 | 0,02–0,05 | |
| Steinwollplatten Rockwool board | Rockwool | 2–8 | 0,01–0,03 | |
| Duroplaste Duroplastics | Glasfaserverstärkte und Kohlefaserverstärkte Kunststoffe GFK/CFK Glass fibre and carbon fibre reinforced plastics GFK/CFK | 20–50 | 0,01–0,03 | |
| | HPL-Schichtstoffplatten HPL (High-Pressure-Laminate) | Trespa®, Resopal®, Wodego®, Duropal®, Formica®, Unilin®, Kronospan®, Homapal®, Decodur®, Abet® | 50–70 | 0,01–0,08 |
| | Mineralwerkstoff Corian, Noblan, Hi-Macs, Staron, Rausolid Mineral material Corian, Noblan, Hi-Macs, Staron, Rausolid | 50–70 | 0,02–0,04 | |
| Mineralisch-Acrylge- bundene Materialien z.B. Küchenplatten/ Waschbecken | Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | 50-70 | 0,02-0,04 | |
| Mineral-Acrylic bound materials e.g. Kitchen worktops/ sink | | | | |

Festlegung der Schnittgeschwindigkeit Vc
 Determination of cutting speed Vc

$$Vc \text{ (m/s)} = \frac{D \cdot \pi \cdot n}{60 \cdot 1000}$$

Vc (m/s) = Schnittgeschwindigkeit · Cutting speed

Festlegung der Vorschubgeschwindigkeit Vf
 Determination of feed rate Vf

$$Vf \text{ (m/min)} = \frac{fz \cdot n \cdot Z}{1000}$$

Vf (m/min) = Vorschubgeschwindigkeit · Feed rate

fz (mm/z) = Vorschub pro Zahn · Feed per tooth

D (mm) = Sägendurchmesser · Saw blade diameter

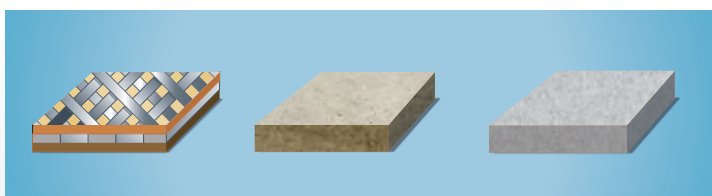
n (min⁻¹) = Drehzahl · rpm

Z = Anzahl der Zähne · Number of teeth

Festlegung der Drehzahl n
 Determination of revolution speed n

$$n \text{ (min}^{-1}\text{)} = \frac{Vc \cdot 1000 \cdot 60}{D \cdot \pi}$$

Abrasive
Abrasive



| Art. Ø mm | Type | Anwendung · Application | |
|--|--|---|-----|
| 11 1130 Ø mm 120-500  | Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/ Dünnschnitt · Negativ | Ideal bei abrasiven, zu hohem Schneidenverschleiß führenden Materialien wie: GFK, CFK, Zementplatten, Gipsfaserplatten, Eternit. Ebenfalls gut für Fertigschnitte in allen Kunststoffen. Exzellent für Hohlkammerplatten aus PMMA (Acrylglas). | 971 |
| | Hard plastics · Abrasive materials · Finishing-cut/Thin-cut · Negative | Ideal for abrasive, heavy machining and abrading materials such as: GFK, CFK, fibre cement panels, gypsum, fibre boards, eternit. Also good for finishing cuts in all plastics. Excellent for hollow section boards for PMMA (acrylic glass). | |
| 11 1350  Ø mm 160-350  | Diamant Universal | Durch DP (Polykristalliner Diamant) Zähne ideal für Zuschnitte sowie Formatschnitte in extrem abrasive, zu hohen Schneidenverschleiß führenden Materialien wie: Corian, Trespa, Laminat, MDF, Gips- und Zementgebun- dene Platten (Faserzement), Steinwollplatten, Heraklith, Eternit (CFK, GFK, Carbon). | 973 |
| | Diamond Universal | Due to DP (Polycrystalline Diamond) teeth excellent for sizing, formatting, cross cuts in extreme abrasive, heavy machining and abrading materials such as: Corian, Trespa, laminates, MDF, gypsum and cement-bonded boards (fiber cement), Rockwool boards, Heraklith pro- ducts, Eternit (CFK, GFK, carbon). | |
| 11 1370  Ø mm 250-350  | Diamant · Formatieren · Fertigschnitt · Harte Kunststoffe · Abrasive Werkstoffe | Durch DP (Polykristalliner Diamant) Zähne ideal zum Trennen extrem abrasiver, zu hohem Schneidenverschleiß führender Materialien. | 975 |
| | Diamond · Panel-sizing · Finishing cut · Hard plastics · Abrasive materials | Due to DP (Polychrystalline Diamond) teeth excellent for cutting extreme abrasive, heavy machining and abrading materials. | |
| 11 1430 Ø mm 120-500  | Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/Dünnschnitt | Fertigschnitte in harte Kunststoffe und abrasive Materialien wie GFK, CFK, Zementfaserplatten/ Gipsfaserplatten, Eternit ... | 977 |
| | Hard plastics · abrasive materials · Finishing-cut / thin-cut | Finishing cuts in hard plastics and abrasive material such as: GFK, CFK, fibre cement panels, gypsum fiber boards, eternit ... | |
| 11 1460 Ø mm 250-400  | Formatieren · Fertigschnitt · Harte Kunststoffe · Abrasive Werkstoffe | Formatieren von Platten/Profilen in verschiedenen Dicken aus harten Kunststoffen. Weiterhin gut bei abrasiven Werkstoffen wie GFK, CFK, Zementfaserplatten/Gips- faserplatten, Eternit ... | 979 |
| | Panel-sizing · Finishing cut · Hard plastics · Abrasive materials | For sizing panels/profiles in various thicknesses. Also very good in abrasive, heavy machining/abrading materi- als such as: GFK, CFK, fibre cement panels, gypsum fiber boards, eternit ... | |

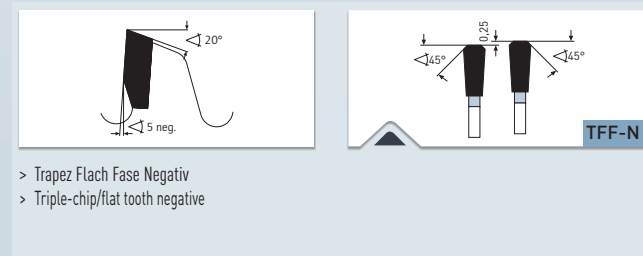
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SELLER



11 1130

Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/Dünnschnitt · Negativ
Hard plastics · Abrasive materials · Finishing-cut/Thin-cut · Negative



MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Tisch- und Formatkreissägen, Plattenaufteilsägen, Kappsägen, Akkusägen

For portable circular saws, bench- and sizing saws, panel sizing saws, cross-cut saws, cordless saws.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Dünnscheibe, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Dünne Profile aus Ne-Metall wie Alu, Messing, Kupfer | Thin profiles made of non ferrous materials like alu, copper, brass |

ANWENDUNG · APPLICATION

Durch spezielles Hartmetall/Zahnform ideal für Fertigschnitte in dünnen Platten und Profilmaterial aus harten Kunststoffen (Thermoplaste) wie: PVC, PE, PA, ABS, PS, POM PC, PMMA (Acrylglas). z.B. Hohlkammerplatten aus PMMA (Acrylglas).

Ebenfalls gut bei abrasiven, zu hohen Schneidenverschleiß führenden Materialien wie: GFK, CFK, Zementplatten, Gipsfaserplatten, Eternit.

Ebenfalls exzellent geeignet für Sandwichmaterialien mit dünnen Deckschichten. Maximale Deckschichtdicke Nicht-Eisen-Metalle / Kunststoffe = 1,0 mm
Maximale Deckschichtdicke Eisenblech = 0,3 mm
Hervorragend auch für dünne Profile bis 1 mm Wandstärke aus Nicht-Eisen-Metalle, wie Alu, Kupfer, Messing.

Durch dünne Schnittbreite wenig Kraftaufwand und Verschnitt. Daher auch ideal für Akku-Maschinen.

Due to special carbide / tooth geometry excellent for finishing cuts in thin plates and profiles made of hard plastics (thermoplastics) such as: PVC, PE, PA, ABS, PS, POM PC, PMMA e.g. hollow section boards of PMMA (acrylic glass).

Also good for abrasive, heavy machining and abrading materials such as: GFK, CFK, fibre cement panels, gypsum, fibre boards, eternit.

Also excellent for sandwich materials with thin layers. Maximum layer thickness for non-ferrous-metals / plastics = 1,0 mm
Maximum layer thickness iron sheet metal = 0,3 mm
Excellent also for thin profiles up to 1 mm thickness made of non-ferrous metal such as aluminum, copper, brass.




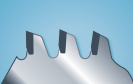



Due to thin cutting width little cutting pressure and waste of material. Therefore also ideal for cordless machines.

Film
Movie



Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/Dünnschnitt · Negativ
Hard plastics · Abrasive materials · Finishing-cut/Thin-cut · Negative

11 1130

| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|--|---|---|--------|
| 11 1130 120 010 | • 120 | 1,8/1,2 | 20 | 48 TFF-N | - | - | - | 50,90 |
| 11 1130 136 010 | • 136 | 1,8/1,2 | 20/10 | 56 TFF-N | 2-6-32 | - | - | 59,35 |
| 11 1130 160 010 | • 160 | 1,8/1,2 | 20/16 | 64 TFF-N | 2-6-32 | - | - | 68,65 |
| 11 1130 190 010 | • 190 | 1,8/1,2 | 30 | 72 TFF-N | UNI 1 | - | - | 77,35 |
| 11 1130 200 010 | • 200 | 2,0/1,4 | 30 | 100 TFF-N | UNI 1 | - | - | 101,25 |
| 11 1130 210 010 | • 210 | 2,0/1,4 | 30 | 100 TFF-N | UNI 1 | - | - | 106,05 |
| 11 1130 216 010 | • 216 | 2,0/1,4 | 30 | 100 TFF-N | UNI 1 | - | - | 107,40 |
| 11 1130 230 010 | • 230/235 | 2,0/1,4 | 30 | 108 TFF-N | UNI 1 | - | - | 115,75 |
| 11 1130 250 010 | • 250 | 2,2/1,8 | 30 | 120 TFF-N | UNI 1 + UNI 2 | ✓ | - | 131,85 |
| 11 1130 260 010 | • 260 | 2,2/1,8 | 30 | 120 TFF-N | UNI 1 + UNI 2 | ✓ | - | 129,55 |
| 11 1130 300 010 | • 300 | 2,4/1,8 | 30 | 128 TFF-N | UNI 1 + UNI 2 | ✓ | - | 146,40 |
| 11 1130 305 010 | • 305 | 2,4/1,8 | 30 | 128 TFF-N | UNI 1 + UNI 2 | ✓ | - | 146,85 |
| 11 1130 330 010 | • 330 | 2,4/1,8 | 30 | 132 TFF-N | UNI 1 + UNI 2 | ✓ | - | 174,95 |
| 11 1130 350 010 | • 350 | 2,4/1,8 | 30 | 132 TFF-N | UNI 1 + UNI 2 | ✓ | - | 175,65 |
| 11 1130 350 020 | • 350 | 2,4/1,8 | 32 | 132 TFF-N | UNI 2 | ✓ | - | 175,65 |
| 11 1130 380 010 | • 380 | 2,4/1,8 | 32 | 132 TFF-N | UNI 2 | ✓ | - | 180,25 |
| 11 1130 400 010 | • 400 | 3,1/2,5 | 30 | 138 TFF-N | UNI 1 + UNI 2 | ✓ | ✓ | 201,60 |
| 11 1130 400 020 | • 400 | 3,1/2,5 | 32 | 138 TFF-N | UNI 2 | ✓ | ✓ | 201,60 |
| 11 1130 420 010 | • 420 | 3,4/2,8 | 30 | 138 TFF-N | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 225,50 |
| 11 1130 420 020 | • 420 | 3,4/2,8 | 40 | 138 TFF-N | 4-12-64 + 2-15-80 | ✓ | ✓ | 225,50 |
| 11 1130 450 010 | • 450 | 3,4/2,8 | 30 | 144 TFF-N | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 255,05 |
| 11 1130 500 010 | • 500 | 3,4/2,8 | 30 | 148 TFF-N | 2-9-46,4 + UNI 2 + 2-10,5-70 | ✓ | ✓ | 285,10 |

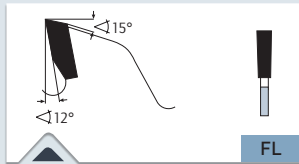
• Gefertigt/Manufactured 232,50 mm

UNI 1 = 2-7-42 + 2-9-46,40 UNI 2 = 2-10-60 + 2-11-63 + 2-12-64



11 1350

Diamant Universal
Diamond Universal



> Flachzahn
> Flat tooth

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Kapp- und Gehrungssägen, Tisch- und Formatkreissägen

For hand-held circular saws, mitre saws, cross-cut saws, table and sizing saws

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropol®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropol®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Gasbetonsteine | Autoclaved aerated concrete blocks |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |

ANWENDUNG · APPLICATION

Durch DP (Polykristalliner Diamant) Zähne ideal für Zuschnitte sowie Formatschnitte in extrem abrasive, zu hohen Schneidenverschleiß führenden Materialien wie: Corian, Trespa, Laminat, MDF, gips- und zementgebundene Platten (Faserzement), Steinwollplatten, Heraklith, Eternit.

Blätter mit niedriger Zähnezahl wie: 160 mm mit 4 Zähnen, 190 mm mit 6 Zähnen, 230 mm mit 6 Zähnen, 250 mm mit 6 Zähnen und 300 mm mit 8 Zähnen, sind speziell geeignet für gips- und zementgebundene Platten. (Faserzement)

Speziell hervorragend ebenfalls für Duroplaste wie: Glasfaserverstärkte sowie Kohlefaser verstärkte Kunststoffe (GFK, CFK), Carbon, Aramidfaserkunststoffe (AFK) HP, HPL, PUR.

Niedere Zahnreihe für Zuschnitte, höhere Zahnreihe für Formatschnitte. Achtung: Kein Fertigschnitt-Blatt (DP-Bestückung = 4 mm). Fertigschnitt-Blätter siehe Art. 11 1370 Seite 939

Due to DP (Polycrystalline Diamond) teeth excellent for sizing, formatting, cross cuts in extreme abrasive, heavy machining and abrading materials such as: Corian, Trespa, laminates, MDF, gypsum and cement-bonded boards (fiber cement), Rockwool boards, Heraklith products, Eternit.

Circular saws with the lowest number of teeth as: 160 mm with 4 teeth, 190 mm with 6 teeth, 230 mm with 6 teeth, 250 mm with 6 teeth und 300 mm with 8 teeth, are specially designed for gypsum and cement-bonded panels (fiber cement).

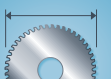




Also excellent for Duroplastic materials such as: Glas fibre plastic (GFK), Carbon fibre plastic (CFK), Carbon, Aramid fibre plastic (AFK), HP, HPL, PUR.

Lower tooth row for sizing, higher tooth row for format cuts. Attention: no finishing cut blade (DP-Tip height = 4 mm). Finishing cut-blades see Art. 11 1370 page 939

Film
Movie



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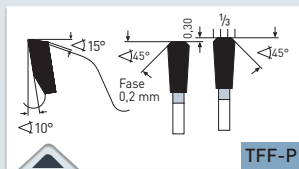
| Art. |  |  |  |  |  |  | € |
|----------------------------|---|---|---|---|---|---|--------|
| NEW 11 1350 120 010 | • 120 | 2,2/1,6 | 20 | 6 FL | - | ✓ | 44,15 |
| NEW 11 1350 136 010 | • 136 | 2,2/1,6 | 20 | 6 FL | 2-6-32 | ✓ | 47,00 |
| 11 1350 160 005 | • 160 | 2,2/1,6 | 20/16 | 4 FL | 2-6-32,5 | ✓ | 39,70 |
| 11 1350 160 010 | • 160 | 2,2/1,6 | 20/16 | 8 FL | 2-6-32,5 | ✓ | 78,05 |
| 11 1350 160 020 | • 160 | 2,2/1,6 | 20/16 | 30 FL | 2-6-32,5 | ✓ | 231,50 |
| 11 1350 180 010 | • 180 | 2,2/1,6 | 30/20 | 8 FL | 2-7-42 | ✓ | 78,55 |
| 11 1350 190 005 | • 190 | 2,2/1,6 | 30/20 | 6 FL | 2-7-42 | ✓ | 27,45 |
| 11 1350 190 010 | • 190 | 2,2/1,6 | 30/20 | 8 FL | 2-7-42 | ✓ | 79,10 |
| NEW 11 1350 190 015 | • 190 | 2,2/1,6 | 30/20 | 12 FL | 2-7-42 | ✓ | 86,35 |
| 11 1350 190 020 | • 190 | 2,2/1,6 | 30/20 | 30 FL | 2-7-42 | ✓ | 249,60 |
| NEW 11 1350 210 005 | • 210 | 2,2/1,6 | 30 | 8 FL | UNI | ✓ | 81,15 |
| 11 1350 210 010 | • 210 | 2,2/1,6 | 30 | 12 FL | UNI | ✓ | 111,10 |
| 11 1350 210 020 | • 210 | 2,2/1,6 | 30 | 30 FL | UNI | ✓ | 279,05 |
| 11 1350 216 005 | • 216 | 2,2/1,6 | 30 | 8 FL | UNI | ✓ | 81,25 |
| 11 1350 216 010 | • 216 | 2,2/1,6 | 30 | 12 FL | UNI | ✓ | 113,25 |
| 11 1350 216 020 | • 216 | 2,2/1,6 | 30 | 30 FL | UNI | ✓ | 279,05 |
| 11 1350 230 005 | • 230 | 2,4/1,8 | 30 | 6 FL | UNI | ✓ | 32,20 |
| NEW 11 1350 230 007 | • 230 | 2,4/1,8 | 30 | 8 FL | UNI | ✓ | 84,00 |
| 11 1350 230 010 | • 230 | 2,4/1,8 | 30 | 15 FL | UNI | ✓ | 148,30 |
| 11 1350 230 020 | • 230 | 2,4/1,8 | 30 | 30 FL | UNI | ✓ | 279,05 |
| 11 1350 250 005 | • 250 | 2,4/1,8 | 30 | 6 FL | UNI | ✓ | 32,95 |
| NEW 11 1350 250 007 | • 250 | 2,4/1,8 | 30 | 8 FL | UNI | ✓ | 91,65 |
| 11 1350 250 010 | • 250 | 2,4/1,8 | 30 | 16 FL | UNI | ✓ | 164,85 |
| NEW 11 1350 250 015 | • 250 | 2,4/1,8 | 30 | 28 FL | UNI | ✓ | 172,00 |
| 11 1350 250 020 | • 250 | 2,4/1,8 | 30 | 40 FL | UNI | ✓ | 375,65 |
| NEW 11 1350 250 030 | • 250 | 2,4/1,8 | 30 | 48 FL | UNI | ✓ | 382,65 |
| 11 1350 300 005 | • 300 | 2,6/2,0 | 30 | 8 FL | UNI | ✓ | 88,25 |
| NEW 11 1350 300 015 | • 300 | 2,6/1,8 | 30 | 18 FL | UNI | ✓ | 140,30 |
| 11 1350 300 020 | • 300 | 2,6/2,0 | 30 | 36 FL | UNI | ✓ | 360,15 |
| 11 1350 300 030 | • 300 | 2,6/2,0 | 30 | 48 FL | UNI | ✓ | 468,15 |
| 11 1350 300 040 | • 300 | 2,6/2,0 | 30 | 60 FL | UNI | ✓ | 609,20 |
| NEW 11 1350 350 002 | • 350 | 2,8/2,2 | 30 | 10 FL | UNI | ✓ | 122,15 |
| NEW 11 1350 350 004 | • 350 | 2,8/2,2 | 30 | 24 FL | UNI | ✓ | 222,15 |
| NEW 11 1350 350 006 | • 350 | 2,8/2,2 | 30 | 36 FL | UNI | ✓ | 367,95 |
| NEW 11 1350 350 008 | • 350 | 2,8/2,2 | 30 | 48 FL | UNI | ✓ | 390,00 |
| 11 1350 350 010 | • 350 | 2,8/2,2 | 30 | 60 FL | UNI | ✓ | 649,50 |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last. · UNI = 2-7-42 + 2-9-46,40 + 2-10-60



11 1370

Diamant · Formatieren · Fertigschnitt · Harte Kunststoffe · Abrasive Werkstoffe
Diamond · Panel-sizing · Finishing cut · Hard plastics · Abrasive materials



TFF-P

- > Trapez-Flachzahn (mit beidseitiger Schutzfase)
- > Triple-chip/flat tooth (with protective chamfer on both sides)

MASCHINE · MACHINE

Für Formatkreissägen, Plattensägen, Tischkreissägen

For sizing saws, panel saws, bench saws

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|---|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoff- platten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineral- werkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |

ANWENDUNG · APPLICATION

Durch DP (Polykristalliner Diamant) Zähne extrem lange Standzeiten gegenüber Hartmetall-bestückte Kreissägeblätter. Ideal für Zuschnitte sowie Formatschnitte in extrem abrasive, zu hohen Schneidenschleiß führenden Materialien wie: Corian, Trespa, Laminat, MDF, Gips- und Zementgebundene Platten, Steinwollplatten, Heraklith, Eternit.

Speziell hervorragend ebenfalls für Duroplaste wie: Glasfaserverstärkte sowie Kohlefaserverstärkte Kunststoffe (GFK, CFK), Carbon, Aramidfaserkunststoffe (AFK) HP, HPL, PUR.

Weiterhin hervorragend für Fertigschnitte in thermoplastische Vollplatten (Acrylglas, PMMA, Polyäthylen, Polyamid usw.) sowie duroplastische Vollplatten (Schichtstoffe, HPL, Hartpapier, Trespa, Resopal, Multiplex). Weiterhin für Polymergebundene Kunststoffe, Mineralwerkstoffe wie Corian, Noblan, Hi-Macs, Staron, Rausolid usw.

Hervorragend ebenfalls für Fertigschnitte in beidseitig kunststoffbeschichteten Plattenwerkstoffe, vorzugsweise in Verbindung mit Vorritzer. Ideal auch zum Schneiden von Kunststoff-Profilen.

Due to DP (Polycrystalline Diamond) teeth extremely long tool life compared to carbide tipped circular saws. Excellent for sizing, formatting, cross cuts in extreme abrasive, heavy machining and abrading materials such as: Corian, Trespa, laminates, MDF, gypsum and cement-bonded boards, Rockwool boards, Heraklith products, Eternit.

Also excellent for Duroplastic materials such as: Glas fibre plastic (GFK), Carbon fibre plastic (CFK), Carbon, Aramid fibre plastic (AFK), HP, HPL, PUR.

For finishing cuts in solid thermoplastic boards (PMMA, acrylic glass, polyethylene, polyamide etc.) and solid duroplastic boards (HPL-high-pressure-laminate, HP-Hardpaper, phenolic resin bonded paper, phenolic laminated cotton sheets, Trespa, Resopal, Multiplex). Also for polymer-bound plastics, mineral materials such as Corian, Noblan, Hi-Macs, Staron, Rausolid etc.




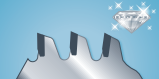






Excellent also for finishing cuts in double-side plastic coated boards, preferably in combination with coring sawblades. Ideal also for cutting plastic profiles.


Film
Movie



Diamant · Formatieren · Fertigschnitt · Harte Kunststoffe · Abrasive Werkstoffe
Diamond · Panel-sizing · Finishing cut · Hard plastics · Abrasive materials

11 1370

| Art. |  |  |  |  |  |  | DP-Bestückungshöhe DP-Tip high | € |
|-----------------|---|---|---|---|--|---|-----------------------------------|--------|
| 11 1370 250 020 |  250 | 3,2/2,2 | 30 | 80 TFF-P | UNI |  | 5 mm | 465,02 |
| 11 1370 303 030 |  303 | 3,2/2,2 | 30 | 96 TFF-P | UNI |  | 4 mm | 553,68 |

 Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

UNI = 2-7-42 + 2-9-46,40 + 2-10-60



Bei Kunststoff/Melamin beschichtete Plattenwerkstoffe Vorritzen empfohlen. Ritzter siehe Seite 983/1037. Sägen von beschichteten/furnierten Plattenwerkstoffe ohne Vorritzer siehe Seite 935, 1005, 1007, 1009, 1011, 1012

For plastic coated/melamine boards scoring recommended. Scorer see page 983/1037. Cutting of coated/veneered boards without scorer see page 935, 1005, 1007, 1009, 1011, 1012

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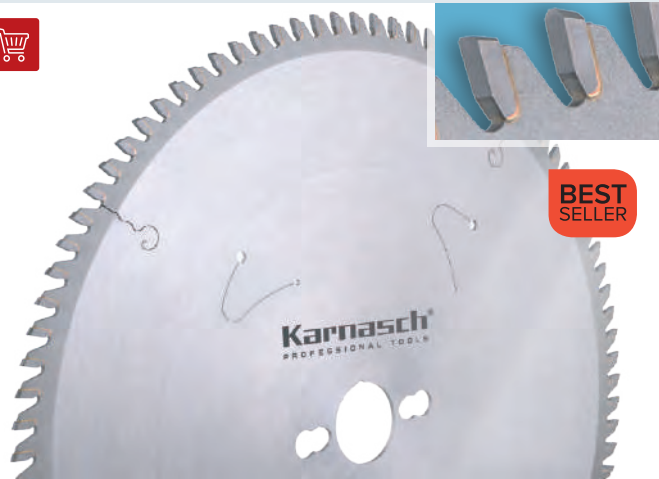


11 1430

Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/Dünnschnitt
Hard plastics · Abrasive materials · Finishing-cut / thin-cut

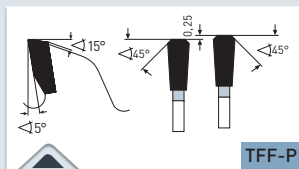


**BEST
SELLER**



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Dünnbleche, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Dünne Profile aus Ne-Metall wie Alu, Messing, Kupfer | Thin profiles made of non ferrous materials like alu, copper, brass |



TFF-P

- > Trapez Flach Fase Positiv
- > Triple-chip/triple-chip teeth

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Tisch- und Formatkreissägen, Plattenaufteilsägen, Kappsägen, Akkusägen

For portable circular saws, bench- and sizing saws, panel sizing saws, cross-cut saws, cordless saws.

ANWENDUNG · APPLICATION

Durch spezielles Hartmetall/Zahnform ideal für Fertigschnitte in dünnen Platten und Profilmaterial aus harten Kunststoffen (Thermoplaste) wie: PVC, PE, PA, ABS, PS, POM PC, PMMA (Acrylglas). Z.B. Hohlkammerplatten aus PMMA (Acrylglas).

Ebenfalls gut bei abrasiven, zu hohen Schneidenverschleiß führenden Materialien wie: GFK, CFK, Zementplatten, Gipsfaserplatten, Eternit.

Sie wünschen:

- Eine noch höhere Zähnezahl um die Schnittgüte/Standzeit zu verbessern?
 - Durch negativen Spanwinkel verbesserte Kontrolle bei Handvorschub?
 - Durch negativen Spanwinkel höhere Unempfindlichkeit gegen Zahnbruch?
- Siehe Art: 11 1130, Seite 971

Durch dünne Schnittbreite wenig Kraftaufwand und Verschnitt. Daher auch ideal für Akku-Maschinen.

Due to special carbide / tooth geometry excellent for finishing cuts in thin plates and profiles made of hard plastics (thermoplastics) such as: PVC, PE, PA, ABS, PS, POM PC, PMMA e.g. hollow section boards of PMMA (acrylic glass).

Also good for abrasive, heavy machining and abrading materials such as: GFK, CFK, fibre cement panels, gypsum, fibre boards, eternit.

You want:

- Even higher number of teeth to improve the cutting quality/tool life?
 - Due to negative rake angle improves control with manual feed?
 - Due to negative rake angle higher insensitivity to tooth breakage?
- See Art. 11 1130, page 971

Due to thin cutting width little cutting pressure and waste of material. Therefore also ideal for cordless machines.




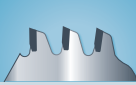


Film
Movie



Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/Dünnschnitt
Hard plastics · Abrasive materials · Finishing-cut / thin-cut

11 1430

Bestseller – preisreduziert · Bestseller – price reduced

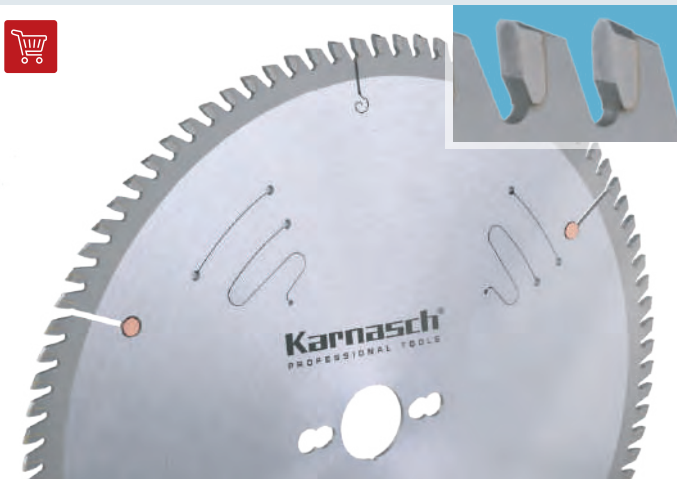
| Art. |  |  |  |  |  |  | € |
|----------------------------|---|---|---|---|---|---|--------|
| 11 1430 120 010 | • 120 | 1,8/1,2 | 20 | 40 TFF-P | - | - | 37,30 |
| 11 1430 136 010 NEW | • 136 | 1,8/1,2 | 20/10 | 48 TFF-P | - | - | 43,00 |
| 11 1430 160 010 | • 160 | 1,8/1,2 | 20/16 | 56 TFF-P | 2-6-32 | - | 45,30 |
| 11 1430 180 010 | • 180 | 1,8/1,2 | 20/16 | 60 TFF-P | 2-6-32 | - | 50,55 |
| 11 1430 190 010 | • 190 | 1,8/1,2 | 30/20 | 60 TFF-P | 2-7-42 | - | 51,15 |
| 11 1430 200 010 | • 200 | 2,0/1,4 | 30 | 64 TFF-P | 2-7-42 | - | 52,15 |
| 11 1430 210 010 | • 210 | 2,0/1,4 | 30 | 64 TFF-P | 2-7-42 | - | 53,00 |
| 11 1430 225 010 | • 225 | 2,0/1,4 | 30 | 68 TFF-P | 2-7-42 | - | 58,45 |
| 11 1430 230 010 | • 230/235 ● | 2,0/1,4 | 30 | 68 TFF-P | 2-7-42 | - | 59,15 |
| 11 1430 250 010 | • 250 | 2,4/1,8 | 30 | 80 TFF-P | UNI | ✓ | 70,05 |
| 11 1430 250 020 NEW | • 250 | 2,2/1,8 | 30 | 120 TFF-P | UNI | ✓ | 113,00 |
| 11 1430 300 010 | • 300 | 2,4/1,8 | 30 | 96 TFF-P | UNI | ✓ | 84,85 |
| 11 1430 300 020 NEW | • 300 | 2,4/1,8 | 30 | 128 TFF-P | UNI | ✓ | 125,50 |
| 11 1430 350 010 | • 350 | 2,4/1,8 | 30 | 108 TFF-P | UNI | ✓ | 98,85 |
| 11 1430 350 020 NEW | • 350 | 2,4/1,8 | 30 | 132 TFF-P | UNI | ✓ | 150,55 |
| 11 1430 400 010 | • 400 | 3,2/2,5 | 30 | 120 TFF-P | UNI | ✓ | 117,35 |
| 11 1430 400 020 NEW | • 400 | 3,1/2,5 | 30 | 138 TFF-P | UNI | ✓ | 172,80 |
| 11 1430 450 010 | • 450 | 3,5/2,8 | 30 | 132 TFF-P | UNI | ✓ | 181,25 |
| 11 1430 450 020 NEW | • 450 | 3,4/2,8 | 30 | 144 TFF-P | UNI | ✓ | 218,60 |
| 11 1430 500 010 | • 500 | 3,5/2,8 | 30 | 144 TFF-P | UNI | ✓ | 234,00 |

● Gefertigt/Manufactured 232,50 mm · UNI = 2-7-42 + 2-9-46,40 + 2-10-60



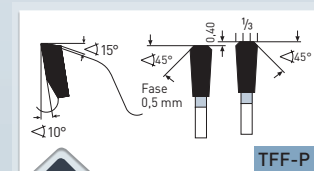
11 1460

Formatieren · Fertigschnitt · Harte Kunststoffe · Abrasive Werkstoffe
Panel-sizing · Finishing cut · Hard plastics · Abrasive materials



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|---|
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoff- platten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineral- werkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |



TFF-P

- > Trapez-Flachzahn (Flachzahn mit Fase)
- > Triple-chip/flat tooth (flat tooth with chamfer on both sides)

ANWENDUNG · APPLICATION

Zum Formatieren von Platten in verschiedenen Dicken, Paketschnitte aus Thermo-
plaste wie: PVC, PE, PA, ABS, PS, POM.

Hervorragend auch zum Schneiden von Kunststoffprofilen sowie für Fertigschnitte in
beidseitig kunststoffbeschichtete Span- und Faserwerkstoffe/Platten vorzugsweise in
Verbindung mit Ritzer.

Durch spezielles Hartmetall auch gut bei abrasiven zu schnellem Schneidenver-
schleiß führenden Verbundstoffen wie faserverstärkte Gipskartonplatten, GFK, CFK.

Ebenfalls ideal für Duroplaste wie HPL Schichtstoff (Trespa, Resopal) und Mineral-
werkstoffe wie Corian, Noblan, Staron usw.

For sizing panels of various thicknesses, cutting stacks made of thermoplastics
such as: PVC, PE, PA, ABS, PS, POM.

Excellent also for cutting plastic profiles and finishing cuts in double-side plastic
coated chip- and hard fibre materials/boards in combination with scoring sawblades.

Due to special carbide teeth also good for cutting abrasive, heavy machining and
abrading materials such as HPL, high-pressure-laminate (Trespa, Resopal) and
mineral materials such as corian, noblan, staron etc.

MASCHINE · MACHINE

Für Formatkreissägen, Plattensägen, Tischkreissägen







For sizing saws, panel saws, bench saws

Film
Movie



Formatieren · Fertigschnitt · Harte Kunststoffe · Abrasive Werkstoffe
Panel-sizing · Finishing cut · Hard plastics · Abrasive materials

11 1460

| Art. |  |  |  |  |  |  | € |
|----------------------------|---|---|---|---|---|---|--------|
| 11 1460 250 010 | • 250 | 3,2/2,2 | 30 | 60 TFF-P | UNI | ✓ | 81,75 |
| 11 1460 250 020 | • 250 | 3,2/2,2 | 30 | 80 TFF-P | UNI | ✓ | 102,55 |
| 11 1460 300 010 | • 300 | 3,2/2,2 | 30 | 72 TFF-P | UNI | ✓ | 99,75 |
| 11 1460 300 020 | • 300 | 3,2/2,2 | 30 | 96 TFF-P | UNI | ✓ | 120,00 |
| 11 1460 303 010 | • 303 | 3,2/2,2 | 30 | 60 TFF-P | UNI | ✓ | 32,54 |
| 11 1460 303 020 | • 303 | 3,2/2,2 | 30 | 72 TFF-P | UNI | ✓ | 99,75 |
| 11 1460 303 030 | • 303 | 3,2/2,2 | 30 | 96 TFF-P | UNI | ✓ | 120,00 |
| 11 1460 350 010 | • 350 | 3,2/2,2 | 30 | 84 TFF-P | UNI | ✓ | 118,55 |
| 11 1460 350 020 | • 350 | 3,2/2,2 | 30 | 108 TFF-P | UNI | ✓ | 143,20 |
| 11 1460 400 010 | • 400 | 3,5/2,5 | 30 | 120 TFF-P | UNI | ✓ | 158,80 |
| NEW 11 1460 450 010 | • 450 | 3,5/2,5 | 30 | 132 TFF-P | UNI | ✓ | 187,35 |
| NEW 11 1460 500 010 | • 500 | 3,8/2,8 | 30 | 144 TFF-P | UNI | ✓ | 219,55 |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

UNI = 2-7-42 + 2-9-46,40 + 2-10-60



Bei Kunststoff/Melamin beschichtete Plattenwerkstoffe Vorritzen empfohlen. Ritzer siehe Seite 1037. Sägen von beschichteten/furnierten Plattenwerkstoffe ohne Vorritzer siehe Seite 983

For plastic coated/melamine boards scoring recommended. Scorer see page 1037. Cutting of coated/veneered boards without scorer see page 983

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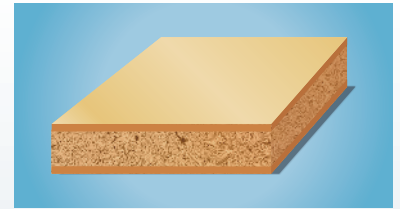


9

Index

Plattenaufteilung (Formatieren) großflächig

Panel sizing large-scale



Schnittwertempfehlungen · Recommended cutting values

| Werkstoffgruppe Material Group | Werkstoffbeispiele Material examples | Vc (m/s) Schnittgeschwindigkeit Cutting speed | fz (mm/z) Vorschub pro Zahn Feed per tooth |
|--|---|---|--|
| Furnierte Platten · Veneered panels | Multiplex | 60–90 | 0,2 |
| HDF (Hochdichte Faserplatte) · HDF (High density fiber board) | Hartfaserplatte · Beaver board | 50–80 | 0,15 |
| MDF (Mitteldichte Faserplatte) · MDF (medium density fiber board) | Doppelstegplatten · Twin-wall panel | 60–80 | 0,1–0,3 |
| OSB-Platten · OSB-Oriented Strand Board | Verlegeplatten · Particle board | 60–80 | 0,1–0,2 |
| Pressschichtholz · Lumber-core plywood | | 40–65 | 0,02–0,06 |
| Spanplatten roh · Chipboard raw | | 60–80 | 0,3 |
| Spanplatten Kunststoff Beschichtet · Chipboard plastic coated | Melamin, HPL, CPL | 60–80 | 0,15 |
| Tischlerplatten (Stabplatten, Stäbchenplatten) · Plywood (lumber-core, rod-shaped) | | 60–80 | 0,1–0,2 |
| Weichfaserplatten · Softboard | | 60–100 | 0,2–0,4 |
| Sperrholz, Lagenholz · Plywood, Iminated layers | | 50–80 | 0,05–0,25 |
| Duroplaste · Duroplastics | HPL-Schichtstoffplatten HPL (High-Pressure-Laminate) Trespa®, Resopal®, Wodego®, Duropal®, Formica®, Unilin®, Kronospan®, Homapal®, Decodur®, Abet® | 50–70 | 0,01–0,08 |
| Mineralisch-Acrylgebundene Materialien · Mineral-Acrylic bound materials | Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | 50–70 | 0,02–0,04 |

Drehzahl n (U/min) · Revolution per minute n (rpm)

| | 1500 | 2000 | 2500 | 2850 | 3000 | 4000 | 4500 | 5000 | 5600 | 6000 | 8000 | 9000 | 10000 | 12000 | 18000 |
|-------|------|------|------|------|------|------|------|------|-------|-------|------|------|-------|-------|-------|
| 80 Ø | 6,5 | 8,5 | 10,5 | 12 | 13 | 17 | 19 | 21 | 23,5 | 26 | 34 | 38 | 42 | 52 | 76 |
| 90 Ø | 7 | 9,5 | 12 | 13,5 | 14 | 19 | 21 | 24 | 26,5 | 28 | 38 | 42 | 48 | 56 | 84 |
| 100 Ø | 8 | 10,5 | 13 | 15 | 16 | 21 | 24 | 26 | 29 | 32 | 42 | 48 | 52 | 54 | 96 |
| 120 Ø | 9,5 | 13 | 16 | 18 | 19 | 26 | 28 | 32 | 35 | 38 | 52 | 56 | 64 | 76 | 112 |
| 125 Ø | 10 | 13,5 | 16,5 | 18,5 | 19,5 | 27 | 29 | 33 | 36,5 | 39 | 54 | 59 | 66 | 78 | 118 |
| 140 Ø | 11 | 15 | 18 | 21 | 22 | 30 | 33 | 36 | 41 | 44 | 60 | 66 | 72 | 88 | 132 |
| 150 Ø | 12 | 15,5 | 19,5 | 22,5 | 23,5 | 31,5 | 33,5 | 39 | 44 | 47 | 63 | 70,5 | 78,5 | 94,5 | 141,5 |
| 160 Ø | 13 | 17 | 21 | 24 | 26 | 34 | 38 | 42 | 47 | 52 | 68 | 76 | 84 | 104 | 152 |
| 180 Ø | 14 | 19 | 24 | 27 | 28 | 38 | 42,5 | 48 | 53 | 56 | 76 | 85 | 96 | 118 | 170 |
| 200 Ø | 16 | 21 | 26 | 30 | 32 | 42 | 47 | 52 | 58,5 | 64 | 84 | 94 | 104 | 128 | 188 |
| 225 Ø | 18 | 24 | 30 | 33,5 | 36 | 48 | 58 | 60 | 66 | 72 | 96 | 106 | 120 | 144 | 212 |
| 250 Ø | 20 | 26 | 33 | 37 | 40 | 52 | 59 | 66 | 73,5 | 80 | 104 | 118 | 132 | 160 | 236 |
| 300 Ø | 24 | 31,5 | 40 | 45 | 48 | 63 | 71 | 80 | 88 | 96 | 126 | 142 | 160 | 192 | 284 |
| 350 Ø | 28 | 36,5 | 47 | 52 | 56 | 73 | 88 | 94 | 105 | 112 | 146 | 166 | 188 | 224 | 332 |
| 400 Ø | 32 | 42 | 54 | 60 | 64 | 84 | 94 | 108 | 117 | 128 | 168 | 188 | 216 | 256 | 376 |
| 450 Ø | 35,5 | 47 | 59 | 67,5 | 70,5 | 94,5 | 106 | 118 | 132 | 141,6 | 188 | 211 | 236 | 283 | 424 |
| 500 Ø | 40 | 53 | 67 | 74,5 | 80 | 106 | 118 | 134 | 146,5 | 160 | 212 | 236 | 268 | 320 | 472 |

Schnittgeschwindigkeit in m/s · Cutting speed in m/s

1 Platten · Panels

2 Sicherheitsgrenze · Safety limits

Festlegung der Schnittgeschwindigkeit Vc
 Determination of cutting speed Vc

$$Vc (m/s) = \frac{D \cdot \pi \cdot n}{60 \cdot 1000}$$

Festlegung der Vorschubgeschwindigkeit Vf
 Determination of feed rate Vf

$$Vf (m/min) = \frac{fz \cdot n \cdot Z}{1000}$$

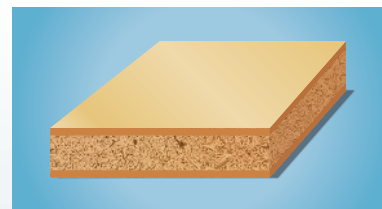
Festlegung der Drehzahl n
 Determination of revolution speed n

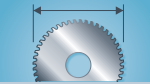
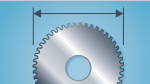
$$n (min^{-1}) = \frac{Vc \cdot 1000 \cdot 60}{D \cdot \pi}$$

- Vc (m/s) = Schnittgeschwindigkeit · Cutting speed
- Vf (m/min) = Vorschubgeschwindigkeit · Feed rate
- fz (mm/z) = Vorschub pro Zahn · Feed per tooth
- D (mm) = Sägendurchmesser · Saw blade diameter
- n (min⁻¹) = Drehzahl · rpm
- Z = Anzahl der Zähne · Number of teeth

Plattenaufteilung (Formatieren) großflächig

Panel sizing large-scale



| Art. Ø mm | Type | Anwendung · Application | |
|---|---|--|-----|
| 11 1510 Ø mm 300-450  | Plattenaufteilsägen großflächig | Für Formatschnitte in beschichtete Holzwerkstoffe einzeln und im Paket sowie Duroplaste. | 983 |
| | Large-scale panel sizing blades | For panel sizing plastic laminated and foil-coated wood-based material and duroplastics. | |
| 11 1520 Ø mm 125-200  | Konische Ritzer passend für obige Plattenaufteilsägen | Konische Ritzer passend für obige Plattenaufteilsägen | 983 |
| | Conical scoring blades suitable for above mentioned panel sizing blades | Conical scoring blades suitable for above mentioned panel sizing blades | |

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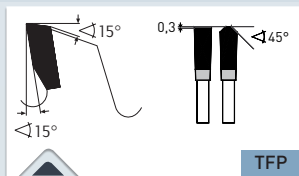
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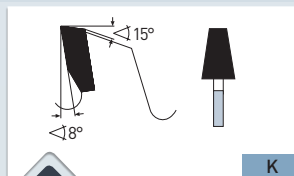
11 1510

Plattenaufteilsägen + konischer Ritzer
Panel sizing saws + conical scoring blades

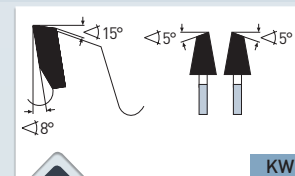
11 1520



> Trapez Flach Positiv
> Trapezoidal flat top positive



> Konisch Flachzahn
> Flat tooth conical



> Konisch-Wechselzahn
> Alternative top bevel conical

MASCHINE · MACHINE

Plattenaufteilanlagen horizontal mit Vorritzaggregat
Panel sizing machine horizontal with scoring aggregate

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |

ANWENDUNG · APPLICATION

Für Formatschnitte in beschichtete Holzwerkstoffe einzeln und im Paket, Duroplaste

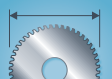


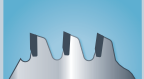


For panel sizing plastic laminated and foil-coated wood-based material and duroplastics

Film
Movie



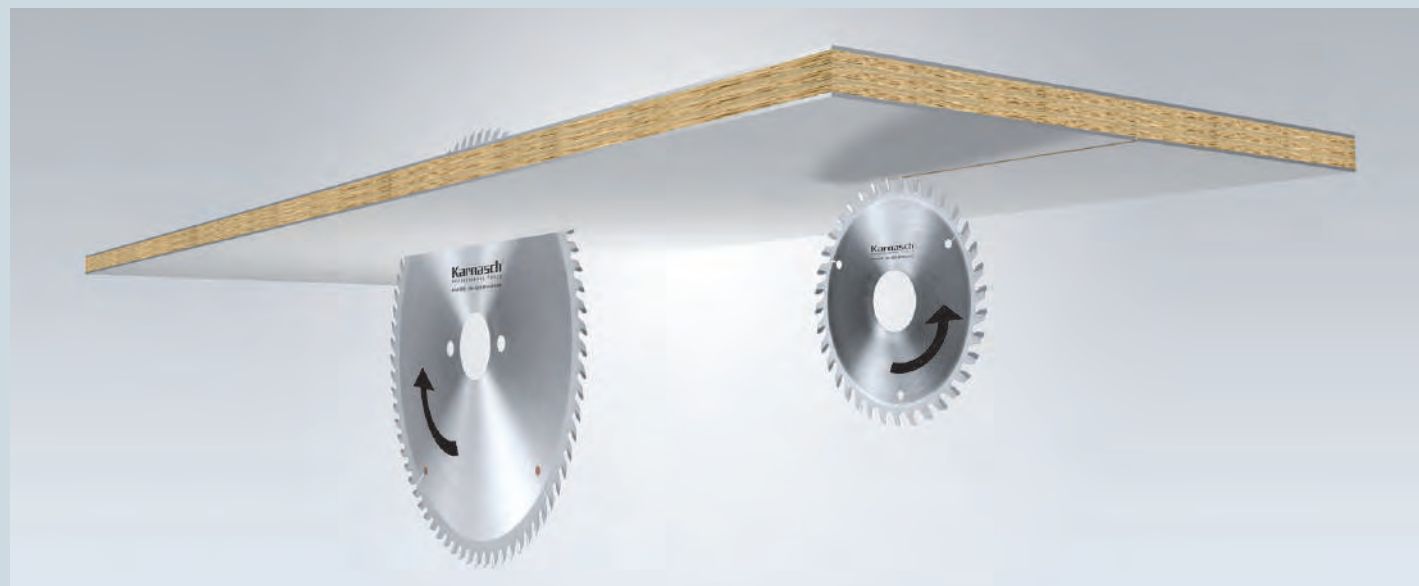
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- 3
- 4
- 5
- 6
- 7
- 8
- 9

Plattenaufteilsägen + konischer Ritzer
Panel sizing saws + conical scorers

| Art. | Art. | HAUPTSÄGE + PASSENDER RITZER MAIN SAW BLADE + SUITABLE SCORING BLADE |  |  |  |  |  |  | € | |
|-----------------|-----------------|--|---|---|---|--|---|---|-------|--|
| 11 1510 320 010 | - | SELCO + Ritzer/Scorer | 320 | 4,4/3,2 | 65 | 60 TFP | 2-9-110 | ✓ | 60,64 | |
| - | 11 1520 200 010 | | 200 | 4,4-5,2/3,2 | 65 | 36 K | 2-9-110 + 2-9-100 | - | 47,48 | |
| 11 1510 350 010 | - | Mayer + Ritzer/Scorer | 350 | 4,4/3,2 | 30 | 72 TFP | 2-10-60 | ✓ | 70,46 | |
| - | 11 1520 200 020 | | 200 | 4,4-5,2/3,2 | 30 | 36 KW | 2-9-60 | - | 46,36 | |
| 11 1510 350 010 | - | Panhans + Ritzer/Scorer | 350 | 4,4/3,2 | 30 | 72 TFP | 2-10-60 | ✓ | 70,46 | |
| - | 11 1520 200 020 | | 200 | 4,4-5,2/3,2 | 30 | 36 KW | 2-9-60 | - | 46,36 | |
| 11 1510 350 010 | - | Scheer + Ritzer/Scorer | 350 | 4,4/3,2 | 30 | 72 TFP | 2-10-60 | ✓ | 70,46 | |
| - | 11 1520 200 020 | | 200 | 4,4-5,2/3,2 | 30 | 36 K | 2-9-60 | - | 46,36 | |
| 11 1510 350 010 | - | Schelling + Ritzer/Scorer | 350 | 4,4/3,2 | 30 | 72 TFP | 2-10-60 | ✓ | 70,46 | |
| - | 11 1520 200 030 | | 200 | 4,4-5,2/3,2 | 20 | 36 K | - | - | 46,36 | |
| 11 1510 350 020 | - | Holzma + Ritzer/Scorer | 350 | 4,4/3,2 | 60 | 72 TFP | 2-14-100 | ✓ | 70,46 | |
| - | 11 1520 180 010 | | 180 | 4,4-5,2/3,2 | 45 | 36 K | - | - | 48,36 | |
| 11 1510 355 010 | - | Homag Espana + Ritzer/scorer | 355 | 4,4/3,2 | 75 | 72 TFP | - | ✓ | 71,58 | |
| - | 11 1520 180 010 | | 180 | 4,4-5,2/3,2 | 45 | 36 K | - | - | 48,36 | |
| 11 1510 380 010 | - | Holzma + Ritzer/Scorer | 380 | 4,8/3,5 | 60 | 72 TFP | 2-14-100 | ✓ | 81,86 | |
| - | 11 1520 180 020 | | 180 | 4,8-5,6/3,5 | 45 | 36 K | - | - | 48,36 | |
| 11 1510 380 020 | - | Holzma + Ritzer/Scorer | 380 | 4,4/3,2 | 60 | 72 TFP | 2-14-100 | ✓ | 75,56 | |
| - | 11 1520 180 010 | | 180 | 4,4-5,2/3,2 | 45 | 36 K | - | - | 48,36 | |
| 11 1510 450 010 | - | Holzma + Ritzer/Scorer | 450 | 4,8/3,5 | 60 | 72 TFP | 2-14-125 | ✓ | 91,52 | |
| - | 11 1520 180 020 | | 180 | 4,8-5,6/3,5 | 45 | 36 K | - | - | 48,36 | |
| - | 11 1520 125 020 | Altendorf, Martin + Ritzer/Scorer | Siehe/See Art. 11 1470 Seite/Page 1003, Siehe/See Art. 11 1370, Seite/Page 995, Siehe/See Art. 11 1460, Seite/Page 1001 | | | | | | | |
| | | | 125 | 3,1-4,3/2,8 | 22/20 | 24 KW | - | - | 35,86 | |

⊘ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Weitere Abmessungen auf Anfrage / Other dimensions are available on request



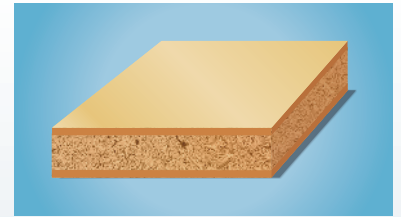
Bei Kunststoff/Melamin beschichtete Plattenwerkstoffe Vorritzen empfohlen.
Ritzer siehe Seite 1037. Sägen von beschichteten/furnierten Plattenwerkstoffe
ohne Vorritzer siehe Seite 935

For plastic coated/melamine boards scoring recommended. Scorer see
page 1037. Cutting of coated/veneered boards without scorer see page 935

- 1 
- 2 
- 3 
- 4 
- 5 
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Formatieren

Panel sizing



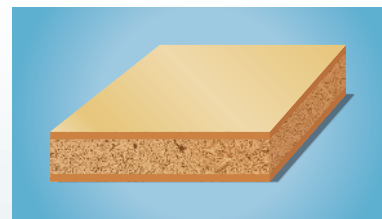
Schnittwertempfehlungen · Recommended cutting values

| Werkstoffgruppe Material Group | Werkstoffbeispiele Material examples | Vc (m/s) Schnittgeschwindigkeit Cutting speed | fz (mm/z) Vorschub pro Zahn Feed per tooth |
|---|---|---|--|
| Furnierte Platten • Veneered panels | Multiplex | 60–90 | 0,2 |
| HDF (Hochdichte Faserplatte) • HDF (High density fiber board) | Hartfaserplatte · Beaver board | 50–80 | 0,15 |
| MDF (Mitteldichte Faserplatte) • MDF (medium density fiber board) | Doppelstegplatten · Twin-wall panel | 60–80 | 0,1–0,3 |
| OSB-Platten • OSB-Oriented Strand Board | Verlegeplatten · Particle board | 60–80 | 0,1–0,2 |
| Pressschichtholz • Lumber-core plywood | | 40–65 | 0,02–0,06 |
| Spanplatten roh • Chipboard raw | | 60–80 | 0,3 |
| Spanplatten Kunststoff Beschichtet • Chipboard plastic coated | Melamin, HPL, CPL | 60–80 | 0,15 |
| Tischlerplatten (Stabplatten, Stäbchenplatten) • Plywood (lumber-core, rod-shaped) | | 60–80 | 0,1–0,2 |
| Weichfaserplatten • Softboard | | 60–100 | 0,2–0,4 |
| Sperrholz, Lagenholz • Plywood, lminated layers | | 50–80 | 0,05–0,25 |
| Duroplaste • Duroplastics | HPL-Schichtstoffplatten (Trespa®, Resopal®, Wodego®, Duropal®, Formica®, Unilin®, Kronospan®, Homapal®, Decodur®, Abet®) PUR Polyurethan, Melamin, HP Hartpapier | 50–70 | 0,01–0,08 |
| | HPL (High-Pressure-Laminate) (Trespa®, Resopal®, Wodego®, Duropal®, Formica®, Unilin®, Kronospan®, Homapal®, Decodur®, Abet®) PUR Polyurethan, Melamin, HP Hardpaper | | |
| | Glasfaserverstärkte und Kohlefaserverstärkte Kunststoffe GFK/CFK Aramidfaserkunststoffe AFK (Kevlar, Nomex, Carbolan, Rigitor, Durostone) | 20–50 | 0,01–0,03 |
| | Glass fibre and carbon fibre reinforced plastic GFK/CFK Aramid fibre plastik AFK (Kevlar, Nomex, Carbolan, Rigitor, Durostone) | | |
| Mineralisch-Acrylgebundene Materialien z.B. Küchenplatten/Waschbecken • Mineral-Acrylic bound materials e.g. kitchen worktops/sink | Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | 50–70 | 0,02–0,04 |



Formatieren

Panel sizing



Drehzahl **n** (U/min) • Revolution per minute **n** (rpm)

| | 1500 | 2000 | 2500 | 2850 | 3000 | 4000 | 4500 | 5000 | 5600 | 6000 | 8000 | 9000 | 10000 | 12000 | 18000 |
|-------|------|------|------|------|------|------|------|------|-------|-------|------|------|-------|-------|-------|
| 80 Ø | 6,5 | 8,5 | 10,5 | 12 | 13 | 17 | 19 | 21 | 23,5 | 26 | 34 | 38 | 42 | 52 | 76 |
| 90 Ø | 7 | 9,5 | 12 | 13,5 | 14 | 19 | 21 | 24 | 26,5 | 28 | 38 | 42 | 48 | 56 | 84 |
| 100 Ø | 8 | 10,5 | 13 | 15 | 16 | 21 | 24 | 26 | 29 | 32 | 42 | 48 | 52 | 54 | 96 |
| 120 Ø | 9,5 | 13 | 16 | 18 | 19 | 26 | 28 | 32 | 35 | 38 | 52 | 56 | 64 | 76 | 112 |
| 125 Ø | 10 | 13,5 | 16,5 | 18,5 | 19,5 | 27 | 29 | 33 | 36,5 | 39 | 54 | 59 | 66 | 78 | 118 |
| 140 Ø | 11 | 15 | 18 | 21 | 22 | 30 | 33 | 36 | 41 | 44 | 60 | 66 | 72 | 88 | 132 |
| 150 Ø | 12 | 15,5 | 19,5 | 22,5 | 23,5 | 31,5 | 33,5 | 39 | 44 | 47 | 63 | 70,5 | 78,5 | 94,5 | 141,5 |
| 160 Ø | 13 | 17 | 21 | 24 | 26 | 34 | 38 | 42 | 47 | 52 | 68 | 76 | 84 | 104 | 152 |
| 180 Ø | 14 | 19 | 24 | 27 | 28 | 38 | 42,5 | 48 | 53 | 56 | 76 | 85 | 96 | 118 | 170 |
| 200 Ø | 16 | 21 | 26 | 30 | 32 | 42 | 47 | 52 | 58,5 | 64 | 84 | 94 | 104 | 128 | 188 |
| 225 Ø | 18 | 24 | 30 | 33,5 | 36 | 48 | 58 | 60 | 66 | 72 | 96 | 106 | 120 | 144 | 212 |
| 250 Ø | 20 | 26 | 33 | 37 | 40 | 52 | 59 | 66 | 73,5 | 80 | 104 | 118 | 132 | 160 | 236 |
| 300 Ø | 24 | 31,5 | 40 | 45 | 48 | 63 | 71 | 80 | 88 | 96 | 126 | 142 | 160 | 192 | 284 |
| 350 Ø | 28 | 36,5 | 47 | 52 | 56 | 73 | 88 | 94 | 105 | 112 | 146 | 166 | 188 | 224 | 332 |
| 400 Ø | 32 | 42 | 54 | 60 | 64 | 84 | 94 | 108 | 117 | 128 | 168 | 188 | 216 | 256 | 376 |
| 450 Ø | 35,5 | 47 | 59 | 67,5 | 70,5 | 94,5 | 106 | 118 | 132 | 141,6 | 188 | 211 | 236 | 283 | 424 |
| 500 Ø | 40 | 53 | 67 | 74,5 | 80 | 106 | 118 | 134 | 146,5 | 160 | 212 | 236 | 268 | 320 | 472 |

Schnittgeschwindigkeit in m/s · Cutting speed in m/s

1 Platten · Panels

2 Sicherheitsgrenze · Safety limits

Festlegung der Schnittgeschwindigkeit Vc
Determination of cutting speed Vc

$$Vc (m/s) = \frac{D \cdot \pi \cdot n}{60 \cdot 1000}$$

Festlegung der Vorschubgeschwindigkeit Vf
Determination of feed rate Vf

$$Vf (m/min) = \frac{fz \cdot n \cdot Z}{1000}$$

Festlegung der Drehzahl n
Determination of revolution speed n

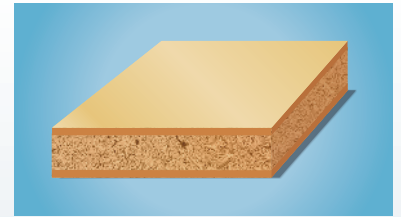
$$n (min^{-1}) = \frac{Vc \cdot 1000 \cdot 60}{D \cdot \pi}$$

- Vc (m/s) = Schnittgeschwindigkeit · Cutting speed
- Vf (m/min) = Vorschubgeschwindigkeit · Feed rate
- fz (mm/z) = Vorschub pro Zahn · Feed per tooth
- D (mm) = Sägendurchmesser · Saw blade diameter
- n (min⁻¹) = Drehzahl · rpm
- Z = Anzahl der Zähne · Number of teeth



Formatieren

Panel sizing



| Art. Ø mm | Type | Anwendung · Application | |
|---|--|---|-----|
| 11 1300 Ø mm 150-800 | Formatieren Universal + Hundegger · Wechselzahn | Gute bis sehr gute Schnittqualität in alle Holzwerkstoffe, Massivholz längs und quer, 1- und 2-seitig Kunststoff/Furnier beschichtete Platten, Leisten, Furniere, Kunststoffe. | 991 |
| | Panel sizing Universal + Hundegger · Alternate top bevel tooth | Good to very good cutting quality in all wooden materials, solid wood along and across the grain, panels and boards 1- and 2 sided plastic coated/veneered, strips and veneer, plastics. | |
| 11 1320 Ø mm 200-500 | Formatieren Universal Plus · Wechselzahn + Achswinkel | Hervorragende und ausrissfreie Schnittqualität in alle Holzwerkstoffe, Massivholz quer, 1- und 2-seitig Kunststoff/Furnier beschichtete Platten, Leisten, Folien, Furniere, Kunststoffe (Thermoplast) | 993 |
| | Panel sizing Universal Plus · Alternate Top Bevel tooth + Axial-Angle | Excellent, tear-free/splinter-free finishing-cut quality in all wooden materials, solid wood across the grain, panels and boards 1- and 2 sided plastic/veneer coated, strips, veneer, foils, plastics (Thermoplastics) | |
| 11 1370 Ø mm 250-350 | Diamant · Formatieren · Fertigschnitt · Harte Kunststoffe · Abrasive Materialien | Durch DP (Polykristalliner Diamant) Zähne extrem lange Standzeit gegenüber Hartmetall-Bestückte Sägen. Ideal für Zuschnitte/ Formatschnitte in abrasive, zu schnellen Schneidenschleiß führenden Materialien. | 995 |
| | Diamond · Panel-sizing · Finishing-cut · Hard Plastics · Abrasive materials | Due to DP (polycrystalline Diamond) teeth extremely long tool life compared to carbide tipped saws. Excellent for sizing, cross cuts in heavy machining and abrading materials. | |
| 11 1425 Ø mm 120-500 | Formatieren Universal · Wechselzahn · Dünnschnitt | Gute bis sehr gute Schnittqualität in alle Holzwerkstoffe, Massivholz längs und quer, 1- und 2-seitig Kunststoff/ Furnier beschichtete Platten, Kunststoffprofile und Platten. Durch dünne Schnittbreite ideal auch für Akkumaschinen und für teure Edelhölzer, Furniere, Leisten da wenig Verschleiß und Schnittdruck/Akkuverbrauch. | 997 |
| | Panel sizing Universal · Alternate Top Bevel tooth · Thin-cut | Good to very good cutting quality in all wooden materials, solid wood along and across the grain, panels and boards 1- and 2 sided plastic coated/veneered, plastic profiles and boards. Due to thin-cut also ideal for battery machines and for cutting expensive precious wood, veneer, strips because of less waste/battery consumption. | |

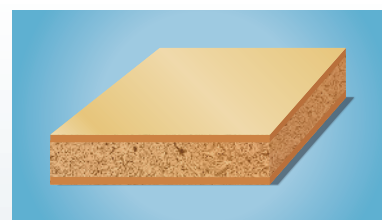
BEST SELLER

BEST SELLER

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Formatieren

Panel sizing

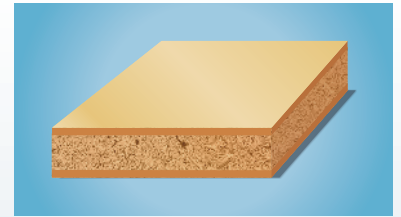


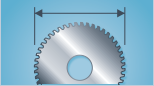



| Art. Ø mm | Type | Anwendung · Application | |
|---|--|--|--|
| 11 1430 Ø mm 120-500  | Formatieren · Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/ Dünnschnitt Panel-sizing · Hard plastics · Abrasive materials · Thin- cut/Finishing-cut | Für Fertigschnitte in dünne Platten-Profil-Leisten aus harten/abrasiven Kunststoffen, GFK, CFK, HPL z.B. Trespa®, Mineralwerkstoffe z.B. Corian®, PMMA, Acrylglas (Plexiglas), Eternit, Gips-Zementfaserplatten, Sandwichmaterialien For finishing cuts in thin boards-profiles-strips of hard/abrasive plastics, GFK, CFK, HPL e.g. Trespa®, mineral material e.g. Corian®, PMMA (Acrylglas-Plexiglass), Eternit®, Fibre cement/Gypsum fibre boards, Sandwichmaterials. | 999  |
| 11 1460 Ø mm 250-400  | Formatieren · Harte + Abrasive Plattenmaterialien · Trapez-Trapezzahn Panel-sizing · Hard + Abrasive Panel Materials · Triple-chip/Triple-Chip tooth | Zum Formatieren von 2-seitig Kunststoff beschichtete/furnierte Platten in verschiedenen Dicken. Hervorragend auch für harten/abrasiven Kunststoffen, GFK, CFK, HPL z.B. Trespa®, Mineralwerkstoffe z.B. Corian®, PMMA, Acrylglas (Plexiglas), Eternit, Gips-Zementfaserplatten, Sandwichmaterialien For sizing 2 sided panels and boards plastic coated/veneered in various thicknesses. Excellent also for hard/abrasive plastics, GFK, CFK, HPL e.g. Trespa®, mineral material e.g. Corian®, PMMA (Acrylglas- Plexiglass), Eternit®, Fibre cement/Gypsum fibre boards, Sandwichmaterials. | 1001  |
| 11 1470 Ø mm 220-400  | Formatieren Universal · Trapez-Flachzahn Panel-sizing Universal · Triple-Chip/Flat tooth | Universalblatt zum Formatieren von 2-seitig Kunststoff beschichtet/fur- nierte Platten in verschiedenen Dicken. Gut auch für harten/abrasiven Kunststoffen, GFK, CFK, HPL z.B. Trespa®, Mineralwerkstoffe z.B. Corian®, PMMA, Acrylglas (Plexiglas), Eternit, Gips-Zementfaserplatten, Sandwichmaterialien. Universal blade for sizing 2 sided panels and boards plastic coated/ veneered in various thicknesses. Excellent also for hard/abrasive plas- tics, GFK, CFK, HPL e.g. Trespa®, mineral material e.g. Corian®, PMMA (Acrylglas-Plexiglass), Eternit®, Fibre cement/Gypsum fibre boards, Sandwichmaterials. | 1003  |
| 11 1600 Ø mm 160-400  | Formatieren · Hohlzahn · Dach-Flach Positiv Panel-sizing · Hollow tooth · Inverted V / Flat tooth positive | Formatieren von 1+2-seitig Kunststoff beschichtet/furnierte Spanplatten/ Möbelplatten in verschiedenen Dicken. Auch ohne Vorritzer gute Unterkante. Panel-sizing 1+2 sided plastic coated/veneered chipboards/furniture boards in various thicknesses. Good lower cutting edge quality even without scorer. | 1005 |



Formatieren

Panel sizing



| Art. Ø mm | Type | Anwendung · Application | |
|--|--|---|------|
| 11 1602 Ø mm 216–350  | Formatieren · Hohlzahn · Dach-Flach Negativ | Formatieren von 1+2-seitig Kunststoff beschichtet/furnierte Spanplatten/Möbelplatten in verschiedenen Dicken. Auch ohne Vorritzer gute Unterkante. Durch negative Zahnform: Ideal auch Kapp- und Gehrungssägen, stabiler und bruchunempfindlicher, besser von Hand zu führen (manueller Vorschub) | 1007 |
| | Panel-sizing · Hollow tooth · Inverted V/Flat tooth negative | Panel-sizing 1+2 sided plastic coated/veneered chipboards/furniture boards in various thicknesses. Good lower cutting edge quality even without scorer. Because of negative tooth shape: Especially also for chop- and mitre saws, more compact and stable, better guiding by hand (manual feed) | |
| 11 1604 Ø mm 220–350  | Formatieren · Hohlzahn · Trapez-Trapez Positiv | Formatieren von 1+2-seitig Kunststoff beschichtet/furnierte Spanplatten/Möbelplatten in verschiedenen Dicken. Auch ohne Vorritzer gute bis sehr gute Unterkante bei harten Oberflächen welche leicht splintern/ausreißen | 1009 |
| | Panel-sizing · Hollow tooth · Triple-Chip/Triple Chip Positive | Panel-sizing 1+2 sided plastic coated/veneered chipboards/furniture boards in various thicknesses. Good to very good lower cutting edge quality even without scorer especially for hard surfaces which splinter/break out easily | |
| 11 1610 Ø mm 160–350  | Formatieren · Wechselzahn Extrem 35° · Positiv | Splinterfreie/Ausrissfreie Feinschnitte bei Massivholz quer, Leisten, Furniere, Profile massiv oder beschichtet/furniert. 1+2-seitig Kunststoff beschichtet/furnierte Spanplatten/Möbelplatten in verschiedenen Dicken. Thermopaste. Auch ohne Vorritzer sehr gute Unterkante. | 1011 |
| | Panel-sizing · Alternate Top Bevel Extreme 35° · Positive | Splinter/tear free finishing cuts in solid wood across the grain, strips, veneer, profiles solid or coated/veneered. 1+2 sided plastic coated/veneered chipboards/furniture boards in various thicknesses. Thermoplastics. Excellent lower cutting edge quality even without scorer. | |
| 11 1615 Ø mm 216–350  | Formatieren · Wechselzahn Extrem 35° · Negativ | Splinterfreie / Ausrissfreie Feinschnitte bei Massivholz quer, Leisten, Furniere, Profile massiv oder beschichtet/furniert. 1+2-seitig Kunststoff beschichtet/furnierte Spanplatten/Möbelplatten in verschiedenen Dicken. Thermopaste. Auch ohne Vorritzer sehr gute Unterkante. Durch negative Zahnform: Ideal auch Kapp- und Gehrungssägen, stabiler und bruchunempfindlicher, besser von Hand zu führen (manueller Vorschub) | 1013 |
| | Panel-sizing · Alternate Top Bevel Extreme 35° · Negative | Splinter/tear free finishing cuts in solid wood across the grain, strips, veneer, profiles solid or coated/veneered. 1+2 sided plastic coated/veneered chipboards/furniture boards in various thicknesses. Thermoplastics. Excellent lower cutting edge quality even without scorer. Because of negative tooth shape: Especially also for chop- and mitre saws, more compact and stable, better guiding by hand (manual feed). | |

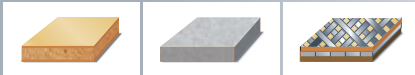




11 1600

11 1370

✓ Geeignet für · Suitable for



Siehe Seite 1005, 995 · See page 1005, 995

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PERFORMANCE.

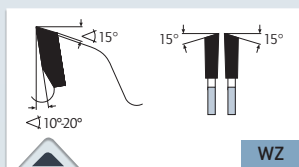
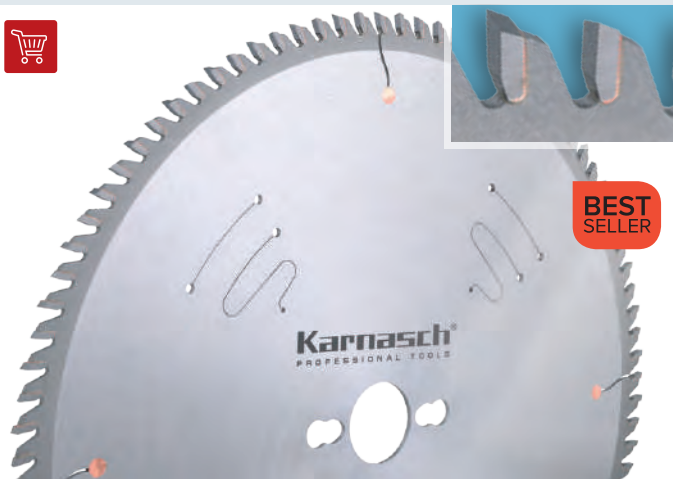
Karnasch®
PROFESSIONAL TOOLS

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

11 1300

Formatieren Universal + Hundegger · Wechselzahn
Panel sizing universal + Hundegger · Alternate top bevel tooth



> Wechselzahn
> Alternate top bevel

MASCHINE · MACHINE

Für Tisch- und Formatkreissägen, Kappkreissägen sowie für Hundegger Abbundanlagen.

For bench and panel sizing saws, cross cut saws, Hundegger trimming machines.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|---|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Weichholz, Hartholz, Exotenholz Längs | Soft wood, hard wood, and exotic wood along the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Furniere | Veneers |
| ✓ | | Profileleisten | Profiled wood |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |

ANWENDUNG · APPLICATION

Geringere Zähnezahlen: Gute Schnittqualität in alle Holzwerkstoffe, Massivholz längs und quer, Plattenwerkstoffe einseitig furniert oder beschichtet, Hartgewebe, Hartpapiere sowie für dickere Kunststoffplatten/Profile (Thermoplast).

Höhere Zähnezahlen: Sehr gute Schnittqualität in alle Holzwerkstoffe, Massivholz vorzugsweise quer, Plattenwerkstoffe zweiseitig furniert oder beschichtet (ggf. Vorritzer verwenden), Hartgewebe, Hartpapier, Leisten und Furnier, Kunststoff (Thermoplaste, Duroplaste).

Für exzellente Schnittgüte aller Holzwerkstoffe massiv sowie Platten beschichtet/furniert auch auf der Unterseite ohne Vorritzer siehe Art. 11 1320 Seite 993.

Ebenfalls exzellente, nahezu glatte und ausrissfreie/splitterfreie Schnittgüte zu einem attraktiven Preis siehe Artikel 11 1610 auf Seite 1010.

Lower number of teeth: Good cutting quality in all wooden materials, solid wood across and along the grain, panels and boards one-sided plastic coated/veneered, paper-based laminate, thicker plastic boards/profiles (thermoplastics).

Higher number of teeth: Very good cutting quality in all wooden materials, solid wood across and along the grain, panels and boards two-sided plastic coated/veneered (if applicable with scorer), paper-based laminate, strips and veneer, plastics (thermoplastics, duroplastics)

For excellent cutting in all wooden materials, solid wood an panels/boards two-sided plastic coated/veneered (also without using scorer) see art. 11 1320 page 993.

Also excellent smooth and tear free/splinter free cutting surface for a attractive price see article 11 1610 on page 1010.








Film
Movie



Formatieren Universal + Hundegger · Wechselzahn
Panel sizing universal + Hundegger · Alternate top bevel tooth








11 1300

Bestseller – preisreduziert · Bestseller – price reduced

| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|---|---|---|--------|
| 11 1300 150 010 | % 150 | 3,2/2,2 | 30 | 36 WZ | 10 | UNI | - | 14,06 |
| 11 1300 180 010 | % 180 | 3,2/2,2 | 30 | 42 WZ | 10 | UNI | - | 16,50 |
| 11 1300 230 010 | • 230 | 3,2/2,2 | 30 | 48 WZ | 15 | UNI | - | 45,20 |
| 11 1300 250 010 | • 250 | 3,2/2,2 | 30 | 40 WZ | 15 | UNI | ✓ | 44,95 |
| 11 1300 250 020 | • 250 | 3,2/2,2 | 30 | 48 WZ | 15 | UNI | ✓ | 44,20 |
| 11 1300 250 030 | • 250 | 3,2/2,2 | 30 | 60 WZ | 10 | UNI | ✓ | 51,60 |
| 11 1300 250 040 | • 250 | 3,2/2,2 | 30 | 80 WZ | 10 | UNI | ✓ | 66,65 |
| 11 1300 300 010 | • 300 | 3,2/2,2 | 30 | 48 WZ | 15 | UNI | ✓ | 49,70 |
| 11 1300 300 020 | • 300 | 3,2/2,2 | 30 | 60 WZ | 15 | UNI | ✓ | 57,60 |
| 11 1300 300 030 | • 300 | 3,2/2,2 | 30 | 72 WZ | 10 | UNI | ✓ | 62,80 |
| 11 1300 300 040 | • 300 | 3,2/2,2 | 30 | 96 WZ | 10 | UNI | ✓ | 83,90 |
| 11 1300 305 010 | • 305 | 3,2/2,2 | 30 | 48 WZ | 15 | UNI | ✓ | 55,25 |
| 11 1300 305 020 | • 305 | 3,2/2,2 | 30 | 60 WZ | 15 | UNI | ✓ | 64,00 |
| 11 1300 305 030 | • 305 | 3,2/2,2 | 30 | 72 WZ | 10 | UNI | ✓ | 69,80 |
| 11 1300 315 010 | • 315 | 3,2/2,2 | 30 | 48 WZ | 15 | UNI | ✓ | 56,05 |
| 11 1300 315 020 | • 315 | 3,2/2,2 | 30 | 60 WZ | 15 | UNI | ✓ | 72,80 |
| 11 1300 315 030 | • 315 | 3,2/2,2 | 30 | 72 WZ | 10 | UNI | ✓ | 75,65 |
| 11 1300 315 040 | • 315 | 3,2/2,2 | 30 | 96 WZ | 10 | UNI | ✓ | 92,55 |
| 11 1300 350 010 | • 350 | 3,5/2,5 | 30 | 54 WZ | 15 | UNI | ✓ | 63,50 |
| 11 1300 350 020 | • 350 | 3,5/2,5 | 30 | 72 WZ | 15 | UNI | ✓ | 82,00 |
| 11 1300 350 030 | • 350 | 3,5/2,5 | 30 | 84 WZ | 10 | UNI | ✓ | 87,90 |
| 11 1300 350 040 | • 350 | 3,5/2,5 | 30 | 108 WZ | 10 | UNI | ✓ | 98,55 |
| 11 1300 370 010 | • 370 | 4,2/2,5 | 30 | 60 WZ | 15 | UNI | ✓ | 89,25 |
| 11 1300 400 010 | • 400 | 3,5/2,5 | 30 | 60 WZ | 15 | UNI | ✓ | 76,25 |
| 11 1300 400 020 | • 400 | 3,5/2,5 | 30 | 84 WZ | 15 | UNI | ✓ | 97,55 |
| 11 1300 400 030 | • 400 | 3,5/2,5 | 30 | 96 WZ | 10 | UNI | ✓ | 106,55 |
| 11 1300 400 040 | • 400 | 3,5/2,5 | 30 | 120 WZ | 10 | UNI | ✓ | 111,90 |
| 11 1300 410 010 | % 410 | 4,2/2,5 | 30 | 60 WZ | 15 | UNI | ✓ | 43,26 |
| 11 1300 450 010 | • 450 | 4,0/2,8 | 30 | 66 WZ | 15 | UNI | ✓ | 104,30 |
| 11 1300 450 020 | • 450 | 4,0/2,8 | 30 | 84 WZ | 15 | UNI | ✓ | 120,45 |
| 11 1300 450 030 | • 450 | 4,0/2,8 | 30 | 108 WZ | 10 | UNI | ✓ | 136,50 |
| 11 1300 450 040 | • 450 | 4,0/2,8 | 30 | 132 WZ | 10 | UNI | ✓ | 163,50 |
| 11 1300 500 010 | • 500 | 4,0/2,8 | 30 | 60 WZ | 20 | UNI+2-10-80 | ✓ | 114,85 |
| 11 1300 500 020 | • 500 | 4,0/2,8 | 30 | 72 WZ | 15 | UNI+2-10-80 | ✓ | 128,25 |
| 11 1300 500 030 | • 500 | 4,0/2,8 | 30 | 96 WZ | 15 | UNI+2-10-80 | ✓ | 150,80 |
| 11 1300 500 050 | • 500 | 4,0/2,8 | 30 | 144 WZ | 10 | UNI+2-10-80 | ✓ | 192,25 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last

SPESIALPROGRAMM HUNDEGGER / SPECIAL SELECTION HUNDEGGER

| Art. | Maschine Machine |  |  |  |  |  |  |  | € |
|-----------------|----------------------------------|---|---|---|---|--|---|---|--------------------------|
| 11 1300 550 010 | Zuschnitt-Automat Turbo-Drive | % 550 | 6,0/4,4 | 30 | 60 WZ | 15 | 8-8,5-120 Angesenkt 2-13-240 Versetzt 22,5° | ✓ | 123,62 |
| 11 1300 600 010 | | ○ 600 | 4,8/3,4 | 30 | 48 WZ | 15 | 2-8,5-90+2-10-80+2-15-63 | ✓ | auf Anfrage / on request |
| 11 1300 650 010 | | % 650 | 5,8/4,0 | 30 | 36 WZ | 15 | 2-8,5-90+2-10-80+2-15-63 | ✓ | 117,46 |
| 11 1300 650 020 | | % 650 | 5,8/4,0 | 30 | 48 WZ | 15 | 2-8,5-90+2-10-80+2-15-63 | ✓ | 129,46 |
| 11 1300 650 030 | | % 650 | 5,6/4,0 | 30 | 96 WZ | 12 | 2-8,5-90+2-10-80+2-15-63 | ✓ | 137,60 |
| 11 1300 720 010 | Zuschnitt-Automat SC-3 | ○ 720 | 6,0/4,4 | 30 | 72 WZ | 15 | 8-8,5-120 Angesenkt 4-8,1-90 Versetzt 2-14-400 Versetzt | ✓ | auf Anfrage / on request |
| 11 1300 720 020 | | % 720 | 6,0/4,4 | 30 | 48 WZ | 15 | 4-8,5-90+2-15-415 | ✓ | 190,34 |
| 11 1300 720 030 | | % 720 | 6,0/4,4 | 30 | 72 WZ | 15 | 4-8,5-90+2-15-415 | ✓ | 219,52 |
| 11 1300 735 010 | | % 735 | 6,0/4,4 | 30 | 72 WZ | 15 | 4-8,5-90+2-15-415 | ✓ | 223,36 |
| 11 1300 760 010 | | ○ 760 | 6,0/4,4 | 30 | 72 WZ | 15 | 4-8,5-90+2-15-415 | ✓ | auf Anfrage / on request |
| 11 1300 800 010 | Abbandmaschine Robot-Drive | ○ 800 | 6,0/4,4 | 30 | 72 WZ | 15 | 8-8,5-160 Angesenkt 4-8,1-90 Versetzt 2-14-400 Versetzt | ✓ | auf Anfrage / on request |
| 11 1300 800 020 | | ○ 800 | 6,0/4,4 | 30 | 80 WZ | 12 | 4-8,5-90+2-15-415 | ✓ | auf Anfrage / on request |

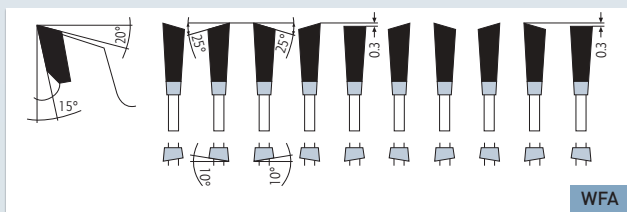
% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Weitere Abmessungen Hundegger kurzfristig auf Anfrage lieferbar / Other sizes Hundegger available at short notice on request
UNI = 2-7-42 + 2-9-46,40 + 2-10-60



11 1320

Formatieren Universal Plus · Wechselzahn + Achswinkel
Panel sizing universal plus · Alternate to bevel tooth + axial-angle



> Wechselzahn/Flachzahn mit Achswinkel
> Alternate top bevel / flat tooth with axial angle

MASCHINE · MACHINE

Plattenaufteilsägen vertikal, Formatkreissägen, Doppelgehrungssägen, mechanische Kappsägemaschinen, Unterflurkappsägemaschinen, CNC-Bearbeitungszentren.

Vertical panel sizing saws, trimming saws, double mitre saws, mechanical chop saws, under frame mounted chop saws, machining centers with saw aggregate.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Furniere | Veneers |
| ✓ | | Profilleisten | Profiled wood |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Formatieren von Holzwerkstoffen in hervorragender Fertigschnittqualität. **Ausriss-freies** Sägen von beschichteten Holzwerkstoffen auch mit sehr dicken Deckschichten, Massivholz quer, Kunststoffprofile, kunststoffummantelte Leisten, furnierte oder folienummantelte Türzagen...

Panel sizing/trimming of wood-based material in excellent finishing-cut quality. **Splinter-free** sawing of laminated wood-based material including material with very thick top layers, solid wood across the grain, plastic profiles, synthetically coated ledges, veneered or foil-sheathed door frames...



Ritzer nicht erforderlich

Scorer not required

Film
Movie



Formatieren Universal Plus · Wechselzahn + Achswinkel
Panel sizing universal plus · Alternate to bevel tooth + axial-angle

11 1320

| Art. | | | | | | | € |
|-----------------|-------|---------|----|---------|------------------------------|---|--------|
| 11 1320 200 010 | • 200 | 3,0/2,2 | 30 | 60 WFA | 2-6,2-42 + 4-6-52 + 4-6,6-60 | - | 136,20 |
| 11 1320 220 010 | • 220 | 3,0/2,2 | 30 | 70 WFA | UNI | - | 54,04 |
| 11 1320 250 010 | • 250 | 3,0/2,2 | 30 | 80 WFA | UNI | ✓ | 157,05 |
| 11 1320 303 010 | • 303 | 3,0/2,2 | 30 | 100 WFA | UNI | ✓ | 190,45 |
| 11 1320 350 010 | • 350 | 3,0/2,2 | 30 | 100 WFA | UNI | ✓ | 209,65 |
| 11 1320 400 010 | • 400 | 3,0/2,2 | 30 | 120 WFA | UNI | ✓ | 255,05 |
| 11 1320 450 010 | • 450 | 3,6/2,8 | 30 | 130 WFA | UNI | ✓ | 285,00 |
| 11 1320 500 010 | • 500 | 3,6/2,8 | 30 | 140 WFA | UNI | ✓ | 315,90 |

🏷️ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Arbeiten mit Sägewelle **unter** dem Werkstück
Working with spindle **under** the panel



Durch den positiven Spanwinkel wirkt der Schnittdruck über dem Werkstück auf die stabile Tischauflage.
Due to the positive cutting angle acts the cutting pressure above the panel into the stable saw table.

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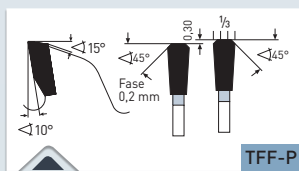
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Index

11 1370

Diamant · Formatieren · Fertigschnitt · Harte Kunststoffe · Abrasive Werkstoffe
Diamond · Panel-sizing · Finishing cut · Hard plastics · Abrasive materials



TFF-P

- > Trapez-Flachzahn (mit beidseitiger Schutzfase)
- > Triple-chip/flat tooth (with protective chamfer on both sides)

MASCHINE · MACHINE

Für Formatkreissägen, Plattensägen, Tischkreissägen

For sizing saws, panel saws, bench saws

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|---|
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoff- platten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineral- werkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Durch DP (Polykristalliner Diamant) Zähne extrem lange Standzeiten gegenüber Hartmetall-bestückte Kreissägeblätter. Ideal für Zuschnitte sowie Formatschnitte in extrem abrasive, zu hohen Schneidenschleiß führenden Materialien wie: Corian, Trespa, Laminat, MDF, Gips- und Zementgebundene Platten, Steinwollplatten, Heraklith, Eternit.

Speziell hervorragend ebenfalls für Duroplaste wie: Glasfaserverstärkte sowie Kohlefaser verstärkte Kunststoffe (GFK, CFK), Carbon, Aramidfaserkunststoffe (AFK) HP, HPL, PUR.

Weiterhin hervorragend für Fertigschnitte in thermoplastische Vollplatten (Acrylglas, PMMA, Polyäthylen, Polyamid usw.) sowie duroplastische Vollplatten (Schichtstoffe, HPL, Hartpapier, Trespa, Resopal, Multiplex). Weiterhin für Polymergebundene Kunststoffe, Mineralwerkstoffe wie Corian, Noblan, Hi-Macs, Staron, Rausolid usw.

Hervorragend ebenfalls für Fertigschnitte in beidseitig kunststoffbeschichteten Plattenwerkstoffe, vorzugsweise in Verbindung mit Vorritzer. Ideal auch zum Schneiden von Kunststoff-Profilen.

Due to DP (Polycrystalline Diamond) teeth extremely long tool life compared to carbide tipped circular saws. Excellent for sizing, formatting, cross cuts in extreme abrasive, heavy machining and abrading materials such as: Corian, Trespa, laminates, MDF, gypsum and cement-bonded boards, Rockwool boards, Heraklith products, Eternit.

Also excellent for Duroplastic materials such as: Glas fibre plastic (GFK), Carbon fibre plastic (CFK), Carbon, Aramid fibre plastic (AFK), HP, HPL, PUR.

For finishing cuts in solid thermoplastic boards (PMMA, acrylic glass, polyethylene, polyamide etc.) and solid duroplastic boards (HPL-high-pressure-laminate, HP-Hardpaper, phenolic resin bonded paper, phenolic laminated cotton sheets, Trespa, Resopal, Multiplex). Also for polymer-bound plastics, mineral materials such as Corian, Noblan, Hi-Macs, Staron, Rausolid etc.




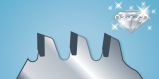






Excellent also for finishing cuts in double-side plastic coated boards, preferably in combination with coring sawblades. Ideal also for cutting plastic profiles.


Film
Movie



Diamant · Formatieren · Fertigschnitt · Harte Kunststoffe · Abrasive Werkstoffe
Diamond · Panel-sizing · Finishing cut · Hard plastics · Abrasive materials

11 1370

| Art. |  |  |  |  |  |  | DP-Bestückungshöhe DP-Tip high | € |
|-----------------|---|---|---|---|--|---|-----------------------------------|--------|
| 11 1370 250 020 |  250 | 3,2/2,2 | 30 | 80 TFF-P | UNI |  | 5 mm | 465,02 |
| 11 1370 303 030 |  303 | 3,2/2,2 | 30 | 96 TFF-P | UNI |  | 4 mm | 553,68 |

 Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

UNI = 2-7-42 + 2-9-46,40 + 2-10-60



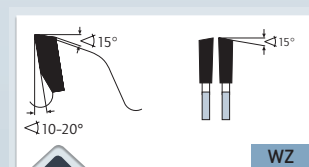
Bei Kunststoff/Melamin beschichtete Plattenwerkstoffe Vorritzen empfohlen. Ritzer siehe Seite 983/1037. Sägen von beschichteten/furnierten Plattenwerkstoffe ohne Vorritzer siehe Seite 935, 1005, 1007, 1009, 1011, 1012

For plastic coated/melamine boards scoring recommended. Scorer see page 983/1037. Cutting of coated/veneered boards without scorer see page 935, 1005, 1007, 1009, 1011, 1012

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- 4 
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- 7 
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11 1425

Formatieren Universal · Wechselzahn · Dünnschnitt
Panel-sizing universal · Alternate top bevel tooth · Thin-cut



> Wechselzahn
> Alternate top bevel

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Tisch- und Formatkreissägen, Plattenaufteilsägen, Kappsägen, Akkusägen

For portable circular saws, bench- and sizing saws, panel sizing saws, cross-cut saws, cordless saws.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|---|
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Furniere | Veneers |
| ✓ | | Profileleisten | Profiled wood |
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Leimholz, Tischler- und Furnier- sperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoff- platten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |

ANWENDUNG · APPLICATION

Durch dünne Schnittbreite ideal auch für Akkumaschinen und für teure Edelhölzer, Furniere und Leisten da wenig Verschnitt und Schnittdruck/Akkuverbrauch.

Niedere Zähnezahl: Grobe bis mittlere Schnittqualität in alle Holzwerkstoffe, Edelhölzer und Massivholz längs und quer, Plattenwerkstoffe einseitig furniert oder Kunststoff beschichtet, Hartgewebe, Hartpapier, dickere Kunststoffprofile und Platten (Thermoplaste) hoher Vorschub möglich.

Mittlere Zähnezahl: Gute Schnittqualität in alle Holzwerkstoffe, Edelhölzer, Massivholz und Leisten längs und quer, Plattenwerkstoffe einseitig/zweiseitig furniert oder Kunststoff beschichtet, Hartgewebe, Hartpapier, Furnier und Furnierpakete sowie Kunststoffprofile und Platten (Thermoplaste, Duroplaste).

Hohe Zähnezahl: Sehr gute Schnittqualität in alle Holzwerkstoffe, Edelhölzer, Massivholz und Leisten vorzugsweise Querschnitte. Plattenwerkstoffe zweiseitig furniert oder Kunststoff beschichtet, Hartgewebe, Hartpapier, Furnier und Furnierpakete sowie Kunststoffprofile und Platten (Thermoplaste, Duroplaste).

Durch spezielles Hartmetall sehr gut zum Sägen harter Thermoplaste wie z.B. dünne Platten, Hohlkammerplatten aus PC (Polycarbonat), PMMA (Acrylglas-Plexiglas) Siehe hierzu auch Artikel 11 1430 Seite 943

Due to thin-cut also ideal for battery machines and for cutting expensive precious wood, veneer, strips because of less waste/battery consumption.

Low number of teeth: Coarse to medium cutting quality in all wooden materials, precious wood and solid wood across and along the grain, panel and boards one-side plastic coated/veneered, paper-based laminate, thicker plastic profiles and plates (Thermoplastics). High feed rate possible

Medium number of teeth: Good cutting quality in all wooden materials, precious wood, solid wood and strips across and along the grain, panel and boards one-side/two side plastic coated/veneered, paper-based laminate, veneer and veneer packages, plastic profiles/plates (Thermoplastics, Duroplastics)

High number of teeth: Very good cutting quality in all wooden materials, precious wood, solid wood and strips preferably across the grain, panel and boards two side plastic coated/veneered, paper-based laminate, veneer and veneer packages, plastic profiles/plates (Thermoplastics, Duroplastics)

Due to special carbide also excellent for cutting hard thermoplastics such as thin panels, hollow section boards made of PC (Polycarbonate), PMMA (Acrylic-glass/Plexiglass). See here also article 11 1430, page 943

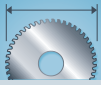


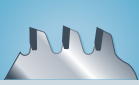
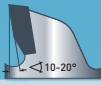


Film
Movie



Formatieren Universal · Wechselzahn · Dünnschnitt
Panel-sizing universal · Alternate top bevel tooth · Thin-cut

11 1425

Bestseller – preisreduziert · Bestseller – price reduced

| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|--|---|---|--------|
| 11 1425 120 010 | ● 120 | 1,8/1,2 | 20 | 12 WZ | 20 | - | - | 22,95 |
| 11 1425 120 020 | ● 120 | 1,8/1,2 | 20 | 28 WZ | 15 | - | - | 30,35 |
| 11 1425 120 030 | ● 120 | 1,8/1,2 | 20 | 44 WZ | 10 | - | - | 39,30 |
| 11 1425 136 010 | ● 136 | 1,8/1,2 | 20/10 | 14 WZ | 20 | - | - | 23,90 |
| 11 1425 136 020 | ● 136 | 1,8/1,2 | 20/10 | 30 WZ | 15 | - | - | 30,60 |
| 11 1425 136 030 | ● 136 | 1,8/1,2 | 20/10 | 48 WZ | 10 | - | - | 43,15 |
| 11 1425 160 010 | ● 160 | 1,8/1,2 | 20/16 | 16 WZ | 20 | 2-6-32 | - | 23,60 |
| 11 1425 160 020 | ● 160 | 1,8/1,2 | 20/16 | 32 WZ | 15 | 2-6-32 | - | 32,55 |
| 11 1425 160 030 | ● 160 | 1,8/1,2 | 20/16 | 54 WZ | 10 | 2-6-32 | - | 44,10 |
| 11 1425 160 040 | ● 160 | 1,8/1,2 | 20/16 | 68 WZ | 10 | 2-6-32 | - | 53,15 |
| 11 1425 165 010 | ● 165 | 1,8/1,2 | 20 | 16 WZ | 20 | 2-6-32 | - | 23,90 |
| 11 1425 165 020 | ● 165 | 1,8/1,2 | 20 | 32 WZ | 15 | 2-6-32 | - | 32,90 |
| 11 1425 165 030 | ● 165 | 1,8/1,2 | 20 | 54 WZ | 10 | 2-6-32 | - | 44,55 |
| 11 1425 165 040 | ● 165 | 1,8/1,2 | 20 | 68 WZ | 10 | 2-6-32 | - | 53,15 |
| 11 1425 180 010 | ● 180 | 1,8/1,2 | 20/16 | 18 WZ | 20 | 2-6-32 | - | 24,20 |
| 11 1425 180 020 | ● 180 | 1,8/1,2 | 20/16 | 40 WZ | 15 | 2-6-32 | - | 36,95 |
| 11 1425 180 030 | ● 180 | 1,8/1,2 | 20/16 | 60 WZ | 10 | 2-6-32 | - | 50,55 |
| 11 1425 180 040 | ● 180 | 1,8/1,2 | 20/16 | 76 WZ | 10 | 2-6-32 | - | 64,95 |
| 11 1425 190 010 | ● 190 | 1,8/1,2 | 30/20 | 18 WZ | 20 | 2-7-42 | - | 26,05 |
| 11 1425 190 020 | ● 190 | 1,8/1,2 | 30/20 | 42 WZ | 15 | 2-7-42 | - | 40,85 |
| 11 1425 190 030 | ● 190 | 1,8/1,2 | 30/20 | 60 WZ | 10 | 2-7-42 | - | 51,15 |
| 11 1425 190 040 | ● 190 | 1,8/1,2 | 30/20 | 76 WZ | 10 | 2-7-42 | - | 65,65 |
| 11 1425 200 010 | ● 200 | 2,0/1,4 | 30 | 18 WZ | 20 | 2-7-42 | - | 27,60 |
| 11 1425 200 020 | ● 200 | 2,0/1,4 | 30 | 42 WZ | 15 | 2-7-42 | - | 41,40 |
| 11 1425 200 030 | ● 200 | 2,0/1,4 | 30 | 64 WZ | 10 | 2-7-42 | - | 52,15 |
| 11 1425 200 040 | ● 200 | 2,0/1,4 | 30 | 80 WZ | 10 | 2-7-42 | - | 67,45 |
| 11 1425 210 010 | ● 210 | 2,0/1,4 | 30 | 20 WZ | 20 | 2-7-42 | - | 29,05 |
| 11 1425 210 020 | ● 210 | 2,0/1,4 | 30 | 48 WZ | 15 | 2-7-42 | - | 42,15 |
| 11 1425 210 030 | ● 210 | 2,0/1,4 | 30 | 64 WZ | 10 | 2-7-42 | - | 53,00 |
| 11 1425 210 040 | ● 210 | 2,0/1,4 | 30 | 80 WZ | 10 | - | - | 68,45 |
| 11 1425 216 010 | ● 216 | 2,0/1,4 | 30 | 20 WZ | 20 | 2-7-42 | - | 30,00 |
| 11 1425 216 020 | ● 216 | 2,0/1,4 | 30 | 48 WZ | 15 | 2-7-42 | - | 42,90 |
| 11 1425 216 030 | ● 216 | 2,0/1,4 | 30 | 64 WZ | 10 | 2-7-42 | - | 53,80 |
| 11 1425 216 040 | ● 216 | 2,0/1,4 | 30 | 80 WZ | 10 | 2-7-42 | - | 69,25 |
| 11 1425 220 010 | ● 220 | 2,0/1,4 | 30 | 48 WZ | 20 | 2-7-42 | - | 42,90 |
| 11 1425 225 010 | ● 225 | 2,0/1,4 | 30 | 24 WZ | 20 | 2-7-42 | - | 30,15 |
| 11 1425 225 020 | ● 225 | 2,0/1,4 | 30 | 48 WZ | 15 | 2-7-42 | - | 43,70 |
| 11 1425 225 030 | ● 225 | 2,0/1,4 | 30 | 68 WZ | 10 | 2-7-42 | - | 58,45 |
| 11 1425 225 040 | ● 225 | 2,0/1,4 | 30 | 88 WZ | 10 | 2-7-42 | - | 75,80 |
| 11 1425 230 010 | ● 230/235 ● | 2,0/1,4 | 30 | 24 WZ | 20 | 2-7-42 | - | 30,90 |
| 11 1425 230 020 | ● 230/235 ● | 2,0/1,4 | 30 | 48 WZ | 15 | 2-7-42 | - | 44,40 |
| 11 1425 230 030 | ● 230/235 ● | 2,0/1,4 | 30 | 68 WZ | 10 | 2-7-42 | - | 59,15 |
| 11 1425 230 040 | ● 230/235 ● | 2,0/1,4 | 30 | 88 WZ | 10 | 2-7-42 | - | 76,50 |
| 11 1425 250 010 | ● 250 | 2,2/1,6 | 30 | 30 WZ | 20 | UNI | ✓ | 43,70 |
| 11 1425 250 020 | ● 250 | 2,2/1,6 | 30 | 56 WZ | 15 | UNI | ✓ | 62,70 |
| 11 1425 250 030 | ● 250 | 2,2/1,6 | 30 | 80 WZ | 10 | UNI | ✓ | 70,05 |
| 11 1425 250 040 | ● 250 | 2,2/1,6 | 30 | 100 WZ | 10 | UNI | ✓ | 83,90 |
| 11 1425 260 010 | ● 260 | 2,2/1,6 | 30 | 30 WZ | 20 | UNI | ✓ | 45,10 |
| 11 1425 260 020 | ● 260 | 2,2/1,6 | 30 | 56 WZ | 15 | UNI | ✓ | 64,00 |
| 11 1425 260 030 | ● 260 | 2,2/1,6 | 30 | 80 WZ | 10 | UNI | ✓ | 71,00 |
| 11 1425 270 010 | ● 270 | 2,2/1,6 | 30 | 30 WZ | 20 | UNI | ✓ | 45,30 |
| 11 1425 270 020 | ● 270 | 2,2/1,6 | 30 | 56 WZ | 15 | UNI | ✓ | 64,25 |
| 11 1425 270 030 | ● 270 | 2,2/1,6 | 30 | 80 WZ | 10 | UNI | ✓ | 72,80 |
| 11 1425 300 010 | ● 300 | 2,2/1,6 | 30 | 36 WZ | 20 | UNI | ✓ | 53,45 |
| 11 1425 300 020 | ● 300 | 2,2/1,6 | 30 | 60 WZ | 15 | UNI | ✓ | 70,50 |
| 11 1425 300 030 | ● 300 | 2,2/1,6 | 30 | 96 WZ | 10 | UNI | ✓ | 84,85 |
| 11 1425 300 040 | ● 300 | 2,2/1,6 | 30 | 120 WZ | 10 | UNI | ✓ | 103,70 |
| 11 1425 350 010 | ● 350 | 2,4/1,8 | 30 | 42 WZ | 20 | UNI | ✓ | 65,40 |
| 11 1425 350 020 | ● 350 | 2,4/1,8 | 30 | 72 WZ | 15 | UNI | ✓ | 86,75 |
| 11 1425 350 030 | ● 350 | 2,4/1,8 | 30 | 108 WZ | 10 | UNI | ✓ | 98,85 |
| 11 1425 350 040 | ● 350 | 2,4/1,8 | 30 | 140 WZ | 10 | UNI | ✓ | 143,40 |
| 11 1425 400 010 | ● 400 | 2,8/2,2 | 30 | 60 WZ | 15 | UNI | ✓ | 102,15 |
| 11 1425 400 020 | ● 400 | 2,8/2,2 | 30 | 96 WZ | 10 | UNI | ✓ | 136,10 |
| 11 1425 400 030 | ● 400 | 2,8/2,2 | 30 | 120 WZ | 10 | UNI | ✓ | 158,85 |
| 11 1425 450 010 | ● 450 | 3,1/2,5 | 30 | 66 WZ | 15 | UNI | ✓ | 118,60 |
| 11 1425 450 020 | ● 450 | 3,1/2,5 | 30 | 108 WZ | 10 | UNI | ✓ | 153,10 |
| 11 1425 450 030 | ● 450 | 3,1/2,5 | 30 | 130 WZ | 10 | UNI | ✓ | 177,15 |
| 11 1425 500 010 | ● 500 | 3,4/2,8 | 30 | 72 WZ | 15 | UNI+2-10-80 | ✓ | 153,35 |
| 11 1425 500 020 | ● 500 | 3,4/2,8 | 30 | 120 WZ | 10 | UNI+2-10-80 | ✓ | 203,15 |
| 11 1425 500 030 | ● 500 | 3,4/2,8 | 30 | 144 WZ | 10 | UNI+2-10-80 | ✓ | 228,65 |

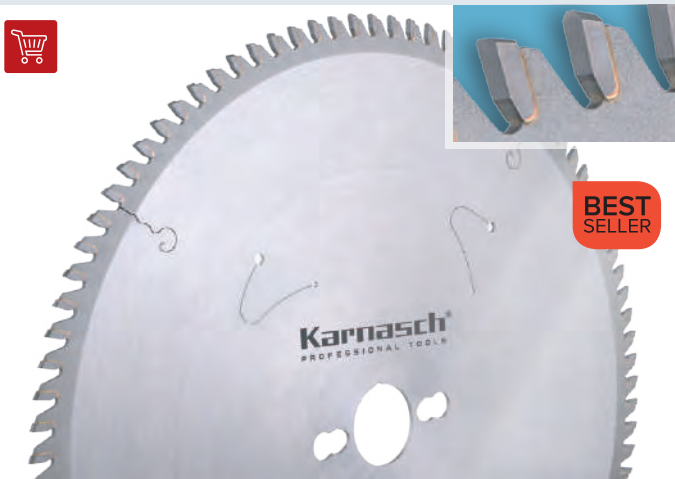
● Gefertigt/Manufactured 232,50 mm · UNI = 2-7-42 + 2-9-46,40 + 2-10-60



Index

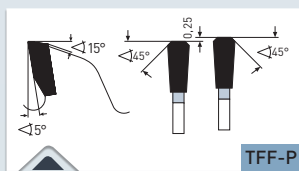
11 1430

Formatieren · Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/Dünnschnitt
Panel-sizing · Hard plastics · Abrasive materials · Finishing-cut / thin-cut



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Dünnbleche, Sandwichmaterial, Verbundstoffe | Thin iron sheets, sandwich material, composites |
| ✓ | | Dünne Profile aus Ne-Metall wie Alu, Messing, Kupfer | Thin profiles made of non ferrous materials like alu, copper, brass |



- > Trapez Flach Fase Positiv
- > Triple-chip/triple-chip teeth

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Tisch- und Formatkreissägen, Plattenaufteilsägen, Kappsägen, Akkusägen

For portable circular saws, bench- and sizing saws, panel sizing saws, cross-cut saws, cordless saws.

ANWENDUNG · APPLICATION

Durch spezielles Hartmetall/Zahnform ideal für Fertigschnitte in dünnen Platten und Profilmaterial aus harten Kunststoffen (Thermoplaste) wie: PVC, PE, PA, ABS, PS, POM PC, PMMA (Acrylglas). z.B. Hohlkammerplatten aus PMMA (Acrylglas).

Ebenfalls gut bei abrasiven, zu hohen Schneidenverschleiß führenden Materialien wie: GFK, CFK, Zementplatten, Gipsfaserplatten, Eternit.

Sie wünschen:

- Eine noch höhere Zähnezahl um die Schnittgüte/Standzeit zu verbessern?
 - Durch negativen Spanwinkel verbesserte Kontrolle bei Handvorschub?
 - Durch negativen Spanwinkel höhere Unempfindlichkeit gegen Zahnbruch?
- Siehe Art: 11 1130, Seite 971

Durch dünne Schnittbreite wenig Kraftaufwand und Verschnitt. Daher auch ideal für Akku-Maschinen.

Due to special carbide / tooth geometry excellent for finishing cuts in thin plates and profiles made of hard plastics (thermoplastics) such as: PVC, PE, PA, ABS, PS, POM PC, PMMA e.g. hollow section boards of PMMA (acrylic glass).

Also good for abrasive, heavy machining and abrading materials such as: GFK, CFK, fibre cement panels, gypsum, fibre boards, eternit.

You want:

- Even higher number of teeth to improve the cutting quality/tool life?
 - Due to negative rake angle improves control with manual feed?
 - Due to negative rake angle higher insensitivity to tooth breakage?
- See Art. 11 1130, page 971

Due to thin cutting width little cutting pressure and waste of material. Therefore also ideal for cordless machines.




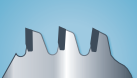


Film
Movie



Formatieren · Harte Kunststoffe · Abrasive Werkstoffe · Fertigschnitt/Dünnschnitt
Panel-sizing · Hard plastics · Abrasive materials · Finishing-cut / thin-cut

11 1430

Bestseller – preisreduziert · Bestseller – price reduced

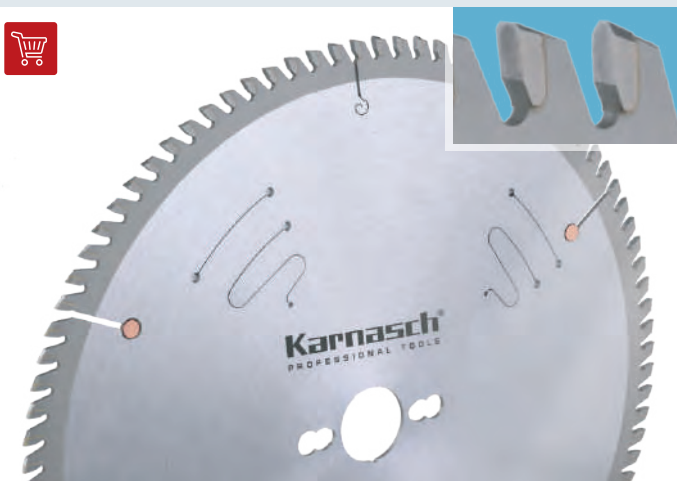
| Art. |  |  |  |  |  |  | € |
|----------------------------|---|---|---|---|---|---|--------|
| 11 1430 120 010 | • 120 | 1,8/1,2 | 20 | 40 TFF-P | - | - | 37,30 |
| 11 1430 136 010 NEW | • 136 | 1,8/1,2 | 20/10 | 48 TFF-P | - | - | 43,00 |
| 11 1430 160 010 | • 160 | 1,8/1,2 | 20/16 | 56 TFF-P | 2-6-32 | - | 45,30 |
| 11 1430 180 010 | • 180 | 1,8/1,2 | 20/16 | 60 TFF-P | 2-6-32 | - | 50,55 |
| 11 1430 190 010 | • 190 | 1,8/1,2 | 30/20 | 60 TFF-P | 2-7-42 | - | 51,15 |
| 11 1430 200 010 | • 200 | 2,0/1,4 | 30 | 64 TFF-P | 2-7-42 | - | 52,15 |
| 11 1430 210 010 | • 210 | 2,0/1,4 | 30 | 64 TFF-P | 2-7-42 | - | 53,00 |
| 11 1430 225 010 | • 225 | 2,0/1,4 | 30 | 68 TFF-P | 2-7-42 | - | 58,45 |
| 11 1430 230 010 | • 230/235 ● | 2,0/1,4 | 30 | 68 TFF-P | 2-7-42 | - | 59,15 |
| 11 1430 250 010 | • 250 | 2,4/1,8 | 30 | 80 TFF-P | UNI | ✓ | 70,05 |
| 11 1430 250 020 NEW | • 250 | 2,2/1,8 | 30 | 120 TFF-P | UNI | ✓ | 113,00 |
| 11 1430 300 010 | • 300 | 2,4/1,8 | 30 | 96 TFF-P | UNI | ✓ | 84,85 |
| 11 1430 300 020 NEW | • 300 | 2,4/1,8 | 30 | 128 TFF-P | UNI | ✓ | 125,50 |
| 11 1430 350 010 | • 350 | 2,4/1,8 | 30 | 108 TFF-P | UNI | ✓ | 98,85 |
| 11 1430 350 020 NEW | • 350 | 2,4/1,8 | 30 | 132 TFF-P | UNI | ✓ | 150,55 |
| 11 1430 400 010 | • 400 | 3,2/2,5 | 30 | 120 TFF-P | UNI | ✓ | 117,35 |
| 11 1430 400 020 NEW | • 400 | 3,1/2,5 | 30 | 138 TFF-P | UNI | ✓ | 172,80 |
| 11 1430 450 010 | • 450 | 3,5/2,8 | 30 | 132 TFF-P | UNI | ✓ | 181,25 |
| 11 1430 450 020 NEW | • 450 | 3,4/2,8 | 30 | 144 TFF-P | UNI | ✓ | 218,60 |
| 11 1430 500 010 | • 500 | 3,5/2,8 | 30 | 144 TFF-P | UNI | ✓ | 234,00 |

● Gefertigt/Manufactured 232,50 mm · UNI = 2-7-42 + 2-9-46,40 + 2-10-60



11 1460

Formatieren · Harte + abrasive Plattenmaterialien / Trapez-Trapezzahn
Panel-sizing · Hard + abrasive panel materials / Triple-chip/triple-chip tooth



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|--|---|
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoff- platten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineral- werkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

1



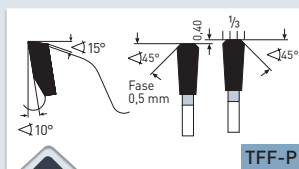
2



3



4



- > Trapez-Flachzahn (Flachzahn mit Fase)
- > Triple-chip/flat tooth (flat tooth with chamfer on both sides)

MASCHINE · MACHINE

Für Formatkreissägen, Plattensägen, Tischkreissägen

For sizing saws, panel saws, bench saws

ANWENDUNG · APPLICATION

Zum Formatieren von Platten in verschiedenen Dicken, Paketschnitte aus Thermo-
plaste wie: PVC, PE, PA, ABS, PS, POM.

Hervorragend auch zum Schneiden von Kunststoffprofilen sowie für Fertigschnitte
in beidseitig kunststoffbeschichtete Span- und Faserwerkstoffe/Platten vorzugs-
weise in Verbindung mit Ritzer.

Durch spezielles Hartmetall auch gut bei abrasiven zu schnellem Schneidenver-
schleiß führenden Verbundstoffen wie faserverstärkte Gipskartonplatten, GFK, CFK.

Ebenfalls ideal für Duroplaste wie HPL Schichtstoff (Trespa, Resopal) und Mineral-
werkstoffe wie Corian, Noblan, Staron usw.

For sizing panels of various thicknesses, cutting stacks made of thermoplastics
such as: PVC, PE, PA, ABS, PS, POM.

Excellent also for cutting plastic profiles and finishing cuts in double-side
plastic coated chip- and hard fibre materials/boards in combination with scoring
sawblades.

Due to special carbide teeth also good for cutting abrasive, heavy machining and
abrading materials such as HPL, high-pressure-laminate (Trespa, Resopal) and
mineral materials such as corian, noblan, staron etc.

5



6



7



8









9

Film
Movie



Formatieren · Harte + abrasive Plattenmaterialien / Trapez-Trapezzahn
Panel-sizing · Hard + abrasive panel materials / Triple-chip/triple-chip tooth

11 1460

| Art. |  |  |  |  |  |  | € |
|----------------------------|---|---|---|---|---|---|--------|
| 11 1460 250 010 | • 250 | 3,2/2,2 | 30 | 60 TFF-P | UNI | ✓ | 81,75 |
| 11 1460 250 020 | • 250 | 3,2/2,2 | 30 | 80 TFF-P | UNI | ✓ | 102,55 |
| 11 1460 300 010 | • 300 | 3,2/2,2 | 30 | 72 TFF-P | UNI | ✓ | 99,75 |
| 11 1460 300 020 | • 300 | 3,2/2,2 | 30 | 96 TFF-P | UNI | ✓ | 120,00 |
| 11 1460 303 010 | • 303 | 3,2/2,2 | 30 | 60 TFF-P | UNI | ✓ | 32,54 |
| 11 1460 303 020 | • 303 | 3,2/2,2 | 30 | 72 TFF-P | UNI | ✓ | 99,75 |
| 11 1460 303 030 | • 303 | 3,2/2,2 | 30 | 96 TFF-P | UNI | ✓ | 120,00 |
| 11 1460 350 010 | • 350 | 3,2/2,2 | 30 | 84 TFF-P | UNI | ✓ | 118,55 |
| 11 1460 350 020 | • 350 | 3,2/2,2 | 30 | 108 TFF-P | UNI | ✓ | 143,20 |
| 11 1460 400 010 | • 400 | 3,5/2,5 | 30 | 120 TFF-P | UNI | ✓ | 158,80 |
| NEW 11 1460 450 010 | • 450 | 3,5/2,5 | 30 | 132 TFF-P | UNI | ✓ | 187,35 |
| NEW 11 1460 500 010 | • 500 | 3,8/2,8 | 30 | 144 TFF-P | UNI | ✓ | 219,55 |

• Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

UNI = 2-7-42 + 2-9-46,40 + 2-10-60



Bei Kunststoff/Melamin beschichtete Plattenwerkstoffe Vorritzen empfohlen. Ritzer siehe Seite 1037. Sägen von beschichteten/furnierten Plattenwerkstoffe ohne Vorritzer siehe Seite 983

For plastic coated/melamine boards scoring recommended. Scorer see page 1037. Cutting of coated/veneered boards without scorer see page 983

1



2



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4



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6



7



8



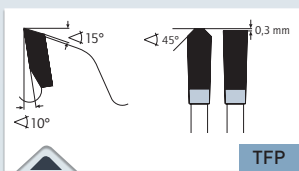
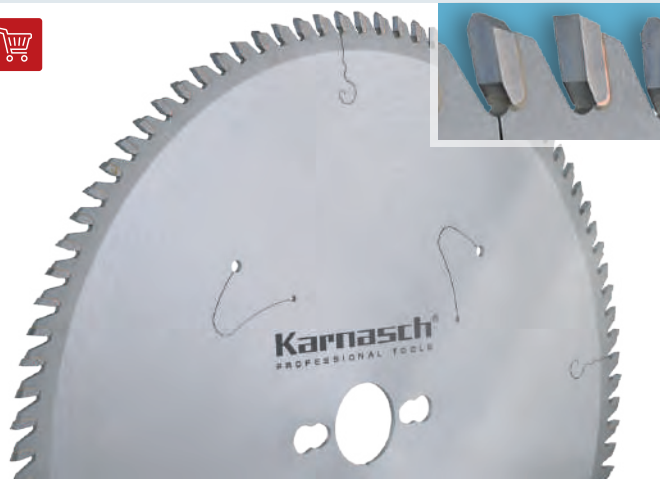
9



Index

11 1470

Formatieren Universal · Trapez-Flachzahn
Panel-sizing universal · Triple chip/flat tooth



> Trapez-Flachzahn Positiv
> Triple-chip/flat tooth positive

MASCHINE · MACHINE

Für Formatkreissägen, Plattensägen, Tischkreissägen

For sizing saws, panel saws, bench saws

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Für Fertigschnitte in thermoplastische Vollplatten (Acrylglas, PMMA, Polyäthylen, Polyamid usw.) sowie duroplastische Vollplatten (Schichtstoffe, HPL, Hartpapier, Trespa, Resopal, Multiplex).

Weiterhin für polymergebundene Kunststoffe, Mineralwerkstoffe wie Corian, Noblan, Hi-Macs, Staron, Rausolid usw.

Hervorragend ebenfalls für Fertigschnitte in beidseitig kunststoffbeschichteten Plattenwerkstoffe, vorzugsweise in Verbindung mit Vorritzer.

Ideal auch zum Schneiden von Kunststoff-Profilen.

For finishing cuts in solid thermoplastic boards (PMMA, acrylic glass, polyethylene, polyamide etc.) and solid duroplastic boards (HPL-high-pressure-laminate, HP-Hardpaper, phenolic resin bonded paper, phenolic laminated cotton sheets, Trespa, Resopal, Multiplex).

Also for polymer-bound plastics, mineral materials such as: Corian, Noblan, Hi-Macs, Staron, Rausolid etc.

Excellent also for finishing cuts in double-side plastic coated boards, preferably in combination with coring sawblades.




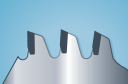


Ideal also for cutting plastic profiles.

Film
Movie



Formatieren Universal · Trapez-Flachzahn
Panel-sizing universal · Triple chip/flat tooth

11 1470

| Art. |  |  |  |  |  |  | € | |
|----------------------------|---|---|---|---|---|---|---|--------|
| 11 1470 220 010 | • 220 | 3,2/2,2 | | 30 | 64 TFP | 2-7-42 | - | 67,45 |
| 11 1470 250 010 | • 250 | 3,2/2,2 | | 30 | 60 TFP | UNI | ✓ | 73,50 |
| 11 1470 250 020 | • 250 | 3,2/2,2 | | 30 | 80 TFP | UNI | ✓ | 84,60 |
| 11 1470 300 010 | • 300 | 3,2/2,2 | | 30 | 72 TFP | UNI | ✓ | 84,55 |
| 11 1470 300 020 | • 300 | 3,2/2,2 | | 30 | 96 TFP | UNI | ✓ | 98,30 |
| 11 1470 303 010 | • 303 | 3,2/2,2 | | 30 | 60 TFP | UNI | ✓ | 80,35 |
| 11 1470 303 020 | • 303 | 3,2/2,2 | | 30 | 72 TFP | UNI | ✓ | 84,55 |
| 11 1470 303 030 | • 303 | 3,2/2,2 | | 30 | 96 TFP | UNI | ✓ | 98,30 |
| 11 1470 350 010 | • 350 | 3,5/2,5 | | 30 | 84 TFP | UNI | ✓ | 110,55 |
| 11 1470 350 020 | • 350 | 3,5/2,5 | | 30 | 108 TFP | UNI | ✓ | 117,30 |
| 11 1470 400 010 | • 400 | 3,5/2,5 | | 30 | 120 TFP | UNI | ✓ | 136,90 |
| NEW 11 1470 450 010 | • 450 | 3,5/2,5 | | 30 | 132 TFP | UNI | ✓ | 160,45 |
| NEW 11 1470 500 010 | • 500 | 3,8/2,8 | | 30 | 144 TFP | UNI | ✓ | 188,00 |

UNI = 2-7-42 + 2-9-46,40 + 2-10-60



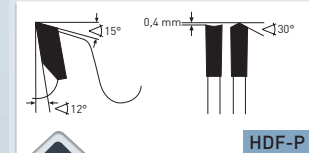
Bei Kunststoff/Melamin beschichtete Plattenwerkstoffe Vorritzen empfohlen. Ritzter siehe Seite 1037. Sägen von beschichteten/furnierten Plattenwerkstoffe ohne Vorritzer siehe Seite 983

For plastic coated/melamine boards scoring recommended. Scorer see page 1037. Cutting of coated/veneered boards without scorer see page 983

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

11 1600

Formatieren · Hohlzahn · Dach-Flach positiv
Panel-sizing · Hollow tooth · Inverted V-flat tooth positive



- > Hohlzahn-Dach / flach Positiv
- > Hollow tooth inverted V-flat positive

MASCHINE · MACHINE

Plattenaufteilanlagen wie z.B. von STRIEBIG, HOLZ-HER. Tischkreissägen z.B. von ALTENDORF, MARTIN. Formatsägen, Handkreissägen, Tauchsägen.

Panel-sizing machines for example from STRIEBIG, HOLZ-HER. Circular bench saws for example from ALTENDORF, MARTIN. Sizing machines, portable machines.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Furniere | Veneers |
| ✓ | | Profilleisten | Profiled wood |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Für Formatschnitte in beidseitig beschichtete Spanplatten (Polyester, Thermoplaste). Belegte Möbelplatten (Furnier, Kunststoff).

Gute Unterkante auch ohne Ritz-Kreissägeblätter.

Für sehr gute Unterkante ohne Ritz-Kreissägeblätter siehe Artikel 11 1320, Seite 993.

For panel sizing two-sided coated chipboards (polyester, thermoplastic). Covered furniture boards (veneer, plastic).

Good cutting quality of the lower edge even without scoring blade.

For very good cutting quality of the lower edge without scoring blade see article 11 1320, page 993

Ritzer nicht erforderlich

Scorer not required






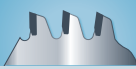

Film
Movie



Formatieren · Hohlzahn · Dach-Flach positiv
Panel-sizing · Hollow tooth · Inverted V-flat tooth positive

11 1600

Bestseller – preisreduziert · Bestseller – price reduced

| Art. |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|---|---|--------|
| 11 1600 160 010 | • 160 | 2,8/1,8 | 20/16 | 38 HDF-P | 2-6-32 | - | 47,70 |
| 11 1600 180 010 | • 180 | 2,8/1,8 | 30/20 | 38 HDF-P | 2-7-42 | - | 48,90 |
| 11 1600 190 010 | • 190 | 2,8/1,8 | 30 | 42 HDF-P | 2-7-42 | - | 54,50 |
| 11 1600 200 010 | • 200 | 2,8/1,8 | 30 | 48 HDF-P | 2-7-42 | - | 59,20 |
| 11 1600 210 010 | • 210 | 2,8/1,8 | 30 | 48 HDF-P | 2-7-42 | - | 59,80 |
| 11 1600 220 010 | • 220 | 3,2/2,2 | 30 | 42 HDF-P | 2-7-42 | - | 55,95 |
| 11 1600 250 010 | • 250 | 3,2/2,2 | 30 | 48 HDF-P | UNI | ✓ | 68,40 |
| 11 1600 303 010 | % 303 | 3,2/2,2 | 30 | 40 HDF-P | UNI | ✓ | 32,06 |
| 11 1600 303 020 | • 303 | 3,2/2,2 | 30 | 60 HDF-P | UNI | ✓ | 80,95 |
| 11 1600 303 030 | • 303 | 3,2/2,2 | 30 | 72 HDF-P | UNI | ✓ | 89,25 |
| 11 1600 350 010 | • 350 | 3,5/2,5 | 30 | 72 HDF-P | UNI | ✓ | 108,45 |
| 11 1600 400 010 | • 400 | 3,5/2,5 | 30 | 78 HDF-P | UNI | ✓ | 116,95 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Arbeiten mit Sägewelle **unter** dem Werkstück
Working with spindle **under** the panel

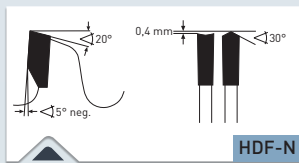


Durch den positiven Spanwinkel wirkt der Schnittdruck über dem Werkstück auf die stabile Tischauflage.
Due to the positive cutting angle acts the cutting pressure above the panel into the stable saw table.



11 1602

Formatieren · Hohlzahn · Dach-Flach negativ
Panel-sizing · Hollow tooth · Inverted V-flat tooth negative



> Hohlzahn-Dach / flach negativ
> Hollow tooth inverted V-flat negative

MASCHINE · MACHINE

Plattenaufteilsägen, speziell auch für vertikale Plattenaufteilsägen wie z.B. von STRIEBIG, HOLZ-HER. Tischkreissägen z.B. von ALTENDORF, MARTIN. Kapp- und Gehrungssägen, Formatsägen.

Panel-sizing machines in particular also for vertical panel-sizing machines for example from STRIEBIG, HOLZ-HER. Circular bench saws for example from ALTENDORF, MARTIN. Chop- and mitre saws, sizing machines.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Furniere | Veneers |
| ✓ | | Profilleisten | Profiled wood |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Für Formatschnitte in beidseitig beschichtete Spanplatten (Polyester, Thermoplaste). Belegte Möbelplatten (Furnier, Kunststoff).

Vorteile der negativen Zahnform:

- Das Blatt ist besser von Hand zu führen (manueller Vorschub) und wird nicht in das Schnittgut gezogen.
- Daher ideal auch für Kapp- und Gehrungssägen sowie vertikale Plattenaufteilsägen.
- Kompakter und somit stabiler und bruchunempfindlicher.

Gute Unterkante auch ohne Ritz-Kreissägeblätter.

Für sehr gute Unterkante ohne Ritz-Kreissägeblätter siehe Artikel 11 1320, Seite 993

For panel sizing two-sided coated chipboards (polyester, thermoplastic). Covered furniture boards (veneer, plastic).

Advantages of the negative tooth shape:

- Due to the negative tooth shape easy guiding by hand (manual feed).
- The blade is not pulled into the material to be cut.
- Therefore excellent for chop- and mitre saws, vertical panel-sizing machines.
- Compact and thus more stable and shatter-insensitive.

Good cutting quality of the lower edge even without scoring blade.

For very good cutting quality of the lower edge without scoring blade see article 11 1320, page 993

Ritzer nicht erforderlich

Scorer not required




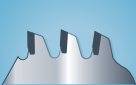




Film
Movie



Formatieren · Hohlzahn · Dach-Flach negativ
Panel-sizing · Hollow tooth · Inverted V-flat tooth negative

11 1602

| Art. |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|---|---|--------|
| 11 1602 216 010 | • 216 | 2,8/1,8 | 30 | 48 HDF-N | 2-7-42 | - | 70,60 |
| 11 1602 220 010 | • 220 | 3,2/2,2 | 30 | 42 HDF-N | 2-7-42 | - | 65,30 |
| 11 1602 250 010 | • 250 | 3,2/2,2 | 30 | 48 HDF-N | UNI | ✓ | 79,75 |
| 11 1602 303 010 | • 303 | 3,2/2,2 | 30 | 60 HDF-N | UNI | ✓ | 94,40 |
| 11 1602 303 020 | • 303 | 3,2/2,2 | 30 | 72 HDF-N | UNI | ✓ | 104,15 |
| 11 1602 350 010 | • 350 | 3,5/2,5 | 30 | 72 HDF-N | UNI | ✓ | 126,50 |

UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Arbeiten mit Sägewelle **über** dem Werkstück
Working with spindle **over** the panel



Durch den negativen Spanwinkel wirkt der Schnittdruck über dem Werkstück auf die stabile Tischauflage.
Due to the negative cutting angle acts the cutting pressure above the panel into the stable saw table.

1



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3



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9

Index

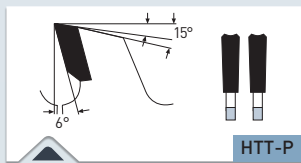
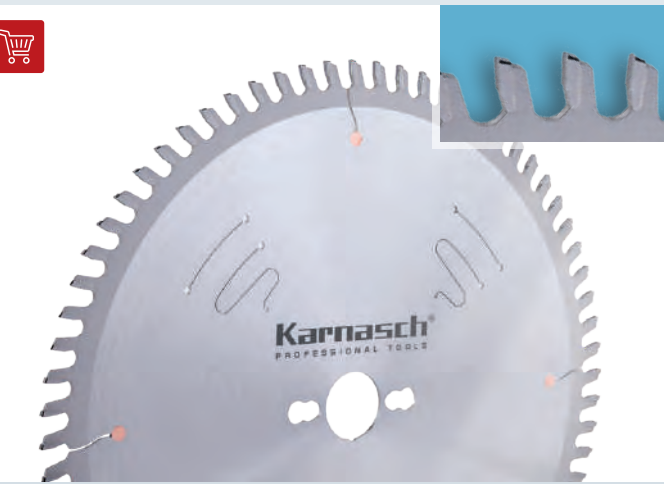
11 1604

Formatieren · Hohlzahn · Trapez-Trapez positiv
Panel-sizing · Hollow tooth · Triple-chip / Triple-chip positive



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Furniere | Veneers |
| ✓ | | Profilleisten | Profiled wood |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |



HTT-P

- > Hohlzahn Trapez / Trapez Positiv
- > Hollow tooth triple-chip / triple-chip positive

MASCHINE · MACHINE

Plattenaufteilanlagen wie z.B. von STRIEBIG, HOLZ-HER. Tischkreissägen z.B. von ALTENDORF, MARTIN. Formatsägen, Handkreissägen, Tauchsägen.

Panel-sizing machines for example from STRIEBIG, HOLZ-HER. Circular bench saws for example from ALTENDORF, MARTIN. Sizing machines, portable machines.

ANWENDUNG · APPLICATION

Für Formatschnitte in beidseitig beschichtete Spanplatten (Polyester, Thermoplaste) Holzwerkstoffe wie Spanplatten, Hartfaserplatten. Belegte Möbelplatten (Furnier, Kunststoff). Thermoplaste.

Vorteile der Trapez-Trapez Verzahnung:

- Da jeder Zahn gleichmäßig im Eingriff ist ergeben sich höhere Standzeiten und bessere Schnittqualität als Hohlzahn Dach-Flach Blätter.
- Durch dünne Schnittbreite weniger Verschnitt.
- Ideal für harte Oberflächen welche leicht splintern / ausreißen.
- Gut zum Trennen harter Thermoplaste, PMMA (Plexiglas), PA, PE, PS, POM usw. bis ca. 10 mm.

Gute bis sehr gute Unterkante auch ohne Ritz-Kreissägeblätter.

Für sehr gute Unterkante auch ohne Ritz-Kreissägeblätter siehe Artikel 11 1320, Seite 993

For panel sizing two-sided coated chipboards (polyester, thermoplastic) wooden panel material laminated such as chipboards, fibre boards. Covered furniture boards (veneer, plastic). Thermoplastics.

Advantages of the triple-chip / triple-chip tooth:

- Each tooth evenly in engagement results in longer life and cutting quality than inverted V / Flat hollow tooth.
- Because of thin-cut blades less waste.
- Excellent for clean cutting edges in hard surfaces that splinter / break out easily.
- Good also for cutting hard thermoplastics such as PMMA (acrylic glass), PA, PE, PS, POM etc. up to 10 mm.

Good up to very good cutting quality of the lower edge even without scoring blade.

For very good cutting quality of the lower edge even without scoring blade see article 11 1320, page 993

Ritzer nicht erforderlich

Scorer not required




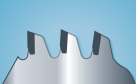




Film
Movie



Formatieren · Hohlzahn · Trapez-Trapez positiv
Panel-sizing · Hollow tooth · Triple-chip / Triple-chip positive

11 1604

| Art. |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|---|---|--------|
| 11 1604 220 010 | • 220 | 2,9/2,0 | 30 | 48 HTT-P | 2-7-42 | - | 65,30 |
| 11 1604 250 010 | • 250 | 2,9/2,0 | 30 | 60 HTT-P | UNI | ✓ | 95,80 |
| 11 1604 303 010 | • 303 | 2,9/2,0 | 30 | 72 HTT-P | UNI | ✓ | 104,15 |
| 11 1604 350 010 | • 350 | 2,9/2,2 | 30 | 84 HTT-P | UNI | ✓ | 139,10 |

UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Arbeiten mit Sägewelle **unter** dem Werkstück
Working with spindle **under** the panel



Durch den positiven Spanwinkel wirkt der Schnittdruck über dem Werkstück auf die stabile Tischauflage.
Due to the positive cutting angle acts the cutting pressure above the panel into the stable saw table.

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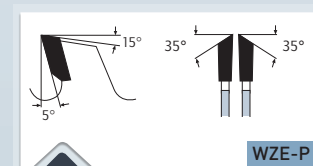
9



Index

11 1610

Formatieren · Wechselzahn extrem 35° · Positiv
Panel-sizing · Alternate top bevel extreme 35° · Positive



> Wechselzahn extrem 35° Positiv
> Alternate top bevel extreme 35° positive

MASCHINE · MACHINE

Plattenaufteilanlagen wie z.B. von STRIEBIG, HOLZ-HER. Tischkreissägen z.B. von ALTENDORF, MARTIN. Formatsägen, Handkreissägen, Tauchsägen.

Panel-sizing machines for example from STRIEBIG, HOLZ-HER. Circular bench saws for example from ALTENDORF, MARTIN. Sizing machines, portable machines.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Furniere | Veneers |
| ✓ | | Profileleisten | Profiled wood |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Für sehr **glatte ausrissfreie** Schnitte bei Massivholz-Querbearbeitung sowie in Massivholzleisten, Kunststoff- und Furnier ummantelte Profile, Leisten und Türzagen.

Splitterfreies schneiden von beidseitig Kunststoff (z.B. Melamin) beschichtete und furnierte Platten.

Hervorragender Schnitt ebenfalls in MDF, Rohe Spanplatten, Leim- und Schicht-hölzer, Sperrholz, Kunststoffprofile und Leisten, Furniere und Profileleisten, harte Thermoplaste bis ca. 30 mm.

Sehr gute Unterkante auch ohne Ritz-Kreissägeblätter.

Weitere Blätter mit guter bis sehr guter Unterkante auch ohne Ritz-Kreissägeblätter siehe Artikel 11 1320, Seite 993

For very **smooth and tear free / splinter free** cutting in solid wood across the grain and profiles, ledges and door frames of wooden material in plastic coated / foil sheathed / veneered.

Tear-free / splinter free cutting of two-sided plastic coated (for example melamine faced) or veneered chipboards, hard fibre boards.

Excellent also for MDF, plywood, glued laminate, veneers and beading, plastic profiles, hard thermoplastics up to 30 mm.

Very good cutting quality of the lower edge even without scoring blade.

Further blades with good and very good cutting quality of the lower edge without scoring blade see article 11 1320, page 993



Ritzer nicht erforderlich

Scorer not required

Film
Movie



Formatieren · Wechselzahn extrem 35° · Positiv
Panel-sizing · Alternate top bevel extreme 35° · Positive

11 1610

| Art. | | | | | | | | € |
|----------------------------|---|-----------|---------|-------|-----------|--------|---|--------|
| 11 1610 160 010 | % | 160 | 2,8/1,8 | 20/16 | 54 WZE-P | 2-6-32 | - | 30,50 |
| 11 1610 190 010 | % | 190 | 2,8/1,8 | 30 | 60 WZE-P | 2-7-42 | - | 34,45 |
| 11 1610 200 010 | % | 200 | 2,8/1,8 | 30 | 64 WZE-P | 2-7-42 | - | 37,00 |
| 11 1610 210 010 | % | 210 | 2,8/1,8 | 30 | 64 WZE-P | 2-7-42 | - | 37,50 |
| 11 1610 220 010 | % | 220 | 3,2/2,2 | 30 | 68 WZE-P | 2-7-42 | - | 39,90 |
| 11 1610 230 010 | % | 230/235 ● | 2,8/1,8 | 30 | 68 WZE-P | 2-7-42 | - | 40,15 |
| 11 1610 250 010 | ● | 250 | 3,2/2,2 | 30 | 80 WZE-P | UNI | ✓ | 81,95 |
| 11 1610 300 010 | ● | 300 | 3,2/2,2 | 30 | 96 WZE-P | UNI | ✓ | 100,70 |
| 11 1610 303 010 | ● | 303 | 3,2/2,2 | 30 | 96 WZE-P | UNI | ✓ | 100,70 |
| 11 1610 350 010 | ● | 350 | 3,5/2,2 | 30 | 108 WZE-P | UNI | ✓ | 144,35 |
| NEW 11 1610 400 010 | ● | 400 | 3,5/2,5 | 30 | 120 WZE-P | UNI | ✓ | 198,75 |
| NEW 11 1610 450 010 | ● | 450 | 3,5/2,5 | 30 | 132 WZE-P | UNI | ✓ | 206,85 |
| NEW 11 1610 500 010 | ● | 500 | 3,8/2,8 | 30 | 144 WZE-P | UNI | ✓ | 241,55 |

● Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

UNI = 2-7-42 + 2-9-46,40 + 2-10-60 ● Gefertigt/Manufactured 232,50 mm

Arbeiten mit Sägewelle **unter** dem Werkstück
Working with spindle **under** the panel



Durch den positiven Spanwinkel wirkt der Schnittdruck über dem Werkstück auf die stabile Tischauflege.
Due to the positive cutting angle acts the cutting pressure above the panel into the stable saw table.

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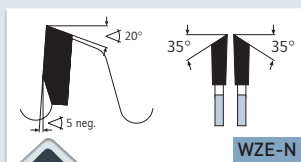
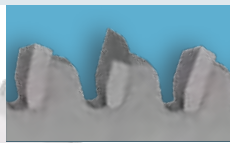


9

Index

11 1615

Formatieren · Wechselzahn extrem 35° · Negativ
Panel-sizing · Alternate top bevel extreme 35° · Negative

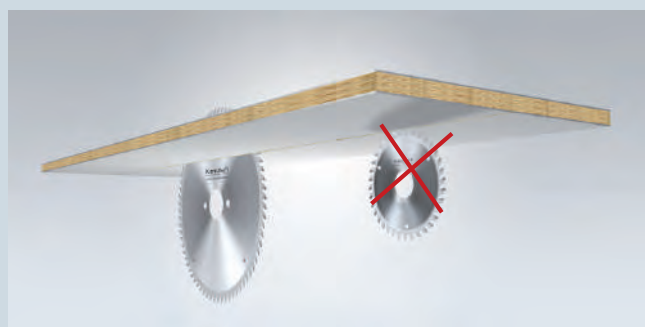


> Wechselzahn extrem 35° Negativ
> Alternate top bevel extreme 35° negative

MASCHINE · MACHINE

Plattenaufteilsägen, speziell auch für vertikale Plattenaufteilsägen wie z.B. von STRIEBIG, HOLZ-HER. Tischkreissägen z.B. von ALTENDORF, MARTIN. Kapp- und Gehrungssägen, Formatsägen.

Panel-sizing machines in particular also for vertical panel-sizing machines for example from STRIEBIG, HOLZ-HER. Circular bench saws for example from ALTENDORF, MARTIN. Chop- and mitre saws, sizing machines.



Ritzer nicht erforderlich

Scorer not required

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Furniere | Veneers |
| ✓ | | Profilleisten | Profiled wood |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |

ANWENDUNG · APPLICATION

Für sehr **glatte ausrissfreie** Schnitte bei Massivholz-Querbearbeitung sowie in Massivholzleisten, Kunststoff- und Furnier ummantelte Profile, Leisten und Türzagen.

Splinterfreies schneiden von beidseitig Kunststoff (z.B. Melamin) beschichtete und furnierte Platten.

Hervorragender Schnitt ebenfalls in MDF, Rohe Spanplatten, Leim- und Schicht-hölzer, Sperrholz, Kunststoffprofile und Leisten, Furniere und Profilleisten, harte Thermoplaste bis ca. 30 mm.

Vorteile der negativen Zahnform:

- Das Blatt ist besser von Hand zu führen (manueller Vorschub) und wird nicht in das Schnittgut gezogen.
- Daher ideal auch für Kapp- und Gehrungssägen sowie vertikale Plattenaufteilsägen.
- Kompakter und somit stabiler und bruchunempfindlicher.

Sehr gute Unterkante auch ohne Ritz-Kreissägeblätter.

Weitere Blätter mit guter bis sehr guter Unterkante auch ohne Ritz-Kreissägeblätter siehe Artikel 11 1320, Seite 993

For very **smooth and tear free / splinter free** cutting in solid wood across the grain and profiles, ledges and door frames of wooden material in plastic coated / foil sheathed / veneered.

Tear-free / splinter free cutting of two-sided plastic coated (for example melamine faced) or veneered chipboards, hard fibre boards.

Excellent also for MDF, plywood, glued laminate, veneers and beading, plastic profiles, hard thermoplastics up to 30 mm.

Advantages of the negative tooth shape:

- Due to the negative tooth shape easy guiding by hand (manual feed).
- The blade is not pulled into the material to be cut.
- Therefore excellent for chop- and mitre saws, vertical panel-sizing machines.
- Compact and thus more stable and shatter-insensitive.

Very good cutting quality of the lower edge even without scoring blade.




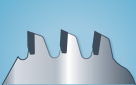


Further blades with good and very good cutting quality of the lower edge without scoring blade see article 11 1320, page 993

Film
Movie



Formatieren · Wechselzahn extrem 35° · Negativ
Panel-sizing · Alternate top bevel extreme 35° · Negative

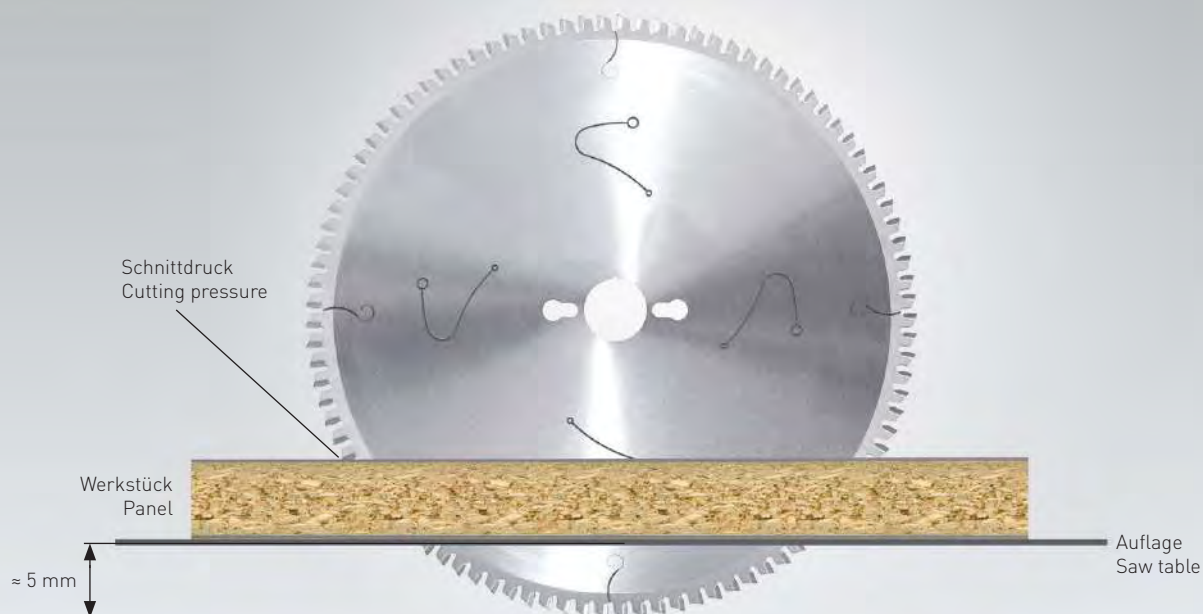
11 1615

| Art. |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|---|---|--------|
| 11 1615 216 010 | % 216 | 2,8/1,8 | 30 | 64 WZE-N | 2-7-42 | - | 38,00 |
| 11 1615 220 010 | % 220 | 3,2/2,2 | 30 | 68 WZE-N | 2-7-42 | - | 39,90 |
| 11 1615 250 010 | • 250 | 3,2/2,2 | 30 | 80 WZE-N | UNI | ✓ | 81,95 |
| 11 1615 300 010 | % 300 | 3,2/2,2 | 30 | 96 WZE-N | UNI | ✓ | 49,25 |
| 11 1615 303 010 | • 303 | 3,2/2,2 | 30 | 96 WZE-N | UNI | ✓ | 100,70 |
| 11 1615 350 010 | • 350 | 3,5/2,5 | 30 | 108 WZE-N | UNI | ✓ | 144,35 |
| 11 1615 355 010 | % 355 | 3,5/2,5 | 30 | 100 WZE-N | 2-10-60 | ✓ | 50,00 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Arbeiten mit Sägewelle **über** dem Werkstück
Working with spindle **over** the panel



Durch den negativen Spanwinkel wirkt der Schnittdruck über dem Werkstück auf die stabile Tischauflage.
Due to the negative cutting angle acts the cutting pressure above the panel into the stable saw table.

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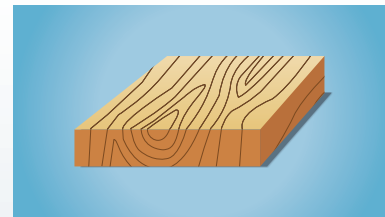


9

Index

Massivholz

Solid wood



Schnittwertempfehlungen · Recommended cutting values

| Werkstoffgruppe Material Group | Werkstoffbeispiele Material examples | Vc (m/s) Schnittgeschwindigkeit Cutting speed | fz (mm/z) Vorschub pro Zahn Feed per tooth |
|---|--|---|--|
| Weichholz Soft wood | Fichte, Kiefer, Pappel, Balsa Spruce, Pine, Poplar, Balsa | 60-100 | 0,5 - 3,0 Längsschnitt Longitudinal cut |
| | | | 0,2 - 0,4 Querschnitt cut crosswise |
| Hartholz, Exotenzholz Hard wood, exotic wood | Eiche, Buche, Bankirai, Teak Oak, Beech, Bankirai, Teak | 60-100 | 0,3 - 1,0 Längsschnitt Longitudinal cut |
| | | | 0,05 - 0,15 Querschnitt cut crosswise |

Drehzahl n (U/min) · Revolution per minute n (rpm)

| | 1500 | 2000 | 2500 | 2850 | 3000 | 4000 | 4500 | 5000 | 5600 | 6000 | 8000 | 9000 | 10000 | 12000 | 18000 |
|-------|------|------|------|------|------|------|------|------|-------|-------|------|------|-------|-------|-------|
| 80 Ø | 6,5 | 8,5 | 10,5 | 12 | 13 | 17 | 19 | 21 | 23,5 | 26 | 34 | 38 | 42 | 52 | 76 |
| 90 Ø | 7 | 9,5 | 12 | 13,5 | 14 | 19 | 21 | 24 | 26,5 | 28 | 38 | 42 | 48 | 56 | 84 |
| 100 Ø | 8 | 10,5 | 13 | 15 | 16 | 21 | 24 | 26 | 29 | 32 | 42 | 48 | 52 | 54 | 96 |
| 120 Ø | 9,5 | 13 | 16 | 18 | 19 | 26 | 28 | 32 | 35 | 38 | 52 | 56 | 64 | 76 | 112 |
| 125 Ø | 10 | 13,5 | 16,5 | 18,5 | 19,5 | 27 | 29 | 33 | 36,5 | 39 | 54 | 59 | 66 | 78 | 118 |
| 140 Ø | 11 | 15 | 18 | 21 | 22 | 30 | 33 | 36 | 41 | 44 | 60 | 66 | 72 | 88 | 132 |
| 150 Ø | 12 | 15,5 | 19,5 | 22,5 | 23,5 | 31,5 | 33,5 | 39 | 44 | 47 | 63 | 70,5 | 78,5 | 94,5 | 141,5 |
| 160 Ø | 13 | 17 | 21 | 24 | 26 | 34 | 38 | 42 | 47 | 52 | 68 | 76 | 84 | 104 | 152 |
| 180 Ø | 14 | 19 | 24 | 27 | 28 | 38 | 42,5 | 48 | 53 | 56 | 76 | 85 | 96 | 118 | 170 |
| 200 Ø | 16 | 21 | 26 | 30 | 32 | 42 | 47 | 52 | 58,5 | 64 | 84 | 94 | 104 | 128 | 188 |
| 225 Ø | 18 | 24 | 30 | 33,5 | 36 | 48 | 58 | 60 | 66 | 72 | 96 | 106 | 120 | 144 | 212 |
| 250 Ø | 20 | 26 | 33 | 37 | 40 | 52 | 59 | 66 | 73,5 | 80 | 104 | 118 | 132 | 160 | 236 |
| 300 Ø | 24 | 31,5 | 40 | 45 | 48 | 63 | 71 | 80 | 88 | 96 | 126 | 142 | 160 | 192 | 284 |
| 350 Ø | 28 | 36,5 | 47 | 52 | 56 | 73 | 88 | 94 | 105 | 112 | 146 | 166 | 188 | 224 | 332 |
| 400 Ø | 32 | 42 | 54 | 60 | 64 | 84 | 94 | 108 | 117 | 128 | 168 | 188 | 216 | 256 | 376 |
| 450 Ø | 35,5 | 47 | 59 | 67,5 | 70,5 | 94,5 | 106 | 118 | 132 | 141,6 | 188 | 211 | 236 | 283 | 424 |
| 500 Ø | 40 | 53 | 67 | 74,5 | 80 | 106 | 118 | 134 | 146,5 | 160 | 212 | 236 | 268 | 320 | 472 |

Schnittgeschwindigkeit in m/s · Cutting speed in m/s

① Massivholz · Solid wood

② Sicherheitsgrenze · Safety limits

Vc (m/s) = Schnittgeschwindigkeit · Cutting speed

Vf (m/min) = Vorschubgeschwindigkeit · Feed rate

fz (mm/z) = Vorschub pro Zahn · Feed per tooth

D (mm) = Sägendurchmesser · Saw blade diameter

n (min⁻¹) = Drehzahl · rpm

Z = Anzahl der Zähne · Number of teeth

Festlegung der Schnittgeschwindigkeit Vc
 Determination of cutting speed Vc

$$Vc (m/s) = \frac{D \cdot \pi \cdot n}{60 \cdot 1000}$$

Festlegung der Vorschubgeschwindigkeit Vf
 Determination of feed rate Vf

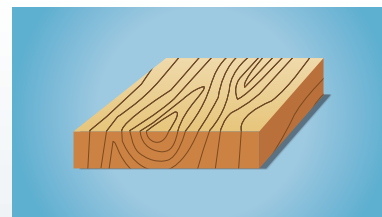
$$Vf (m/min) = \frac{fz \cdot n \cdot Z}{1000}$$

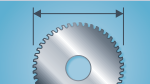

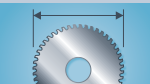
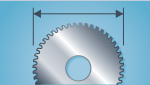
Festlegung der Drehzahl n
 Determination of revolution speed n

$$n (min^{-1}) = \frac{Vc \cdot 1000 \cdot 60}{D \cdot \pi}$$

Massivholz

Solid wood

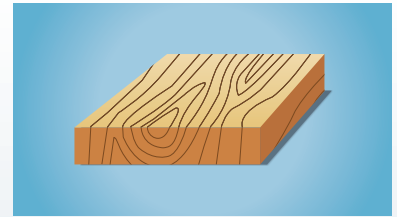


| Art. Ø mm | Type | Anwendung · Application | |
|---|--|---|------|
| 11 1200 Ø mm 250-800  | Zuschnitt Kreissägeblatt · Wechselzahn mit Abweiser Rip sawblade · Alternate bevel tooth with chip limiter <div style="float: right; border: 1px solid black; padding: 2px; color: white; font-weight: bold;">BEST SELLER</div> | Für Zuschnitte in Weich- und Hartholz sowie für Brennholz, Bauhölzer, Schalungsplatten, Rohspanplatten. For ripping and cross cutting in soft and hard wood, as well as for cutting firewood, construction wood, plywood boards, raw chipboards. | 1018 |
| 11 1215 Ø mm 150-500  | Zuschnitt Kreissägeblatt · Wechselzahn Rip sawblade · Alternate top bevel tooth | Für Zuschnitte in Weich- und Hartholz sowie für Brennholz, Bauhölzer, Schalungsplatten, Rohspanplatten. Generell für Massivholzverarbeitung auch nass. For ripping and cross cutting in soft and hard wood, as well as for cutting firewood, construction wood, plywood boards, raw chipboards. In general for solid wood also wet. | 1019 |
| 11 1220 Ø mm 250-400  | Zuschnitt Kreissägeblatt · Flachzahn mit Abweiser Rip sawblade · Flat tooth with chip limiter | Für große und schnelle Zuschnitte in weich- und mittelharte Hölzer sowie Naturhölzer wie sie in Tischlereien und Zimmereigeschäften verwendet werden. For rough and quick cuts in soft and medium hard wood, as well as in natural wood line that is used in joiner's workshops and carpentry businesses. | 1020 |
| 11 1230 Ø mm 250-500  | Zuschnitt Kreissägeblatt · Tiefschnitt Rip sawblade · Deep-cut | Das ideale und preiswerte Blatt zum Erreichen hoher Schnitttiefen dank großem Zahnüberstand. Für grobe, schnelle und tiefe Zuschnitte in weich- und mittelharte Hölzer. The ideal and inexpensive blade for reaching greater cutting depths thanks to the enlarged projection of the tooth. For rough, quick and deep cuts in soft and medium hard wood. | 1021 |



Massivholz

Solid wood

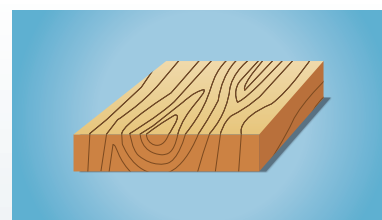


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| Art. Ø mm | Type | Anwendung · Application | |
|---|---|--|------|
| <p>11 1232</p> <p>Ø mm 250-500</p> | <p>Zuschnitt/Vielblattkreissäge mit Räumerschneiden + Abweiser</p> <p>Rip/multi-rip sawblades with raker teeth + chip limiter</p> | <p>Für Längs- und Querschnitte in Massivholz weich bis hart. Trocken bis naturfeucht. Ideal auch für tiefe Schnitte dank 3/4 × HM - Räumerschneiden. Flachzahn vorzugsweise für Längsschnitte.</p> <p>For longitudinal and cross cuts in soft to hard solid wood. Dry to natural moisture. Also ideal for deep cuts thanks to 3/4 × raker teeth. Flat tooth is preferable for longitudinal cuts.</p> | 1022 |
| <p>11 1235</p> <p>Ø mm 300-500</p> | <p>Zuschnitt/Vielblattkreissäge mit Räumerschneiden</p> <p>Rip/multi-rip sawblades with raker teeth</p> | <p>Für Längs- und Querschnitte in Massivholz weich bis hart. Trocken bis naturfeucht. Ideal auch für tiefe Schnitte dank 3/4 × HM - Räumerschneiden.</p> <p>For longitudinal and cross cuts in soft to hard solid wood. Dry to natural moisture. Also ideal for deep cuts thanks to 3/4 × raker teeth.</p> | 1023 |
| <p>11 1238</p> <p>Ø mm 250-450</p> | <p>Vielblattkreissäge mit Räumerschneiden</p> <p>Multi-rip sawblades with raker teeth</p> | <p>Für Längsschnitte in Massivholz weich bis hart, naturfeucht bis nass.</p> <p>For longitudinal cuts in solid wood soft to hard, naturally moist to wet.</p> | 1024 |
| <p>11 1239</p> <p>Ø mm 250-400</p> | <p>Vielblattkreissäge mit Räumerschneiden</p> <p>Multi-rip sawblades with raker teeth</p> | <p>Für Längsschnitte in Massivholz weich bis hart, naturfeucht bis nass.</p> <p>For longitudinal cuts in solid wood soft to hard, naturally moist to wet.</p> | 1025 |

Massivholz

Solid wood

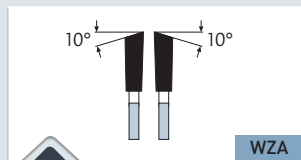
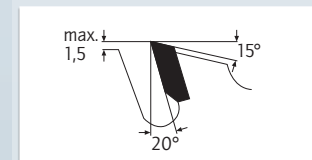


| Art. Ø mm | Type | Anwendung · Application | |
|---|--|--|------|
| <p>11 1300</p> <p>Ø mm 150-800</p> | <p>Massivholz Universal + Hundegger · Wechselzahn</p> <p>BEST SELLER</p> <p>Solid wood Universal + Hundegger · Alternate top bevel tooth</p> | <p>Gute bis sehr gute Schnittqualität in alle Holzwerkstoffe, Massivholz längs und quer, 1- und 2-seitig Kunststoff/Furnier beschichtete Platten, Leisten, Furniere, Kunststoffe.</p> <p>Good to very good cutting quality in all wooden materials, solid wood along and across the grain, panels and boards 1- and 2 sided plastic coated/veneered, strips and veneer, plastics.</p> | 1027 |
| <p>11 1320</p> <p>Ø mm 200-500</p> | <p>Massivholz Universal Plus · Wechselzahn + Achswinkel</p> <p>Solid wood Universal Plus · Alternate Top Bevel tooth + Axial-Angle</p> | <p>Hervorragende und ausrissfreie Schnittqualität in alle Holzwerkstoffe, Massivholz quer, 1- und 2-seitig Kunststoff/Furnier beschichtet Platten, Leisten, Folien, Furniere, Kunststoffe (Thermoplast)</p> <p>Excellent, tear-free/splinter-free finishing-cut quality in all wooden materials, solid wood across the grain, panels and boards 1- and 2 sided plastic/veneer coated, strips, veneer, foils, plastics (Thermoplastics)</p> | 1029 |
| <p>11 1425</p> <p>Ø mm 120-500</p> | <p>Massivholz Universal · Wechselzahn · Dünnschnitt</p> <p>BEST SELLER</p> <p>Solid wood Universal · Alternate Top Bevel tooth · Thin-cut</p> | <p>Gute bis sehr gute Schnittqualität in alle Holzwerkstoffe, Massivholz längs und quer, 1- und 2-seitig Kunststoff/Furnier beschichtete Platten, Kunststoffprofile und Platten. Durch dünne Schnittbreite ideal auch für Akkumaschinen und für teure Edelhölzer, Furniere, Leisten da wenig Verschnitt und Schnittdruck/Akkuverbrauch.</p> <p>Good to very good cutting quality in all wooden materials, solid wood along and across the grain, panels and boards 1- and 2 sided plastic coated/veneered, plastic profiles and boards. Due to thin-cut also ideal for battery machines and for cutting expensive precious wood, veneer, strips because of less waste/battery consumption.</p> | 1031 |
| <p>11 1450</p> <p>Ø mm 210-600</p> | <p>Kapp- und Gehrungssägeblätter · Wechselzahn/Negativ</p> <p>Chop- and mitre circular saws · Alternate Top Bevel tooth/negative</p> | <p>Für Querschnitte in Weich- und Hartholz, Holzwerkstoffe, Leimholz, Schichtholz, Plattenwerkstoffe furniert oder beschichtet. Durch die negative Zahnform ist das Sägeblatt besser von Hand zu führen und wird nicht in das Schnittgut gezogen.</p> <p>For cross cuts in soft and hard wood, wooden materials, glued wood, plywood, veneered or coated boards. Due to the negative tooth shape, that saw blade can be guided easier by hand and is not pulled into the material to be cut.</p> | 1033 |



11 1200

Zuschnitt Kreissägeblatt · Wechselzahn mit Abweiser
Rip sawblade · Alternate top bevel tooth with chip limiter



- > Wechselzahn mit Abweiser
- > Alternate top bevel tooth with chip limiter

MASCHINE · MACHINE

Für Tischkreissägen, Formatkreissägen, Wippkreissägen

For bench saws, sliding table saws, rocker saws

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Weichholz, Hartholz, Exotenholz Längs | Soft wood, hard wood, and exotic wood along the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |

ANWENDUNG · APPLICATION

Für Zuschnitte in Weich- und Hartholz sowie für Brennholz, Bauhölzer, Schalungspanplatten, Rohspanplatten. Ebenfalls für Trennschnitte in Holzplattenwerkstoffe (auch einseitig furniert oder mit Kunststoff belegt).

For ripping and cross cutting in soft and hard wood, as well as for cutting firewood, construction wood, plywood boards, raw chipboard. Also suitable for making cuts in wooden panels (also with veneer or plastic coating on one side).

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | | | | | | € |
|-----------------|-------|---------|----|--------|-----|--------|
| 11 1200 250 010 | ● 250 | 3,2/2,2 | 30 | 24 WZA | UNI | 27,50 |
| 11 1200 280 010 | ● 280 | 3,2/2,2 | 30 | 28 WZA | UNI | 34,10 |
| 11 1200 300 010 | ● 300 | 3,2/2,2 | 30 | 28 WZA | UNI | 33,50 |
| 11 1200 315 010 | ● 315 | 3,2/2,2 | 30 | 28 WZA | UNI | 39,20 |
| 11 1200 350 010 | ● 350 | 3,5/2,5 | 30 | 24 WZA | UNI | 40,55 |
| 11 1200 350 020 | ● 350 | 3,5/2,5 | 30 | 32 WZA | UNI | 43,10 |
| 11 1200 400 010 | ● 400 | 3,5/2,5 | 30 | 28 WZA | UNI | 47,95 |
| 11 1200 400 020 | ● 400 | 3,5/2,5 | 30 | 36 WZA | UNI | 49,85 |
| 11 1200 450 010 | ● 450 | 4,2/2,8 | 30 | 32 WZA | UNI | 58,35 |
| 11 1200 450 020 | ● 450 | 4,2/2,8 | 30 | 40 WZA | UNI | 63,80 |
| 11 1200 500 010 | ● 500 | 4,4/2,8 | 30 | 36 WZA | UNI | 71,40 |
| 11 1200 500 020 | ● 500 | 4,4/2,8 | 30 | 44 WZA | UNI | 74,35 |
| 11 1200 550 010 | ● 550 | 4,4/3,0 | 30 | 48 WZA | UNI | 118,00 |
| 11 1200 600 010 | ● 600 | 4,4/3,0 | 30 | 40 WZA | UNI | 123,60 |
| 11 1200 600 020 | ● 600 | 4,4/3,0 | 30 | 54 WZA | UNI | 130,55 |
| 11 1200 700 010 | ● 700 | 4,4/3,2 | 30 | 46 WZA | UNI | 140,65 |
| 11 1200 700 020 | ● 700 | 4,4/3,2 | 30 | 60 WZA | UNI | 156,65 |
| 11 1200 800 010 | 🔴 800 | 4,8/3,6 | 30 | 60 WZA | UNI | 174,84 |

🔴 Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Blätter für tiefe Schnitte, siehe Art. 11 1215 Seite 1019, Art. 11 1220 Seite 1020, Art. 11 1235 Seite 1023, Art. 11 1230 Seite 1021 sowie Art. 11 1232 Seite 1022

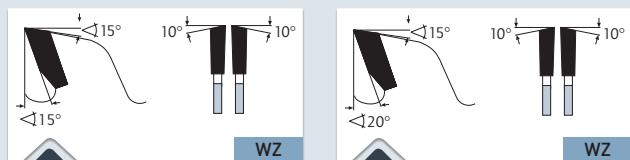
Blades for deep cuts see item 11 1215 page 1019, item 11 1220 page 1020, item 11 1235 page 1023, item 11 1230 page 1021 and item 11 1232 page 1022

Film
Movie



Zuschnitt Kreissägeblatt · Wechselzahn
Rip sawblade · Alternate top bevel tooth

11 1215



> Ø 150-230 mm Wechselzahn
> Ø 150-230 mm Alternate top bevel

> Ø 250-500 mm Wechselzahn
> Ø 250-500 mm Alternate top bevel

MASCHINE · MACHINE

Für Tischkreissägen, Formatkreissägen

For bench saws, sizing saws

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Weichholz, Hartholz, Exotenholz Längs | Soft wood, hard wood, and exotic wood along the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |

ANWENDUNG · APPLICATION

Für Zuschnitte in Weich- und Hartholz sowie für Brennholz, Bauhölzer, Schalungsplatten, Rohspanplatten. Ebenfalls für Trennschnitte in Holzplattenwerkstoffe (auch einseitig furniert oder mit Kunststoff belegt). **Generell für Massivholzbearbeitung auch nass.**

For ripping and cross cutting in soft and hard wood, as well as for cutting firewood, construction wood, plywood boards, raw chipboard. Also suitable for making cuts in wooden panels (also with veneer or plastic coating on one side). **In general for solid wood. Also Wet.**

| Art. | | | | | | € |
|-----------------|-----------|---|----|-------|-----|-------|
| 11 1215 150 010 | • 150 | 3,2/2,2 | 30 | 24 WZ | UNI | 32,50 |
| - | • 160-170 | Siehe/See Art. 11 1400, Seite/Page 1035 | | | | |
| 11 1215 180 010 | • 180 | 3,2/2,2 | 30 | 30 WZ | UNI | 37,05 |
| - | • 190 | Siehe/See Art. 11 1400, Seite/Page 1035 | | | | |
| 11 1215 200 010 | • 200 | 3,2/2,2 | 30 | 36 WZ | UNI | 46,85 |
| - | • 210-225 | Siehe/See Art. 11 1400, Seite/Page 1036 | | | | |
| 11 1215 230 010 | • 230 | 3,2/2,2 | 30 | 24 WZ | UNI | 33,80 |
| - | • 240 | Siehe/See Art. 11 1400, Seite/Page 1036 | | | | |
| 11 1215 250 010 | • 250 | 3,2/2,2 | 30 | 24 WZ | UNI | 33,80 |
| 11 1215 250 020 | • 250 | 3,2/2,2 | 30 | 30 WZ | UNI | 37,05 |
| 11 1215 255 010 | • 255 | 3,2/2,2 | 30 | 24 WZ | UNI | 33,80 |
| - | • 260-280 | Siehe/See Art. 11 1400, Seite/Page 1036 | | | | |
| 11 1215 300 010 | • 300 | 3,2/2,2 | 30 | 24 WZ | UNI | 41,20 |
| 11 1215 300 020 | • 300 | 3,2/2,2 | 30 | 36 WZ | UNI | 50,20 |
| 11 1215 315 010 | • 315 | 3,2/2,2 | 30 | 24 WZ | UNI | 45,10 |
| 11 1215 315 020 | • 315 | 3,2/2,2 | 30 | 36 WZ | UNI | 54,90 |
| - | • 320-335 | Siehe/See Art. 11 1400, Seite/Page 1036 | | | | |
| 11 1215 350 010 | • 350 | 3,5/2,5 | 30 | 24 WZ | UNI | 45,75 |
| 11 1215 350 020 | • 350 | 3,5/2,5 | 30 | 32 WZ | UNI | 50,95 |
| 11 1215 350 040 | • 350 | 3,5/2,5 | 30 | 42 WZ | UNI | 59,20 |
| - | • 355 | Siehe/See Art. 11 1400, Seite/Page 1036 | | | | |
| 11 1215 370 010 | • 370 | 4,2/2,5 | 30 | 26 WZ | UNI | 58,90 |
| 11 1215 400 010 | • 400 | 3,5/2,5 | 30 | 28 WZ | UNI | 59,20 |
| 11 1215 400 020 | • 400 | 3,5/2,5 | 30 | 36 WZ | UNI | 66,30 |
| 11 1215 400 030 | • 400 | 3,5/2,5 | 30 | 48 WZ | UNI | 70,80 |
| 11 1215 410 010 | • 410 | 4,2/2,5 | 30 | 28 WZ | UNI | 69,15 |
| 11 1215 450 010 | • 450 | 4,2/2,8 | 30 | 40 WZ | UNI | 74,05 |
| 11 1215 500 010 | • 500 | 4,2/2,8 | 30 | 44 WZ | UNI | 88,80 |

UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Blätter mit höherer Zähnezahl siehe Art. 11 1300 Seite 1027
Blades with more teeth, see item 11 1300 page 1027

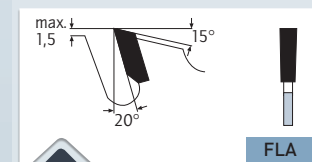
Blätter für tiefe Schnitte, siehe Art. 11 1230 Seite 1021
sowie Artikel 11 1232 Seite 1022
Blades for deep cuts see item 11 1230 page 1021,
or item 11 1232 page 1022

Film
Movie



11 1220

Zuschnitt Kreissägeblatt · Flachzahn mit Abweiser
Rip sawblade · Flat tooth with chip limiter



> Flachzahn mit Abweiser
> Flat tooth with chip limiter

MASCHINE · MACHINE

Für Tischkreissägen, Formatkreissägen

For bench saws, sizing saws

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz Längs | Soft wood, hard wood, and exotic wood along the grain |
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |

ANWENDUNG · APPLICATION

Für grobe und schnelle Zuschnitte in weich- und mittelharten Hölzern sowie Naturhölzern wie sie in Tischlereien und Zimmereigeschäften verwendet werden. Vorzugsweise für Längsschnitte. (Querschnitte ebenfalls möglich)

For rough and quick cuts in soft and medium hard wood, as well as in natural wood, like that used in joiner's workshops and carpentry businesses. Particularly suitable for longitudinal cuts. (Cross cuts are also possible).

| Art. | | | | | | € |
|-----------------|-------|---------|----|--------|-----|-------|
| 11 1220 250 010 | ● 250 | 3,2/2,2 | 30 | 12 FLA | UNI | 30,05 |
| 11 1220 300 010 | ● 300 | 3,2/2,2 | 30 | 14 FLA | UNI | 33,15 |
| 11 1220 300 020 | ● 300 | 3,2/2,2 | 30 | 20 FLA | UNI | 40,30 |
| 11 1220 350 010 | ● 350 | 3,5/2,5 | 30 | 16 FLA | UNI | 44,40 |
| 11 1220 350 020 | ● 350 | 3,5/2,5 | 30 | 24 FLA | UNI | 45,75 |
| 11 1220 400 010 | ● 400 | 3,5/2,5 | 30 | 18 FLA | UNI | 56,35 |
| 11 1220 400 020 | ● 400 | 3,5/2,5 | 30 | 28 FLA | UNI | 59,20 |

UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Weitere Trenn- und Zuschnitt grob-Blätter siehe Art. 11 1200 Seite 1018, Art. 11 1215 Seite 1019, Art. 11 1230 Seite 1021, Art. 11 1232 Seite 1022, Art. 11 1235 Seite 1023

For more cutting and sizing coarse blades, see item 11 1200 page 1018, item 11 1215 page 1019, item 11 1230 page 1021, item 11 1232 page 1022, item 11 1235 page 1023

Film
Movie



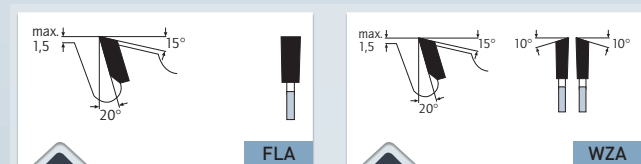
Zuschnitt Kreissägeblatt · Tiefschnitt
Rip sawblade · Deep-cut

11 1230



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz Längs | Soft wood, hard wood, and exotic wood along the grain |
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |



> Flachzahn mit Abweiser
> Flat tooth with chip limiter

> Wechselzahn mit Abweiser
> Alternate top bevel with chip limiter

ANWENDUNG · APPLICATION

Das ideale und preiswerte Blatt zum Erreichen hoher Schnitttiefen dank großem Zahnüberstand. Für grobe, schnelle und tiefe Zuschnitte in weich- und mittelharten Hölzern. Trocken bis naturfeucht. Flachzahn (FLA) Ausführung vorzugsweise für Langsschnitte.

The ideal and inexpensive blade for reaching greater cutting depths thanks to the enlarged projection of the tooth. For rough, quick and deep cuts in soft and medium hard wood. Dry to natural moisture. Flat tooth (FLA) design preferably for cuts along the grain.

MASCHINE · MACHINE

Für Tischkreissägen, Formatkreissägen

For bench saws, sizing saws

| Art. | | | | | | € |
|-----------------|-------|---------|----|--------|-----|-------|
| 11 1230 250 010 | ● 250 | 3,6/2,2 | 30 | 12 FLA | UNI | 34,20 |
| 11 1230 250 020 | ● 250 | 3,6/2,2 | 30 | 16 WZA | UNI | 36,35 |
| 11 1230 300 010 | ● 300 | 3,8/2,2 | 30 | 14 FLA | UNI | 36,65 |
| 11 1230 300 020 | ● 300 | 3,8/2,2 | 30 | 18 WZA | UNI | 44,30 |
| 11 1230 350 010 | ● 350 | 4,2/2,5 | 30 | 16 FLA | UNI | 48,20 |
| 11 1230 350 020 | ● 350 | 4,2/2,5 | 30 | 20 WZA | UNI | 50,70 |
| 11 1230 400 010 | ● 400 | 4,4/2,8 | 30 | 18 FLA | UNI | 63,20 |
| 11 1230 400 020 | ● 400 | 4,4/2,8 | 30 | 24 WZA | UNI | 69,65 |
| 11 1230 450 010 | ● 450 | 4,5/2,8 | 30 | 20 FLA | UNI | 74,10 |
| 11 1230 450 020 | ● 450 | 4,5/2,8 | 30 | 28 WZA | UNI | 83,45 |
| 11 1230 500 010 | ● 500 | 4,5/2,8 | 30 | 24 FLA | UNI | 86,00 |
| 11 1230 500 020 | ● 500 | 4,5/2,8 | 30 | 32 WZA | UNI | 97,65 |

UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Weitere Trenn- und Zuschnitt grob-Blätter siehe Art. 11 1200 Seite 1018, Art. 11 1215 Seite 1019, Art. 11 1220 Seite 1020, Art. 11 1232 Seite 1022, Art. 11 1235 Seite 1023

For more cutting and sizing coarse blades, see item 11 1200 page 1018, item 11 1215 page 1019, item 11 1220 page 1020, item 11 1232 page 1022, item 11 1235 page 1023

Film
Movie



1021

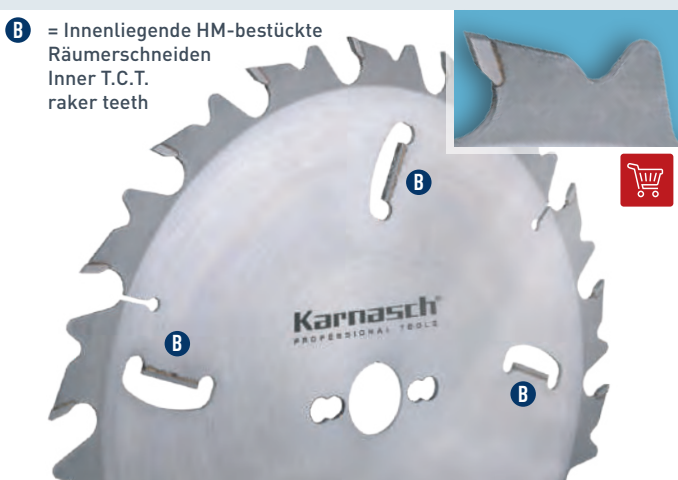


Index

11 1232

Zuschnitt/Vielblatt Kreissäge mit Rämerschneiden + Abweiser
Rip/multi-rip sawblade with raker teeth + chip limiter

B = Innenliegende HM-bestückte
Rämerschneiden
Inner T.C.T.
raker teeth



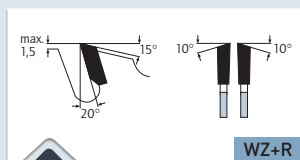
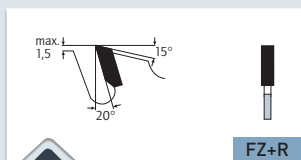
✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz Längs | Soft wood, hard wood, and exotic wood along the grain |
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Leimholz, Tischler- und Furnier- sperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |

ANWENDUNG · APPLICATION

Für Längs- und Querschnitte in Massivholz weich bis hart. Trocken bis naturfeucht. Ideal auch für tiefe Schnitte dank 3/4 × HM - Rämerschneiden. Flachzahn vorzugsweise für Längsschnitte.

For longitudinal and cross cuts in soft to hard solid wood. Dry to natural moisture. Also ideal for deep cuts thanks to 3/4 × raker teeth. Flat tooth is preferable for longitudinal cuts.



> Flachzahn mit Abweiser + Rämerschneiden
> Flat tooth with chip thickness limiter + raker teeth

> Wechselzahn mit Abweiser + Rämerschneiden
> Alternate tooth with chip thickness limiter + raker teeth

MASCHINE · MACHINE

Für Formatmaschinen, Tischkreissägen, Zimmerei-Handkreissägen, Säumer, Mehrblatt-Abbandanlagen. Manueller oder automatischer Vorschub.

For sizing saws, bench saws, Carpentry portable circular saws, seamers, multi-rip, joining saws. Manual or automatic feed.

| Art. | | | | | | | MAXIMALER FLANSCH Ø MAXIMUM FLANGE Ø | MAXIMALE SCHNITTIEFE MAXIMUM DEPTH OF CUT | € |
|-----------------|-------|---------|----|---------|-------------|-----|---|--|--------|
| 11 1232 250 010 | • 250 | 3,2/2,2 | 30 | 18 FZ+R | 3× B | UNI | 100 mm | 60 mm | 59,35 |
| 11 1232 300 010 | • 300 | 3,2/2,2 | 30 | 18 FZ+R | 3× B | UNI | 130 mm | 75 mm | 68,25 |
| 11 1232 300 020 | • 300 | 3,6/2,5 | 30 | 18 WZ+R | 4× B | UNI | 105 mm | 75 mm | 80,60 |
| 11 1232 350 010 | • 350 | 3,6/2,5 | 30 | 20 FZ+R | 4× B | UNI | 120 mm | 100 mm | 90,35 |
| 11 1232 350 020 | • 350 | 3,6/2,5 | 30 | 24 WZ+R | 4× B | UNI | 120 mm | 100 mm | 95,00 |
| 11 1232 400 010 | • 400 | 4,0/2,8 | 30 | 24 FZ+R | 4× B | UNI | 120 mm | 120 mm | 101,45 |
| 11 1232 400 020 | • 400 | 4,0/2,8 | 30 | 28 WZ+R | 4× B | UNI | 120 mm | 120 mm | 111,65 |
| 11 1232 450 010 | • 450 | 4,2/2,8 | 30 | 28 FZ+R | 4× B | UNI | 160 mm | 140 mm | 140,65 |
| 11 1232 450 020 | • 450 | 4,0/2,8 | 30 | 36 WZ+R | 4× B | UNI | 160 mm | 140 mm | 148,25 |
| 11 1232 500 010 | • 500 | 4,4/3,2 | 30 | 32 FZ+R | 4× B | UNI | 180 mm | 155 mm | 166,25 |

UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Weitere Abmessungen auf Anfrage
Other dimensions are available on request

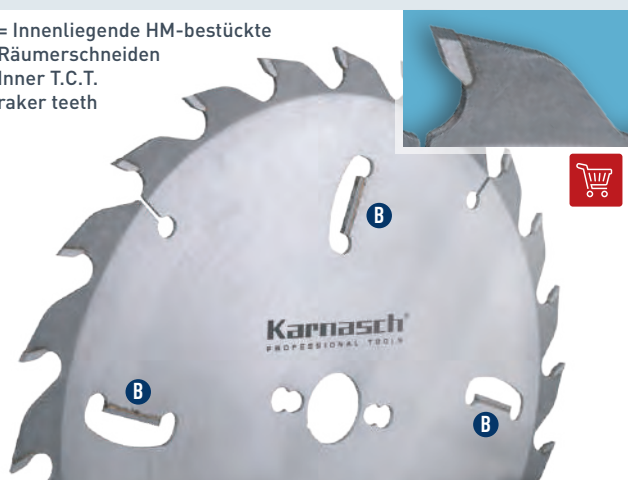
Film
Movie



Zuschnitt/Vielblatt Kreissäge mit Räumerschnneiden
Rip/multi-rip sawblade with raker teeth

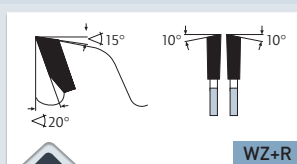
11 1235

B = Innenliegende HM-bestückte
Räumerschnneiden
Inner T.C.T.
raker teeth



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz Längs | Soft wood, hard wood, and exotic wood along the grain |
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Leimholz, Tischler- und Furnier- sperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |



- > Wechselzahn + Räumerschnneiden
- > Alternate tooth + raker teeth

ANWENDUNG · APPLICATION

Für Längs- und Querschnitte in Massivholz weich bis hart. Trocken bis natur-
feucht. Ideal auch für tiefe Schnitte dank 3/4 × HM - Räumerschnneiden.

For longitudinal and cross cuts in soft to hard solid wood. Dry to natural moisture.
Also ideal for deep cuts thanks to 3/4 × raker teeth.

MASCHINE · MACHINE

Für Formatmaschinen, Tischkreissägen, Zimmerei-Handkreissägen,
Säumer, Mehrblatt-Abbundanlagen. Manueller oder automatischer
Vorschub.

For sizing saws, bench saws, Carpentry portable circular saws, seamers,
multi-rip, joining saws. Manual or automatic feed.

| Art. | | | | | | | MAXIMALER FLANSCH Ø MAXIMUM FLANGE Ø | MAXIMALE SCHNITTITIEFE MAXIMUM DEPTH OF CUT | € |
|-----------------|-------|---------|----|---------|-------------|-----|---|--|--------|
| 11 1235 300 010 | • 300 | 3,4/2,2 | 30 | 24 WZ+R | 4× B | UNI | 130 mm | 60 mm | 93,50 |
| 11 1235 350 010 | • 350 | 3,6/2,5 | 30 | 32 WZ+R | 4× B | UNI | 105 mm | 100 mm | 104,25 |
| 11 1235 400 010 | • 400 | 4,0/2,8 | 30 | 36 WZ+R | 4× B | UNI | 120 mm | 120 mm | 125,10 |
| 11 1235 450 010 | • 450 | 4,2/2,8 | 30 | 40 WZ+R | 4× B | UNI | 170 mm | 140 mm | 159,35 |
| 11 1235 500 010 | • 500 | 4,4/3,2 | 30 | 44 WZ+R | 4× B | UNI | 180 mm | 155 mm | 170,65 |

UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Weitere Abmessungen auf Anfrage
Other dimensions are available on request

Film
Movie



1023



Index

11 1238


Vielblatt Kreissägen mit Räumerschneiden
Multi-rip sawblades with raker teeth

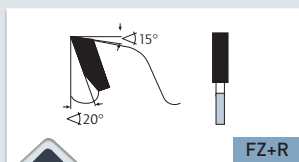
A = Außenliegende HM-bestückte
Räumerschneiden
Outer T.C.T raker teeth

B = Innenliegende HM-
bestückte Räum-
erschneiden
Inner T.C.T
raker teeth



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

✓  Weichholz, Hartholz, Exotenholz
Längs Soft wood, hard wood, and exotic
wood along the grain



> Flachzahn mit Räumerschneiden
> Flat tooth with raker teeth

ANWENDUNG · APPLICATION




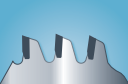

Für Längsschnitte in Massivholz weich bis hart, naturfeucht bis nass.

For longitudinal cuts in solid wood soft to hard, naturally moist to wet.

MASCHINE · MACHINE

Ein- oder Doppelwellige Vielblattkreissägen, Besäumkreissägen

Single- or double-shaft multi-blade circular saw, trimming circular saw

| Art. |  |  |  |  |  | MAXIMALER FLANSCH Ø MAXIMUM FLANGE Ø | MAXIMALE SCHNITTIEFE MAXIMUM DEPTH OF CUT | € |
|-----------------|---|---|---|---|---|---|--|-------|
| 11 1238 250 010 | % 250 | 3,2/2,2 | Ø=70 / 1=13x5 / 2=20x6,5 | 16 FZ+R | 2x A + 2x B | 105 mm | 65 mm | 26,12 |
| 11 1238 250 020 | % 250 | 3,2/2,2 | Ø=80 / 1=14x5 / 2=22x6,5 | 16 FZ+R | 2x A + 2x B | 105 mm | 65 mm | 26,12 |
| 11 1238 300 020 | % 300 | 3,2/2,2 | Ø=80 / 1=14x5 / 2=22x6,5 | 18 FZ+R | 2x A + 2x B | 120 mm | 85 mm | 27,86 |
| 11 1238 300 030 | % 300 | 3,2/2,2 | Ø=30, UNI | 24 FZ+R | 2x A + 2x B | 120 mm | 85 mm | 30,06 |
| 11 1238 315 010 | % 315 | 3,2/2,2 | Ø=70 / 1=13x5 / 2=20x6,5 | 18 FZ+R | 2x A + 2x B | 120 mm | 90 mm | 33,08 |
| 11 1238 315 020 | % 315 | 3,2/2,2 | Ø=80 / 1=14x5 / 2=22x6,5 | 18 FZ+R | 2x A + 2x B | 120 mm | 90 mm | 33,08 |
| 11 1238 350 010 | % 350 | 3,6/2,5 | Ø=70 / 1=13x5 / 2=20x6,5 | 20 FZ+R | 2x A + 2x B | 120 mm | 110 mm | 34,82 |
| 11 1238 350 020 | % 350 | 3,6/2,5 | Ø=80 / 1=14x5 / 2=22x6,5 | 20 FZ+R | 2x A + 2x B | 120 mm | 110 mm | 34,82 |
| 11 1238 350 030 | % 350 | 3,6/2,5 | Ø=30, UNI | 24 FZ+R | 2x A + 2x B | 120 mm | 110 mm | 36,56 |
| 11 1238 400 020 | % 400 | 4,0/2,8 | Ø=80 / 1=14x5 / 2=22x6,5 | 24 FZ+R | 2x A + 2x B | 145 mm | 120 mm | 38,84 |
| 11 1238 450 010 | % 450 | 4,4/3,2 | Ø=70 / 1=13x5 / 2=20x6,5 | 28 FZ+R | 2x A + 2x B | 160 mm | 140 mm | 52,88 |
| 11 1238 450 020 | % 450 | 4,4/3,2 | Ø=80 / 1=14x5 / 2=22x6,5 | 28 FZ+R | 2x A + 2x B | 160 mm | 140 mm | 52,88 |

2-7-42 + 2-9-46,40 + 2-10-60

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.

Special price / sale article. While stocks last.

Weitere Abmessungen auf Anfrage / Other dimensions are available on request

Film
Movie




Vielblatt Kreissägen mit Räumerschneiden
Multi-rip sawblades with raker teeth

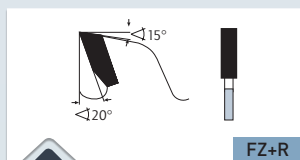
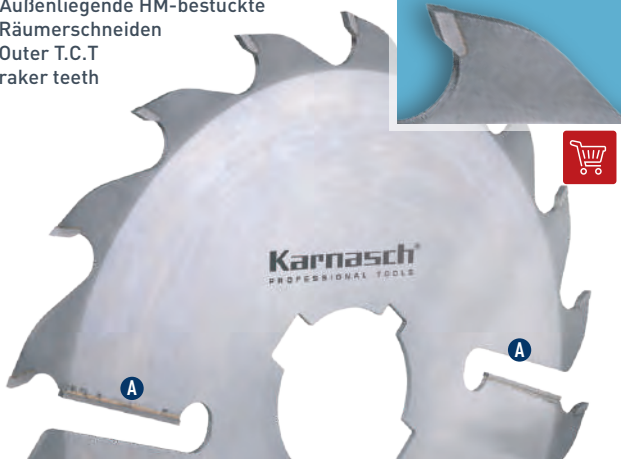
11 1239

A = Außenliegende HM-bestückte
Räumerschneiden
Outer T.C.T
raker teeth



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

✓  Weichholz, Hartholz, Exotenholz
Längs Soft wood, hard wood, and exotic
wood along the grain



- > Flachzahn mit Räumerschneiden
- > Flat tooth with raker teeth

MASCHINE · MACHINE




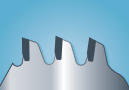

Ein- oder Doppelwellige Vielblattkreissägen, Besäumkreissägen

Single- or double-shaft multi-blade circular saw, trimming circular saw

ANWENDUNG · APPLICATION

Für Längsschnitte in Massivholz weich bis hart, naturfeucht bis nass.

For longitudinal cuts in solid wood soft to hard, naturally moist to wet.

| Art. |  |  |  |  |  | MAXIMALER FLANSCH Ø MAXIMUM FLANGE Ø | MAXIMALE SCHNITTIEFE MAXIMUM DEPTH OF CUT | € |
|-----------------|---|---|---|---|---|---|--|-------|
| 11 1239 250 010 | % 250 | 3,6/2,5 | Ø=70 / ①=13x5 / ②=20x6,5 | 16 FZ+R | 2x A | 130 mm | 50 mm | 20,48 |
| 11 1239 250 020 | % 250 | 3,6/2,5 | Ø=80 / ①=14x5 / ②=22x6,5 | 16 FZ+R | 2x A | 130 mm | 50 mm | 20,48 |
| 11 1239 300 010 | % 300 | 4,0/2,8 | Ø=70 / ①=13x5 / ②=20x6,5 | 18 FZ+R | 2x A | 130 mm | 70 mm | 27,00 |
| 11 1239 300 020 | % 300 | 4,0/2,8 | Ø=80 / ①=14x5 / ②=22x6,5 | 18 FZ+R | 2x A | 130 mm | 70 mm | 27,00 |
| 11 1239 350 010 | % 350 | 4,0/2,8 | Ø=70 / ①=13x5 / ②=20x6,5 | 20 FZ+R | 2x A | 135 mm | 100 mm | 31,34 |
| 11 1239 350 020 | % 350 | 4,0/2,8 | Ø=80 / ①=14x5 / ②=22x6,5 | 20 FZ+R | 2x A | 135 mm | 100 mm | 31,34 |
| 11 1239 400 010 | % 400 | 4,0/2,8 | Ø=70 / ①=13x5 / ②=20x6,5 | 24 FZ+R | 2x A | 185 mm | 110 mm | 36,32 |
| 11 1239 400 020 | % 400 | 4,0/2,8 | Ø=80 / ①=14x5 / ②=22x6,5 | 24 FZ+R | 2x A | 185 mm | 110 mm | 36,32 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Weitere Abmessungen auf Anfrage / Other dimensions are available on request

Film
Movie



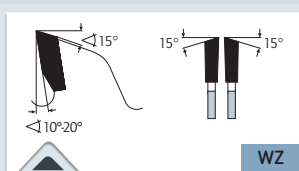
1025



Index

11 1300

Massivholz Universal + Hundegger · Wechselzahn
Solid wood universal + Hundegger · Alternate top bevel tooth



> Wechselzahn
> Alternate top bevel

MASCHINE · MACHINE

Für Tisch- und Formatkreissägen, Kappkreissägen sowie für Hundegger Abbundanlagen.

For bench and panel sizing saws, cross cut saws, Hundegger trimming machines.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Weichholz, Hartholz, Exotenholz Längs | Soft wood, hard wood, and exotic wood along the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Furniere | Veneers |
| ✓ | | Profileleisten | Profiled wood |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/face panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |

ANWENDUNG · APPLICATION

Geringere Zähnezahlen: Gute Schnittqualität in alle Holzwerkstoffe, Massivholz längs und quer, Plattenwerkstoffe einseitig furniert oder beschichtet, Hartgewebe, Hartpapiere sowie für dickere Kunststoffplatten/Profile (Thermoplast).

Höhere Zähnezahlen: Sehr gute Schnittqualität in alle Holzwerkstoffe, Massivholz vorzugsweise quer, Plattenwerkstoffe zweiseitig furniert oder beschichtet (ggf. Vorritzer verwenden), Hartgewebe, Hartpapier, Leisten und Furnier, Kunststoff (Thermoplaste, Duroplaste).

Für exzellente Schnittgüte aller Holzwerkstoffe massiv sowie Platten beschichtet/furniert auch auf der Unterseite ohne Vorritzer siehe Art. 11 1320 Seite 993.

Ebenfalls exzellente, nahezu glatte und ausrissfreie/splitterfreie Schnittgüte zu einem attraktiven Preis siehe Artikel 11 1610 auf Seite 1010.

Lower number of teeth: Good cutting quality in all wooden materials, solid wood across and along the grain, panels and boards one-sided plastic coated/veneered, paper-based laminate, thicker plastic boards/profiles (thermoplastics).

Higher number of teeth: Very good cutting quality in all wooden materials, solid wood across and along the grain, panels and boards two-sided plastic coated/veneered (if applicable with scorer), paper-based laminate, strips and veneer, plastics (thermoplastics, duroplastics)

For excellent cutting in all wooden materials, solid wood an panels/boards two-sided plastic coated/veneered (also without using scorer) see art. 11 1320 page 993.

Also excellent smooth and tear free/splinter free cutting surface for a attractive price see article 11 1610 on page 1010.








Film
Movie



Massivholz Universal + Hundegger · Wechselzahn
Solid wood universal + Hundegger · Alternate top bevel tooth








11 1300

Bestseller – preisreduziert · Bestseller – price reduced

| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|---|---|---|--------|
| 11 1300 150 010 | % 150 | 3,2/2,2 | 30 | 36 WZ | 10 | UNI | - | 14,06 |
| 11 1300 180 010 | % 180 | 3,2/2,2 | 30 | 42 WZ | 10 | UNI | - | 16,50 |
| 11 1300 200 010 | % 200 | 3,2/2,2 | 30 | 48 WZ | 10 | UNI | - | 18,86 |
| 11 1300 230 010 | • 230 | 3,2/2,2 | 30 | 48 WZ | 15 | UNI | - | 45,20 |
| 11 1300 250 010 | • 250 | 3,2/2,2 | 30 | 40 WZ | 15 | UNI | ✓ | 44,95 |
| 11 1300 250 020 | • 250 | 3,2/2,2 | 30 | 48 WZ | 15 | UNI | ✓ | 44,20 |
| 11 1300 250 030 | • 250 | 3,2/2,2 | 30 | 60 WZ | 10 | UNI | ✓ | 51,60 |
| 11 1300 250 040 | • 250 | 3,2/2,2 | 30 | 80 WZ | 10 | UNI | ✓ | 66,65 |
| 11 1300 300 010 | • 300 | 3,2/2,2 | 30 | 48 WZ | 15 | UNI | ✓ | 49,70 |
| 11 1300 300 020 | • 300 | 3,2/2,2 | 30 | 60 WZ | 15 | UNI | ✓ | 57,60 |
| 11 1300 300 030 | • 300 | 3,2/2,2 | 30 | 72 WZ | 10 | UNI | ✓ | 62,80 |
| 11 1300 300 040 | • 300 | 3,2/2,2 | 30 | 96 WZ | 10 | UNI | ✓ | 83,90 |
| 11 1300 305 010 | • 305 | 3,2/2,2 | 30 | 48 WZ | 15 | UNI | ✓ | 55,25 |
| 11 1300 305 020 | • 305 | 3,2/2,2 | 30 | 60 WZ | 15 | UNI | ✓ | 64,00 |
| 11 1300 305 030 | • 305 | 3,2/2,2 | 30 | 72 WZ | 10 | UNI | ✓ | 69,80 |
| 11 1300 315 010 | • 315 | 3,2/2,2 | 30 | 48 WZ | 15 | UNI | ✓ | 56,05 |
| 11 1300 315 020 | • 315 | 3,2/2,2 | 30 | 60 WZ | 15 | UNI | ✓ | 72,80 |
| 11 1300 315 030 | • 315 | 3,2/2,2 | 30 | 72 WZ | 10 | UNI | ✓ | 75,65 |
| 11 1300 315 040 | • 315 | 3,2/2,2 | 30 | 96 WZ | 10 | UNI | ✓ | 92,55 |
| 11 1300 350 010 | • 350 | 3,5/2,5 | 30 | 54 WZ | 15 | UNI | ✓ | 63,50 |
| 11 1300 350 020 | • 350 | 3,5/2,5 | 30 | 72 WZ | 15 | UNI | ✓ | 82,00 |
| 11 1300 350 030 | • 350 | 3,5/2,5 | 30 | 84 WZ | 10 | UNI | ✓ | 87,90 |
| 11 1300 350 040 | • 350 | 3,5/2,5 | 30 | 108 WZ | 10 | UNI | ✓ | 98,55 |
| 11 1300 370 010 | • 370 | 4,2/2,5 | 30 | 60 WZ | 15 | UNI | ✓ | 89,25 |
| 11 1300 400 010 | • 400 | 3,5/2,5 | 30 | 60 WZ | 15 | UNI | ✓ | 76,25 |
| 11 1300 400 020 | • 400 | 3,5/2,5 | 30 | 84 WZ | 15 | UNI | ✓ | 97,55 |
| 11 1300 400 030 | • 400 | 3,5/2,5 | 30 | 96 WZ | 10 | UNI | ✓ | 106,55 |
| 11 1300 400 040 | • 400 | 3,5/2,5 | 30 | 120 WZ | 10 | UNI | ✓ | 111,90 |
| 11 1300 410 010 | % 410 | 4,2/2,5 | 30 | 60 WZ | 15 | UNI | ✓ | 43,26 |
| 11 1300 450 010 | • 450 | 4,0/2,8 | 30 | 66 WZ | 15 | UNI | ✓ | 104,30 |
| 11 1300 450 020 | • 450 | 4,0/2,8 | 30 | 84 WZ | 15 | UNI | ✓ | 120,45 |
| 11 1300 450 030 | • 450 | 4,0/2,8 | 30 | 108 WZ | 10 | UNI | ✓ | 136,50 |
| 11 1300 450 040 | • 450 | 4,0/2,8 | 30 | 132 WZ | 10 | UNI | ✓ | 163,50 |
| 11 1300 500 010 | • 500 | 4,0/2,8 | 30 | 60 WZ | 20 | UNI+2-10-80 | ✓ | 114,85 |
| 11 1300 500 020 | • 500 | 4,0/2,8 | 30 | 72 WZ | 15 | UNI+2-10-80 | ✓ | 128,25 |
| 11 1300 500 030 | • 500 | 4,0/2,8 | 30 | 96 WZ | 15 | UNI+2-10-80 | ✓ | 150,80 |
| 11 1300 500 050 | • 500 | 4,0/2,8 | 30 | 144 WZ | 10 | UNI+2-10-80 | ✓ | 192,25 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

SPEZIALPROGRAMM HUNDEGGER / SPECIAL SELECTION HUNDEGGER

| Art. | Maschine Machine |  |  |  |  |  |  |  | € |
|-----------------|----------------------------------|---|---|---|---|--|---|---|--------------------------|
| 11 1300 550 010 | Zuschnitt-Automat Turbo-Drive | % 550 | 6,0/4,4 | 30 | 60 WZ | 15 | 8-8,5-120 Angesenkt 2-13-240 Versetzt 22,5° | ✓ | 123,62 |
| 11 1300 600 010 | | ○ 600 | 4,8/3,4 | 30 | 48 WZ | 15 | 2-8,5-90+2-10-80+2-15-63 | ✓ | auf Anfrage / on request |
| 11 1300 650 010 | | % 650 | 5,8/4,0 | 30 | 36 WZ | 15 | 2-8,5-90+2-10-80+2-15-63 | ✓ | 117,46 |
| 11 1300 650 020 | | % 650 | 5,8/4,0 | 30 | 48 WZ | 15 | 2-8,5-90+2-10-80+2-15-63 | ✓ | 129,46 |
| 11 1300 650 030 | | % 650 | 5,6/4,0 | 30 | 96 WZ | 12 | 2-8,5-90+2-10-80+2-15-63 | ✓ | 137,60 |
| 11 1300 720 010 | Zuschnitt-Automat SC-3 | ○ 720 | 6,0/4,4 | 30 | 72 WZ | 15 | 8-8,5-120 Angesenkt 4-8,1-90 Versetzt 2-14-400 Versetzt | ✓ | auf Anfrage / on request |
| 11 1300 720 020 | | % 720 | 6,0/4,4 | 30 | 48 WZ | 15 | 4-8,5-90+2-15-415 | ✓ | 190,34 |
| 11 1300 720 030 | | % 720 | 6,0/4,4 | 30 | 72 WZ | 15 | 4-8,5-90+2-15-415 | ✓ | 219,52 |
| 11 1300 735 010 | | % 735 | 6,0/4,4 | 30 | 72 WZ | 15 | 4-8,5-90+2-15-415 | ✓ | 223,36 |
| 11 1300 760 010 | | ○ 760 | 6,0/4,4 | 30 | 72 WZ | 15 | 4-8,5-90+2-15-415 | ✓ | auf Anfrage / on request |
| 11 1300 800 010 | Abbandmaschine Robot-Drive | ○ 800 | 6,0/4,4 | 30 | 72 WZ | 15 | 8-8,5-160 Angesenkt 4-8,1-90 Versetzt 2-14-400 Versetzt | ✓ | auf Anfrage / on request |
| 11 1300 800 020 | | ○ 800 | 6,0/4,4 | 30 | 80 WZ | 12 | 4-8,5-90+2-15-415 | ✓ | auf Anfrage / on request |

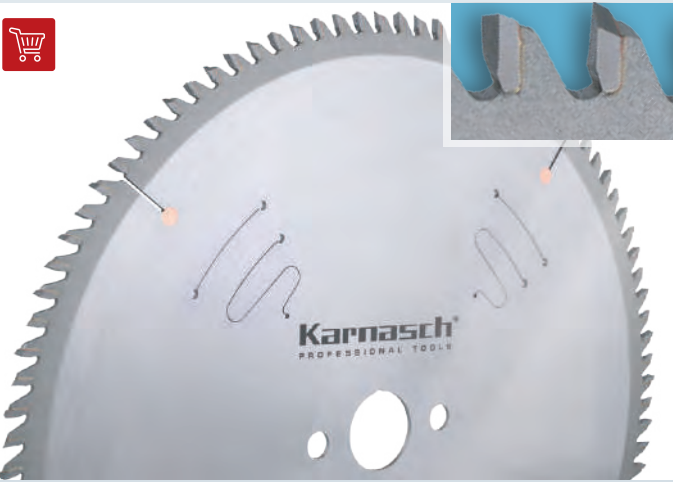
% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

Weitere Abmessungen Hundegger kurzfristig auf Anfrage lieferbar / Other sizes Hundegger available at short notice on request
UNI = 2-7-42 + 2-9-46,40 + 2-10-60



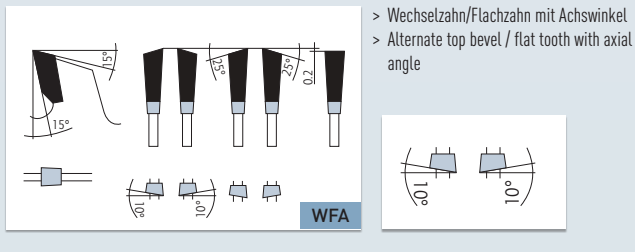
11 1320

Massivholz Universal Plus · Wechselzahn + Achswinkel
Solid wood universal plus · Alternate to bevel tooth + axial-angle



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Furniere | Veneers |
| ✓ | | Profilleisten | Profiled wood |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |



MASCHINE · MACHINE

Plattenaufteilsägen vertikal, Formatkreissägen, Doppelgehrungssägen, mechanische Kappsägemaschinen, Unterflurkappsägemaschinen, CNC-Bearbeitungszentren.

Vertical panel sizing saws, trimming saws, double mitre saws, mechanical chop saws, under frame mounted chop saws, machining centers with saw aggregate.

ANWENDUNG · APPLICATION

Formatieren von Holzwerkstoffen in hervorragender Fertigschnittqualität. **Ausriss-freies** Sägen von beschichteten Holzwerkstoffen auch mit sehr dicken Deckschichten, Massivholz quer, Kunststoffprofile, kunststoffummantelte Leisten, furnierte oder folienummantelte Türzagen...

Panel sizing/trimming of wood-based material in excellent finishing-cut quality. **Splinter-free** sawing of laminated wood-based material including material with very thick top layers, solid wood across the grain, plastic profiles, synthetically coated ledges, veneered or foil-sheathed door frames...



Ritzer nicht erforderlich

Scorer not required

Film
Movie



Massivholz Universal Plus · Wechselzahn + Achswinkel
Solid wood universal plus · Alternate to bevel tooth + axial-angle

11 1320

| Art. | | | | | | | | € |
|-----------------|-------|---|---------|----|---------|------------------------------|---|--------|
| 11 1320 200 010 | • 200 | | 3,0/2,2 | 30 | 60 WFA | 2-6,2-42 + 4-6-52 + 4-6,6-60 | - | 136,20 |
| 11 1320 220 010 | • 220 | ⊘ | 3,0/2,2 | 30 | 70 WFA | UNI | - | 54,04 |
| 11 1320 250 010 | • 250 | | 3,0/2,2 | 30 | 80 WFA | UNI | ✓ | 157,05 |
| 11 1320 303 010 | • 303 | | 3,0/2,2 | 30 | 100 WFA | UNI | ✓ | 190,45 |
| 11 1320 350 010 | • 350 | | 3,0/2,2 | 30 | 100 WFA | UNI | ✓ | 209,65 |
| 11 1320 400 010 | • 400 | | 3,0/2,2 | 30 | 120 WFA | UNI | ✓ | 255,05 |
| 11 1320 450 010 | • 450 | | 3,6/2,8 | 30 | 130 WFA | UNI | ✓ | 285,00 |
| 11 1320 500 010 | • 500 | | 3,6/2,8 | 30 | 140 WFA | UNI | ✓ | 315,90 |

⊘ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

UNI = 2-7-42 + 2-9-46,40 + 2-10-60

Arbeiten mit Sägewelle **unter** dem Werkstück
Working with spindle **under** the panel



Durch den positiven Spanwinkel wirkt der Schnittdruck über dem Werkstück auf die stabile Tischauflage.
Due to the positive cutting angle acts the cutting pressure above the panel into the stable saw table.

1



2



3



4



5



6



7



8



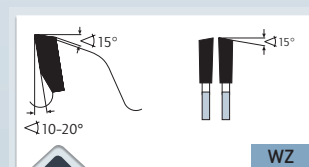
9



Index

11 1425

Massivholz Universal · Wechselzahn · Dünnschnitt
Solid wood universal · Alternate top bevel tooth · Thin-cut



> Wechselzahn
> Alternate top bevel

MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Tisch- und Formatkreissägen, Plattenaufteilsägen, Kappsägen, Akkusägen

For portable circular saws, table- and sizing saws, panel sizing saws, cross-cut saws, cordless saws.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|---|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Profileleisten | Profiled wood |
| ✓ | | Furniere | Veneers |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Kronospan®, Decodur® |

ANWENDUNG · APPLICATION

Durch dünne Schnittbreite ideal auch für Akkumaschinen und für teure Edelhölzer, Furniere und Leisten da wenig Verschnitt und Schnittdruck/Akkuverbrauch.

Niedere Zähnezahl: Grobe bis mittlere Schnittqualität in alle Holzwerkstoffe, Edelhölzer und Massivholz längs und quer, Plattenwerkstoffe einseitig furniert oder Kunststoff beschichtet, Hartgewebe, Hartpapier, dickere Kunststoffprofile und Platten (Thermoplaste) Hoher Vorschub möglich.

Mittlere Zähnezahl: Gute Schnittqualität in alle Holzwerkstoffe, Edelhölzer, Massivholz und Leisten längs und quer, Plattenwerkstoffe einseitig/zweiseitig furniert oder Kunststoff beschichtet, Hartgewebe, Hartpapier, Furnier und Furnierpakete sowie Kunststoffprofile und Platten (Thermoplaste, Duroplaste).

Hohe Zähnezahl: Sehr gute Schnittqualität in alle Holzwerkstoffe, Edelhölzer, Massivholz und Leisten vorzugsweise Querschnitte. Plattenwerkstoffe zweiseitig furniert oder Kunststoff beschichtet, Hartgewebe, Hartpapier, Furnier und Furnierpakete sowie Kunststoffprofile und Platten (Thermoplaste, Duroplaste).

Durch spezielles Hartmetall sehr gut zum Sägen harter Thermoplaste wie z.B. dünne Platten, Hohlkammerplatten aus PC (Polycarbonat), PMMA (Acrylglas-Plexiglas) Siehe hierzu auch Artikel 11 1430 Seite 999

Due to thin-cut also ideal for battery machines and for cutting expensive precious wood, veneer, strips because of less waste/battery consumption.

Low number of teeth: Coarse to medium cutting quality in all wooden materials, precious wood and solid wood across and along the grain, panel and boards one-side plastic coated/veneered, paper-based laminate, thicker plastic profiles and plates (Thermoplastics). High feed rate possible

Medium number of teeth: Good cutting quality in all wooden materials, precious wood, solid wood and strips across and along the grain, panel and boards one-side/two side plastic coated/veneered, paper-based laminate, veneer and veneer packages, plastic profiles/plates (Thermoplastics, Duroplastics)

High number of teeth: Very good cutting quality in all wooden materials, precious wood, solid wood and strips preferably across the grain, panel and boards two side plastic coated/veneered, paper-based laminate, veneer and veneer packages, plastic profiles/plates (Thermoplastics, Duroplastics)

Due to special carbide also excellent for cutting hard thermoplastics such as thin panels, hollow section boards made of PC (Polycarbonate), PMMA (Acrylic-glass/Plexiglass). See here also article 11 1430, page 999




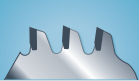
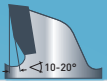


Film
Movie



Massivholz Universal · Wechselzahn · Dünnschnitt
Solid wood universal · Alternate top bevel tooth · Thin-cut

11 1425

Bestseller – preisreduziert · Bestseller – price reduced

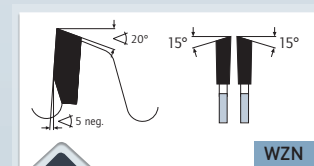
| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|--|---|---|--------|
| 11 1425 120 010 | ● 120 | 1,8/1,2 | 20 | 12 WZ | 20 | - | - | 22,95 |
| 11 1425 120 020 | ● 120 | 1,8/1,2 | 20 | 28 WZ | 15 | - | - | 30,35 |
| 11 1425 120 030 | ● 120 | 1,8/1,2 | 20 | 44 WZ | 10 | - | - | 39,30 |
| 11 1425 136 010 | ● 136 | 1,8/1,2 | 20/10 | 14 WZ | 20 | - | - | 23,90 |
| 11 1425 136 020 | ● 136 | 1,8/1,2 | 20/10 | 30 WZ | 15 | - | - | 30,60 |
| 11 1425 136 030 | ● 136 | 1,8/1,2 | 20/10 | 48 WZ | 10 | - | - | 43,15 |
| 11 1425 160 010 | ● 160 | 1,8/1,2 | 20/16 | 16 WZ | 20 | 2-6-32 | - | 23,60 |
| 11 1425 160 020 | ● 160 | 1,8/1,2 | 20/16 | 32 WZ | 15 | 2-6-32 | - | 32,55 |
| 11 1425 160 030 | ● 160 | 1,8/1,2 | 20/16 | 54 WZ | 10 | 2-6-32 | - | 44,10 |
| 11 1425 160 040 | ● 160 | 1,8/1,2 | 20/16 | 68 WZ | 10 | 2-6-32 | - | 53,15 |
| 11 1425 165 010 | ● 165 | 1,8/1,2 | 20 | 16 WZ | 20 | 2-6-32 | - | 23,90 |
| 11 1425 165 020 | ● 165 | 1,8/1,2 | 20 | 32 WZ | 15 | 2-6-32 | - | 32,90 |
| 11 1425 165 030 | ● 165 | 1,8/1,2 | 20 | 54 WZ | 10 | 2-6-32 | - | 44,55 |
| 11 1425 165 040 | ● 165 | 1,8/1,2 | 20 | 68 WZ | 10 | 2-6-32 | - | 53,15 |
| 11 1425 180 010 | ● 180 | 1,8/1,2 | 20/16 | 18 WZ | 20 | 2-6-32 | - | 24,20 |
| 11 1425 180 020 | ● 180 | 1,8/1,2 | 20/16 | 40 WZ | 15 | 2-6-32 | - | 36,95 |
| 11 1425 180 030 | ● 180 | 1,8/1,2 | 20/16 | 60 WZ | 10 | 2-6-32 | - | 50,55 |
| 11 1425 180 040 | ● 180 | 1,8/1,2 | 20/16 | 76 WZ | 10 | 2-6-32 | - | 64,95 |
| 11 1425 190 010 | ● 190 | 1,8/1,2 | 30/20 | 18 WZ | 20 | 2-7-42 | - | 26,05 |
| 11 1425 190 020 | ● 190 | 1,8/1,2 | 30/20 | 42 WZ | 15 | 2-7-42 | - | 40,85 |
| 11 1425 190 030 | ● 190 | 1,8/1,2 | 30/20 | 60 WZ | 10 | 2-7-42 | - | 51,15 |
| 11 1425 190 040 | ● 190 | 1,8/1,2 | 30/20 | 76 WZ | 10 | 2-7-42 | - | 65,65 |
| 11 1425 200 010 | ● 200 | 2,0/1,4 | 30 | 18 WZ | 20 | 2-7-42 | - | 27,60 |
| 11 1425 200 020 | ● 200 | 2,0/1,4 | 30 | 42 WZ | 15 | 2-7-42 | - | 41,40 |
| 11 1425 200 030 | ● 200 | 2,0/1,4 | 30 | 64 WZ | 10 | 2-7-42 | - | 52,15 |
| 11 1425 200 040 | ● 200 | 2,0/1,4 | 30 | 80 WZ | 10 | 2-7-42 | - | 67,45 |
| 11 1425 210 010 | ● 210 | 2,0/1,4 | 30 | 20 WZ | 20 | 2-7-42 | - | 29,05 |
| 11 1425 210 020 | ● 210 | 2,0/1,4 | 30 | 48 WZ | 15 | 2-7-42 | - | 42,15 |
| 11 1425 210 030 | ● 210 | 2,0/1,4 | 30 | 64 WZ | 10 | 2-7-42 | - | 53,00 |
| 11 1425 210 040 | ● 210 | 2,0/1,4 | 30 | 80 WZ | 10 | - | - | 68,45 |
| 11 1425 216 010 | ● 216 | 2,0/1,4 | 30 | 20 WZ | 20 | 2-7-42 | - | 30,00 |
| 11 1425 216 020 | ● 216 | 2,0/1,4 | 30 | 48 WZ | 15 | 2-7-42 | - | 42,90 |
| 11 1425 216 030 | ● 216 | 2,0/1,4 | 30 | 64 WZ | 10 | 2-7-42 | - | 53,80 |
| 11 1425 216 040 | ● 216 | 2,0/1,4 | 30 | 80 WZ | 10 | 2-7-42 | - | 69,25 |
| 11 1425 220 010 | ● 220 | 2,0/1,4 | 30 | 48 WZ | 20 | 2-7-42 | - | 42,90 |
| 11 1425 225 010 | ● 225 | 2,0/1,4 | 30 | 24 WZ | 20 | 2-7-42 | - | 30,15 |
| 11 1425 225 020 | ● 225 | 2,0/1,4 | 30 | 48 WZ | 15 | 2-7-42 | - | 43,70 |
| 11 1425 225 030 | ● 225 | 2,0/1,4 | 30 | 68 WZ | 10 | 2-7-42 | - | 58,45 |
| 11 1425 225 040 | ● 225 | 2,0/1,4 | 30 | 88 WZ | 10 | 2-7-42 | - | 75,80 |
| 11 1425 230 010 | ● 230/235 ● | 2,0/1,4 | 30 | 24 WZ | 20 | 2-7-42 | - | 30,90 |
| 11 1425 230 020 | ● 230/235 ● | 2,0/1,4 | 30 | 48 WZ | 15 | 2-7-42 | - | 44,40 |
| 11 1425 230 030 | ● 230/235 ● | 2,0/1,4 | 30 | 68 WZ | 10 | 2-7-42 | - | 59,15 |
| 11 1425 230 040 | ● 230/235 ● | 2,0/1,4 | 30 | 88 WZ | 10 | 2-7-42 | - | 76,50 |
| 11 1425 250 010 | ● 250 | 2,2/1,6 | 30 | 30 WZ | 20 | UNI | ✓ | 43,70 |
| 11 1425 250 020 | ● 250 | 2,2/1,6 | 30 | 56 WZ | 15 | UNI | ✓ | 62,70 |
| 11 1425 250 030 | ● 250 | 2,2/1,6 | 30 | 80 WZ | 10 | UNI | ✓ | 70,05 |
| 11 1425 250 040 | ● 250 | 2,2/1,6 | 30 | 100 WZ | 10 | UNI | ✓ | 83,90 |
| 11 1425 260 010 | ● 260 | 2,2/1,6 | 30 | 30 WZ | 20 | UNI | ✓ | 45,10 |
| 11 1425 260 020 | ● 260 | 2,2/1,6 | 30 | 56 WZ | 15 | UNI | ✓ | 64,00 |
| 11 1425 260 030 | ● 260 | 2,2/1,6 | 30 | 80 WZ | 10 | UNI | ✓ | 71,00 |
| 11 1425 270 010 | ● 270 | 2,2/1,6 | 30 | 30 WZ | 20 | UNI | ✓ | 45,30 |
| 11 1425 270 020 | ● 270 | 2,2/1,6 | 30 | 56 WZ | 15 | UNI | ✓ | 64,25 |
| 11 1425 270 030 | ● 270 | 2,2/1,6 | 30 | 80 WZ | 10 | UNI | ✓ | 72,80 |
| 11 1425 300 010 | ● 300 | 2,2/1,6 | 30 | 36 WZ | 20 | UNI | ✓ | 53,45 |
| 11 1425 300 020 | ● 300 | 2,2/1,6 | 30 | 60 WZ | 15 | UNI | ✓ | 70,50 |
| 11 1425 300 030 | ● 300 | 2,2/1,6 | 30 | 96 WZ | 10 | UNI | ✓ | 84,85 |
| 11 1425 300 040 | ● 300 | 2,2/1,6 | 30 | 120 WZ | 10 | UNI | ✓ | 103,70 |
| 11 1425 350 010 | ● 350 | 2,4/1,8 | 30 | 42 WZ | 20 | UNI | ✓ | 65,40 |
| 11 1425 350 020 | ● 350 | 2,4/1,8 | 30 | 72 WZ | 15 | UNI | ✓ | 86,75 |
| 11 1425 350 030 | ● 350 | 2,4/1,8 | 30 | 108 WZ | 10 | UNI | ✓ | 98,85 |
| 11 1425 350 040 | ● 350 | 2,4/1,8 | 30 | 140 WZ | 10 | UNI | ✓ | 143,40 |
| 11 1425 400 010 | ● 400 | 2,8/2,2 | 30 | 60 WZ | 15 | UNI | ✓ | 102,15 |
| 11 1425 400 020 | ● 400 | 2,8/2,2 | 30 | 96 WZ | 10 | UNI | ✓ | 136,10 |
| 11 1425 400 030 | ● 400 | 2,8/2,2 | 30 | 120 WZ | 10 | UNI | ✓ | 158,85 |
| 11 1425 450 010 | ● 450 | 3,1/2,5 | 30 | 66 WZ | 15 | UNI | ✓ | 118,60 |
| 11 1425 450 020 | ● 450 | 3,1/2,5 | 30 | 108 WZ | 10 | UNI | ✓ | 153,10 |
| 11 1425 450 030 | ● 450 | 3,1/2,5 | 30 | 130 WZ | 10 | UNI | ✓ | 177,15 |
| 11 1425 500 010 | ● 500 | 3,4/2,8 | 30 | 72 WZ | 15 | UNI+2-10-80 | ✓ | 153,35 |
| 11 1425 500 020 | ● 500 | 3,4/2,8 | 30 | 120 WZ | 10 | UNI+2-10-80 | ✓ | 203,15 |
| 11 1425 500 030 | ● 500 | 3,4/2,8 | 30 | 144 WZ | 10 | UNI+2-10-80 | ✓ | 228,65 |

● Gefertigt/Manufactured 232,50 mm · UNI = 2-7-42 + 2-9-46,40 + 2-10-60



11 1450

Kapp- und Gehrungskreissägeblätter Wechselzahn/negativ
Chop- and mitre circular saws alternate top bevel tooth/negative



> Wechselzahn Negativ
> Alternate top bevel negative

MASCHINE · MACHINE

Spezialprogramm für Kapp- und Gehrungssägen, Radialkreissägen, Pendelkreissägen, oben liegende Kappkreissägen, Tischkreissägen, Abbundanlagen.

Special selection for chop- and mitre saws, radial saws, pendulum saws, top clipping saws, table saws, trimming saws.

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Furniere | Veneers |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |
| ✓ | | Profileleisten | Profiled wood |

ANWENDUNG · APPLICATION

Für Querschnitte in Weich- und Hartholz, Holzmischwerkstoffe, Leimholz, Schichtholz, Plattenwerkstoffe furniert oder beschichtet.

Durch spezielles Hartmetall auch hervorragend für Kunststoffe wie kunststoffbeschichtete Profile, dünnes Acrylglas, Duroplast-Profil und Leisten (hohe Zähnezahl wählen) geeignet.

Ebenfalls für harte Thermoplaste wie PA, PE, PS, POM, ABS.

Durch die negative Zahnform ist das Sägeblatt besser von Hand zu führen und wird nicht in das Schnittgut gezogen.

For cross cuts in soft and hard wood, wooden materials, glued wood, plywood, veneered or coated boards.

Due to special carbide also excellent for plastics such as: plastic laminated profiles, thin acrylic glass, duroplast profiles and strips (high number of teeth recommended).

Also for hard thermoplastics such as PA, PE, PS, POM, ABS.




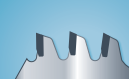


Due to the negative tooth shape, that saw blade can be guided easier by hand and is not pulled into the material to be cut.

Film
Movie



Kapp- und Gehrungskreissägeblätter Wechselzahn/negativ
Chop- and mitre circular saws alternate top bevel tooth/negative

11 1450

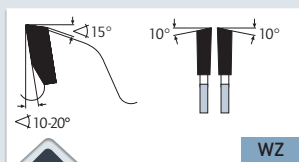
| Art. |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|---|---|--------|
| 11 1450 210 010 | • 210 | 2,8/1,8 | 30 | 24 WZN | 2-7-42 | - | 29,95 |
| 11 1450 210 020 | • 210 | 2,8/1,8 | 30 | 48 WZN | 2-7-42 | - | 45,75 |
| 11 1450 210 030 | • 210 | 2,8/1,8 | 30 | 80 WZN | 2-7-42 | - | 64,15 |
| 11 1450 216 010 | • 216 | 2,8/1,8 | 30 | 24 WZN | 2-7-42 | - | 33,15 |
| 11 1450 216 020 | • 216 | 2,8/1,8 | 30 | 48 WZN | 2-7-42 | - | 45,75 |
| 11 1450 216 030 | • 216 | 2,8/1,8 | 30 | 60 WZN | 2-7-42 | - | 50,75 |
| 11 1450 216 040 | • 216 | 2,8/1,8 | 30 | 80 WZN | 2-7-42 | - | 64,15 |
| 11 1450 250 010 | • 250 | 3,2/2,2 | 30 | 24 WZN | UNI | ✓ | 38,50 |
| 11 1450 250 020 | • 250 | 3,2/2,2 | 30 | 40 WZN | UNI | ✓ | 51,85 |
| 11 1450 250 030 | • 250 | 3,2/2,2 | 30 | 60 WZN | UNI | ✓ | 64,80 |
| 11 1450 250 040 | • 250 | 3,2/2,2 | 30 | 80 WZN | UNI | ✓ | 74,70 |
| 11 1450 260 010 | • 260 | 2,5/1,8 | 30 | 48 WZN | UNI | ✓ | 62,65 |
| 11 1450 260 020 | • 260 | 2,5/1,8 | 30 | 60 WZN | UNI | ✓ | 79,35 |
| 11 1450 260 030 | • 260 | 2,5/1,8 | 30 | 80 WZN | UNI | ✓ | 85,50 |
| 11 1450 300 010 | • 300 | 3,2/2,2 | 30 | 72 WZN | UNI | ✓ | 77,95 |
| 11 1450 305 010 | • 305 | 2,6/1,8 | 30 | 32 WZN | UNI | ✓ | 60,60 |
| 11 1450 305 020 | • 305 | 2,6/1,8 | 30 | 48 WZN | UNI | ✓ | 63,75 |
| 11 1450 305 030 | • 305 | 2,6/1,8 | 30 | 60 WZN | UNI | ✓ | 72,90 |
| 11 1450 305 040 | • 305 | 2,6/1,8 | 30 | 72 WZN | UNI | ✓ | 79,90 |
| 11 1450 305 050 | • 305 | 2,6/1,8 | 30 | 96 WZN | UNI | ✓ | 95,00 |
| 11 1450 350 010 | • 350 | 4,4/2,8 | 30 | 42 WZN | UNI | ✓ | 104,45 |
| 11 1450 400 010 | • 400 | 4,4/2,8 | 30 | 48 WZN | UNI | ✓ | 119,10 |
| 11 1450 420 010 | • 420 | 4,2/2,8 | 40/30 | 48 WZN | 2-10-60+2-11-63+2-12-64 | ✓ | 128,05 |
| 11 1450 420 020 | • 420 | 3,5/2,5 | 40/30 | 84 WZN | 2-10-60+2-11-63+2-12-64 | ✓ | 173,60 |
| 11 1450 450 010 | • 450 | 4,4/2,8 | 30 | 54 WZN | UNI | ✓ | 136,55 |
| 11 1450 500 010 | • 500 | 4,4/2,8 | 30 | 60 WZN | UNI | ✓ | 159,85 |
| 11 1450 550 010 | • 550 | 4,8/3,4 | 30 | 64 WZN | UNI | ✓ | 202,80 |
| 11 1450 600 010 | • 600 | 5,4/4,0 | 30 | 72 WZN | UNI | ✓ | 253,70 |

UNI = 2-7-42 + 2-9-46,40 + 2-10-60



11 1400

Handkreissägen + Lamello
Portable circular saws + Lamello



WZ

> Wechselzahn
> Alternate top bevel

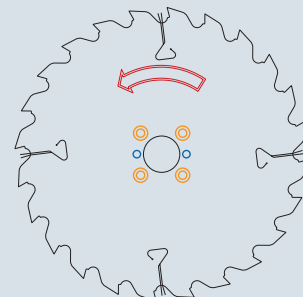
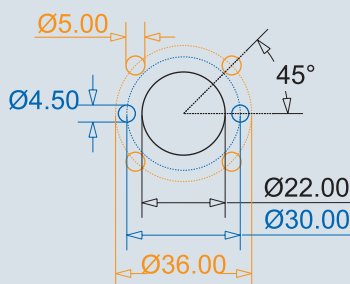
MASCHINE · MACHINE

Für Handkreissägen, Tauchsägen, Tischkreissägen, Kappkreissägen.

For portable circular saws, table saws, bench saws, cross-cut saws.

Lamello-Nebenlöcher **NL 2 / 4,5 / 30 + NL 4 / 5 / 36** gesenkt 90°, mit Bohrung 22,00 mm

Pin holes Lamello **NL 2 / 4,5 / 30 + NL 4 / 5 / 36** countersunk 90°, with bore 22,00 mm



Film
Movie



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Weichholz, Hartholz, Exotenholz Längs | Soft wood, hard wood, and exotic wood along the grain |
| ✓ | | Leimholz, Tischler- und Furniersperrholz, Schichtholzplatten | Bonded wood, blockboard and veneer plywood, laminated wood |
| ✓ | | Spanplatten, Hartfaserplatten, Platten ohne Belag LDF, MDF, HDF | Chipboard, hard fibre board, boards without laminate LDF, MDF, HDF |
| ✓ | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
| ✓ | | Furniere | Veneers |
| ✓ | | Profileleisten | Profiled wood |
| ✓ | | Mineralische/acrylgebundene Massivplatten/Küchenplatten: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® | Mineral/acrylic bound solid boards/kitchen worktops: Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid®, Varicor® |
| ✓ | | HPL-Duroplastische Schichtstoffplatten/Fassadenplatten: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® | HPL High-Pressure-Laminate solid boards/façade panels: Trespa®, Resopal®, Duropal®, Formica®, Kronospan®, Decodur® |
| ✓ | | Gips-Zement-Steinwollplatten, Eternit, GFK, CFK, HPL, Mineralwerkstoffe | Gypsum/Cement fibre boards, Rockwool, Eternit, GRP, CFK, HPL, Mineral material |

ANWENDUNG · APPLICATION

Niedere Zähnezahl: Holz, Leimholz, Spanplatten roh.

Mittlere Zähnezahl für: Holz, Leimholz, Tischplatten, Spanplatten roh, Spanplatten einseitig beschichtet / furniert.

Hohe Zähnezahl für: Spanplatten roh, Spanplatten 1- und 2-seitig beschichtet / furniert.

Kunststoffe, Thermoplaste.

Low number of teeth: Wood, laminated wood, coarse chipboard.

Average number of teeth for: Wood, laminated wood, tabletops, coarse chipboard, chipboard with coating / veneer on one side.

High number of teeth for: Coarse chipboard, chipboard that is coated/veneered on 1 and 2 sides.

Plastics, thermoplastics.

1

2

3

4

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6

7

8




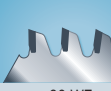



9

Index

Handkreissägen + Lamello
Portable circular saws + Lamello

11 1400

Bestseller – preisreduziert · Bestseller – price reduced

| Art. |  |  |  |  |  |  |  | € |
|-----------------|---|---|---|---|--|---|---|-------|
| 11 1400 100 010 | ● 100 | 2,6/1,6 | 12 | 30 WZ | 10° | - | - | 22,90 |
| 11 1400 100 020 | ● 100 | 2,6/1,6 | 22/20 | 30 WZ | 10° | Lamello | - | 33,20 |
| 11 1400 100 030 | ● 100 | 3,97/2,8 | 22 | 6 WZ | 20° | Lamello | - | 24,05 |
| 11 1400 100 040 | ● 100 | 3,97/2,8 | 22 | 12 WZ | 20° | Lamello | - | 31,10 |
| 11 1400 105 010 | ● 105 | 2,6/1,6 | 22/20 | 30 WZ | 10° | - | - | 24,50 |
| 11 1400 120 010 | ● 120 | 2,4/1,4 | 22 | 24 WZ | 15° | Lamello | - | 29,60 |
| - | ● 120 | 1,8/1,2 | 20 | 12/28/44 WZ | - | Siehe/See Art. 11 1425 Seite/Page 1031 | - | - |
| 11 1400 125 010 | ● 125 | 2,6/1,6 | 20/12,7 | 24 WZ | 15° | - | - | 20,70 |
| 11 1400 125 020 | ● 125 | 2,6/1,6 | 20/12,7 | 36 WZ | 10° | - | - | 27,15 |
| 11 1400 130 010 | ● 130 | 2,6/1,6 | 20/16 | 24 WZ | 15° | - | - | 20,70 |
| 11 1400 130 020 | ● 130 | 2,6/1,6 | 20/16 | 36 WZ | 10° | - | - | 27,15 |
| - | ● 136 | 1,8/1,2 | 20/10 | 14/30/48 | - | Siehe/See Art. 11 1425 Seite/Page 1031 | - | - |
| 11 1400 140 010 | ● 140 | 2,6/1,6 | 20 | 12 WZ | 20° | - | - | 16,00 |
| 11 1400 140 020 | ● 140 | 2,6/1,6 | 20 | 20 WZ | 15° | - | - | 19,05 |
| 11 1400 140 030 | ● 140 | 2,6/1,6 | 20 | 36 WZ | 10° | - | - | 29,70 |
| 11 1400 150 010 | ● 150 | 2,6/1,6 | 20/16 | 12 WZ | 20° | 2-6-32 | - | 17,00 |
| 11 1400 150 020 | ● 150 | 2,6/1,6 | 20/16 | 24 WZ | 15° | 2-6-32 | - | 20,70 |
| 11 1400 150 030 | ● 150 | 2,6/1,6 | 20/16 | 36 WZ | 10° | 2-6-32 | - | 21,55 |
| 11 1400 150 040 | ● 150 | 2,6/1,6 | 20/16 | 48 WZ | 10° | 2-6-32 | - | 35,35 |
| 11 1400 150 045 | ● 150 | 2,6/1,6 | 22 | 24 WZ | 15° | Lamello | - | 28,95 |
| 11 1400 150 050 | ● 150 | 2,6/1,6 | 30 | 12 WZ | 20° | - | - | 6,66 |
| 11 1400 150 060 | ● 150 | 2,6/1,6 | 30 | 24 WZ | 15° | - | - | 20,30 |
| 11 1400 150 070 | ● 150 | 2,6/1,6 | 30 | 36 WZ | 10° | - | - | 27,45 |
| 11 1400 150 080 | ● 150 | 2,6/1,6 | 30 | 48 WZ | 10° | - | - | 35,35 |
| 11 1400 160 010 | ● 160 | 2,6/1,6 | 20/16 | 12 WZ | 20° | 2-6-32 | - | 16,20 |
| 11 1400 160 020 | ● 160 | 2,6/1,6 | 20/16 | 24 WZ | 15° | 2-6-32 | - | 20,30 |
| 11 1400 160 030 | ● 160 | 2,6/1,6 | 20/16 | 36 WZ | 10° | 2-6-32 | - | 26,25 |
| 11 1400 160 040 | ● 160 | 2,6/1,6 | 20/16 | 48 WZ | 10° | 2-6-32 | - | 32,90 |
| 11 1400 160 050 | ● 160 | 2,6/1,6 | 30 | 12 WZ | 20° | 2-7-42 | - | 16,55 |
| 11 1400 160 060 | ● 160 | 2,6/1,6 | 30 | 24 WZ | 15° | 2-7-42 | - | 21,00 |
| 11 1400 160 070 | ● 160 | 2,6/1,6 | 30 | 36 WZ | 10° | 2-7-42 | - | 28,10 |
| 11 1400 160 080 | ● 160 | 2,6/1,6 | 30 | 48 WZ | 10° | 2-7-42 | - | 35,25 |
| 11 1400 165 010 | ● 165 | 2,6/1,6 | 20 | 24 WZ | 15° | 2-6-32 | - | 22,55 |
| 11 1400 165 020 | ● 165 | 2,6/1,6 | 20 | 36 WZ | 10° | 2-6-32 | - | 28,10 |
| 11 1400 165 030 | ● 165 | 2,6/1,6 | 20 | 48 WZ | 10° | 2-6-32 | - | 35,25 |
| 11 1400 170 010 | ● 170 | 2,6/1,6 | 20/16 | 24 WZ | 15° | - | - | 23,50 |
| 11 1400 170 020 | ● 170 | 2,6/1,6 | 30 | 24 WZ | 15° | 2-7-42 | - | 21,55 |
| 11 1400 170 030 | ● 170 | 2,6/1,6 | 30 | 36 WZ | 15° | 2-7-42 | - | 28,95 |
| 11 1400 170 040 | ● 170 | 2,6/1,6 | 30 | 48 WZ | 10° | 2-7-42 | - | 36,45 |
| 11 1400 180 010 | ● 180 | 2,8/1,8 | 20/16 | 14 WZ | 20° | 2-6-32 | - | 22,15 |
| 11 1400 180 020 | ● 180 | 2,8/1,8 | 20/16 | 24 WZ | 20° | 2-6-32 | - | 23,50 |
| 11 1400 180 030 | ● 180 | 2,8/1,8 | 20/16 | 40 WZ | 15° | 2-6-32 | - | 33,95 |
| 11 1400 180 040 | ● 180 | 2,8/1,8 | 20/16 | 56 WZ | 10° | 2-6-32 | - | 43,35 |
| 11 1400 180 043 | ● 180 | 2,5/1,4 | 22 | 12 WZ | 20° | Lamello | - | 14,52 |
| 11 1400 180 046 | ● 180 | 2,8/1,8 | 22 | 24 WZ | 20° | Lamello | - | 31,50 |
| 11 1400 180 050 | ● 180 | 2,8/1,8 | 30 | 14 WZ | 20° | 2-7-42 | - | 21,45 |
| 11 1400 180 060 | ● 180 | 2,8/1,8 | 30 | 24 WZ | 20° | 2-7-42 | - | 22,90 |
| 11 1400 180 070 | ● 180 | 2,8/1,8 | 30 | 40 WZ | 15° | 2-7-42 | - | 33,95 |
| 11 1400 180 080 | ● 180 | 2,8/1,8 | 30 | 56 WZ | 10° | 2-7-42 | - | 42,30 |
| 11 1400 185 010 | ● 185 | 2,8/1,8 | 20/16 | 14 WZ | 20° | 2-6-32 | - | 22,40 |
| 11 1400 185 020 | ● 185 | 2,8/1,8 | 20/16 | 24 WZ | 20° | 2-6-32 | - | 23,75 |
| 11 1400 185 030 | ● 185 | 2,8/1,8 | 20/16 | 40 WZ | 15° | 2-6-32 | - | 34,60 |
| 11 1400 185 040 | ● 185 | 2,8/1,8 | 20/16 | 56 WZ | 10° | 2-6-32 | - | 42,40 |
| 11 1400 190 010 | ● 190 | 2,8/1,8 | 20/16 | 16 WZ | 20° | 2-6-32 | - | 22,35 |
| 11 1400 190 020 | ● 190 | 2,8/1,8 | 20/16 | 30 WZ | 15° | 2-6-32 | - | 27,40 |
| 11 1400 190 030 | ● 190 | 2,8/1,8 | 20/16 | 48 WZ | 10° | 2-6-32 | - | 38,30 |
| 11 1400 190 040 | ● 190 | 2,8/1,8 | 20/16 | 60 WZ | 10° | 2-6-32 | - | 44,00 |
| 11 1400 190 050 | ● 190 | 2,8/1,8 | 30 | 16 WZ | 20° | 2-7-42 | - | 18,20 |
| 11 1400 190 060 | ● 190 | 2,8/1,8 | 30 | 30 WZ | 15° | 2-7-42 | - | 24,90 |
| 11 1400 190 070 | ● 190 | 2,8/1,8 | 30 | 48 WZ | 10° | 2-7-42 | - | 35,60 |
| 11 1400 190 080 | ● 190 | 2,8/1,8 | 30 | 60 WZ | 10° | 2-7-42 | - | 42,65 |
| 11 1400 200 010 | ● 200 | 2,8/1,8 | 30 | 18 WZ | 20° | 2-7-42 | - | 21,55 |
| 11 1400 200 020 | ● 200 | 2,8/1,8 | 30 | 30 WZ | 15° | 2-7-42 | - | 27,25 |
| 11 1400 200 030 | ● 200 | 2,8/1,8 | 30 | 48 WZ | 10° | 2-7-42 | - | 38,05 |
| 11 1400 200 040 | ● 200 | 2,8/1,8 | 30 | 64 WZ | 10° | 2-7-42 | - | 45,30 |

● Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.

Special price / sale article. While stocks last.

UNI = 2-7-42 + 2-9-46,40 + 2-10-60. Fortsetzung nächste Seite / Continue to next page











Karnasch® HARTMETALL-BESTÜCKTE KREISSÄGEBLÄTTER CARBIDE TIPPED CIRCULAR SAW BLADES

11 1400

Handkreissägen
Portable circular saws

Bestseller – preisreduziert · Bestseller – price reduced

| Art. |  |  |  |  |  |  |  |  | € |
|-----------------|---|--|---|---|---|--|---|---|-------|
| 11 1400 210 010 | • 210 | 2,8/1,8 | 30 | 18 WZ | 20° | 2-7-42 | - | | 20,70 |
| - | • 210 | 2,0/1,4 | 30 | 20/48/64 WZ | - | Siehe/See Art. 11 1425 Seite/Page 1031 | | | |
| 11 1400 210 020 | • 210 | 2,8/1,8 | 30 | 30 WZ | 15° | 2-7-42 | - | | 26,00 |
| 11 1400 210 030 | • 210 | 2,8/1,8 | 30 | 48 WZ | 10° | 2-7-42 | - | | 36,15 |
| 11 1400 210 040 | • 210 | 2,8/1,8 | 30 | 64 WZ | 10° | 2-7-42 | - | | 45,85 |
| - | • 216 | Siehe Tabelle nach Ø und Anwendung (Index)/See table according Ø and application (index) | | | | | | | |
| 11 1400 220 010 | • 220 | 2,8/1,8 | 30 | 20 WZ | 20° | 2-7-42 | - | | 24,05 |
| 11 1400 220 020 | • 220 | 2,8/1,8 | 30 | 36 WZ | 15° | 2-7-42 | - | | 32,05 |
| 11 1400 220 030 | • 220 | 2,8/1,8 | 30 | 48 WZ | 15° | 2-7-42 | - | | 39,25 |
| - | • 220 | 2,0/1,4 | 30 | 48 WZ | - | Siehe/See Art. 11 1425 Seite/Page 1031 | | | |
| 11 1400 220 040 | • 220 | 2,8/1,8 | 30 | 64 WZ | 10° | 2-7-42 | - | | 46,65 |
| 11 1400 225 010 | • 225 | 2,8/1,8 | 30 | 24 WZ | 20° | 2-7-42 | - | | 25,05 |
| - | • 225 | 2,0/1,4 | 30 | 24/48/68 WZ | - | Siehe/See Art. 11 1425 Seite/Page 1031 | | | |
| 11 1400 225 020 | • 225 | 2,8/1,8 | 30 | 36 WZ | 15° | 2-7-42 | - | | 32,20 |
| 11 1400 225 030 | • 225 | 2,8/1,8 | 30 | 48 WZ | 15° | 2-7-42 | - | | 39,30 |
| 11 1400 225 040 | • 225 | 2,8/1,8 | 30 | 64 WZ | 10° | 2-7-42 | - | | 46,90 |
| 11 1400 230 010 | • 230/235 | 2,8/1,8 | 30 | 24 WZ | 20° | 2-7-42 | - | | 23,55 |
| - | • 230/235 | 2,0/1,4 | 30 | 24/48/68 WZ | - | Siehe/See Art. 11 1425 Seite/Page 1031 | | | |
| 11 1400 230 020 | • 230/235 | 2,8/1,8 | 30 | 36 WZ | 15° | 2-7-42 | - | | 30,40 |
| 11 1400 230 030 | • 230/235 | 2,8/1,8 | 30 | 48 WZ | 15° | 2-7-42 | - | | 39,30 |
| 11 1400 230 040 | • 230/235 | 2,8/1,8 | 30 | 64 WZ | 10° | 2-7-42 | - | | 47,95 |
| 11 1400 240 010 | • 240 | 3,0/2,0 | 30 | 24 WZ | 20° | 2-7-42 | - | | 26,75 |
| 11 1400 240 020 | • 240 | 3,0/2,0 | 30 | 36 WZ | 15° | 2-7-42 | - | | 33,30 |
| 11 1400 240 030 | • 240 | 3,0/2,0 | 30 | 48 WZ | 15° | 2-7-42 | - | | 42,30 |
| - | • 250 | Siehe Tabelle nach Ø und Anwendung (Index)/See table according Ø and application (index) | | | | | | | |
| 11 1400 255 010 | • 255 | 3,0/2,0 | 30 | 36 WZ | 15° | UNI | - | | 35,00 |
| 11 1400 255 020 | • 255 | 3,0/2,0 | 30 | 48 WZ | 15° | UNI | - | | 42,45 |
| 11 1400 255 030 | • 255 | 3,0/2,0 | 30 | 64 WZ | 10° | UNI | - | | 52,35 |
| 11 1400 255 040 | • 255 | 3,0/2,0 | 30 | 80 WZ | 10° | UNI | - | | 60,00 |
| 11 1400 260 010 | • 260 | 3,2/2,2 | 30 | 24 WZ | 20° | UNI | - | | 33,95 |
| - | • 260 | 2,2/1,6 | 30 | 30/56/80 WZ | - | Siehe/See Art. 11 1425 Seite/Page 1031 | | | |
| 11 1400 260 020 | • 260 | 3,2/2,2 | 30 | 48 WZ | 15° | UNI | - | | 49,70 |
| 11 1400 260 030 | • 260 | 3,2/2,2 | 30 | 64 WZ | 10° | UNI | - | | 61,70 |
| 11 1400 270 010 | • 270 | 3,2/2,2 | 30 | 24 WZ | 20° | UNI | - | | 38,25 |
| - | • 270 | 2,2/1,6 | 30 | 30/56/80 WZ | - | Siehe/See Art. 11 1425 Seite/Page 1031 | | | |
| 11 1400 270 020 | • 270 | 3,2/2,2 | 30 | 48 WZ | 15° | UNI | - | | 48,75 |
| 11 1400 270 030 | • 270 | 3,2/2,2 | 30 | 80 WZ | 10° | UNI | - | | 73,25 |
| 11 1400 280 010 | • 280 | 3,2/2,2 | 30 | 48 WZ | 15° | UNI | - | | 49,75 |
| 11 1400 280 020 | • 280 | 3,2/2,2 | 30 | 64 WZ | 10° | UNI | - | | 61,95 |
| - | • 300 | Siehe Tabelle nach Ø und Anwendung (Index)/See table according Ø and application (index) | | | | | | | |
| 11 1400 330 010 | • 330 | 3,2/2,2 | 30 | 24 WZ | 20° | UNI | - | | 39,55 |
| 11 1400 330 020 | • 330 | 3,2/2,2 | 30 | 40 WZ | 20° | UNI | - | | 49,20 |
| 11 1400 330 030 | • 330 | 3,2/2,2 | 30 | 60 WZ | 15° | UNI | - | | 63,15 |
| 11 1400 335 010 | • 335 | 3,2/2,2 | 30 | 36 WZ | 20° | UNI | - | | 47,70 |
| 11 1400 335 020 | • 335 | 3,2/2,2 | 30 | 60 WZ | 15° | UNI | - | | 63,55 |
| - | • 350 | Siehe Tabelle nach Ø und Anwendung (Index)/See table according Ø and application (index) | | | | | | | |
| 11 1400 355 010 | • 355 | 3,2/2,2 | 30 | 30 WZ | 20° | UNI | - | | 48,50 |
| 11 1400 355 020 | • 355 | 3,2/2,2 | 30 | 60 WZ | 15° | UNI | - | | 64,90 |

● Gefertigt/Manufactured 232,50 mm · UNI = 2-7-42 + 2-9-46,40 + 2-10-60

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- 6 
- 7 
- 8 
- 9 

Index

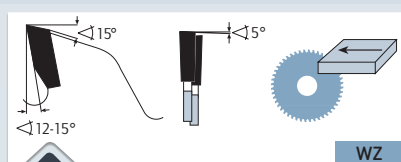
Ritzer 2-teilig
Split scoring saw blades (2-part)

11 1480



✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---|--|
| ✓ | | Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF | Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF |
|---|--|---|--|



WZ

- > Wechselzahn
- > Alternate top bevel

MASCHINE · MACHINE

Für Formatsägen und Plattenaufteilsägen mit Vorritzaggregat.

For panel sizing machines with scoring aggregate.

ANWENDUNG · APPLICATION

Zum Vorritzen von kunststoffbeschichteten oder furnierten Plattenmaterialien

For scoring laminated or veneered panel materials

| Art. | Maschinenhersteller Machine manufacturers | | | | | | | € |
|-----------------|--|-------|---------|-----|----|---------|--------------------------------|--------|
| 11 1480 080 010 | Felder, Striebig | • 80 | 2,8-3,6 | 2,2 | 20 | 2x10 WZ | - | 102,00 |
| 11 1480 100 010 | Schelling KS, MartinT70, Panhans 684+685A | • 100 | 2,8-3,6 | 2,2 | 20 | 2x12 WZ | - | 90,60 |
| 11 1480 100 020 | Altendorf, Panhans, Striebig | • 100 | 2,8-3,6 | 2,2 | 22 | 2x12 WZ | - | 90,60 |
| 11 1480 120 010 | Holz-Her, SCM S1, MAKA | • 120 | 2,8-3,6 | 2,2 | 20 | 2x12 WZ | - | 92,60 |
| 11 1480 120 020 | Altendorf T70, Martin T72 A | • 120 | 2,8-3,6 | 2,2 | 22 | 2x12 WZ | - | 92,60 |
| 11 1480 120 030 | Martin-System* | 🔴 120 | 2,8-3,8 | 2,2 | 22 | 2x12 WZ | 4-4,6-39/4-4,6-55 Angesenkt | 42,74 |
| 11 1480 120 040 | Altendorf, Rapido, Leuco-System* | • 120 | 2,8-3,8 | 2,2 | 50 | 2x12 WZ | 4-6,4-62 Angesenkt | 112,80 |
| 11 1480 125 010 | Panhans, Paoloni | • 125 | 2,8-3,6 | 2,2 | 20 | 2x12 WZ | - | 92,60 |
| 11 1480 125 020 | Altendorf, Martin | • 125 | 2,8-3,6 | 2,2 | 22 | 2x12 WZ | - | 92,60 |

🔴 Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

- Die Ritzsägen kommen mit einem Satz Distanzscheiben: 1 x 0,1 mm · 1 x 0,2 mm · 2 x 0,3 mm
The scoring blades comes with a set of spacers/intermediate discs: 1 x 0,1 mm · 1 x 0,2 mm · 2 x 0,3 mm
- Martin-System* sowie Altendorf, Rapido, Leuco-System* kommen ohne Distanzscheiben da Schnittbreitenverstellung an der Maschine erfolgt.
Martin-System* and Altendorf, Rapido, Leuco-System* comes without spacers/intermediate discs because the width is adjusted on the machine.
- Weitere Ritzer siehe Seite 981
More scoring blades see page 981

Film
Movie



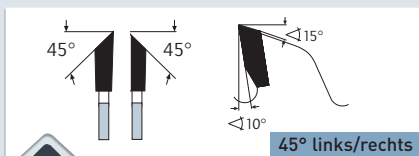
11 1150
HM/T.C.T.

Glasleisten Kreissägen
Glazing bead (glass ledge) circular saws

11 1170
HSS-LINE

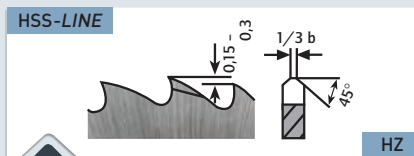


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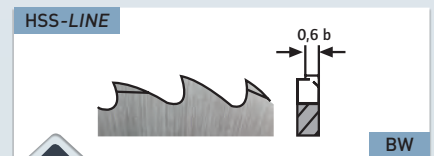
45° links/rechts

- > 45° links / rechts = Einseitig spitz 45° links oder rechts geschliffen
Für Kunststoffprofile, Holzwerkstoffe
- > 45° left / right = 45° acute on one side, left or right cut
For plastic profile, wooden material



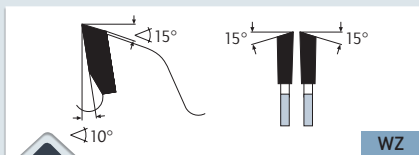
HZ

- > HZ = Bogenzahn mit Vor- und Nachschneider
Für Kunststoffprofile, Aluminiumprofile
- > HZ = Precutter tooth with bevels sides and finishing tooth without bevels
For plastic profile, aluminum profile



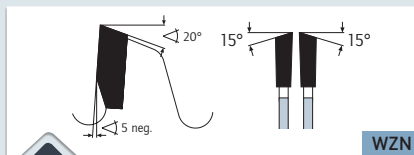
BW

- > BW = Bogenzahn mit wechselseitiger Abkantung
Für Kunststoffprofile, Aluminiumprofile
- > BW = Tooth with alternate bevels
For plastic profile, aluminum profile



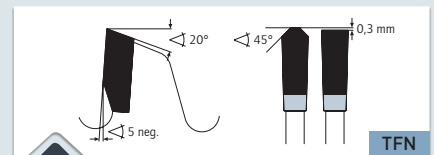
WZ

- > WZ = Wechselzahn
Für Kunststoffprofile, Holzwerkstoffe
- > WZ = Alternate top bevel
For plastic profile, wooden material



WZN

- > WZN = Wechselzahn negativer Spanwinkel
Für Kunststoffprofile, Holzwerkstoffe
- > WZN = Alternate top bevel, negative cutting angle
For plastic profile, wooden material



TFN

- > TFN = Trapez / Flachzahn negativer Spanwinkel
Für Kunststoffprofile, Aluminiumprofile
- > TFN = Triple-chip flat tooth, negative cutting angle
For plastic profile, aluminum profile

MASCHINE · MACHINE

Für Spezialmaschinen wie Glasleistensägen von HAFFNER, ROTOX, WEGOMA, STRIFFLER u.ä.

For special machines, such as glazing bead saws from HAFFNER, ROTOX, WEGOMA, STRIFFLER, etc.

ANWENDUNG · APPLICATION

Sägen für den Fensterbau z.B. Auftrennen von Glasleisten und als Kappfase-Satz. Material: Kunststoffprofil, Aluminiumprofil, Holzwerkstoffe.

Saw blades for window fitting, e.g. cutting glazing beads. Removing glass ledges or as trimmin set. Material: plastic profile, aluminum profile, wooden material.

Film
Movie



Glasleisten Kreissägen
Glazing bead (glass ledge) circular saws

11 1150
HM/T.C.T.



Hartmetall-bestückt

Carbide tipped



| Art. | Maschinenhersteller Machine manufacturers | | | | | | € |
|-----------------|--|--|-----|---------|-------|-----------------|--|
| 11 1150 092 010 | Rotox | | 92 | 3,0/2,5 | 30 | 24 / 45° links | 20,88 |
| 11 1150 092 020 | Rotox | | 92 | 3,0/2,5 | 30 | 24 / 45° rechts | 20,88 |
| 11 1150 095 010 | Haffner, Rapid | | 95 | 2,1/1,6 | 20 | 20 / 45° links | 44,80 |
| 11 1150 095 020 | Haffner, Rapid | | 95 | 2,1/1,6 | 20 | 20 / 45° rechts | 44,80 |
| 11 1150 098 010 | Elu | | 98 | 3,0/2,0 | 32 | 36 / 45° links | 71,80 |
| 11 1150 098 020 | Elu | | 98 | 3,0/2,0 | 32 | 36 / 45° rechts | 71,80 |
| 11 1150 103 010 | Wegoma | | 103 | 2,1/1,6 | 32 | 24 / 45° links | 49,75 |
| 11 1150 103 020 | Wegoma | | 103 | 2,1/1,6 | 32 | 24 / 45° rechts | 49,75 |
| 11 1150 138 010 | Rotox | | 138 | 2,5/2,0 | 14 | 24 FL | 19,26 |
| 11 1150 138 020 | Rotox | | 138 | 2,5/2,0 | 20 | 24 FL | 19,26 |
| 11 1150 175 010 | Haffner | | 175 | 2,1/1,6 | 20 | 68 WZ | 88,90 |
| 11 1150 200 010 | Rapid, Striffler | | 200 | 2,1/1,6 | 20 | 80 WZ | 31,94 |
| 11 1150 200 020 | Rapid, Striffler | | 200 | 2,1/1,6 | 20 | 80 WZN | 85,75 |
| 11 1150 200 030 | Rapid, Striffler | | 200 | 2,2/1,8 | 20 | 100 TFN | 115,00 |
| 11 1150 200 040 | Wegoma | | 200 | 2,1/1,6 | 32 | 80 WZ | 85,75 |
| 11 1150 200 050 | Rotox | | 200 | 2,2/1,8 | 30 | 100 TFN | 115,00 |
| 11 1150 200 060 | Wegoma | | 200 | 2,2/1,8 | 32 | 100 TFN | 115,00 |
| 11 1150 200 070 | Wegoma, Rotox | | 200 | 2,2/1,8 | 32/30 | 100 WZN | 116,55 |
| 11 1150 250 010 | Haffner | | 250 | 2,2/1,8 | 20 | 120 WZN | 138,65 |
| | BMJ, Rapid | | 250 | 2,2/1,8 | 30 | 100 TFN | Siehe/See Art. 11 1120, Seite/Page 931 |
| | BMJ, Rapid | | 250 | 2,2/1,8 | 32/30 | 120 TFN | Siehe/See Art. 11 1120, Seite/Page 931 |
| | | | 300 | 2,4/1,8 | 30 | 120 TFN | Siehe/See Art. 11 1120, Seite/Page 931 |
| | | | 350 | 2,7/2,0 | 30 | 120 TFN | Siehe/See Art. 11 1120, Seite/Page 931 |
| | | | 400 | 3,0/2,4 | 30 | 130 TFN | Siehe/See Art. 11 1120, Seite/Page 931 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

Weitere Alu-Negativ TFN Verzahnung siehe Artikel 11 1100 Seite 929 und 11 1120 Seite 931 - Other aluminum negativ TFN teeth, see article 11 1100 page 929 and 11 1120 page 931

| | | | |
|--|--|--|--|
| | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |
| | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |

OPTIMAL · OPTIMAL

GUT · GOOD

MÖGLICH · POSSIBLE

Vollstahl HSS

Solid steel HSS



11 1170
HSS-LINE



| Art. | Maschinenhersteller Machine manufacturers | | | | | | € |
|-----------------|--|--|-----|-----|----|-----------------|--|
| 11 1170 103 010 | Wegoma | | 103 | 2,0 | 32 | 60 / 45° links | 48,35 |
| 11 1170 103 020 | Wegoma | | 103 | 2,0 | 32 | 60 / 45° rechts | 48,35 |
| 11 1170 200 010 | Wegoma | | 200 | 2,0 | 32 | 180 HZ | 38,90 |
| | Wegoma, STB | | 250 | 2,0 | 32 | 200 BW | Siehe/See Art. 5 1000 250 170, Seite/Page 1054 |

| | | | |
|--|--|--|--|
| | | Kunststoffe, Plexiglas, Duro- und Thermoplaste | Plastics, plexiglass, acrylics, duro- and thermoplastics |
| | | Ne-Metall wie Alu, Messing, Kupfer | Non ferrous materials like alu, copper, brass |

OPTIMAL · OPTIMAL

GUT · GOOD

MÖGLICH · POSSIBLE

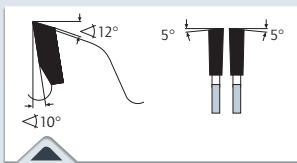
Film
Movie



Index

11 1340

Kreissägen für Straßenrand Freischneider / Böschungsmäher von Mulag, Spearhead, Power usw.
Circular saws for roadside maintenance hedging and sliding machines from Mulag, Spearhead, Power etc.



- > Wechseltzahn
- > Alternate top bevel

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---------------------------------------|--|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Weichholz, Hartholz, Exotenholz Längs | Soft wood, hard wood, and exotic wood along the grain |

MASCHINE · MACHINE

Passend für MULAG, Spearhead, Power und weitere Straßenrand Freischneider/Böschungsmäher

Suitable for MULAG, Spearhead, Power and other roadside maintenance hedging and siding machines

ANWENDUNG · APPLICATION

Kürzen von Ästen und Gestrüpp am Straßenrand.

For cutting branches, twigs and undergrowth on the roadside.

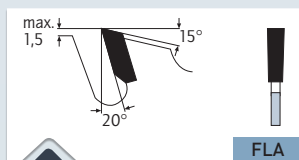
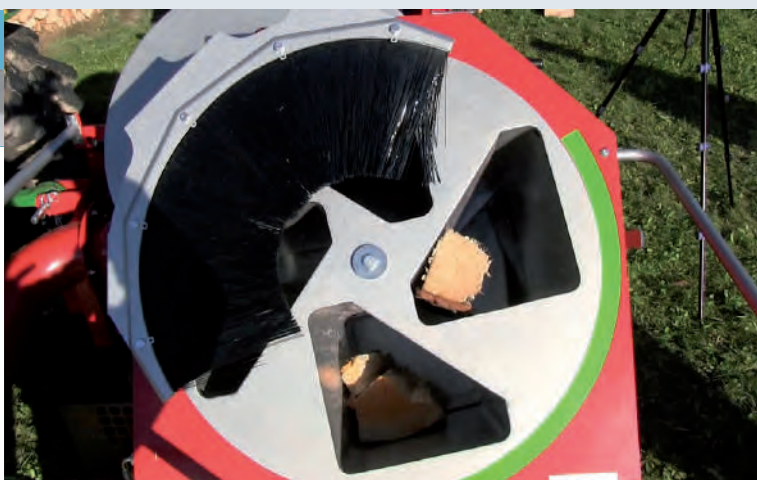
| Art. | | | | | | | € |
|----------------------------|-------|---------|----|----|-------|----------|--------|
| 11 1340 390 010 | • 390 | 3,5/2,5 | 25 | H7 | 60 WZ | 6-8,0-64 | 97,80 |
| NEW 11 1340 390 020 | • 390 | 3,5/2,5 | 61 | | 60 WZ | 6-9-75 | 114,90 |
| 11 1340 500 010 | • 500 | 4,0/3,0 | 30 | | 60 WZ | 6-8,5-80 | 130,85 |
| 11 1340 500 020 | • 500 | 4,0/3,0 | 30 | | 72 WZ | 6-8,5-80 | 145,65 |
| 11 1340 590 010 | • 590 | 4,5/3,6 | 30 | | 78 WZ | 6-8,5-80 | 209,55 |
| NEW 11 1340 590 020 | • 590 | 4,5/3,6 | 85 | | 78 WZ | 6-11-110 | 225,25 |
| 11 1340 600 010 | • 600 | 4,0/3,0 | 45 | | 60 WZ | 2-18-120 | 221,75 |

Film
Movie



Kreissägen für Vogesenblitz Trommelsäge SAT 4-700
Circular saw for Vogesenblitz cylinder/circular barrel saw

11 1345



- > Flachzahn mit Abweiser
- > Flat tooth with chip limiter

MASCHINE · MACHINE

Passend für Vogesenblitz Trommelsäge SAT 4-700

Suitable for Vogesenblitz cylinder/circular barrel saw SAT 4-700

✓ OPTIMAL · OPTIMAL ✓ GUT · GOOD ✓ MÖGLICH · POSSIBLE

| | | | |
|---|--|---------------------------------------|--|
| ✓ | | Weichholz, Hartholz, Exotenholz, Quer | Soft wood, hard wood, and exotic wood across the grain |
| ✓ | | Weichholz, Hartholz, Exotenholz Längs | Soft wood, hard wood, and exotic wood along the grain |

ANWENDUNG · APPLICATION

Zum Trennen von Holzscheite mit einer Länge bis 1200 mm und Durchmesser bis 270 mm.

For sawing logs with a length up to 1200 mm and diameters up to 270 mm.

| Art. | | | | | | | € |
|-----------------|-----|---------|----|----|--------|---|--------|
| 11 1345 700 010 | 700 | 6,0/4,5 | H7 | 30 | 42 FLA | - | 393,00 |

Film
Movie



1041



Index

11 1630

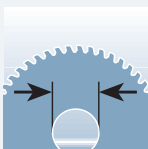
Reduzierringe, geschliffen, außen gerändelt, Passung H7
Reduction rings, ground, knurled outward, H7 fit



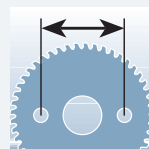
| Ø Außen Outer | Ø Innen Inner | Stärke Strength | ART. 11 1630 | € | Ø Außen Outer | Ø Innen Inner | Stärke Strength | ART. 11 1630 | € | Ø Außen Outer | Ø Innen Inner | Stärke Strength | ART. 11 1630 | € |
|---------------|---------------|-----------------|--------------|------|---------------|---------------|-----------------|--------------|------|---------------|---------------|-----------------|--------------|------|
| • 16 | 12,7 | 1,6 | 11 1630 005 | 1,75 | • 30 | 18 | 1,4 | 11 1630 205 | 1,95 | • 32 | 25,4 | 1,8 | 11 1630 382 | 2,10 |
| • 16 | 13 | 1,5 | 11 1630 010 | 1,75 | • 30 | 18 | 1,8 | 11 1630 210 | 1,95 | • 32 | 30 | 1,6 | 11 1630 385 | 2,10 |
| • 18 | 16 | 1,4 | 11 1630 015 | 1,75 | • 30 | 20 | 1,4 | 11 1630 215 | 1,95 | • 32 | 30 | 1,8 | 11 1630 390 | 2,10 |
| • 18 | 16 | 1,6 | 11 1630 020 | 1,75 | • 30 | 20 | 1,6 | 11 1630 220 | 1,95 | • 32 | 30 | 2,0 | 11 1630 395 | 2,10 |
| • 20 | 10 | 1,4 | 11 1630 025 | 1,75 | • 30 | 20 | 1,8 | 11 1630 225 | 1,95 | • 32 | 30 | 2,2 | 11 1630 400 | 2,10 |
| • 20 | 12,7 | 1,4 | 11 1630 030 | 1,75 | • 30 | 20 | 2,0 | 11 1630 230 | 1,95 | • 32 | 30 | 2,5 | 11 1630 405 | 2,10 |
| • 20 | 12,7 | 1,6 | 11 1630 035 | 1,75 | • 30 | 20 | 2,2 | 11 1630 235 | 1,95 | • 32 | 30 | 3,5 | 11 1630 410 | 2,10 |
| • 20 | 13 | 1,4 | 11 1630 040 | 1,75 | • 30 | 20 | 2,5 | 11 1630 240 | 1,95 | • 35 | 20 | 2,0 | 11 1630 415 | 2,10 |
| • 20 | 13 | 1,6 | 11 1630 045 | 1,75 | • 30 | 20 | 2,8 | 11 1630 245 | 1,95 | • 35 | 20 | 2,2 | 11 1630 420 | 2,10 |
| • 20 | 13 | 1,8 | 11 1630 050 | 1,75 | • 30 | 22 | 1,4 | 11 1630 250 | 1,95 | • 35 | 20 | 2,5 | 11 1630 425 | 2,10 |
| • 20 | 15 | 1,6 | 11 1630 055 | 1,75 | • 30 | 22 | 1,8 | 11 1630 255 | 1,95 | • 35 | 20 | 2,8 | 11 1630 430 | 2,10 |
| • 20 | 16 | 1,4 | 11 1630 060 | 1,75 | • 30 | 22 | 2,0 | 11 1630 260 | 1,95 | • 35 | 25 | 2,2 | 11 1630 435 | 2,10 |
| • 20 | 16 | 1,6 | 11 1630 065 | 1,75 | • 30 | 22 | 2,2 | 11 1630 265 | 1,95 | • 35 | 25 | 2,5 | 11 1630 440 | 2,10 |
| • 20 | 16 | 1,8 | 11 1630 070 | 1,75 | • 30 | 22,23 | 1,4 | 11 1630 270 | 1,95 | • 35 | 25 | 2,8 | 11 1630 445 | 2,10 |
| • 20 | 16 | 2,0 | 11 1630 075 | 1,75 | • 30 | 22,23 | 1,6 | 11 1630 275 | 1,95 | • 35 | 30 | 1,8 | 11 1630 450 | 2,10 |
| • 20 | 16 | 2,2 | 11 1630 080 | 1,75 | • 30 | 22,23 | 1,8 | 11 1630 280 | 1,95 | • 35 | 30 | 2,0 | 11 1630 455 | 2,10 |
| • 20 | 16 | 2,6 | 11 1630 085 | 1,75 | • 30 | 22,23 | 2,2 | 11 1630 285 | 1,95 | • 35 | 30 | 2,2 | 11 1630 460 | 2,10 |
| • 20 | 18 | 1,4 | 11 1630 090 | 1,75 | • 30 | 22,23 | 2,5 | 11 1630 290 | 1,95 | • 35 | 30 | 2,5 | 11 1630 465 | 2,10 |
| • 22 | 20 | 1,4 | 11 1630 095 | 1,95 | • 30 | 25 | 1,4 | 11 1630 295 | 1,95 | • 35 | 30 | 2,8 | 11 1630 470 | 2,10 |
| • 22 | 20 | 1,6 | 11 1630 100 | 1,95 | • 30 | 25 | 1,6 | 11 1630 300 | 1,95 | • 35 | 32 | 1,8 | 11 1630 475 | 2,10 |
| • 22 | 20 | 1,8 | 11 1630 105 | 1,95 | • 30 | 25 | 1,8 | 11 1630 305 | 1,95 | • 40 | 22 | 2,5 | 11 1630 480 | 2,50 |
| • 22 | 20 | 2,0 | 11 1630 110 | 1,95 | • 30 | 25 | 2,0 | 11 1630 310 | 1,95 | • 40 | 25 | 2,8 | 11 1630 485 | 2,50 |
| • 22,23 | 20 | 1,4 | 11 1630 115 | 1,95 | • 30 | 25 | 2,2 | 11 1630 315 | 1,95 | • 40 | 25,4 | 2,0 | 11 1630 490 | 2,50 |
| • 22,23 | 20 | 1,6 | 11 1630 120 | 1,95 | • 30 | 25 | 2,5 | 11 1630 320 | 1,95 | • 40 | 30 | 2,0 | 11 1630 495 | 2,50 |
| • 25 | 16 | 1,4 | 11 1630 125 | 1,95 | • 30 | 25 | 2,8 | 11 1630 325 | 1,95 | • 40 | 30 | 2,2 | 11 1630 500 | 2,50 |
| • 25 | 20 | 1,4 | 11 1630 130 | 1,95 | • 30 | 25,4 | 1,4 | 11 1630 326 | 1,95 | • 40 | 30 | 2,5 | 11 1630 505 | 2,50 |
| • 25 | 20 | 1,6 | 11 1630 135 | 1,95 | • 30 | 25,4 | 1,6 | 11 1630 327 | 1,95 | • 40 | 30 | 2,8 | 11 1630 510 | 2,50 |
| • 25 | 20 | 1,8 | 11 1630 140 | 1,95 | • 30 | 25,4 | 1,8 | 11 1630 328 | 1,95 | • 40 | 32 | 1,8 | 11 1630 515 | 2,50 |
| • 25 | 20 | 2,0 | 11 1630 145 | 1,95 | • 30 | 25,4 | 2,0 | 11 1630 329 | 1,95 | • 40 | 32 | 2,0 | 11 1630 520 | 2,50 |
| • 25,4 | 20 | 1,4 | 11 1630 150 | 1,95 | • 30 | 28 | 2,8 | 11 1630 330 | 1,95 | • 40 | 32 | 2,5 | 11 1630 525 | 2,50 |
| • 25,4 | 22,23 | 1,4 | 11 1630 155 | 1,95 | • 30 | 28 | 3,0 | 11 1630 335 | 1,95 | • 40 | 32 | 2,8 | 11 1630 530 | 2,50 |
| • 25,4 | 22,23 | 1,8 | 11 1630 160 | 1,95 | • 30 | 28 | 3,2 | 11 1630 340 | 1,95 | • 40 | 32 | 3,0 | 11 1630 535 | 2,50 |
| • 30 | 15 | 1,8 | 11 1630 165 | 1,95 | • 32 | 20 | 1,8 | 11 1630 345 | 2,10 | • 40 | 32 | 3,2 | 11 1630 540 | 2,50 |
| • 30 | 15 | 2,0 | 11 1630 170 | 1,95 | • 32 | 20 | 2,2 | 11 1630 350 | 2,10 | • 40 | 35 | 2,8 | 11 1630 545 | 2,50 |
| • 30 | 16 | 1,4 | 11 1630 175 | 1,95 | • 32 | 22 | 2,2 | 11 1630 355 | 2,10 | • 40 | 38 | 2,8 | 11 1630 550 | 2,50 |
| • 30 | 16 | 1,6 | 11 1630 180 | 1,95 | • 32 | 22 | 2,5 | 11 1630 360 | 2,10 | • 40 | 38 | 3,0 | 11 1630 555 | 2,50 |
| • 30 | 16 | 1,8 | 11 1630 185 | 1,95 | • 32 | 25 | 2,0 | 11 1630 365 | 2,10 | • 50 | 30 | 2,5 | 11 1630 560 | 2,95 |
| • 30 | 16 | 2,0 | 11 1630 190 | 1,95 | • 32 | 25 | 2,2 | 11 1630 370 | 2,10 | • 50 | 30 | 2,8 | 11 1630 565 | 2,95 |
| • 30 | 16 | 2,2 | 11 1630 195 | 1,95 | • 32 | 25 | 2,5 | 11 1630 375 | 2,10 | • 50 | 30 | 3,0 | 11 1630 570 | 2,95 |
| • 30 | 16 | 2,5 | 11 1630 200 | 1,95 | • 32 | 25 | 2,6 | 11 1630 380 | 2,10 | • 50 | 32 | 3,0 | 11 1630 575 | 2,95 |

Änderungen

Rework

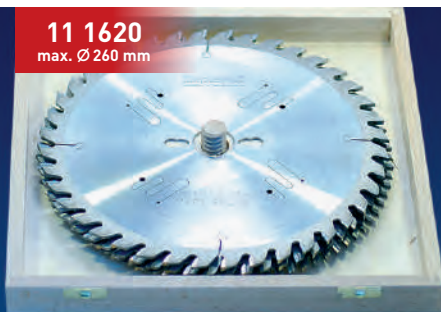


Bohrungen erweitern
Rebore standard bore



Nebenlöcher
Pin holes

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▲ 2 m ▼

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11 1300

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Siehe Seite 990/991 · See page 990/991

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1



2



3



4



5



6



7



8



9

Index

METALLKREISSÄGEBLÄTTER · HSS-DM05 · HSS-Co5 · HSS-DIN · VOLLHARTMETALL

METAL CIRCULAR SAW BLADES · HSS-DM05 · HSS-Co5 · HSS-DIN · SOLID CARBIDE



Index

5.2

KONTAKT | CONTACT

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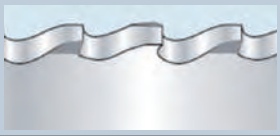


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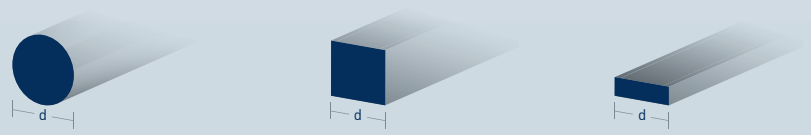
ONLINE



Zahnformen Tooth shapes

| | | |
|-----------|---|---|
| BW | Zum Sägen von Profilen und Röhren. For cutting profile and pipes. |  |
| HZ | Zum Sägen von Vollmaterial und Rohre, Profile mit dickeren Wandstärken > 3 mm For cutting solid material and thicker profiles, pipes > 3 mm |  |
| BR | Spezialverzahnung zum Sägen von Profilen und Röhren. Im Vergleich zur Zahnform BW hat diese die doppelte Anzahl von Zahnflanken im Eingriff. Daraus resultiert weitaus höhere Standzeit und saubere Schnittflächen. Preis und Lieferung auf Anfrage. Special geometry for cutting pipes and profiles. In comparison to tooth shape BW has this BR shape double the number of cutting edges. This results to a much higher number of cuts and smooth surface finish. Price and time of delivery on request. |  |

Empfohlene Zähnezahl zum Sägen von Vollmaterial Recommended number of teeth for cutting solid material



| Querschnitt Crosscut d mm | Zahnteilung Pitch | Zahnform Tooth shape | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm |
|---------------------------------|----------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| | | | 175 | 200 | 250 | 275 | 300 | 315 | 350 | 370 | 400 | 425 | 450 | 500 | 560 |
| | | | *40 mm | *45 mm | *60 mm | *65 mm | *70 mm | *75 mm | *80 mm | *86 mm | *96 mm | *106 mm | *112 mm | *128 mm | *145 mm |
| 10 mm | 5 | HZ | 110 | 130 | 160 | 180 | 180 | 200 | 220 | 220 | 250 | 260 | 280 | 310 | 350 |
| 20 mm | 6 | HZ | 90 | 100 | 128 | 140 | 160 | 160 | 180 | 190 | 200 | 220 | 230 | 260 | 300 |
| 30 mm | 8 | HZ | 70 | 80 | 100 | 110 | 120 | 120 | 140 | 140 | 160 | 160 | 180 | 200 | 220 |
| 50 mm | 8 | HZ | | | 100 | 90 | 120 | 120 | 140 | 140 | 160 | 160 | 180 | 200 | 220 |
| 70 mm | 10 | HZ | | | | | 94 | 100 | 110 | 110 | 120 | 130 | 140 | 160 | 180 |
| 90 mm | 12 | HZ | | | | | 80 | 80 | 90 | 90 | 110 | 110 | 120 | 130 | 150 |
| 110 mm | 14 | HZ | | | | | | | | 80 | 80 | 80 | 90 | 100 | 120 |
| 130 mm | 14 | HZ | | | | | | | | | 80 | 80 | 90 | 100 | 120 |
| 150 mm | 16 | HZ | | | | | | | | | | | 80 | 90 | 100 |
| 160 mm | 16 | HZ | | | | | | | | | | | | 90 | 100 |
| 180 mm | 18 | HZ | | | | | | | | | | | | 80 | 90 |

* Maximaler Schnittbereich · Maximum cutting capacity

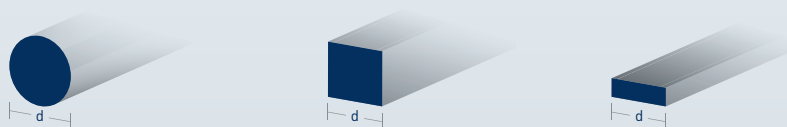
Empfohlene Zähnezahl zum Sägen von Röhren und Profilen Recommended number of teeth for cutting pipes and profiles



| Wandstärke Wall thickness S mm | Zahnteilung Pitch | Zahnform Tooth shape | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm | Ø mm |
|--------------------------------------|----------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| | | | 175 | 200 | 250 | 275 | 300 | 315 | 350 | 370 | 400 | 425 | 450 | 500 | 560 |
| | | | *40 mm | *45 mm | *60 mm | *65 mm | *70 mm | *75 mm | *80 mm | *86 mm | *96 mm | *106 mm | *112 mm | *128 mm | *145 mm |
| 0,5 mm | 3 | BW | 180 | 200 | 250 | 280 | 300 | 320 | 350 | 380 | | | | | |
| 1,0 mm | 4 | BW, BR | 140 | 160 | 200 | 220 | 220 | 240 | 280 | 290 | 310 | 320 | 350 | 390 | |
| 2,0 mm | 4,5 | BW, BR | 120 | 140 | 180 | 200 | 210 | 230 | 250 | 260 | 280 | 290 | 310 | 350 | 390 |
| 3,0 mm | 5 | BW, BR | 110 | 130 | 160 | 180 | 180 | 200 | 220 | 230 | 250 | 260 | 280 | 310 | 350 |
| 4,0 mm | 6 | HZ, BR | 90 | 100 | 130 | 140 | 160 | 170 | 180 | 200 | 200 | 220 | 230 | 260 | 290 |
| 5,0 mm | 8 | HZ, BR | | 80 | 100 | 110 | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 200 | 220 |
| 6,0 mm | 9 | HZ, BR | | | 90 | 100 | 110 | 120 | 130 | 130 | 140 | 150 | 160 | 180 | 200 |
| 7,0 mm | 10 | HZ, BR | | | | | | 100 | 110 | 120 | 120 | 130 | 140 | 160 | 180 |
| 8,0 mm | 11 | HZ, BR | | | | | | | | | | | 130 | 140 | 160 |
| 9,0 mm | 12 | HZ, BR | | | | | | | | | | | | 130 | 150 |
| 10,0 mm | 13 | HZ | | | | | | | | | | | | 120 | 130 |

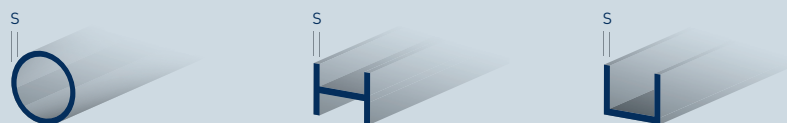
* Maximaler Schnittbereich · Maximum cutting capacity

Schnittparameter Vollmaterial
Cutting parameters solid material



| Werkstoffe Materials | | fz (mm/z) | | Schnittgeschwindigkeit · Cutting speed Vc (m/min) | | | |
|------------------------------------|--------------------------|-------------------------------------|------|--|---|--|--|
| | | Vorschub pro Zahn Feed per tooth | | 5 1000 | 5 1040 | 5 1300 | 5 1340 |
| | | Min | Max | HSS-DMo5 Dampfbehandelt Steam treated | HSS-DMo5 Kx-Beschichtet Kx-coated | HSS-Co5 Dampfbehandelt Steam treated | HSS-Co5 Kx-Beschichtet Kx-coated |
| Stahl · Steel | < 500 N/mm ² | 0,025 | 0,08 | 30-40 | 30-50 | - | - |
| | < 800 N/mm ² | 0,025 | 0,07 | 20-35 | 25-40 | - | - |
| | < 1200 N/mm ² | 0,02 | 0,06 | - | - | 15-25 | 15-30 |
| Rostfreie Stähle · Stainless steel | | 0,01 | 0,06 | - | - | 10-25 | 10-30 |
| Guss · Cast iron | | 0,025 | 0,05 | - | - | 20-30 | 30-50 |
| Aluminium · Aluminum | | 0,04 | 0,09 | - | 500-900 | - | - |
| Bronze · Bronze | | 0,04 | 0,07 | - | 200-400 | - | - |
| Kupfer · Copper | | 0,04 | 0,06 | - | 200-300 | - | - |
| Messing · Brass | | 0,04 | 0,08 | - | 400-600 | - | - |
| Zinklegierungen · Zinc Alloy | | 0,025 | 0,08 | - | 30-100 | - | - |
| Inconel · Inconel | | 0,025 | 0,05 | - | - | - | 16-45 |
| Titan · Titanium | | 0,02 | 0,05 | - | - | - | 15-30 |

Schnittparameter Rohre und Profile
Cutting parameters pipes and profiles



| Werkstoffe Materials | | fz (mm/z) | | Schnittgeschwindigkeit · Cutting speed Vc (m/min) | | | |
|------------------------------------|--------------------------|-------------------------------------|------|--|---|--|--|
| | | Vorschub pro Zahn Feed per tooth | | 5 1000 | 5 1040 5 1305 | 5 1300 | 5 1340 |
| | | Min | Max | HSS-DMo5 Dampfbehandelt Steam treated | HSS-DMo5 Kx-Beschichtet Kx-coated | HSS-Co5 Dampfbehandelt Steam treated | HSS-Co5 Kx-Beschichtet Kx-coated |
| Stahl · Steel | < 500 N/mm ² | 0,025 | 0,24 | 45-130 | 70-230 | - | - |
| | < 800 N/mm ² | 0,025 | 0,18 | 30-100 | 45-140 | - | - |
| | < 1200 N/mm ² | 0,02 | 0,12 | - | - | 15-50 | 25-100 |
| Rostfreie Stähle · Stainless steel | | 0,01 | 0,12 | - | - | 15-45 | 16-80 |
| Guss · Cast iron | | 0,025 | 0,05 | - | - | 15-45 | 30-65 |
| Aluminium · Aluminum | | 0,025 | 0,12 | - | 1000-1600 | - | - |
| Bronze · Bronze | | 0,04 | 0,07 | - | 200-400 | - | - |
| Kupfer · Copper | | 0,04 | 0,06 | - | 200-300 | - | - |
| Messing · Brass | | 0,04 | 0,08 | - | 400-600 | - | - |
| Zinklegierungen · Zinc Alloy | | 0,025 | 0,08 | - | 30-100 | - | - |
| Inconel · Inconel | | 0,02 | 0,08 | - | - | - | 16-45 |
| Titan · Titanium | | 0,02 | 0,08 | - | - | - | 15-30 |

Festlegung der Schnittgeschwindigkeit Vc
Determination of cutting speed Vc

$$Vc \text{ (m/min)} = \frac{D \cdot \pi \cdot n}{1000}$$

Festlegung der Vorschubgeschwindigkeit Vf
Determination of feed rate Vf

$$Vf \text{ (mm/min)} = fz \cdot n \cdot Z$$

Festlegung der Drehzahl n
Determination of revolution speed n

$$n \text{ (min}^{-1}\text{)} = \frac{Vc \cdot 1000}{D \cdot \pi}$$

fz (mm/z) = Vorschub pro Zahn · Feed per tooth
D (mm) = Sägendurchmesser · Saw blade diameter
Z = Anzahl der Zähne · Number of teeth
n (min⁻¹) = Drehzahl · rpm

1



2



3



4



5



6



7



8



9



Index

5 1000

HSS-DMo5
(M2)-DIN
1.3343

Dampfbehandelt
Steam treated



ANWENDUNG · APPLICATION



Stahl
Steel
< 800 N

Siehe ab Seite 1053
See from page 1053

Für Stähle ≤ 800 N/mm²

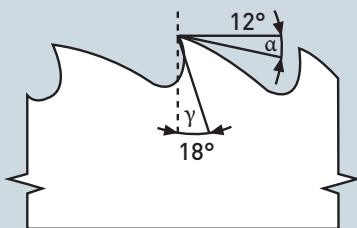
HSS-DMo5: Hochlegierter Schnellarbeitsstahl mit Wolfram-, Vanadium- und Molybdänanteil für:

- Sehr gute mechanische Eigenschaften und hervorragende Festigkeit mit einer Härte von 64 ± 1HRC.

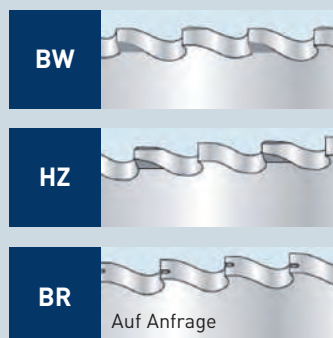
"Dampfbehandelt" ist eine kontrollierte Oxydierung CO₂ der Oberfläche durch Anlassen der fertigen Kreissägen in erhitztem Dampf bei ca. 350 °C. Dies ergibt:

- Feine Mikroporen zur besseren Verteilung des Kühlmittels.
- Oberflächenhärte von 900 HV.
- Außergewöhnlich feine Oberflächenschicht welche die Reibung extrem verringert (Reibungskoeffizient 0,60).

Zahnwinkel



ZAHNFORMEN



SEITENSCHLAG

| |
|------------------|
| ∅ 200-225 = 0,15 |
| ∅ 250-300 = 0,20 |
| ∅ 315-400 = 0,25 |
| ∅ 425-450 = 0,30 |
| ∅ 500 = 0,35 |

Reduzierter Seitenschlag auf Anfrage

For steels ≤ 800 N/mm²

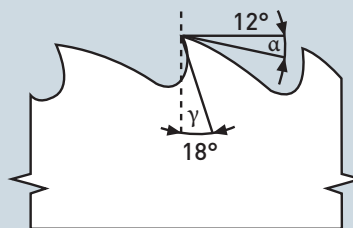
HSS-DMo5: High-speed steel which includes vanadium, wolfram and Molybdenum. This results to:

- Very good mechanical characteristics and excellent strength with a hardness of 64 ± 1HRC.

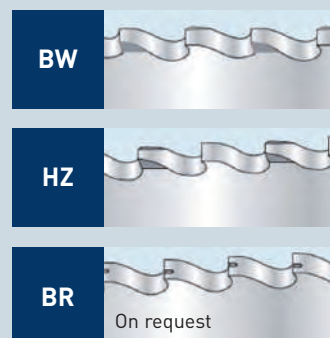
"Steam treated" is a surface modification by CO₂ oxidation. Circular saws are let to tempering in overheated steam of arround 350 °C. This results to:

- Microporosity arised on surface enables better coolant distribution
- Surface hardness of 900 HV.
- Extremely fine surface layer decreases the friction (antifriction). Coefficient friction 0,60.

Cutting angles



TOOTH SHAPE



SIDE RUNOUT

| |
|------------------|
| ∅ 200-225 = 0,15 |
| ∅ 250-300 = 0,20 |
| ∅ 315-400 = 0,25 |
| ∅ 425-450 = 0,30 |
| ∅ 500 = 0,35 |

Reduced side runout on request

Film
Movie



Kx Beschichtet
Kx coated

5 1040
HSS-DMo5
(M2)-DIN
1.3343



ANWENDUNG · APPLICATION

| | | | |
|-------------------|------------|---|-----------------------------|
| | | | |
| Stahl Steel | Alu Alu | Kupfer, Kupfer- legierungen Copper, copper alloys | Zinklegierung Zinc alloy |
| < 800 N | | | |

Siehe ab Seite 1053
See from page 1053

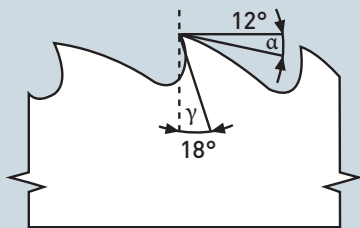
Für Stähle/Edelstähle ≤ 800 N/mm²
Aluminium, Kupfer, Messing

HSS-DMo5: Hochlegierter Schnellarbeitsstahl mit Wolfram-, Vanadium- und Molybdänanteil für:
– Sehr gute mechanische Eigenschaften und hervorragende Festigkeit mit einer Härte von 64 ± 1HRC.

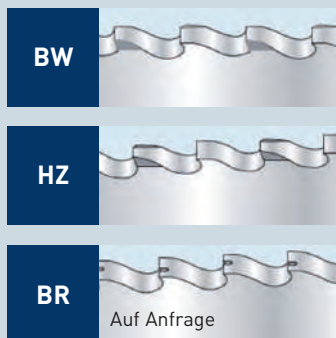
Kx Beschichtung: Ergibt generell weitaus höhere Standzeiten als Dampf-behandelte Blätter (siehe Art. 5 1000).

Weiterhin:
– Gute Widerstandsfähigkeit bei hohen Bearbeitungstemperaturen. Daher geeignet auch bei ungenügender Kühlung, Minimalschmierung, Sprühnebelschmierung.
– Durch geringen Reibungskoeffizient (0,45) und hoher Oberflächenhärte von 3500 HV sind höhere Schnittgeschwindigkeiten möglich. Daher ideal für automatische Maschinen.

Zahnwinkel



ZAHNFORMEN



SEITENSCHLAG

| |
|------------------|
| ∅ 200–225 = 0,15 |
| ∅ 250–300 = 0,20 |
| ∅ 315–400 = 0,25 |
| ∅ 425–450 = 0,30 |
| ∅ 500 = 0,35 |

Reduzierter Seitenschlag auf Anfrage

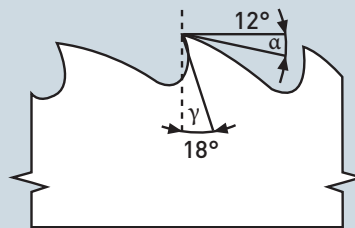
For steel/stainless steel ≤ 800 N/mm²
Aluminum, copper, brass

HSS-DMo5: High-speed steel which includes vanadium, wolfram and Molybdenum. This results to:
– Very good mechanical characteristics and excellent strength with a hardness of 64 ± 1HRC.

Kx coating: Provides much longer tool life than steam treated blades (see Art. 5 1000).

Furthermore:
– High resistance in high work temperatures. Therefore ideal also in cuts with insufficient cooling, minimal cooling, spray oil (mist).
– Due to low friction coefficient (0,45) and high surface hardness of 3500 HV suitable for higher cutting speed. Therefore ideal for automatic machines.

Cutting angles



TOOTH SHAPE



SIDE RUNOUT

| |
|------------------|
| ∅ 200–225 = 0,15 |
| ∅ 250–300 = 0,20 |
| ∅ 315–400 = 0,25 |
| ∅ 425–450 = 0,30 |
| ∅ 500 = 0,35 |

Reduced side runout on request

Film
Movie



Index

5 1300

Dampfbehandelt
Steam treated

HSS-Co5
Cobalt 5%
(M35)-DIN 1.3243



ANWENDUNG · APPLICATION

| | | |
|--------------------|-----------|----------------|
| | | |
| Stahl | Edelstahl | Grauguss |
| Steel | Stainless | Grey cast iron |
| < 1200 N | | |

Siehe ab Seite 1053
See from page 1053

Für Stähle/Edelstähle ≤ 1200 N/mm²
Guss, Bronze, Zinklegierungen, Inconel

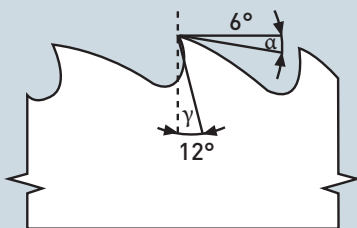
HSS-Co5: Hochlegierter Schnellarbeitsstahl mit Wolfram-, Molybdän- und Kobaltanteile. Kobalt verhindert das Kornwachstum bei hohen Betriebstemperaturen. Dadurch behält der Stahl seine Härte. Diese Eigenschaften sind erforderlich wenn **harte** und **hochlegierte** Werkstoffe wie z.B. Edelstahl geschnitten werden sollen, welche im Schneidbereich hohe Temperaturen erzeugen.

Härte des Stahls: 65 ± 1HRC.

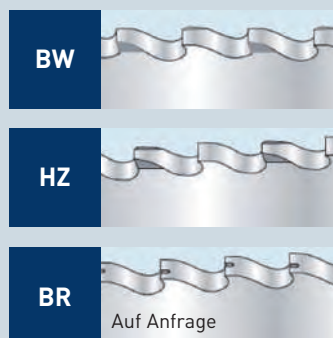
“**Dampfbehandelt**” ist eine kontrollierte Oxydierung CO₂ der Oberfläche durch Anlassen der fertigen Kreissägen in erhitztem Dampf bei ca. 350 °C. Dies ergibt:

- Feine Mikroporen zur besseren Verteilung des Kühlmittels.
- Oberflächenhärte von 900 HV.
- Außergewöhnlich feine Oberflächenschicht welche die Reibung extrem verringert (Reibungskoeffizient 0,60).

Zahnwinkel



ZAHNFORMEN



SEITENSCHLAG

| |
|------------------|
| ∅ 200-225 = 0,15 |
| ∅ 250-300 = 0,20 |
| ∅ 315-400 = 0,25 |
| ∅ 425-450 = 0,30 |
| ∅ 500 = 0,35 |

Reduzierter Seitenschlag auf Anfrage

For steel/stainless steel ≤ 1200 N/mm²
Cast iron, bronze, zinc alloy, inconel

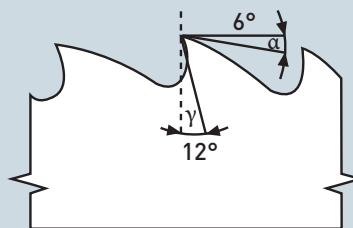
HSS-Co5: Strongly alloyed high speed steel with content of wolfram, molybdenum and **cobalt**. Cobalt obstructs critical grain growth and above all, maintains an excellent degree of hardness at high operating temperatures. These characteristics are very important when cutting very high-alloy materials such as stainless steel and very hard metals, which tend to develop high temperatures in the cutting zone.

Hardness of this steel: 65 ± 1HRC.

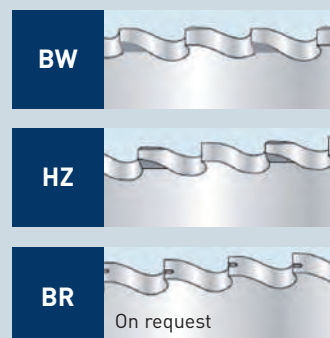
“**Steam treated**” is a surface modification by CO₂ oxidation. Circular saws are let to tempering in overheated steam of around 350 °C. This results to:

- Microporosity arised on surface enables better coolant distribution
- Surface hardness of 900 HV.
- Extremely fine surface layer decreases the friction (antifriction). Coefficient friction 0,60.

Cutting angles



TOOTH SHAPE



SIDE RUNOUT

| |
|------------------|
| ∅ 200-225 = 0,15 |
| ∅ 250-300 = 0,20 |
| ∅ 315-400 = 0,25 |
| ∅ 425-450 = 0,30 |
| ∅ 500 = 0,35 |

Reduced side runout on request

Film
Movie



Kx Beschichtet
Kx coated

5 1340

HSS-Co5
Cobalt 5%
(M35)-DIN 1.3243



ANWENDUNG ·
APPLICATION

| | | | | |
|--------------------|------------------------|----------------------------|---------|-------------------|
| | | | | |
| Stahl Steel | Edelstahl Stainless | Grauguss Grey cast iron | Inconel | Titan Titanium |
| < 1200 N | | | | |

Siehe ab Seite 1053
See from page 1053

Für Stähle/Edelstähle ≤ 1200 N/mm²
Guss, Bronze, Zinklegierungen, Inconel

HSS-Co5: Hochlegierter Schnellarbeitsstahl mit Wolfram-, Molybdän- und **Kobaltanteile**. Kobalt verhindert das Kornwachstum bei hohen Betriebstemperaturen. Dadurch behält der Stahl seine Härte. Diese Eigenschaften sind erforderlich wenn **harte** und **hochlegierte** Werkstoffe wie z.B. Edelstahl geschnitten werden sollen, welche im Schneidbereich hohe Temperaturen erzeugen.

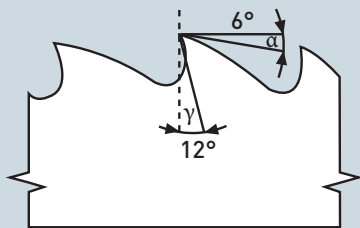
Härte des Stahls: 65 ± 1HRC.

Kx Beschichtung: Ergibt generell weitaus höhere Standzeiten als Dampfbehandelte Blätter (siehe Art. 5 1300).

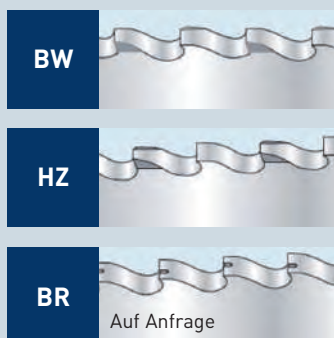
Weiterhin:

- Gute Widerstandsfähigkeit bei hohen Bearbeitungstemperaturen. Daher geeignet auch bei ungenügender Kühlung, Minimalschmierung, Sprühnebelschmierung.
- Durch geringen Reibungskoeffizient (0,50) und hoher Oberflächenhärte von 3500 HV sind höhere Schnittgeschwindigkeiten möglich. Daher ideal für automatische Maschinen.

Zahnwinkel



ZAHNFORMEN



SEITENSCHLAG

| |
|------------------|
| ∅ 200-225 = 0,15 |
| ∅ 250-300 = 0,20 |
| ∅ 315-400 = 0,25 |
| ∅ 425-450 = 0,30 |
| ∅ 500 = 0,35 |

Reduzierter Seitenschlag auf Anfrage

For steel/stainless steel ≤ 1200 N/mm²
Cast iron, bronze, zinc alloy, inconel

HSS-Co5: Strongly alloyed high speed steel with content of wolfram, molybdenum and **cobalt**. Cobalt obstructs critical grain growth and above all, maintains an excellent degree of hardness at high operating temperatures. These characteristics are very important when cutting very high-alloy materials such as stainless steel and very hard metals, which tend to develop high temperatures in the cutting zone.

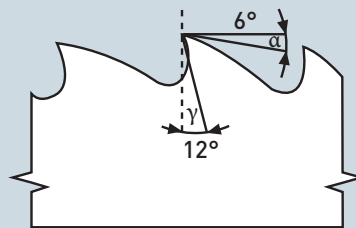
Hardness of this steel: 65 ± 1HRC.

Kx coating: Provides much longer tool life than steam treated blades (see Art. 5 1300).

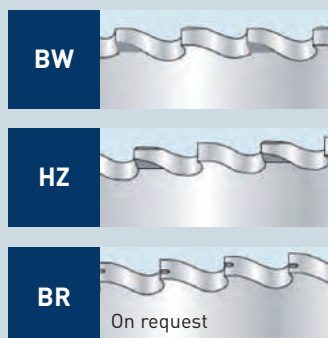
Furthermore:

- High resistance in high work temperatures. Therefore ideal also in cuts with insufficient cooling, minimal cooling, spray oil (mist).
- Due to low friction coefficient (0,50) and high surface hardness of 3500 HV suitable for higher cutting speed. Therefore ideal for automatic machines.

Cutting angles



TOOTH SHAPE



SIDE RUNOUT

| |
|------------------|
| ∅ 200-225 = 0,15 |
| ∅ 250-300 = 0,20 |
| ∅ 315-400 = 0,25 |
| ∅ 425-450 = 0,30 |
| ∅ 500 = 0,35 |

Reduced side runout on request

Film
Movie



5 1305

HSS-DMo5
(M2)-DIN
1.3343

Kx Beschichtet + Profil Geometrie
Kx coated + profile geometry



ANWENDUNG · APPLICATION

| | | | |
|-------------------|------------|---|-----------------------------|
| | | | |
| Stahl Steel | Alu Alu | Kupfer, Kupfer- legierungen Copper, copper alloys | Zinklegierung Zinc alloy |
| < 800 N | | | |

Beste Schneidgeometrie zum Sägen von Rohren und Profilen aus Stahl/Edelstahl ≤ 800 N/mm² sowie aus Aluminium, Kupfer, Messing

Preis und Lieferzeit auf Anfrage

HSS-DMo5: Hochlegierter Schnellarbeitsstahl mit Wolfram-, Vanadium- und Molybdänanteil für:

- Sehr gute mechanische Eigenschaften und hervorragende Festigkeit mit einer Härte von 64 ± 1HRC.

Kx Beschichtung: Ergibt generell weitaus höhere Standzeiten als Dampf-behandelte Blätter (siehe Art. 5 1000).

Weiterhin:

- Gute Widerstandsfähigkeit bei hohen Bearbeitungstemperaturen. Daher geeignet auch bei ungenügender Kühlung, Minimalschmierung, Sprühnebelschmierung.
- Durch geringen Reibungskoeffizient (0,45) und hoher Oberflächenhärte von 3500 HV sind höhere Schnittgeschwindigkeiten möglich. Daher Ideal für automatische Maschinen.

Best cutting geometry for cutting pipes, profiles made of steel/stainless steel ≤ 800 N/mm² and made of aluminum, copper, brass

Price and time of delivery on request

HSS-DMo5: High-speed steel which includes vanadium, wolfram and Molybdenum. This results to:

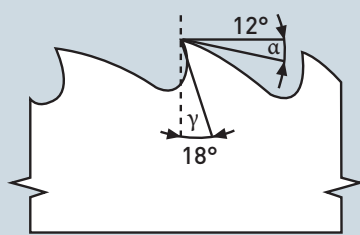
- Very good mechanical characteristics and excellent strength with a hardness of 64 ± 1HRC.

Kx coating: Provides much longer tool life than steam treated blades (see Art. 5 1000).

Furthermore:

- High resistance in high work temperatures. Therefore ideal also in cuts with insufficient cooling, minimal cooling, spray oil (mist).
- Due to low friction coefficient (0,45) and high surface hardness of 3500 HV suitable for higher cutting speed. Therefore ideal for automatic machines.

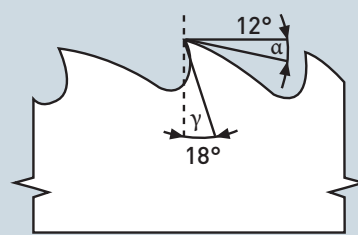
Zahnwinkel



Profil Geometrie (BR)



Cutting angles



Profile Geometry (BR)



ZAHNFORMEN



BR

Auf Anfrage

SEITENSCHLAG

| |
|------------------|
| ∅ 200-225 = 0,15 |
| ∅ 250-300 = 0,20 |
| ∅ 315-400 = 0,25 |
| ∅ 425-450 = 0,30 |
| ∅ 500 = 0,35 |

Reduzierter Seitenschlag auf Anfrage

TOOTH SHAPE



BR

On request

SIDE RUNOUT

| |
|------------------|
| ∅ 200-225 = 0,15 |
| ∅ 250-300 = 0,20 |
| ∅ 315-400 = 0,25 |
| ∅ 425-450 = 0,30 |
| ∅ 500 = 0,35 |

Reduced side runout on request

Film
Movie



Anwendung siehe Seite
Application see page

| | | | | | 1048 | 1049 | 1050 | 1051 | | | | |
|-----|-----|----|--------|-----------------------|--|--|---|---|------------------|-------|------|---|
| | | | | | 5 1000 HSS-DMo5 Dampfbehandelt Steam treated | 5 1040 HSS-DMo5 Kx-Beschichtet Kx-coated | 5 1300 HSS-Co5 Dampfbehandelt Steam treated | 5 1340 HSS-Co5 Kx-Beschichtet Kx-coated | | | | |
| | | | | | Art. | € | Art. | € | Art. | € | Art. | € |
| 200 | 1,2 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 200 010 | 57,55 | - | - | - | - | - | - |
| 200 | 1,2 | 32 | 200 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 200 020 | 62,45 | - | - | - | - | - | - |
| 200 | 1,2 | 32 | 160 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 200 030 | 62,45 | - | - | - | - | - | - |
| 200 | 1,2 | 32 | 140 BW | 2-8-45+2-9-50+2-11-63 | 🔥 5 1000 200 040 | 33,50 | - | - | - | - | - | - |
| 200 | 1,6 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 200 050 | 52,85 | - | - | - | - | - | - |
| 200 | 1,6 | 32 | 200 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 200 060 | 57,40 | - | - | - | - | - | - |
| 200 | 1,6 | 32 | 160 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 200 070 | 57,40 | - | - | - | - | - | - |
| 200 | 1,6 | 32 | 100 HZ | 2-8-45+2-9-50+2-11-63 | ● 5 1000 200 080 | 57,40 | - | - | - | - | - | - |
| 200 | 1,8 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 200 090 | 51,60 | - | - | - | - | - | - |
| 200 | 1,8 | 32 | 200 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 200 100 | 56,10 | - | - | - | - | - | - |
| 200 | 1,8 | 32 | 160 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 200 110 | 56,10 | - | - | - | - | - | - |
| 200 | 2,0 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 200 130 | 54,05 | - | - | - | - | - | - |
| 200 | 2,0 | 32 | 200 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 200 140 | 58,80 | - | - | - | - | - | - |
| 200 | 2,0 | 32 | 160 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 200 150 | 58,80 | - | - | - | - | - | - |
| 200 | 2,0 | 32 | 130 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 200 160 | 58,80 | - | - | - | - | - | - |
| 200 | 2,0 | 32 | 100 HZ | 2-8-45+2-9-50+2-11-63 | ● 5 1000 200 170 | 58,80 | - | - | - | - | - | - |
| 200 | 2,0 | 32 | 0 | - | 🔥 5 1000 200 180 | 27,30 | - | - | - | - | - | - |
| 200 | 2,0 | 32 | 200 BW | - | 🔥 5 1000 200 190 | 29,65 | - | - | - | - | - | - |
| 200 | 2,0 | 32 | 160 BW | - | - | - | - | - | - | - | - | - |
| 200 | 2,0 | 32 | 130 BW | - | 🔥 5 1000 200 210 | 29,65 | - | - | - | - | - | - |
| 200 | 2,0 | 32 | 100 HZ | - | 🔥 5 1000 200 220 | 31,50 | - | - | - | - | - | - |
| 210 | 2,0 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | - | - | - | 🔥 5 1300 210 010 | 34,65 | - | - | - |
| 210 | 2,0 | 32 | 210 BW | 2-8-45+2-9-50+2-11-63 | 🔥 5 1000 210 020 | 40,40 | - | - | - | - | - | - |
| 210 | 2,0 | 32 | 160 BW | 2-8-45+2-9-50+2-11-63 | - | - | - | 🔥 5 1300 210 025 | 37,25 | - | - | - |
| 210 | 2,0 | 32 | 120 HZ | 2-8-45+2-9-50+2-11-63 | - | - | 🔥 5 1040 210 027 | 41,55 | - | - | - | - |
| 210 | 2,0 | 40 | 0 | 2-8-55 + 4-11-63 | 🔥 5 1000 210 030 | 37,15 | - | - | 🔥 5 1300 210 030 | 34,65 | - | - |
| 210 | 2,0 | 40 | 160 BW | 2-8-55 + 4-11-63 | 🔥 5 1000 210 040 | 40,40 | 🔥 5 1040 210 040 | 41,55 | - | - | - | - |
| 225 | 1,2 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 225 010 | 78,35 | - | - | - | - | - | - |
| 225 | 1,2 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 225 020 | 87,50 | - | - | - | - | - | - |
| 225 | 1,2 | 32 | 180 BW | 2-8-45+2-9-50+2-11-63 | 🔥 5 1000 225 030 | 40,95 | - | - | - | - | - | - |
| 225 | 1,2 | 32 | 160 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 225 040 | 87,50 | - | - | - | - | - | - |
| 225 | 1,6 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 225 050 | 64,65 | - | - | - | - | - | - |
| 225 | 1,6 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 225 060 | 70,40 | - | - | - | - | - | - |
| 225 | 1,6 | 32 | 180 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 225 070 | 70,40 | - | - | - | - | - | - |
| 225 | 1,6 | 32 | 160 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 225 080 | 70,40 | - | - | - | - | - | - |
| 225 | 1,6 | 32 | 120 HZ | 2-8-45+2-9-50+2-11-63 | ● 5 1000 225 090 | 70,40 | - | - | - | - | - | - |
| 225 | 1,6 | 40 | 0 | 2-8-55 + 4-11-63 | 🔥 5 1000 225 100 | 32,85 | - | - | 🔥 5 1300 225 100 | 33,80 | - | - |
| 225 | 1,6 | 40 | 180 BW | 2-8-55 + 4-11-63 | 🔥 5 1000 225 110 | 35,70 | - | - | - | - | - | - |
| 225 | 1,6 | 40 | 120 HZ | 2-8-55 + 4-11-63 | 🔥 5 1000 225 120 | 35,70 | - | - | - | - | - | - |
| 225 | 2,0 | 32 | 0 | 2 NL REMS/Roller | 🔥 5 1000 225 130 | 33,35 | - | - | - | - | - | - |
| 225 | 2,0 | 32 | 220 BW | 2 NL REMS/Roller | 🔥 5 1000 225 140 | 35,90 | 🔥 5 1040 225 140 | 47,55 | 🔥 5 1300 225 140 | 44,60 | - | - |
| 225 | 2,0 | 32 | 180 BW | 2 NL REMS/Roller | 🔥 5 1000 225 150 | 35,90 | 🔥 5 1040 225 150 | 48,30 | 🔥 5 1300 225 150 | 44,60 | - | - |
| 225 | 2,0 | 32 | 120 HZ | 2 NL REMS/Roller | 🔥 5 1000 225 160 | 51,20 | 🔥 5 1040 225 160 | 45,55 | - | - | - | - |
| 225 | 2,0 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 225 170 | 56,50 | - | - | ● 5 1300 225 170 | 73,90 | - | - |
| 225 | 2,0 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 225 180 | 61,45 | ● 5 1040 225 180 | 88,90 | ● 5 1300 225 180 | 80,35 | - | - |
| 225 | 2,0 | 32 | 180 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 225 190 | 61,45 | ● 5 1040 225 190 | 88,90 | ● 5 1300 225 190 | 80,35 | - | - |
| 225 | 2,0 | 32 | 160 HZ | 2-8-45+2-9-50+2-11-63 | ● 5 1000 225 200 | 61,45 | ● 5 1040 225 200 | 88,90 | ● 5 1300 225 200 | 80,35 | - | - |
| 225 | 2,0 | 32 | 120 HZ | 2-8-45+2-9-50+2-11-63 | ● 5 1000 225 210 | 61,45 | ● 5 1040 225 210 | 88,90 | ● 5 1300 225 210 | 80,35 | - | - |
| 225 | 2,0 | 32 | 90 BW | 2-8-45+2-9-50+2-11-63 | 🔥 5 1000 225 220 | 31,00 | - | - | - | - | - | - |
| 225 | 2,0 | 32 | 0 | 4-9-50 + 4-11-63 | 🔥 5 1000 225 230 | 28,50 | - | - | - | - | - | - |
| 225 | 2,0 | 32 | 220 BW | 4-9-50 + 4-11-63 | - | - | - | - | - | - | - | - |
| 225 | 2,0 | 32 | 160 BW | 4-9-50 + 4-11-63 | 🔥 5 1000 225 250 | 31,00 | - | - | - | - | - | - |
| 225 | 2,0 | 32 | 120 BW | 4-9-50 + 4-11-63 | 🔥 5 1000 225 260 | 31,00 | - | - | - | - | - | - |
| 225 | 2,0 | 32 | 90 HZ | 4-9-50 + 4-11-63 | 🔥 5 1000 225 270 | 31,00 | - | - | - | - | - | - |
| 225 | 2,0 | 40 | 0 | 2-8-55 + 4-11-63 | 🔥 5 1000 225 280 | 28,50 | - | - | 🔥 5 1300 225 280 | 37,65 | - | - |
| 225 | 2,0 | 40 | 220 BW | 2-8-55 + 4-11-63 | 🔥 5 1000 225 290 | 31,00 | 🔥 5 1040 225 290 | 45,55 | - | - | - | - |

🔥 Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

Weitere Abmessungen auf Anfrage / Other dimensions are available on request



Anwendung siehe Seite
Application see page

1048



1049



1050



1051



| | | | | | 5 1000 HSS-DMo5 Dampfbehandelt Steam treated | | 5 1040 HSS-DMo5 Kx-Beschichtet Kx-coated | | 5 1300 HSS-Co5 Dampfbehandelt Steam treated | | 5 1340 HSS-Co5 Kx-Beschichtet Kx-coated | | |
|--|-----|-----|----|--------|--|------------------|--|------------------|---|------------------|---|------------------|--------|
| | | | | | Art. | € | Art. | € | Art. | € | Art. | € | |
| | 225 | 2,0 | 40 | 180 BW | 2-8-55 + 4-11-63 | % 5 1000 225 300 | 31,00 | % 5 1040 225 300 | 45,55 | - | - | - | |
| | 225 | 2,0 | 40 | 160 BW | 2-8-55 + 4-11-63 | % 5 1000 225 310 | 31,00 | % 5 1040 225 310 | 45,55 | % 5 1300 225 310 | 40,90 | - | |
| | 225 | 2,0 | 40 | 120 HZ | 2-8-55 + 4-11-63 | - | - | % 5 1040 225 320 | 45,55 | % 5 1300 225 320 | 40,90 | - | |
| | 225 | 2,0 | 40 | 90 HZ | 2-8-55 + 4-11-63 | % 5 1000 225 330 | 31,00 | % 5 1040 225 330 | 45,55 | - | - | - | |
| | 225 | 2,5 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | % 5 1000 225 340 | 46,30 | - | - | - | - | - | |
| | 225 | 2,5 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | - | - | - | - | - | - | - | |
| | 225 | 2,5 | 32 | 160 BW | 2-8-45+2-9-50+2-11-63 | % 5 1000 225 360 | 50,35 | - | - | - | - | - | |
| | 225 | 2,5 | 32 | 120 HZ | 2-8-45+2-9-50+2-11-63 | % 5 1000 225 370 | 50,35 | - | - | - | - | - | |
| | 225 | 2,5 | 32 | 90 HZ | 2-8-45+2-9-50+2-11-63 | % 5 1000 225 380 | 50,35 | - | - | - | - | - | |
| | 225 | 2,5 | 40 | 0 | 2-8-55 + 4-11-63 | % 5 1000 225 390 | 46,30 | - | - | - | - | - | |
| | 225 | 2,5 | 40 | 220 BW | 2-8-55 + 4-11-63 | % 5 1000 225 400 | 50,35 | - | - | - | - | - | |
| | 225 | 2,5 | 40 | 120 HZ | 2-8-55 + 4-11-63 | % 5 1000 225 410 | 50,35 | - | - | - | - | - | |
| | 250 | 1,2 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 010 | 71,65 | - | - | ● 5 1300 250 010 | 89,25 | - | |
| | 250 | 1,2 | 32 | 240 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 020 | 77,50 | - | - | - | - | - | |
| | 250 | 1,2 | 32 | 200 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 030 | 77,50 | - | - | - | - | - | |
| | 250 | 1,2 | 32 | 180 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 040 | 77,50 | - | - | - | - | - | |
| | 250 | 1,2 | 32 | 160 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 050 | 77,50 | - | - | - | - | - | |
| | 250 | 1,6 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 060 | 62,95 | - | - | ● 5 1300 250 060 | 82,65 | - | |
| | 250 | 1,6 | 32 | 240 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 070 | 68,25 | - | - | - | - | - | |
| | 250 | 1,6 | 32 | 200 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 080 | 68,25 | - | - | - | - | - | |
| | 250 | 1,6 | 32 | 180 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 090 | 68,25 | - | - | - | - | - | |
| | 250 | 1,6 | 32 | 160 BW | 2-8-45+2-9-50+2-11-63 | % 5 1000 250 100 | 37,10 | - | - | - | - | - | |
| | 250 | 1,6 | 32 | 128 HZ | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 110 | 68,25 | - | - | - | - | - | |
| | 250 | 1,6 | 40 | 0 | 2-8-55 + 4-12-64 | % 5 1000 250 120 | 30,95 | - | - | - | - | - | |
| | 250 | 2,0 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 150 | 60,25 | - | - | ● 5 1300 250 150 | 82,35 | - | |
| | 250 | 2,0 | 32 | 240 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 160 | 65,50 | ● 5 1040 250 160 | 99,40 | ● 5 1300 250 160 | 89,50 | ● 5 1340 250 160 | 116,50 |
| | 250 | 2,0 | 32 | 200 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 170 | 65,50 | ● 5 1040 250 170 | 99,40 | ● 5 1300 250 170 | 89,50 | ● 5 1340 250 170 | 116,50 |
| | 250 | 2,0 | 32 | 180 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 180 | 65,50 | ● 5 1040 250 180 | 99,40 | ● 5 1300 250 180 | 89,50 | ● 5 1340 250 180 | 116,50 |
| | 250 | 2,0 | 32 | 160 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 190 | 65,50 | ● 5 1040 250 190 | 99,40 | ● 5 1300 250 190 | 89,50 | - | |
| | 250 | 2,0 | 32 | 140 BW | 2-8-45+2-9-50+2-11-63 | % 5 1000 250 200 | 35,10 | - | - | - | - | - | |
| | 250 | 2,0 | 32 | 128 HZ | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 210 | 65,50 | ● 5 1040 250 210 | 99,40 | ● 5 1300 250 210 | 89,85 | - | |
| | 250 | 2,0 | 32 | 100 HZ | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 220 | 65,50 | % 5 1040 250 220 | 53,85 | ● 5 1300 250 220 | 89,85 | - | |
| | 250 | 2,0 | 32 | 0 | 4-9-50 + 4-11-63 | % 5 1000 250 230 | 30,40 | - | - | % 5 1300 250 230 | 41,95 | - | |
| | 250 | 2,0 | 32 | 200 BW | 4-9-50 + 4-11-63 | - | - | - | - | - | - | - | |
| | 250 | 2,0 | 32 | 100 HZ | 4-9-50 + 4-11-63 | % 5 1000 250 270 | 33,05 | - | - | - | - | - | |
| | 250 | 2,0 | 40 | 0 | 2-8-55 + 4-12-64 | ● 5 1000 250 280 | 60,25 | - | - | ● 5 1300 250 280 | 82,35 | - | |
| | 250 | 2,0 | 40 | 240 BW | 2-8-55 + 4-12-64 | ● 5 1000 250 290 | 65,50 | ● 5 1040 250 290 | 99,40 | ● 5 1300 250 290 | 89,50 | ● 5 1340 250 290 | 116,50 |
| | 250 | 2,0 | 40 | 200 BW | 2-8-55 + 4-12-64 | ● 5 1000 250 300 | 65,50 | ● 5 1040 250 300 | 99,40 | ● 5 1300 250 300 | 89,50 | ● 5 1340 250 300 | 116,50 |
| | 250 | 2,0 | 40 | 180 BW | 2-8-55 + 4-12-64 | % 5 1000 250 310 | 35,10 | ● 5 1040 250 310 | 99,40 | ● 5 1300 250 310 | 89,50 | ● 5 1340 250 310 | 116,50 |
| | 250 | 2,0 | 40 | 160 BW | 2-8-55 + 4-12-64 | ● 5 1000 250 320 | 65,50 | ● 5 1040 250 320 | 99,40 | ● 5 1300 250 320 | 89,50 | - | |
| | 250 | 2,0 | 40 | 128 HZ | 2-8-55 + 4-12-64 | ● 5 1000 250 330 | 65,50 | ● 5 1040 250 330 | 99,40 | ● 5 1300 250 330 | 89,50 | - | |
| | 250 | 2,0 | 40 | 100 HZ | 2-8-55 + 4-12-64 | ● 5 1000 250 340 | 65,50 | ● 5 1040 250 340 | 99,40 | ● 5 1300 250 340 | 89,50 | - | |
| | 250 | 2,5 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 350 | 74,15 | - | - | ● 5 1300 250 350 | 97,35 | - | |
| | 250 | 2,5 | 32 | 240 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 360 | 80,60 | % 5 1040 250 360 | 61,75 | % 5 1300 250 360 | 56,80 | ● 5 1340 250 360 | 130,60 |
| | 250 | 2,5 | 32 | 200 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 370 | 80,60 | % 5 1040 250 370 | 61,75 | ● 5 1300 250 370 | 105,80 | ● 5 1340 250 370 | 130,60 |
| | 250 | 2,5 | 32 | 160 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 380 | 80,60 | ● 5 1040 250 380 | 111,40 | ● 5 1300 250 380 | 105,80 | ● 5 1340 250 380 | 130,60 |
| | 250 | 2,5 | 32 | 128 HZ | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 390 | 80,60 | ● 5 1040 250 390 | 111,40 | ● 5 1300 250 390 | 105,80 | - | |
| | 250 | 2,5 | 32 | 100 HZ | 2-8-45+2-9-50+2-11-63 | ● 5 1000 250 400 | 80,60 | % 5 1040 250 400 | 61,75 | ● 5 1300 250 400 | 105,80 | - | |
| | 250 | 2,5 | 32 | 0 | 4-9-50 + 4-11-63 | % 5 1000 250 410 | 37,40 | - | - | - | - | - | |
| | 250 | 2,5 | 32 | 128 HZ | 4-9-50 + 4-11-63 | % 5 1000 250 420 | 40,65 | - | - | % 5 1300 250 420 | 53,85 | - | |
| | 250 | 2,5 | 32 | 100 HZ | 4-9-50 + 4-11-63 | % 5 1000 250 430 | 40,65 | - | - | - | - | - | |
| | 250 | 2,5 | 40 | 0 | 2-8-55 + 4-12-64 | ● 5 1000 250 440 | 75,05 | - | - | ● 5 1300 250 440 | 97,35 | - | |
| | 250 | 2,5 | 40 | 240 BW | 2-8-55 + 4-12-64 | ● 5 1000 250 450 | 80,60 | % 5 1040 250 450 | 61,75 | % 5 1300 250 450 | 56,80 | - | |
| | 250 | 2,5 | 40 | 200 BW | 2-8-55 + 4-12-64 | ● 5 1000 250 460 | 80,60 | % 5 1040 250 460 | 61,75 | ● 5 1300 250 460 | 105,80 | - | |
| | 250 | 2,5 | 40 | 160 BW | 2-8-55 + 4-12-64 | ● 5 1000 250 470 | 80,60 | % 5 1040 250 470 | 61,75 | ● 5 1300 250 470 | 105,80 | - | |
| | 250 | 2,5 | 40 | 128 HZ | 2-8-55 + 4-12-64 | ● 5 1000 250 480 | 80,60 | % 5 1040 250 480 | 61,75 | ● 5 1300 250 480 | 105,80 | - | |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

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1054

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Index

Anwendung siehe Seite
Application see page

| | | | | | 1048 | 1049 | 1050 | 1051 | | | | |
|-----|-----|----|--------|-----------------------|--|--|---|---|-------------------------|--------------|-------------------------|--------------|
| | | | | | 5 1000 HSS-DMo5 Dampfbehandelt Steam treated | 5 1040 HSS-DMo5 Kx-Beschichtet Kx-coated | 5 1300 HSS-Co5 Dampfbehandelt Steam treated | 5 1340 HSS-Co5 Kx-Beschichtet Kx-coated | | | | |
| | | | | | Art. | € | Art. | € | Art. | € | Art. | € |
| | | | | | % 5 1000 250 490 | 43,30 | % 5 1040 250 490 | 61,75 | % 5 1300 250 490 | 56,80 | - | - |
| 250 | 2,5 | 40 | 100 HZ | 2-8-55 + 4-12-64 | • 5 1000 275 010 | 70,75 | - | - | • 5 1300 275 010 | 93,55 | - | - |
| 275 | 1,6 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | % 5 1000 275 020 | 41,30 | - | - | - | - | - | - |
| 275 | 1,6 | 32 | 280 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 030 | 76,90 | - | - | - | - | - | - |
| 275 | 1,6 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 040 | 76,90 | - | - | - | - | - | - |
| 275 | 1,6 | 32 | 180 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 050 | 73,25 | - | - | • 5 1300 275 050 | 98,20 | - | - |
| 275 | 2,0 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 060 | 79,60 | • 5 1040 275 060 | 117,35 | • 5 1300 275 060 | 106,80 | • 5 1340 275 060 | 141,50 |
| 275 | 2,0 | 32 | 280 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 070 | 79,60 | • 5 1040 275 070 | 117,35 | • 5 1300 275 070 | 106,80 | • 5 1340 275 070 | 141,50 |
| 275 | 2,0 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 080 | 79,60 | • 5 1040 275 080 | 117,35 | • 5 1300 275 080 | 106,80 | • 5 1340 275 080 | 141,50 |
| 275 | 2,0 | 32 | 200 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 090 | 79,60 | • 5 1040 275 090 | 117,35 | % 5 1300 275 090 | 57,40 | - | - |
| 275 | 2,0 | 32 | 180 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 100 | 79,60 | % 5 1040 275 100 | 65,15 | % 5 1300 275 100 | 57,40 | - | - |
| 275 | 2,0 | 32 | 160 HZ | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 110 | 79,60 | % 5 1040 275 110 | 65,15 | • 5 1300 275 110 | 106,80 | - | - |
| 275 | 2,0 | 32 | 110 HZ | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 120 | 79,60 | % 5 1040 275 120 | 65,15 | • 5 1300 275 120 | 106,80 | - | - |
| 275 | 2,0 | 32 | 0 | 4-9-50 + 4-11-63 | % 5 1000 275 130 | 36,95 | - | - | - | - | - | - |
| 275 | 2,0 | 32 | 220 BW | 4-9-50 + 4-11-63 | - | - | - | - | - | - | - | - |
| 275 | 2,0 | 32 | 160 BW | 4-9-50 + 4-11-63 | • 5 1000 275 160 | 79,60 | - | - | - | - | - | - |
| 275 | 2,0 | 32 | 140 HZ | 4-9-50 + 4-11-63 | - | - | - | - | - | - | - | - |
| 275 | 2,0 | 32 | 110 HZ | 4-9-50 + 4-11-63 | - | - | - | - | - | - | - | - |
| 275 | 1,6 | 40 | 0 | 2-8-55 + 4-12-64 | • 5 1000 275 190 | 70,75 | - | - | • 5 1300 275 190 | 93,55 | - | - |
| 275 | 1,6 | 40 | 280 BW | 2-8-55 + 4-12-64 | • 5 1000 275 200 | 76,90 | - | - | - | - | - | - |
| 275 | 1,6 | 40 | 220 BW | 2-8-55 + 4-12-64 | % 5 1000 275 210 | 41,30 | - | - | - | - | - | - |
| 275 | 1,6 | 40 | 180 BW | 2-8-55 + 4-12-64 | • 5 1000 275 220 | 76,90 | - | - | - | - | - | - |
| 275 | 2,0 | 40 | 0 | 2-8-55 + 4-12-64 | • 5 1000 275 230 | 73,25 | - | - | • 5 1300 275 230 | 98,20 | - | - |
| 275 | 2,0 | 40 | 280 BW | 2-8-55 + 4-12-64 | • 5 1000 275 240 | 79,60 | % 5 1040 275 240 | 65,15 | • 5 1300 275 240 | 106,80 | • 5 1340 275 240 | 141,50 |
| 275 | 2,0 | 40 | 220 BW | 2-8-55 + 4-12-64 | • 5 1000 275 250 | 79,60 | • 5 1040 275 250 | 117,35 | • 5 1300 275 250 | 106,80 | - | - |
| 275 | 2,0 | 40 | 200 BW | 2-8-55 + 4-12-64 | % 5 1000 275 260 | 42,70 | % 5 1040 275 260 | 65,15 | • 5 1300 275 260 | 106,80 | % 5 1340 275 260 | 75,65 |
| 275 | 2,0 | 40 | 180 BW | 2-8-55 + 4-12-64 | % 5 1000 275 270 | 42,70 | % 5 1040 275 270 | 65,15 | % 5 1300 275 270 | 57,40 | - | - |
| 275 | 2,0 | 40 | 160 BW | 2-8-55 + 4-12-64 | • 5 1000 275 280 | 79,60 | % 5 1040 275 280 | 65,15 | % 5 1300 275 280 | 57,40 | - | - |
| 275 | 2,0 | 40 | 140 HZ | 2-8-55 + 4-12-64 | • 5 1000 275 290 | 79,60 | • 5 1040 275 290 | 117,35 | % 5 1300 275 290 | 57,40 | - | - |
| 275 | 2,5 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 300 | 78,80 | - | - | • 5 1300 275 300 | 99,80 | - | - |
| 275 | 2,5 | 32 | 280 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 310 | 85,65 | % 5 1040 275 310 | 66,40 | • 5 1300 275 310 | 108,50 | • 5 1340 275 310 | 147,75 |
| 275 | 2,5 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 320 | 85,65 | • 5 1040 275 320 | 119,45 | • 5 1300 275 320 | 108,50 | • 5 1340 275 320 | 147,75 |
| 275 | 2,5 | 32 | 180 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 330 | 85,65 | • 5 1040 275 330 | 119,45 | • 5 1300 275 330 | 108,50 | • 5 1340 275 330 | 147,75 |
| 275 | 2,5 | 32 | 160 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 340 | 85,65 | % 5 1040 275 340 | 66,40 | • 5 1300 275 340 | 108,50 | - | - |
| 275 | 2,5 | 32 | 140 HZ | 2-8-45+2-9-50+2-11-63 | • 5 1000 275 350 | 85,65 | • 5 1040 275 350 | 119,45 | • 5 1300 275 350 | 108,50 | - | - |
| 275 | 2,5 | 32 | 120 HZ | 2-8-45+2-9-50+2-11-63 | - | - | - | - | - | - | - | - |
| 275 | 2,5 | 32 | 110 HZ | 2-8-45+2-9-50+2-11-63 | - | - | - | - | - | - | - | - |
| 275 | 2,5 | 32 | 90 HZ | 2-8-45+2-9-50+2-11-63 | - | - | - | - | - | - | - | - |
| 275 | 2,5 | 32 | 0 | 4-9-50 + 4-11-63 | % 5 1000 275 380 | 39,75 | - | - | - | - | - | - |
| 275 | 2,5 | 32 | 280 BW | 4-9-50 + 4-11-63 | - | - | - | - | - | - | - | - |
| 275 | 2,5 | 32 | 220 BW | 4-9-50 + 4-11-63 | - | - | - | - | - | - | - | - |
| 275 | 2,5 | 32 | 160 BW | 4-9-50 + 4-11-63 | % 5 1000 275 420 | 43,20 | - | - | - | - | - | - |
| 275 | 2,5 | 32 | 140 HZ | 4-9-50 + 4-11-63 | % 5 1000 275 430 | 43,20 | - | - | - | - | - | - |
| 275 | 2,5 | 32 | 120 HZ | 4-9-50 + 4-11-63 | % 5 1000 275 440 | 43,20 | - | - | - | - | - | - |
| 275 | 2,5 | 32 | 110 HZ | 4-9-50 + 4-11-63 | % 5 1000 275 450 | 43,20 | - | - | - | - | - | - |
| 275 | 2,5 | 32 | 90 HZ | 4-9-50 + 4-11-63 | % 5 1000 275 460 | 43,20 | - | - | - | - | - | - |
| 275 | 2,5 | 40 | 0 | 2-8-55 + 4-12-64 | • 5 1000 275 470 | 78,80 | - | - | • 5 1300 275 470 | 99,80 | - | - |
| 275 | 2,5 | 40 | 280 BW | 2-8-55 + 4-12-64 | • 5 1000 275 480 | 85,65 | • 5 1040 275 480 | 119,45 | • 5 1300 275 480 | 108,50 | • 5 1340 275 480 | 147,75 |
| 275 | 2,5 | 40 | 220 BW | 2-8-55 + 4-12-64 | • 5 1000 275 490 | 85,65 | • 5 1040 275 490 | 119,45 | • 5 1300 275 490 | 108,50 | • 5 1340 275 490 | 147,75 |
| 275 | 2,5 | 40 | 180 BW | 2-8-55 + 4-12-64 | • 5 1000 275 500 | 85,65 | • 5 1040 275 500 | 119,45 | • 5 1300 275 500 | 108,50 | • 5 1340 275 500 | 147,75 |
| 275 | 2,5 | 40 | 160 BW | 2-8-55 + 4-12-64 | • 5 1000 275 510 | 85,65 | • 5 1040 275 510 | 119,45 | • 5 1300 275 510 | 108,50 | - | - |
| 275 | 2,5 | 40 | 140 HZ | 2-8-55 + 4-12-64 | • 5 1000 275 520 | 85,65 | • 5 1040 275 520 | 119,45 | • 5 1300 275 520 | 108,50 | - | - |
| 275 | 2,5 | 40 | 120 HZ | 2-8-55 + 4-12-64 | • 5 1000 275 530 | 85,65 | - | - | - | - | - | - |
| 275 | 2,5 | 40 | 110 HZ | 2-8-55 + 4-12-64 | • 5 1000 275 540 | 85,65 | - | - | % 5 1300 275 540 | 55,25 | - | - |
| 275 | 2,5 | 40 | 90 HZ | 2-8-55 + 4-12-64 | • 5 1000 275 550 | 85,65 | - | - | - | - | - | - |
| 275 | 3,0 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | % 5 1000 275 560 | 52,20 | - | - | - | - | - | - |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

Weitere Abmessungen auf Anfrage · Other dimensions are available on request



Index

Karnasch® METALLKREISSÄGEBLÄTTER METAL CIRCULAR SAW BLADES

Anwendung siehe Seite
Application see page

1048



1049



1050



1051



| | | | | | 5 1000 HSS-DMo5 Dampfbehandelt Steam treated | | 5 1040 HSS-DMo5 Kx-Beschichtet Kx-coated | | 5 1300 HSS-Co5 Dampfbehandelt Steam treated | | 5 1340 HSS-Co5 Kx-Beschichtet Kx-coated | | |
|--|-----|-----|----|--------|--|------------------|--|------------------|---|------------------|---|------------------|--------|
| | | | | | Art. | € | Art. | € | Art. | € | Art. | € | |
| | 275 | 3,0 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | % 5 1000 275 570 | 56,75 | - | - | - | - | - | |
| | 275 | 3,0 | 32 | 140 HZ | 2-8-45+2-9-50+2-11-63 | % 5 1000 275 580 | 56,75 | - | - | - | - | - | |
| | 275 | 3,0 | 32 | 110 HZ | 2-8-45+2-9-50+2-11-63 | - | - | - | - | - | - | - | |
| | 275 | 3,0 | 32 | 0 | 4-9-50 + 4-11-63 | % 5 1000 275 600 | 52,20 | - | - | - | - | - | |
| | 275 | 3,0 | 40 | 0 | 2-8-55 + 4-12-64 | % 5 1000 275 610 | 52,20 | - | - | - | - | - | |
| | 275 | 3,0 | 40 | 220 BW | 2-8-55 + 4-12-64 | % 5 1000 275 620 | 56,75 | - | - | - | - | - | |
| | 300 | 1,6 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 300 010 | 99,80 | - | - | ● 5 1300 300 010 | 132,50 | - | |
| | 300 | 1,6 | 32 | 300 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 300 020 | 108,45 | - | - | - | - | - | |
| | 300 | 1,6 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 300 030 | 108,45 | - | - | - | - | - | |
| | 300 | 1,6 | 32 | 180 BW | 2-8-45+2-9-50+2-11-63 | % 5 1000 300 040 | 58,25 | - | - | - | - | - | |
| | 300 | 2,0 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 300 050 | 95,15 | - | - | ● 5 1300 300 050 | 126,30 | - | |
| | 300 | 2,0 | 32 | 300 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 300 060 | 103,20 | - | - | - | - | - | |
| | 300 | 2,0 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 300 070 | 103,20 | - | - | - | - | - | |
| | 300 | 2,0 | 32 | 180 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 300 080 | 103,20 | - | - | - | - | - | |
| | 300 | 2,5 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 300 090 | 96,35 | - | - | ● 5 1300 300 090 | 127,85 | - | |
| | 300 | 2,5 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 300 100 | 104,75 | ● 5 1040 300 100 | 147,85 | ● 5 1300 300 100 | 138,95 | ● 5 1340 300 100 | 175,20 |
| | 300 | 2,5 | 32 | 200 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 300 110 | 104,75 | % 5 1040 300 110 | 82,55 | ● 5 1300 300 110 | 138,95 | ● 5 1340 300 110 | 175,20 |
| | 300 | 2,5 | 32 | 180 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 300 120 | 104,75 | ● 5 1040 300 120 | 147,85 | ● 5 1300 300 120 | 138,95 | % 5 1340 300 120 | 93,65 |
| | 300 | 2,5 | 32 | 160 HZ | 2-8-45+2-9-50+2-11-63 | ● 5 1000 300 130 | 104,75 | % 5 1040 300 130 | 82,55 | ● 5 1300 300 130 | 138,95 | ● 5 1340 300 130 | 175,20 |
| | 300 | 2,5 | 32 | 120 HZ | 2-8-45+2-9-50+2-11-63 | ● 5 1000 300 140 | 104,75 | ● 5 1040 300 140 | 147,85 | ● 5 1300 300 140 | 138,95 | - | - |
| | 300 | 2,5 | 32 | 100 HZ | 2-8-45+2-9-50+2-11-63 | ● 5 1000 300 150 | 104,75 | - | - | - | - | - | |
| | 300 | 2,5 | 32 | 0 | - | % 5 1000 300 160 | 48,60 | - | - | - | - | - | |
| | 300 | 2,5 | 32 | 220 BW | - | % 5 1000 300 170 | 52,85 | - | - | - | - | - | |
| | 300 | 2,5 | 32 | 200 BW | - | % 5 1000 300 180 | 52,85 | - | - | - | - | - | |
| | 300 | 2,5 | 32 | 160 HZ | - | % 5 1000 300 190 | 52,85 | - | - | - | - | - | |
| | 300 | 2,5 | 32 | 120 HZ | - | % 5 1000 300 200 | 52,85 | - | - | - | - | - | |
| | 300 | 2,5 | 40 | 0 | 2-8-55 + 4-12-64 | ● 5 1000 300 210 | 96,35 | - | - | ● 5 1300 300 210 | 127,85 | - | |
| | 300 | 2,5 | 40 | 220 BW | 2-8-55 + 4-12-64 | ● 5 1000 300 220 | 104,75 | ● 5 1040 300 220 | 147,85 | ● 5 1300 300 220 | 138,95 | ● 5 1340 300 220 | 175,20 |
| | 300 | 2,5 | 40 | 200 BW | 2-8-55 + 4-12-64 | ● 5 1000 300 230 | 104,75 | % 5 1040 300 230 | 82,55 | ● 5 1300 300 230 | 138,95 | % 5 1340 300 230 | 93,65 |
| | 300 | 2,5 | 40 | 180 BW | 2-8-55 + 4-12-64 | ● 5 1000 300 240 | 104,75 | % 5 1040 300 240 | 82,55 | ● 5 1300 300 240 | 138,95 | % 5 1340 300 240 | 93,65 |
| | 300 | 2,5 | 40 | 160 HZ | 2-8-55 + 4-12-64 | ● 5 1000 300 250 | 104,75 | ● 5 1040 300 250 | 147,85 | ● 5 1300 300 250 | 138,95 | ● 5 1340 300 250 | 175,20 |
| | 300 | 2,5 | 40 | 120 HZ | 2-8-55 + 4-12-64 | ● 5 1000 300 260 | 104,75 | ● 5 1040 300 260 | 147,85 | ● 5 1300 300 260 | 138,95 | - | - |
| | 300 | 2,5 | 40 | 100 HZ | 2-8-55 + 4-12-64 | ● 5 1000 300 270 | 104,75 | - | - | - | - | - | |
| | 300 | 3,0 | 32 | 160 HZ | 2-8-45+2-9-50+2-11-63 | - | - | - | - | - | - | - | |
| | 300 | 3,0 | 32 | 120 HZ | 2-8-45+2-9-50+2-11-63 | % 5 1000 300 290 | 61,30 | - | - | - | - | - | |
| | 300 | 3,0 | 32 | 0 | - | % 5 1000 300 300 | 56,40 | - | - | - | - | - | |
| | 300 | 3,0 | 40 | 0 | 2-8-55 + 4-12-64 | % 5 1000 300 310 | 56,40 | - | - | - | - | - | |
| | 300 | 3,0 | 40 | 160 HZ | 2-8-55 + 4-12-64 | - | - | - | - | - | - | - | |
| | 300 | 3,0 | 40 | 120 HZ | 2-8-55 + 4-12-64 | - | - | - | - | - | - | - | |
| | 315 | 1,6 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 315 010 | 114,30 | - | - | ● 5 1300 315 010 | 138,35 | - | |
| | 315 | 1,6 | 32 | 300 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 315 020 | 123,85 | - | - | - | - | - | |
| | 315 | 1,6 | 32 | 240 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 315 030 | 123,85 | - | - | - | - | - | |
| | 315 | 1,6 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | % 5 1000 315 040 | 66,40 | - | - | - | - | - | |
| | 315 | 1,6 | 32 | 200 BW | 2-8-45+2-9-50+2-11-63 | % 5 1000 315 050 | 66,40 | - | - | - | - | - | |
| | 315 | 1,6 | 40 | 0 | 2-8-55 + 4-12-64 | ● 5 1000 315 060 | 114,30 | - | - | ● 5 1300 315 060 | 138,35 | - | |
| | 315 | 1,6 | 40 | 300 BW | 2-8-55 + 4-12-64 | ● 5 1000 315 070 | 123,85 | - | - | - | - | - | |
| | 315 | 1,6 | 40 | 240 BW | 2-8-55 + 4-12-64 | % 5 1000 315 080 | 66,40 | - | - | - | - | - | |
| | 315 | 1,6 | 40 | 220 BW | 2-8-55 + 4-12-64 | % 5 1000 315 090 | 66,40 | - | - | - | - | - | |
| | 315 | 1,6 | 40 | 200 BW | 2-8-55 + 4-12-64 | ● 5 1000 315 100 | 123,85 | - | - | - | - | - | |
| | 315 | 2,0 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 315 110 | 102,55 | - | - | ● 5 1300 315 110 | 132,70 | - | |
| | 315 | 2,0 | 32 | 300 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 315 120 | 111,45 | - | - | - | - | - | |
| | 315 | 2,0 | 32 | 240 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 315 130 | 111,45 | - | - | - | - | - | |
| | 315 | 2,0 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 315 140 | 111,45 | - | - | - | - | - | |
| | 315 | 2,0 | 32 | 200 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 315 150 | 111,45 | - | - | - | - | - | |
| | 315 | 2,0 | 32 | 180 BW | 2-8-45+2-9-50+2-11-63 | ● 5 1000 315 160 | 111,45 | - | - | - | - | - | |
| | 315 | 2,0 | 40 | 0 | 2-8-55 + 4-12-64 | ● 5 1000 315 170 | 102,55 | - | - | ● 5 1300 315 170 | 132,70 | - | |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

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1056

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Index

METALLKREISSÄGEBLÄTTER
METAL CIRCULAR SAW BLADES

Anwendung siehe Seite
Application see page

| | | | | | 1048 | 1049 | 1050 | 1051 | | | | |
|-----|-----|----|-----------|-----------------------|--|--|---|---|------------------|--------|------------------|--------|
| | | | | | 5 1000 HSS-DMo5 Dampfbehandelt Steam treated | 5 1040 HSS-DMo5 Kx-Beschichtet Kx-coated | 5 1300 HSS-Co5 Dampfbehandelt Steam treated | 5 1340 HSS-Co5 Kx-Beschichtet Kx-coated | | | | |
| | | | | | Art. | € | Art. | € | Art. | € | Art. | € |
| | | | | | | | | | | | | |
| | | | BW | | | | | | | | | |
| | | | HZ | | | | | | | | | |
| | | | | | | | | | | | | |
| 315 | 2,0 | 40 | 300 BW | 2-8-55 + 4-12-64 | % 5 1000 315 180 | 59,75 | - | - | - | - | - | - |
| 315 | 2,0 | 40 | 240 BW | 2-8-55 + 4-12-64 | % 5 1000 315 190 | 59,75 | - | - | - | - | - | - |
| 315 | 2,0 | 40 | 220 BW | 2-8-55 + 4-12-64 | % 5 1000 315 200 | 59,75 | - | - | - | - | - | - |
| 315 | 2,0 | 40 | 200 BW | 2-8-55 + 4-12-64 | • 5 1000 315 210 | 111,45 | - | - | - | - | - | - |
| 315 | 2,0 | 40 | 180 BW | 2-8-55 + 4-12-64 | • 5 1000 315 220 | 111,45 | - | - | - | - | - | - |
| 315 | 2,5 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | • 5 1000 315 230 | 104,10 | - | - | • 5 1300 315 230 | 139,10 | - | - |
| 315 | 2,5 | 32 | 240 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 315 240 | 112,80 | • 5 1040 315 240 | 160,30 | • 5 1300 315 240 | 151,20 | • 5 1340 315 240 | 194,90 |
| 315 | 2,5 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 315 250 | 112,80 | • 5 1040 315 250 | 160,30 | • 5 1300 315 250 | 151,20 | • 5 1340 315 250 | 194,90 |
| 315 | 2,5 | 32 | 200 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 315 260 | 112,80 | • 5 1040 315 260 | 160,30 | • 5 1300 315 260 | 151,20 | • 5 1340 315 260 | 194,90 |
| 315 | 2,5 | 32 | 180 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 315 270 | 112,80 | % 5 1040 315 270 | 89,75 | • 5 1300 315 270 | 151,20 | • 5 1340 315 270 | 194,90 |
| 315 | 2,5 | 32 | 160 HZ | 2-8-45+2-9-50+2-11-63 | • 5 1000 315 280 | 112,80 | • 5 1040 315 280 | 160,30 | • 5 1300 315 280 | 151,20 | • 5 1340 315 280 | 194,90 |
| 315 | 2,5 | 32 | 120 HZ | 2-8-45+2-9-50+2-11-63 | • 5 1000 315 290 | 112,80 | • 5 1040 315 290 | 160,30 | • 5 1300 315 290 | 151,20 | • 5 1340 315 290 | 194,90 |
| 315 | 2,5 | 32 | 100 HZ | 2-8-45+2-9-50+2-11-63 | - | - | - | - | - | - | - | - |
| 315 | 2,5 | 40 | 0 | 2-8-55 + 4-12-64 | • 5 1000 315 300 | 104,10 | - | - | • 5 1300 315 300 | 139,10 | - | - |
| 315 | 2,5 | 40 | 240 BW | 2-8-55 + 4-12-64 | • 5 1000 315 310 | 112,80 | • 5 1040 315 310 | 160,30 | • 5 1300 315 310 | 151,20 | • 5 1340 315 310 | 194,90 |
| 315 | 2,5 | 40 | 220 BW | 2-8-55 + 4-12-64 | • 5 1000 315 320 | 112,80 | • 5 1040 315 320 | 160,30 | • 5 1300 315 320 | 151,20 | • 5 1340 315 320 | 194,90 |
| 315 | 2,5 | 40 | 200 BW | 2-8-55 + 4-12-64 | • 5 1000 315 330 | 112,80 | • 5 1040 315 330 | 160,30 | • 5 1300 315 330 | 151,20 | • 5 1340 315 330 | 194,90 |
| 315 | 2,5 | 40 | 180 BW | 2-8-55 + 4-12-64 | • 5 1000 315 340 | 112,80 | • 5 1040 315 340 | 160,30 | • 5 1300 315 340 | 151,20 | • 5 1340 315 340 | 194,90 |
| 315 | 2,5 | 40 | 160 HZ | 2-8-55 + 4-12-64 | • 5 1000 315 350 | 112,80 | % 5 1040 315 350 | 89,75 | • 5 1300 315 350 | 151,20 | • 5 1340 315 350 | 194,90 |
| 315 | 2,5 | 40 | 120 HZ | 2-8-55 + 4-12-64 | • 5 1000 315 360 | 112,80 | % 5 1040 315 360 | 89,75 | • 5 1300 315 360 | 151,20 | - | - |
| 315 | 2,5 | 40 | 100 HZ | 2-8-55 + 4-12-64 | - | - | - | - | - | - | - | - |
| 315 | 2,5 | 50 | 0 | 4-15-80 + 4-14-85 | % 5 1000 315 380 | 50,50 | - | - | - | - | - | - |
| 315 | 2,5 | 50 | 240 BW | 4-15-80 + 4-14-85 | % 5 1000 315 390 | 54,90 | - | - | - | - | - | - |
| 315 | 2,5 | 50 | 160 HZ | 4-15-80 + 4-14-85 | % 5 1000 315 400 | 54,90 | - | - | - | - | - | - |
| 315 | 2,5 | 50 | 120 HZ | 4-15-80 + 4-14-85 | - | - | - | - | - | - | - | - |
| 315 | 3,0 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | • 5 1000 315 420 | 129,40 | - | - | • 5 1300 315 420 | 163,35 | - | - |
| 315 | 3,0 | 32 | 240 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 315 430 | 133,35 | • 5 1040 315 430 | 176,10 | % 5 1300 315 430 | 94,70 | - | - |
| 315 | 3,0 | 32 | 200 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 315 440 | 140,40 | • 5 1040 315 440 | 176,10 | • 5 1300 315 440 | 177,15 | - | - |
| 315 | 3,0 | 32 | 160 HZ | 2-8-45+2-9-50+2-11-63 | • 5 1000 315 450 | 140,40 | • 5 1040 315 450 | 176,10 | • 5 1300 315 450 | 177,15 | - | - |
| 315 | 3,0 | 32 | 120 HZ | 2-8-45+2-9-50+2-11-63 | - | - | - | - | % 5 1300 315 455 | 86,30 | - | - |
| 315 | 3,0 | 32 | 100 HZ | 2-8-45+2-9-50+2-11-63 | - | - | % 5 1040 315 457 | 91,45 | % 5 1300 315 457 | 86,30 | - | - |
| 315 | 3,0 | 40 | 0 | 2-8-55 + 4-12-64 | • 5 1000 315 460 | 129,40 | - | - | • 5 1300 315 460 | 155,95 | - | - |
| 315 | 3,0 | 40 | 240 BW | 2-8-55 + 4-12-64 | • 5 1000 315 470 | 140,40 | % 5 1040 315 470 | 96,90 | % 5 1300 315 470 | 94,70 | - | - |
| 315 | 3,0 | 40 | 200 BW | 2-8-55 + 4-12-64 | • 5 1000 315 480 | 140,40 | % 5 1040 315 480 | 96,90 | • 5 1300 315 480 | 169,50 | - | - |
| 315 | 3,0 | 40 | 160 HZ | 2-8-55 + 4-12-64 | • 5 1000 315 490 | 140,40 | • 5 1040 315 490 | 176,10 | • 5 1300 315 490 | 169,50 | - | - |
| 315 | 3,0 | 40 | 120 HZ | 2-8-55 + 4-12-64 | - | - | - | - | % 5 1300 315 500 | 86,30 | - | - |
| 315 | 3,0 | 40 | 100 HZ | 2-8-55 + 4-12-64 | - | - | % 5 1040 315 510 | 91,45 | % 5 1300 315 510 | 86,30 | - | - |
| 315 | 3,0 | 50 | 0 | 4-15-80 + 4-14-85 | % 5 1000 315 520 | 62,90 | - | - | - | - | - | - |
| 315 | 3,0 | 50 | 160 HZ | 4-15-80 + 4-14-85 | % 5 1000 315 530 | 68,40 | - | - | - | - | - | - |
| 315 | 3,0 | 50 | 120 HZ | 4-15-80 + 4-14-85 | % 5 1000 315 540 | 68,40 | - | - | - | - | - | - |
| 325 | 2,5 | 40 | 0 | 2-8-55 + 4-12-64 | • 5 1000 325 010 | 130,05 | - | - | • 5 1300 325 010 | 146,15 | - | - |
| 325 | 2,5 | 40 | 160 HZ | 2-8-55 + 4-12-64 | • 5 1000 325 020 | 140,85 | - | - | • 5 1300 325 020 | 158,60 | - | - |
| 325 | 3,0 | 40 | 0 | 2-9-55 + 4-12-64 | - | - | - | - | % 5 1300 325 030 | 86,85 | - | - |
| 325 | 3,0 | 40 | 160 HZ | 2-9-55 + 4-12-64 | - | - | - | - | - | - | - | - |
| 350 | 2,0 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | • 5 1000 350 010 | 130,60 | - | - | • 5 1300 350 010 | 167,75 | - | - |
| 350 | 2,0 | 32 | 350 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 350 020 | 139,60 | • 5 1040 350 020 | 182,20 | % 5 1300 350 020 | 95,55 | • 5 1340 350 020 | 213,20 |
| 350 | 2,0 | 32 | 280 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 350 030 | 139,60 | • 5 1040 350 030 | 182,20 | • 5 1300 350 030 | 178,70 | • 5 1340 350 030 | 213,20 |
| 350 | 2,0 | 32 | 240 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 350 040 | 139,60 | • 5 1040 350 040 | 174,05 | % 5 1300 350 040 | 95,55 | • 5 1340 350 040 | 213,20 |
| 350 | 2,0 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 350 050 | 139,60 | • 5 1040 350 050 | 174,05 | • 5 1300 350 050 | 178,70 | • 5 1340 350 050 | 213,20 |
| 350 | 2,5 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | • 5 1000 350 060 | 132,65 | - | - | • 5 1300 350 060 | 171,95 | - | - |
| 350 | 2,5 | 32 | 350 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 350 070 | 141,65 | • 5 1040 350 070 | 185,85 | • 5 1300 350 070 | 186,95 | • 5 1340 350 070 | 232,20 |
| 350 | 2,5 | 32 | 280 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 350 080 | 141,65 | • 5 1040 350 080 | 185,85 | • 5 1300 350 080 | 186,95 | • 5 1340 350 080 | 232,20 |
| 350 | 2,5 | 32 | 240 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 350 090 | 141,65 | • 5 1040 350 090 | 185,85 | • 5 1300 350 090 | 186,95 | • 5 1340 350 090 | 232,20 |
| 350 | 2,5 | 32 | 220 BW | 2-8-45+2-9-50+2-11-63 | • 5 1000 350 100 | 141,65 | % 5 1040 350 100 | 106,50 | • 5 1300 350 100 | 186,95 | • 5 1340 350 100 | 232,20 |
| 350 | 2,5 | 32 | 180 HZ | 2-8-45+2-9-50+2-11-63 | • 5 1000 350 110 | 141,65 | • 5 1040 350 110 | 185,85 | • 5 1300 350 110 | 186,95 | • 5 1340 350 110 | 232,20 |
| 350 | 2,5 | 32 | 160 HZ | 2-8-45+2-9-50+2-11-63 | • 5 1000 350 120 | 141,65 | • 5 1040 350 120 | 185,85 | • 5 1300 350 120 | 186,95 | • 5 1340 350 120 | 232,20 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

Weitere Abmessungen auf Anfrage · Other dimensions are available on request



Index

Anwendung siehe Seite
Application see page

| | | | | | 1048 | 1049 | 1050 | 1051 | | | | |
|-----|-----|----|--------|------------------------------|---|--------|---|--------|--|--------|--|---|
| | | | BW | HZ | 5 1000 HSS-DMo5 Dampfbehandelt Steam treated | | 5 1040 HSS-DMo5 Kx-Beschichtet Kx-coated | | 5 1300 HSS-Co5 Dampfbehandelt Steam treated | | 5 1340 HSS-Co5 Kx-Beschichtet Kx-coated | |
| | | | | | Art. | € | Art. | € | Art. | € | Art. | € |
| 370 | 3,0 | 40 | 0 | 2-8-55+4-12-64 | ● 5 1000 370 130 | 182,00 | - | - | ● 5 1300 370 130 | 244,45 | - | - |
| 370 | 3,0 | 40 | 220 BW | 2-8-55+4-12-64 | ● 5 1000 370 140 | 195,65 | - | - | - | - | - | - |
| 370 | 3,0 | 40 | 160 HZ | 2-8-55+4-12-64 | ● 5 1000 370 150 | 195,65 | - | - | - | - | - | - |
| 370 | 3,0 | 40 | 120 HZ | 2-8-55+4-12-64 | ● 5 1000 370 160 | 195,65 | - | - | - | - | - | - |
| 370 | 3,0 | 50 | 0 | 4-15-80 + 4-14-85 | ● 5 1000 370 170 | 182,00 | - | - | ● 5 1300 370 170 | 244,45 | - | - |
| 370 | 3,0 | 50 | 220 BW | 4-15-80 + 4-14-85 | ● 5 1000 370 180 | 195,65 | ⊗ 5 1040 370 180 | 138,70 | ● 5 1300 370 180 | 258,90 | - | - |
| 370 | 3,0 | 50 | 160 HZ | 4-15-80 + 4-14-85 | ● 5 1000 370 190 | 195,65 | ⊗ 5 1040 370 190 | 246,15 | ● 5 1300 370 190 | 258,90 | - | - |
| 370 | 3,0 | 50 | 120 HZ | 4-15-80 + 4-14-85 | ● 5 1000 370 200 | 195,65 | ⊗ 5 1040 370 200 | 138,70 | ● 5 1300 370 200 | 258,90 | - | - |
| 370 | 3,0 | 50 | 100 HZ | 4-15-80 + 4-14-85 | ● 5 1000 370 210 | 195,65 | ⊗ 5 1040 370 210 | 246,15 | ● 5 1300 370 210 | 258,90 | - | - |
| 400 | 2,5 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 400 010 | 210,65 | - | - | ● 5 1300 400 010 | 290,00 | - | - |
| 400 | 2,5 | 32 | 240 BW | 2-8-45+2-9-50+2-11-63 | ⊗ 5 1000 400 020 | 123,85 | - | - | - | - | - | - |
| 400 | 2,5 | 32 | 200 HZ | 2-8-45+2-9-50+2-11-63 | ⊗ 5 1000 400 030 | 123,85 | - | - | - | - | - | - |
| 400 | 2,5 | 32 | 160 HZ | 2-8-45+2-9-50+2-11-63 | ⊗ 5 1000 400 040 | 123,85 | - | - | - | - | - | - |
| 400 | 2,5 | 50 | 0 | 4-15-80+4-14-85 | ● 5 1000 400 050 | 213,10 | - | - | ● 5 1300 400 050 | 279,90 | - | - |
| 400 | 2,5 | 50 | 240 BW | 4-15-80+4-14-85 | ● 5 1000 400 060 | 228,65 | - | - | - | - | - | - |
| 400 | 2,5 | 50 | 200 HZ | 4-15-80+4-14-85 | ⊗ 5 1000 400 070 | 123,85 | - | - | - | - | - | - |
| 400 | 2,5 | 50 | 160 HZ | 4-15-80+4-14-85 | ● 5 1000 400 080 | 228,65 | - | - | - | - | - | - |
| 400 | 3,0 | 32 | 0 | 2-8-45+2-9-50+2-11-63 | ● 5 1000 400 090 | 204,75 | - | - | ● 5 1300 400 090 | 274,10 | - | - |
| 400 | 3,0 | 32 | 200 HZ | 2-8-45+2-9-50+2-11-63 | ● 5 1000 400 100 | 222,30 | - | - | - | - | - | - |
| 400 | 3,0 | 32 | 160 HZ | 2-8-45+2-9-50+2-11-63 | ⊗ 5 1000 400 110 | 118,80 | - | - | - | - | - | - |
| 400 | 3,0 | 32 | 120 HZ | 2-8-45+2-9-50+2-11-63 | ⊗ 5 1000 400 120 | 118,80 | - | - | - | - | - | - |
| 400 | 3,0 | 32 | 100 HZ | 2-8-45+2-9-50+2-11-63 | ⊗ 5 1000 400 130 | 118,80 | - | - | - | - | - | - |
| 400 | 3,0 | 40 | 0 | 2-8-55+4-12-64 | ● 5 1000 400 140 | 204,75 | - | - | ● 5 1300 400 140 | 274,10 | - | - |
| 400 | 3,0 | 40 | 200 HZ | 2-8-55+4-12-64 | ● 5 1000 400 150 | 222,30 | - | - | ⊗ 5 1300 400 150 | 158,80 | - | - |
| 400 | 3,0 | 40 | 160 HZ | 2-8-55+4-12-64 | ● 5 1000 400 160 | 222,30 | - | - | ● 5 1300 400 160 | 297,10 | - | - |
| 400 | 3,0 | 40 | 120 HZ | 2-8-55+4-12-64 | ⊗ 5 1000 400 170 | 120,25 | - | - | ⊗ 5 1300 400 170 | 158,80 | - | - |
| 400 | 3,0 | 40 | 100 HZ | 2-8-55+4-12-64 | ● 5 1000 400 180 | 222,30 | - | - | ⊗ 5 1300 400 180 | 158,80 | - | - |
| 400 | 3,0 | 50 | 0 | 4-15-80+4-14-85 | ● 5 1000 400 190 | 204,75 | - | - | ⊗ 5 1300 400 190 | 146,50 | - | - |
| 400 | 3,0 | 50 | 200 HZ | 4-15-80+4-14-85 | ● 5 1000 400 200 | 222,30 | - | - | ● 5 1300 400 200 | 297,10 | - | - |
| 400 | 3,0 | 50 | 160 HZ | 4-15-80+4-14-85 | ● 5 1000 400 210 | 222,30 | - | - | ⊗ 5 1300 400 210 | 158,80 | - | - |
| 400 | 3,0 | 50 | 120 HZ | 4-15-80+4-14-85 | ● 5 1000 400 220 | 222,30 | - | - | ● 5 1300 400 220 | 297,10 | - | - |
| 400 | 3,0 | 50 | 100 HZ | 4-15-80+4-14-85 | ● 5 1000 400 230 | 222,30 | - | - | ● 5 1300 400 230 | 297,10 | - | - |
| 400 | 3,5 | 40 | 0 | 2-15-80 + 4-12-64 | - | - | - | - | ⊗ 5 1300 400 240 | 154,00 | - | - |
| 400 | 3,5 | 40 | 160 HZ | 2-15-80 + 4-12-64 | - | - | - | - | - | - | - | - |
| 400 | 3,5 | 40 | 120 HZ | 2-15-80 + 4-12-64 | ⊗ 5 1000 400 260 | 115,25 | - | - | - | - | - | - |
| 400 | 3,5 | 50 | 0 | 4-15-80+4-14-85 | ● 5 1000 400 270 | 228,55 | - | - | ● 5 1300 400 270 | 302,45 | - | - |
| 400 | 3,5 | 50 | 200 HZ | 4-15-80+4-14-85 | ● 5 1000 400 280 | 248,45 | - | - | ● 5 1300 400 280 | 328,75 | - | - |
| 400 | 3,5 | 50 | 160 HZ | 4-15-80+4-14-85 | ● 5 1000 400 290 | 248,45 | - | - | ● 5 1300 400 290 | 328,75 | - | - |
| 400 | 3,5 | 50 | 120 HZ | 4-15-80+4-14-85 | ● 5 1000 400 300 | 248,45 | - | - | ⊗ 5 1300 400 300 | 181,50 | - | - |
| 400 | 3,5 | 50 | 100 HZ | 4-15-80+4-14-85 | ● 5 1000 400 310 | 248,45 | - | - | ⊗ 5 1300 400 310 | 181,50 | - | - |
| 400 | 4,0 | 40 | 0 | 2-15-80 + 4-12-64 | ⊗ 5 1000 400 320 | 125,80 | - | - | ⊗ 5 1300 400 320 | 168,25 | - | - |
| 400 | 4,0 | 40 | 200 HZ | 2-15-80 + 4-12-64 | ⊗ 5 1000 400 330 | 136,75 | - | - | - | - | - | - |
| 400 | 4,0 | 40 | 120 HZ | 2-15-80 + 4-12-64 | ⊗ 5 1000 400 340 | 136,75 | - | - | - | - | - | - |
| 400 | 4,0 | 40 | 100 HZ | 2-15-80 + 4-12-64 | - | - | - | - | - | - | - | - |
| 400 | 4,0 | 50 | 0 | 4-15-80+4-14-85 | ● 5 1000 400 360 | 259,45 | - | - | ● 5 1300 400 360 | 342,95 | - | - |
| 400 | 4,0 | 50 | 200 HZ | 4-15-80+4-14-85 | ● 5 1000 400 370 | 282,00 | - | - | ⊗ 5 1300 400 370 | 199,05 | - | - |
| 400 | 4,0 | 50 | 160 HZ | 4-15-80+4-14-85 | ● 5 1000 400 380 | 282,00 | - | - | ● 5 1300 400 380 | 372,40 | - | - |
| 400 | 4,0 | 50 | 120 HZ | 4-15-80+4-14-85 | ● 5 1000 400 390 | 282,00 | - | - | ● 5 1300 400 390 | 372,40 | - | - |
| 400 | 4,0 | 50 | 100 HZ | 4-15-80+4-14-85 | ● 5 1000 400 400 | 282,00 | - | - | ● 5 1300 400 400 | 372,40 | - | - |
| 425 | 3,0 | 40 | 0 | 2-15-80 + 2-15-100 + 4-12-64 | ⊗ 5 1000 425 010 | 118,35 | - | - | - | - | - | - |
| 425 | 3,0 | 40 | 160 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ⊗ 5 1000 425 020 | 128,65 | - | - | - | - | - | - |
| 425 | 3,0 | 40 | 120 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ⊗ 5 1000 425 030 | 128,65 | - | - | - | - | - | - |
| 425 | 3,0 | 50 | 0 | 4-15-80+4-14-85 | ● 5 1000 425 040 | 230,75 | - | - | ● 5 1300 425 040 | 329,90 | - | - |
| 425 | 3,0 | 50 | 220 HZ | 4-15-80+4-14-85 | ● 5 1000 425 050 | 250,25 | - | - | - | - | - | - |
| 425 | 3,0 | 50 | 160 HZ | 4-15-80+4-14-85 | ● 5 1000 425 060 | 250,25 | - | - | - | - | - | - |
| 425 | 3,0 | 50 | 120 HZ | 4-15-80+4-14-85 | ⊗ 5 1000 425 070 | 128,65 | - | - | - | - | - | - |

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Weitere Abmessungen auf Anfrage · Other dimensions are available on request



Anwendung siehe Seite
Application see page

1048



1049



1050



1051



| | | | | | | 5 1000 | | 5 1040 | | 5 1300 | | 5 1340 | |
|--|-----|-----|----|--------|------------------------------|---|--------|---|---|--|--------|--|---|
| | | | | | | HSS-DMo5 Dampfbehandelt Steam treated | | HSS-DMo5 Kx-Beschichtet Kx-coated | | HSS-Co5 Dampfbehandelt Steam treated | | HSS-Co5 Kx-Beschichtet Kx-coated | |
| | | | | | | Art. | € | Art. | € | Art. | € | Art. | € |
| | 425 | 3,5 | 40 | 0 | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 425 080 | 265,00 | - | - | ● 5 1300 425 080 | 379,75 | - | - |
| | 425 | 3,5 | 40 | 220 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 425 090 | 156,10 | - | - | - | - | - | - |
| | 425 | 3,5 | 40 | 160 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 425 100 | 287,60 | - | - | - | - | - | - |
| | 425 | 3,5 | 50 | 0 | 4-15-80+4-14-85 | ● 5 1000 425 110 | 265,00 | - | - | ● 5 1300 425 110 | 379,75 | - | - |
| | 425 | 3,5 | 50 | 220 HZ | 4-15-80+4-14-85 | ● 5 1000 425 120 | 287,60 | - | - | - | - | - | - |
| | 425 | 3,5 | 50 | 160 HZ | 4-15-80+4-14-85 | ● 5 1000 425 130 | 287,60 | - | - | - | - | - | - |
| | 425 | 3,5 | 50 | 120 HZ | 4-15-80+4-14-85 | ● 5 1000 425 140 | 147,30 | - | - | - | - | - | - |
| | 425 | 4,0 | 40 | 0 | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 425 150 | 140,75 | - | - | ● 5 1300 425 150 | 206,35 | - | - |
| | 425 | 4,0 | 40 | 220 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 425 160 | 153,00 | - | - | - | - | - | - |
| | 425 | 4,0 | 40 | 160 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 425 170 | 153,00 | - | - | ● 5 1300 425 170 | 224,30 | - | - |
| | 425 | 4,0 | 40 | 120 HZ | 2-15-80 + 2-15-100 + 4-12-64 | - | - | - | - | - | - | - | - |
| | 425 | 4,0 | 50 | 0 | 4-15-80+4-14-85 | ● 5 1000 425 190 | 285,90 | - | - | ● 5 1300 425 190 | 418,90 | - | - |
| | 425 | 4,0 | 50 | 76 HZ | 4-15-80+4-14-85 | - | - | - | - | - | - | - | - |
| | 450 | 3,0 | 40 | 0 | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 010 | 258,95 | - | - | ● 5 1300 450 010 | 369,95 | - | - |
| | 450 | 3,0 | 40 | 240 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 020 | 283,40 | - | - | - | - | - | - |
| | 450 | 3,0 | 40 | 200 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 030 | 152,55 | - | - | - | - | - | - |
| | 450 | 3,0 | 40 | 180 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 040 | 283,40 | - | - | - | - | - | - |
| | 450 | 3,0 | 40 | 160 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 050 | 152,55 | - | - | - | - | - | - |
| | 450 | 3,0 | 40 | 120 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 060 | 283,40 | - | - | - | - | - | - |
| | 450 | 3,0 | 50 | 0 | 4-15-80+4-14-85 | ● 5 1000 450 070 | 261,25 | - | - | ● 5 1300 450 070 | 367,95 | - | - |
| | 450 | 3,0 | 50 | 240 HZ | 4-15-80+4-14-85 | ● 5 1000 450 080 | 283,40 | - | - | - | - | - | - |
| | 450 | 3,0 | 50 | 200 HZ | 4-15-80+4-14-85 | ● 5 1000 450 090 | 152,55 | - | - | - | - | - | - |
| | 450 | 3,0 | 50 | 180 HZ | 4-15-80+4-14-85 | ● 5 1000 450 100 | 152,55 | - | - | - | - | - | - |
| | 450 | 3,0 | 50 | 160 HZ | 4-15-80+4-14-85 | ● 5 1000 450 110 | 283,40 | - | - | - | - | - | - |
| | 450 | 3,0 | 50 | 120 HZ | 4-15-80+4-14-85 | ● 5 1000 450 120 | 283,40 | - | - | - | - | - | - |
| | 450 | 3,5 | 40 | 0 | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 130 | 281,05 | - | - | ● 5 1300 450 130 | 403,55 | - | - |
| | 450 | 3,5 | 40 | 240 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 140 | 305,50 | - | - | ● 5 1300 450 140 | 206,35 | - | - |
| | 450 | 3,5 | 40 | 200 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 150 | 164,00 | - | - | - | - | - | - |
| | 450 | 3,5 | 40 | 180 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 160 | 305,50 | - | - | - | - | - | - |
| | 450 | 3,5 | 40 | 160 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 170 | 305,50 | - | - | - | - | - | - |
| | 450 | 3,5 | 40 | 120 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 180 | 305,50 | - | - | - | - | - | - |
| | 450 | 3,5 | 50 | 0 | 4-15-80+4-14-85 | ● 5 1000 450 190 | 283,10 | - | - | ● 5 1300 450 190 | 403,55 | - | - |
| | 450 | 3,5 | 50 | 240 HZ | 4-15-80+4-14-85 | ● 5 1000 450 200 | 164,00 | - | - | - | - | - | - |
| | 450 | 3,5 | 50 | 200 HZ | 4-15-80+4-14-85 | ● 5 1000 450 210 | 164,00 | - | - | - | - | - | - |
| | 450 | 3,5 | 50 | 180 HZ | 4-15-80+4-14-85 | ● 5 1000 450 220 | 306,80 | - | - | - | - | - | - |
| | 450 | 3,5 | 50 | 160 HZ | 4-15-80+4-14-85 | ● 5 1000 450 230 | 164,00 | - | - | - | - | - | - |
| | 450 | 3,5 | 50 | 120 HZ | 4-15-80+4-14-85 | ● 5 1000 450 240 | 306,80 | - | - | - | - | - | - |
| | 450 | 4,0 | 40 | 0 | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 250 | 318,90 | - | - | ● 5 1300 450 250 | 464,30 | - | - |
| | 450 | 4,0 | 40 | 240 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 260 | 346,15 | - | - | - | - | - | - |
| | 450 | 4,0 | 40 | 200 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 270 | 188,40 | - | - | - | - | - | - |
| | 450 | 4,0 | 40 | 180 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 280 | 346,15 | - | - | - | - | - | - |
| | 450 | 4,0 | 40 | 160 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 290 | 188,40 | - | - | - | - | - | - |
| | 450 | 4,0 | 40 | 120 HZ | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 450 300 | 346,15 | - | - | - | - | - | - |
| | 450 | 4,0 | 50 | 0 | 4-15-80+4-14-85 | ● 5 1000 450 310 | 318,90 | - | - | ● 5 1300 450 310 | 464,30 | - | - |
| | 450 | 4,0 | 50 | 240 HZ | 4-15-80+4-14-85 | ● 5 1000 450 320 | 346,15 | - | - | - | - | - | - |
| | 450 | 4,0 | 50 | 180 HZ | 4-15-80+4-14-85 | ● 5 1000 450 330 | 346,15 | - | - | - | - | - | - |
| | 450 | 4,0 | 50 | 120 HZ | 4-15-80+4-14-85 | ● 5 1000 450 340 | 346,15 | - | - | - | - | - | - |
| | 500 | 4,0 | 40 | 0 | 2-15-80 + 2-15-100 + 4-12-64 | ● 5 1000 500 010 | 241,40 | - | - | ● 5 1300 500 010 | 346,00 | - | - |
| | 500 | 4,0 | 40 | 260 HZ | 2-15-80 + 2-15-100 + 4-12-64 | - | - | - | - | - | - | - | - |

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1060

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- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

DIN-VHM-SÄGEN

DIN-SOLID CARBIDE-SAW BLADES



1



2



3



4



5



6



7



8



9



Index

DIN-VHM 5.3

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







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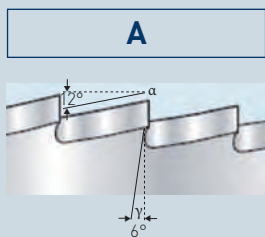
ANWENDUNG · APPLICATION

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |
| Stahl Steel | Edelstahl Stainless | Grauguss Grey cast iron | Alu Alu | Kupfer, Kupfer- legierungen Copper, copper alloys | Zinklegierung Zinc alloy | Inconel Inconel | Titan Titanium | Kunststoffe GFK/CFK Plastics GRP/CRP |
| > 1000 N | | | | | | | | |

Vollhartmetall-Kreissägeblätter sollten nur auf stabilen und schwingungsarmen Maschinen eingesetzt werden (vorzugsweise Fräsmaschinen). Die Kreissägeblätter müssen zwischen exact planlaufenden, möglichst großen Spannflanschen fest eingespannt werden (Aufnahmealter siehe Seite 1080). Seitendruck sowie der einsatz auf Maschinen mit Handvorschub sind zu vermeiden. Für die Stahlzerspanung wird eine besonders fette Kühlung empfohlen. Unzureichende Kühlung führt zu vorzeitigem Werkzeugverschleiß, zur Rissbildung und zum Werkzeugbruch. Bei der Zerspanung von NE-Metallen kann auch eine Sprühnebelschmierung eingesetzt werden. Grauguss und Kunststoffe sind trocken zu Zerspanen. Wird dies beachtet kann die Schnittgeschwindigkeit gegenüber HSS-DIN Kreissägeblättern bis zum 4-fachen gesteigert werden.

Full carbide circular saw blades should only be used on stable and low-vibration machines (preferably milling machines). The circular saw blades must be firmly clamped between precisely evenly running clamping flanges that are as large as possible (receptacle holders, see page 1080). Lateral pressure and use on machines with manual infeed must be avoided. For steel machining, particularly fast cooling is recommended. Insufficient cooling will lead to premature tool wear, crack formation and tool break. When chipping NF metals, spray mist lubrication can be used. Cast iron and plastics must be machined dry. If this is observed, the cutting speed as compared to the HSS-DIN circular saw blades can be increased up to four-fold.

5 6000



Ähnlich DIN 1837 Blätter kommen mit feingezahnten Zähnen.

Hauptanwendungsgebiet:

- Feine Schlitz- und Trennarbeiten (Feinmechanik, Schmuckindustrie).
- Ideal auch zum Schlitzten von Schrauben.
- Zum Trennen/Schlitzten von dünnwandigen Profilen und kurzspanenden Werkstücken aus Edelstahl, Stahl, Guss, Nichteisenmetalle, Kunststoffe.

Maximal empfohlene Schnitttiefe ca. 3 mm

- Somit generell nur für geringe Bearbeitungstiefen oder kurze Schlitzlängen.
- Vorschub pro Zahn: 0,005-0,05 je nach Werkstoff, dicke und Gesamtstarrheit (genauere Daten siehe Tabelle nächste Seite).

Similar DIN 1837 blades comes with fine teeth.

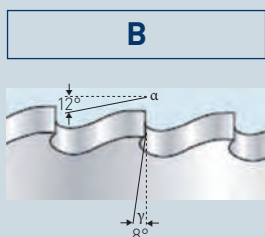
Main field of application:

- This shape is mostly used for fine slotting and cutting works (micro-mechanics and jewellery).
- Excellent also for screw slotting.
- For cutting and slotting thin walled profiles and short chipping work pieces made of stainless steel, steel, cast iron, non ferrous metals, plastics.

Maximum recommended cutting depth approx. 3 mm

- So basically for low machining depths or short slots.
- Feed per tooth: 0,005-0,05 according to material, thickness and global rigidity (more precise data see next page).

5 6001



Ähnlich DIN 1838 Blätter kommen mit grobgezahnten Zähnen.

Hauptanwendungsgebiet:

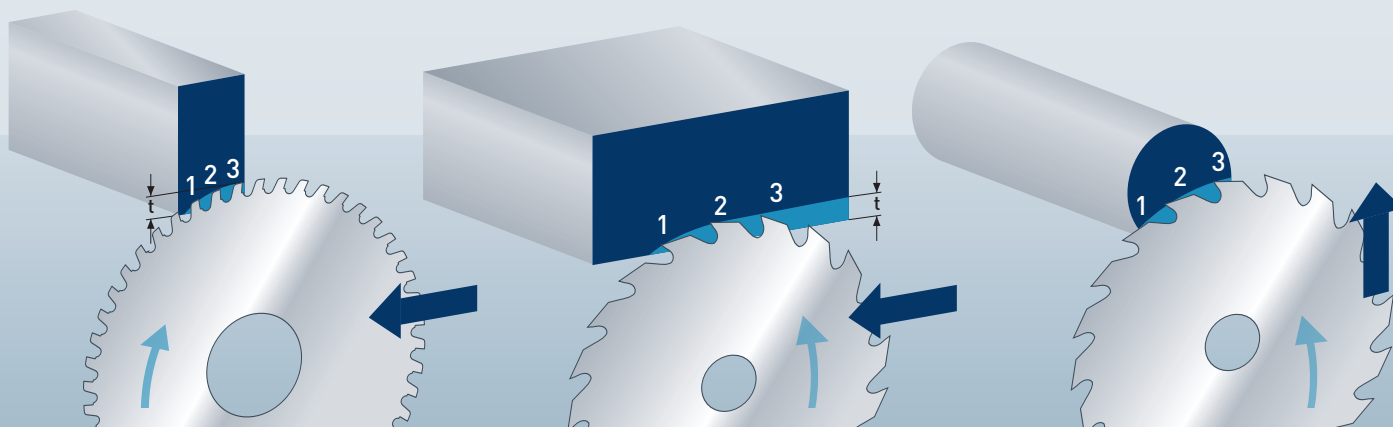
- Die am meisten verwendete Universalverzahnung für Schlitz- und Trennarbeiten von dickwandigen Profilen / Vollmaterial **ab ca. 3 mm**.
- Generell für Arbeiten an langspanenden Werkstücken aus Edelstahl, Stahl, Guss, Nichteisenmetalle.
- Somit generell nur für große Bearbeitungstiefen oder große Schlitzlängen.
- Vorschub pro Zahn: 0,01-0,1 je nach Werkstoff, dicke und Gesamtstarrheit (genauere Daten siehe Tabelle nächste Seite).

Similar DIN 1838 blades comes with rough teeth.

Main field of application:

- The most widely used universal toothing for slotting and cutting thick walled profiles and solid material **from 3 mm**.
- In general for cutting long chipping work pieces made of stainless steel, steel, cast iron, non ferrous metals.
- So basically for deep machining depths or long slots
- Feed per tooth: 0,01-0,1 according to material, thickness and global rigidity (more precise data see next page).

Im Idealfall sollten immer 2-3 Zähne im Einsatz sein
Ideally 2-3 teeth in contact



Richtwerte für den Einsatz von Vollhartmetall-Kreissägeblättern nach DIN
Recommended cutting data for solid carbide circular saw blades according DIN

| Material | Kühlung Cooling | Schnittgeschwindigkeit Cutting speed V_c m/min | Vorschub Feed f_z mm/Z mm/t | Verzahnungswahl Teeth selection / cutting feed |
|-------------------------|--------------------|--|-------------------------------------|---|
| Automatenstahl | free-cutting steel | 120 - 240 | 0,020 - 0,040 | Typ 5 6000 Für geringe Bearbeitungstiefen oder kurze Schlitzlängen. Vorschub pro Zahn: 0,005 - 0,05** For low machining depth or short slots. Feed per tooth: 0,005 - 0,05** |
| Stahl | Steel | < 600 N/mm ² | 0,010 - 0,030 | |
| Stahl | Steel | < 800 N/mm ² | 0,007 - 0,025 | |
| Stahl | Steel | < 1000 N/mm ² | 0,006 - 0,023 | |
| Stahl | Steel | > 1000 N/mm ² | 0,005 - 0,020 | |
| Edelstahl | Stainless steel | 50 - 100 | 0,005 - 0,015 | |
| Warmfester Stahl | High temp alloy | 25 - 60 | 0,005 - 0,015 | |
| Legierter Werkzeugstahl | Alloy tool steel | 15 - 40 | 0,005 - 0,012 | |
| Gusseisen | Cast iron | 60 - 120 | 0,006 - 0,023 | |
| Aluminium Si <12% | Aluminum Si <12% | 150 - 600 | 0,010 - 0,040 | |
| Aluminium Si >12% | Aluminum Si >12% | 80 - 300 | 0,006 - 0,030 | Typ 5 6001 Für große Bearbeitungstiefen oder große Schlitzlängen. Vorschub pro Zahn: 0,01 - 0,1** For deep machining depth or long slots. Feed per tooth: 0,01 - 0,1** |
| Titan | Titanium | 30 - 60 | 0,003 - 0,008 | |
| Kupfer | Copper | 80 - 300 | 0,020 - 0,040 | |
| Messing | Brass | 80 - 300 | 0,020 - 0,040 | |
| Bronze | Bronze | 80 - 300 | 0,020 - 0,040 | ** je nach Werkstoff, Dicke und Gesamtstarrheit ** According to material, thickness and global rigidity |
| Thermoplaste | Thermoplastics | 200 - 700 | 0,010 - 0,040 | |
| Duroplaste | Duroplastics | 150 - 600 | 0,010 - 0,040 | |

*O = Schneidöl / cutting oil
*E = Emulsion
*A = Trocken (Pressluft), air

Verwenden Sie ein gutes Schneidöl; siehe ab Seite 1144
Use good cutting oil; see from page 1144

Festlegung der Schnittgeschwindigkeit V_c
Determination of cutting speed V_c

$$V_c \text{ (m/min)} = \frac{D \cdot \pi \cdot n}{1000}$$

Festlegung der Vorschubgeschwindigkeit V_f
Determination of feed rate V_f

$$V_f \text{ (mm/min)} = f_z \cdot n \cdot Z$$

Festlegung der Drehzahl n
Determination of revolution speed n

$$n \text{ (min}^{-1}\text{)} = \frac{V_c \cdot 1000}{D \cdot \pi}$$

f_z (mm/z) = Vorschub pro Zahn · Feed per tooth
 D (mm) = Sägendurchmesser · Saw blade diameter
 Z = Anzahl der Zähne · Number of teeth
 n (min⁻¹) = Drehzahl · rpm



Karnasch® VOLLHARTMETALL-KREISSÄGEBLÄTTER NACH DIN SOLID CARBIDE METAL CIRCULAR SAW BLADES ACCORDING DIN

Anwendung siehe Seite
Application see page

1062



1062



| Ø | Stärke Thickness | Bohrung Bore | 1062 | | | 1062 | | |
|----|---------------------|-----------------|-----------------------|-------------------------|-------|-----------------------|-------------------------|-------|
| | | | Art. 5 6000 | DIN 1837A "A" | € | Art. 5 6001 | DIN 1838B "B" | € |
| 15 | 0,10 | 5 | • 5 6000 015 010 | 64 A | 22,40 | - | - | - |
| 15 | 0,15 | 5 | % 5 6000 015 015 | 64 A | 9,50 | - | - | - |
| 15 | 0,20 | 5 | • 5 6000 015 020 | 64 A | 13,30 | • 5 6001 015 020 | 20 B | 13,30 |
| 15 | 0,25 | 5 | • 5 6000 015 025 | 64 A | 13,30 | • 5 6001 015 025 | 20 B | 13,30 |
| 15 | 0,30 | 5 | • 5 6000 015 030 | 64 A | 13,30 | • 5 6001 015 030 | 20 B | 13,30 |
| 15 | 0,35 | 5 | • 5 6000 015 035 | 64 A | 13,90 | - | - | - |
| 15 | 0,40 | 5 | • 5 6000 015 040 | 64 A | 13,90 | • 5 6001 015 040 | 20 B | 13,90 |
| 15 | 0,45 | 5 | - | - | - | - | - | - |
| 15 | 0,50 | 5 | • 5 6000 015 050 | 48 A | 14,60 | • 5 6001 015 050 | 20 B | 14,60 |
| 15 | 0,60 | 5 | • 5 6000 015 060 | 48 A | 15,20 | • 5 6001 015 060 | 20 B | 15,20 |
| 15 | 0,70 | 5 | • 5 6000 015 070 | 48 A | 17,15 | • 5 6001 015 070 | 20 B | 17,15 |
| 15 | 0,80 | 5 | • 5 6000 015 080 | 40 A | 17,75 | • 5 6001 015 080 | 20 B | 17,75 |
| 15 | 0,90 | 5 | • 5 6000 015 090 | 40 A | 18,65 | • 5 6001 015 090 | 20 B | 18,65 |
| 15 | 1,00 | 5 | • 5 6000 015 100 | 40 A | 19,35 | • 5 6001 015 100 | 20 B | 19,35 |
| 15 | 1,10 | 5 | • 5 6000 015 110 | 40 A | 19,95 | - | - | - |
| 15 | 1,20 | 5 | • 5 6000 015 120 | 40 A | 20,90 | • 5 6001 015 120 | 20 B | 20,90 |
| 15 | 1,30 | 5 | % 5 6000 015 130 | 40 A | 12,60 | - | - | - |
| 15 | 1,40 | 5 | • 5 6000 015 140 | 40 A | 23,35 | - | - | - |
| 15 | 1,50 | 5 | % 5 6000 015 150 | 40 A | 13,60 | - | - | - |
| 15 | 1,60 | 5 | % 5 6000 015 160 | 40 A | 14,00 | - | - | - |
| 15 | 1,70 | 5 | % 5 6000 015 170 | 40 A | 14,75 | - | - | - |
| 15 | 1,80 | 5 | % 5 6000 015 180 | 40 A | 15,30 | - | - | - |
| 15 | 1,90 | 5 | - | - | - | - | - | - |
| 15 | 2,00 | 5 | • 5 6000 015 200 | 40 A | 29,80 | • 5 6001 015 200 | 20 B | 29,80 |
| 15 | 2,50 | 5 | • 5 6000 015 250 | 40 A | 37,70 | • 5 6001 015 250 | 20 B | 37,70 |
| 15 | 3,00 | 5 | % 5 6000 015 300 | 40 A | 24,20 | • 5 6001 015 300 | 20 B | 43,70 |
| 15 | 3,50 | 5 | - | - | - | - | - | - |
| 15 | 4,00 | 5 | - | - | - | % 5 6001 015 400 | 20 B | 31,65 |
| 15 | 5,00 | 5 | - | - | - | - | - | - |
| 15 | 6,00 | 5 | - | - | - | - | - | - |
| 20 | 0,10 | 5 | • 5 6000 020 010 | 80 A | 24,60 | - | - | - |
| 20 | 0,15 | 5 | • 5 6000 020 015 | 80 A | 19,00 | - | - | - |
| 20 | 0,20 | 5 | • 5 6000 020 020 | 80 A | 15,20 | • 5 6001 020 020 | 20 B | 15,20 |
| 20 | 0,25 | 5 | • 5 6000 020 025 | 64 A | 15,20 | % 5 6001 020 025 | 20 B | 8,45 |
| 20 | 0,30 | 5 | • 5 6000 020 030 | 64 A | 15,20 | • 5 6001 020 030 | 20 B | 15,20 |
| 20 | 0,35 | 5 | • 5 6000 020 035 | 64 A | 15,80 | - | - | - |
| 20 | 0,40 | 5 | • 5 6000 020 040 | 64 A | 15,80 | • 5 6001 020 040 | 20 B | 15,80 |
| 20 | 0,45 | 5 | • 5 6000 020 045 | 48 A | 16,70 | - | - | - |
| 20 | 0,50 | 5 | • 5 6000 020 050 | 48 A | 16,70 | • 5 6001 020 050 | 20 B | 16,70 |
| 20 | 0,60 | 5 | • 5 6000 020 060 | 48 A | 16,70 | • 5 6001 020 060 | 20 B | 16,70 |
| 20 | 0,70 | 5 | % 5 6000 020 070 | 48 A | 10,75 | • 5 6001 020 070 | 20 B | 19,35 |
| 20 | 0,80 | 5 | • 5 6000 020 080 | 40 A | 19,35 | • 5 6001 020 080 | 20 B | 19,35 |
| 20 | 0,90 | 5 | • 5 6000 020 090 | 40 A | 19,95 | - | - | - |
| 20 | 1,00 | 5 | • 5 6000 020 100 | 40 A | 22,00 | • 5 6001 020 100 | 20 B | 22,00 |
| 20 | 1,10 | 5 | % 5 6000 020 110 | 40 A | 12,95 | - | - | - |
| 20 | 1,20 | 5 | • 5 6000 020 120 | 40 A | 23,35 | • 5 6001 020 120 | 20 B | 23,35 |
| 20 | 1,30 | 5 | • 5 6000 020 130 | 40 A | 24,60 | - | - | - |
| 20 | 1,40 | 5 | • 5 6000 020 140 | 40 A | 26,60 | - | - | - |
| 20 | 1,50 | 5 | % 5 6000 020 150 | 40 A | 14,75 | % 5 6001 020 150 | 20 B | 14,75 |
| 20 | 1,60 | 5 | • 5 6000 020 160 | 40 A | 27,95 | % 5 6001 020 160 | 20 B | 15,50 |
| 20 | 1,70 | 5 | - | - | - | - | - | - |
| 20 | 1,80 | 5 | • 5 6000 020 180 | 32 A | 30,65 | - | - | - |
| 20 | 1,90 | 5 | - | - | - | - | - | - |
| 20 | 2,00 | 5 | • 5 6000 020 200 | 32 A | 32,90 | • 5 6001 020 200 | 20 B | 32,90 |
| 20 | 2,50 | 5 | % 5 6000 020 250 | 32 A | 21,35 | % 5 6001 020 250 | 20 B | 21,35 |
| 20 | 3,00 | 5 | • 5 6000 020 300 | 32 A | 44,30 | • 5 6001 020 300 | 20 B | 44,30 |
| 20 | 3,50 | 5 | % 5 6000 020 350 | 24 A | 27,25 | - | - | - |
| 20 | 4,00 | 5 | - | - | - | - | - | - |
| 20 | 5,00 | 5 | % 5 6000 020 500 | 24 A | 40,45 | % 5 6001 020 500 | 20 B | 40,45 |
| 20 | 6,00 | 5 | % 5 6000 020 600 | 24 A | 48,55 | - | - | - |
| 25 | 0,10 | 8 | • 5 6000 025 010 | 80 A | 25,75 | - | - | - |
| 25 | 0,15 | 8 | • 5 6000 025 015 | 80 A | 19,65 | - | - | - |
| 25 | 0,20 | 8 | • 5 6000 025 020 | 80 A | 15,80 | • 5 6001 025 020 | 20 B | 15,80 |
| 25 | 0,25 | 8 | • 5 6000 025 025 | 80 A | 15,80 | - | - | - |
| 25 | 0,30 | 8 | • 5 6000 025 030 | 80 A | 15,80 | % 5 6001 025 030 | 20 B | 8,75 |
| 25 | 0,35 | 8 | • 5 6000 025 035 | 64 A | 16,70 | - | - | - |
| 25 | 0,40 | 8 | • 5 6000 025 040 | 64 A | 17,30 | • 5 6001 025 040 | 20 B | 17,30 |
| 25 | 0,45 | 8 | % 5 6000 025 045 | 64 A | 11,05 | - | - | - |
| 25 | 0,50 | 8 | • 5 6000 025 050 | 64 A | 19,95 | • 5 6001 025 050 | 20 B | 19,95 |
| 25 | 0,60 | 8 | • 5 6000 025 060 | 64 A | 19,95 | • 5 6001 025 060 | 20 B | 19,95 |
| 25 | 0,70 | 8 | • 5 6000 025 070 | 48 A | 22,00 | • 5 6001 025 070 | 20 B | 22,00 |
| 25 | 0,80 | 8 | • 5 6000 025 080 | 48 A | 24,60 | • 5 6001 025 080 | 20 B | 24,60 |
| 25 | 0,90 | 8 | • 5 6000 025 090 | 48 A | 26,60 | • 5 6001 025 090 | 20 B | 26,60 |
| 25 | 1,00 | 8 | • 5 6000 025 100 | 48 A | 26,60 | • 5 6001 025 100 | 20 B | 26,60 |
| 25 | 1,10 | 8 | % 5 6000 025 110 | 48 A | 16,10 | - | - | - |

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1064

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Index

Anwendung siehe Seite
Application see page

1062



1062



| Ø | Stärke Thickness | Bohrung Bore | Art. | DIN 1837A | € | Art. | DIN 1838B | € |
|----|---------------------|-----------------|------------------|-----------|--------|------------------|-----------|-------|
| | | | 5 6000 | | | 5 6001 | | |
| 25 | 1,20 | 8 | • 5 6000 025 120 | 48 A | 29,80 | % 5 6001 025 120 | 20 B | 16,50 |
| 25 | 1,30 | 8 | % 5 6000 025 130 | 40 A | 17,70 | - | - | - |
| 25 | 1,40 | 8 | % 5 6000 025 140 | 40 A | 18,40 | - | - | - |
| 25 | 1,50 | 8 | % 5 6000 025 150 | 40 A | 18,40 | • 5 6001 025 150 | 20 B | 33,25 |
| 25 | 1,60 | 8 | • 5 6000 025 160 | 40 A | 36,60 | - | - | - |
| 25 | 1,70 | 8 | • 5 6000 025 170 | 40 A | 36,60 | - | - | - |
| 25 | 1,80 | 8 | % 5 6000 025 180 | 40 A | 21,00 | • 5 6001 025 180 | 20 B | 37,90 |
| 25 | 1,90 | 8 | - | - | - | - | - | - |
| 25 | 2,00 | 8 | • 5 6000 025 200 | 40 A | 41,90 | • 5 6001 025 200 | 20 B | 41,90 |
| 25 | 2,50 | 8 | • 5 6000 025 250 | 40 A | 48,70 | • 5 6001 025 250 | 20 B | 48,70 |
| 25 | 3,00 | 8 | % 5 6000 025 300 | 32 A | 30,15 | • 5 6001 025 300 | 20 B | 54,45 |
| 25 | 3,50 | 8 | % 5 6000 025 350 | 32 A | 35,75 | - | - | - |
| 25 | 4,00 | 8 | % 5 6000 025 400 | 32 A | 40,65 | • 5 6001 025 400 | 20 B | 73,40 |
| 25 | 5,00 | 8 | • 5 6000 025 500 | 32 A | 87,95 | % 5 6001 025 500 | 20 B | 48,70 |
| 25 | 6,00 | 8 | % 5 6000 025 600 | 24 A | 57,45 | - | - | - |
| 30 | 0,10 | 8 | • 5 6000 030 010 | 100 A | 30,40 | - | - | - |
| 30 | 0,15 | 8 | • 5 6000 030 015 | 100 A | 24,10 | - | - | - |
| 30 | 0,20 | 8 | • 5 6000 030 020 | 100 A | 20,25 | • 5 6001 030 020 | 30 B | 20,25 |
| 30 | 0,25 | 8 | • 5 6000 030 025 | 100 A | 20,25 | % 5 6001 030 025 | 30 B | 11,20 |
| 30 | 0,30 | 8 | • 5 6000 030 030 | 80 A | 20,25 | • 5 6001 030 030 | 30 B | 20,25 |
| 30 | 0,35 | 8 | • 5 6000 030 035 | 80 A | 20,90 | - | - | - |
| 30 | 0,40 | 8 | • 5 6000 030 040 | 80 A | 20,90 | % 5 6001 030 040 | 30 B | 11,60 |
| 30 | 0,45 | 8 | • 5 6000 030 045 | 80 A | 21,55 | - | - | - |
| 30 | 0,50 | 8 | • 5 6000 030 050 | 80 A | 21,55 | % 5 6001 030 050 | 30 B | 11,95 |
| 30 | 0,60 | 8 | • 5 6000 030 060 | 64 A | 23,35 | % 5 6001 030 060 | 30 B | 12,80 |
| 30 | 0,70 | 8 | • 5 6000 030 070 | 64 A | 27,20 | % 5 6001 030 070 | 30 B | 15,05 |
| 30 | 0,80 | 8 | • 5 6000 030 080 | 64 A | 27,90 | • 5 6001 030 080 | 24 B | 27,90 |
| 30 | 0,90 | 8 | % 5 6000 030 090 | 64 A | 16,50 | - | - | - |
| 30 | 1,00 | 8 | • 5 6000 030 100 | 64 A | 30,40 | • 5 6001 030 100 | 24 B | 30,40 |
| 30 | 1,10 | 8 | • 5 6000 030 110 | 48 A | 32,90 | - | - | - |
| 30 | 1,20 | 8 | • 5 6000 030 120 | 48 A | 34,20 | • 5 6001 030 120 | 24 B | 34,20 |
| 30 | 1,30 | 8 | • 5 6000 030 130 | 48 A | 37,35 | - | - | - |
| 30 | 1,40 | 8 | • 5 6000 030 140 | 48 A | 39,25 | - | - | - |
| 30 | 1,50 | 8 | % 5 6000 030 150 | 48 A | 22,45 | • 5 6001 030 150 | 24 B | 40,55 |
| 30 | 1,60 | 8 | • 5 6000 030 160 | 48 A | 42,40 | • 5 6001 030 160 | 24 B | 42,40 |
| 30 | 1,70 | 8 | • 5 6000 030 170 | 48 A | 44,30 | - | - | - |
| 30 | 1,80 | 8 | • 5 6000 030 180 | 48 A | 44,95 | • 5 6001 030 180 | 24 B | 44,95 |
| 30 | 1,90 | 8 | % 5 6000 030 190 | 48 A | 25,95 | - | - | - |
| 30 | 2,00 | 8 | • 5 6000 030 200 | 48 A | 48,10 | • 5 6001 030 200 | 24 B | 48,10 |
| 30 | 2,50 | 8 | • 5 6000 030 250 | 40 A | 55,05 | • 5 6001 030 250 | 24 B | 55,05 |
| 30 | 3,00 | 8 | • 5 6000 030 300 | 40 A | 62,00 | % 5 6001 030 300 | 24 B | 34,35 |
| 30 | 3,50 | 8 | % 5 6000 030 350 | 40 A | 40,65 | - | - | - |
| 30 | 4,00 | 8 | % 5 6000 030 400 | 40 A | 46,25 | % 5 6001 030 400 | 24 B | 46,25 |
| 30 | 5,00 | 8 | % 5 6000 030 500 | 32 A | 55,35 | % 5 6001 030 500 | 24 B | 55,35 |
| 30 | 6,00 | 8 | % 5 6000 030 600 | 32 A | 64,45 | % 5 6001 030 600 | 24 B | 64,45 |
| 40 | 0,10 | 10 | • 5 6000 040 010 | 128 A | 38,55 | - | - | - |
| 40 | 0,15 | 10 | • 5 6000 040 015 | 128 A | 31,95 | - | - | - |
| 40 | 0,20 | 10 | • 5 6000 040 020 | 128 A | 27,95 | • 5 6001 040 020 | 40 B | 27,95 |
| 40 | 0,25 | 10 | • 5 6000 040 025 | 100 A | 27,95 | • 5 6001 040 025 | 40 B | 27,95 |
| 40 | 0,30 | 10 | • 5 6000 040 030 | 100 A | 27,95 | • 5 6001 040 030 | 40 B | 27,95 |
| 40 | 0,35 | 10 | • 5 6000 040 035 | 100 A | 27,95 | - | - | - |
| 40 | 0,40 | 10 | • 5 6000 040 040 | 100 A | 29,25 | % 5 6001 040 040 | 40 B | 16,20 |
| 40 | 0,45 | 10 | • 5 6000 040 045 | 80 A | 31,05 | - | - | - |
| 40 | 0,50 | 10 | • 5 6000 040 050 | 80 A | 31,05 | • 5 6001 040 050 | 40 B | 31,05 |
| 40 | 0,60 | 10 | • 5 6000 040 060 | 80 A | 31,95 | - | - | - |
| 40 | 0,70 | 10 | • 5 6000 040 070 | 80 A | 36,10 | % 5 6001 040 070 | 40 B | 20,00 |
| 40 | 0,80 | 10 | • 5 6000 040 080 | 80 A | 36,75 | • 5 6001 040 080 | 32 B | 36,75 |
| 40 | 0,90 | 10 | • 5 6000 040 090 | 64 A | 37,90 | % 5 6001 040 090 | 32 B | 21,00 |
| 40 | 1,00 | 10 | • 5 6000 040 100 | 64 A | 39,25 | • 5 6001 040 100 | 32 B | 39,25 |
| 40 | 1,10 | 10 | • 5 6000 040 110 | 64 A | 40,60 | - | - | - |
| 40 | 1,20 | 10 | • 5 6000 040 120 | 64 A | 41,90 | • 5 6001 040 120 | 32 B | 41,90 |
| 40 | 1,30 | 10 | • 5 6000 040 130 | 64 A | 42,50 | - | - | - |
| 40 | 1,40 | 10 | • 5 6000 040 140 | 64 A | 45,20 | - | - | - |
| 40 | 1,50 | 10 | • 5 6000 040 150 | 64 A | 46,50 | • 5 6001 040 150 | 32 B | 46,50 |
| 40 | 1,60 | 10 | • 5 6000 040 160 | 64 A | 47,85 | • 5 6001 040 160 | 32 B | 47,85 |
| 40 | 1,70 | 10 | % 5 6000 040 170 | 48 A | 28,00 | - | - | - |
| 40 | 1,80 | 10 | • 5 6000 040 180 | 48 A | 51,85 | • 5 6001 040 180 | 24 B | 51,85 |
| 40 | 1,90 | 10 | - | - | - | - | - | - |
| 40 | 2,00 | 10 | • 5 6000 040 200 | 48 A | 54,45 | • 5 6001 040 200 | 24 B | 54,45 |
| 40 | 2,50 | 10 | • 5 6000 040 250 | 48 A | 69,15 | • 5 6001 040 250 | 24 B | 69,15 |
| 40 | 3,00 | 10 | • 5 6000 040 300 | 48 A | 79,75 | • 5 6001 040 300 | 24 B | 79,75 |
| 40 | 3,50 | 10 | % 5 6000 040 350 | 40 A | 49,30 | - | - | - |
| 40 | 4,00 | 10 | • 5 6000 040 400 | 40 A | 98,35 | • 5 6001 040 400 | 20 B | 98,35 |
| 40 | 5,00 | 10 | % 5 6000 040 500 | 40 A | 64,45 | % 5 6001 040 500 | 20 B | 64,45 |
| 40 | 6,00 | 10 | • 5 6000 040 600 | 40 A | 134,10 | % 5 6001 040 600 | 20 B | 74,25 |

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Karnasch® VOLLHARTMETALL-KREISSÄGEBLÄTTER NACH DIN SOLID CARBIDE METAL CIRCULAR SAW BLADES ACCORDING DIN

Anwendung siehe Seite
Application see page

1062



1062



| Ø | Stärke Thickness | Bohrung Bore | 1062 | | | 1062 | | |
|----|---------------------|-----------------|-----------------------|------------------|--------|-----------------------|------------------|--------|
| | | | Art. 5 6000 | DIN 1837A "A" | € | Art. 5 6001 | DIN 1838B "B" | € |
| 50 | 0,20 | 13 | ● 5 6000 050 020 | 128 A | 42,80 | - | - | - |
| 50 | 0,25 | 13 | ● 5 6000 050 025 | 128 A | 40,55 | - | - | - |
| 50 | 0,30 | 13 | ● 5 6000 050 030 | 128 A | 20,60 | - | - | - |
| 50 | 0,35 | 13 | ● 5 6000 050 035 | 100 A | 20,60 | - | - | - |
| 50 | 0,40 | 13 | ● 5 6000 050 040 | 100 A | 20,60 | - | - | - |
| 50 | 0,45 | 13 | ● 5 6000 050 045 | 100 A | 21,35 | - | - | - |
| 50 | 0,50 | 13 | ● 5 6000 050 050 | 100 A | 38,55 | ● 5 6001 050 050 | 48 B | 38,55 |
| 50 | 0,60 | 13 | ● 5 6000 050 060 | 100 A | 38,55 | ● 5 6001 050 060 | 48 B | 38,55 |
| 50 | 0,70 | 13 | ● 5 6000 050 070 | 80 A | 40,60 | ● 5 6001 050 070 | 40 B | 40,60 |
| 50 | 0,80 | 13 | ● 5 6000 050 080 | 80 A | 43,90 | ● 5 6001 050 080 | 40 B | 43,90 |
| 50 | 0,90 | 13 | ● 5 6000 050 090 | 80 A | 45,20 | - | - | - |
| 50 | 1,00 | 13 | ● 5 6000 050 100 | 80 A | 46,50 | ● 5 6001 050 100 | 40 B | 46,50 |
| 50 | 1,10 | 13 | ● 5 6000 050 110 | 80 A | 26,50 | - | - | - |
| 50 | 1,20 | 13 | ● 5 6000 050 120 | 80 A | 49,20 | ● 5 6001 050 120 | 40 B | 49,20 |
| 50 | 1,30 | 13 | ● 5 6000 050 130 | 64 A | 30,55 | - | - | - |
| 50 | 1,40 | 13 | ● 5 6000 050 140 | 64 A | 56,55 | - | - | - |
| 50 | 1,50 | 13 | ● 5 6000 050 150 | 64 A | 59,15 | ● 5 6001 050 150 | 32 B | 59,15 |
| 50 | 1,60 | 13 | ● 5 6000 050 160 | 64 A | 60,50 | ● 5 6001 050 160 | 32 B | 60,50 |
| 50 | 1,70 | 13 | ● 5 6000 050 170 | 64 A | 61,15 | - | - | - |
| 50 | 1,80 | 13 | ● 5 6000 050 180 | 64 A | 36,05 | ● 5 6001 050 180 | 32 B | 36,05 |
| 50 | 1,90 | 13 | ● 5 6000 050 190 | 64 A | 65,15 | - | - | - |
| 50 | 2,00 | 13 | ● 5 6000 050 200 | 64 A | 67,75 | ● 5 6001 050 200 | 32 B | 67,75 |
| 50 | 2,50 | 13 | ● 5 6000 050 250 | 64 A | 82,40 | ● 5 6001 050 250 | 32 B | 82,40 |
| 50 | 3,00 | 13 | ● 5 6000 050 300 | 48 A | 95,70 | ● 5 6001 050 300 | 24 B | 95,70 |
| 50 | 3,50 | 13 | ● 5 6000 050 350 | 48 A | 109,00 | - | - | - |
| 50 | 4,00 | 13 | ● 5 6000 050 400 | 48 A | 64,00 | ● 5 6001 050 400 | 24 B | 64,00 |
| 50 | 5,00 | 13 | ● 5 6000 050 500 | 48 A | 78,00 | ● 5 6001 050 500 | 24 B | 140,85 |
| 50 | 6,00 | 13 | ● 5 6000 050 600 | 40 A | 165,75 | ● 5 6001 050 600 | 20 B | 91,75 |
| 63 | 0,20 | 16 | ● 5 6000 063 020 | 160 A | 34,35 | - | - | - |
| 63 | 0,25 | 16 | ● 5 6000 063 025 | 128 A | 56,95 | - | - | - |
| 63 | 0,30 | 16 | ● 5 6000 063 030 | 128 A | 52,55 | - | - | - |
| 63 | 0,35 | 16 | ● 5 6000 063 035 | 128 A | 29,10 | - | - | - |
| 63 | 0,40 | 16 | ● 5 6000 063 040 | 128 A | 52,55 | ● 5 6001 063 040 | 64 B | 52,55 |
| 63 | 0,45 | 16 | ● 5 6000 063 045 | 128 A | 51,20 | - | - | - |
| 63 | 0,50 | 16 | ● 5 6000 063 050 | 128 A | 51,20 | ● 5 6001 063 050 | 64 B | 51,20 |
| 63 | 0,60 | 16 | ● 5 6000 063 060 | 100 A | 52,55 | ● 5 6001 063 060 | 48 B | 52,55 |
| 63 | 0,70 | 16 | ● 5 6000 063 070 | 100 A | 59,15 | ● 5 6001 063 070 | 48 B | 59,15 |
| 63 | 0,80 | 16 | ● 5 6000 063 080 | 100 A | 62,00 | ● 5 6001 063 080 | 48 B | 62,00 |
| 63 | 0,90 | 16 | ● 5 6000 063 090 | 100 A | 35,75 | ● 5 6001 063 090 | 48 B | 35,75 |
| 63 | 1,00 | 16 | ● 5 6000 063 100 | 100 A | 65,80 | ● 5 6001 063 100 | 48 B | 65,80 |
| 63 | 1,10 | 16 | ● 5 6000 063 110 | 80 A | 39,00 | - | - | - |
| 63 | 1,20 | 16 | ● 5 6000 063 120 | 80 A | 72,15 | ● 5 6001 063 120 | 40 B | 72,15 |
| 63 | 1,30 | 16 | ● 5 6000 063 130 | 80 A | 74,05 | - | - | - |
| 63 | 1,40 | 16 | ● 5 6000 063 140 | 80 A | 75,35 | - | - | - |
| 63 | 1,50 | 16 | ● 5 6000 063 150 | 80 A | 77,05 | ● 5 6001 063 150 | 40 B | 77,05 |
| 63 | 1,60 | 16 | ● 5 6000 063 160 | 80 A | 81,05 | ● 5 6001 063 160 | 40 B | 81,05 |
| 63 | 1,70 | 16 | ● 5 6000 063 170 | 80 A | 47,10 | - | - | - |
| 63 | 1,80 | 16 | ● 5 6000 063 180 | 80 A | 86,40 | ● 5 6001 063 180 | 40 B | 47,85 |
| 63 | 1,90 | 16 | - | - | - | - | - | - |
| 63 | 2,00 | 16 | ● 5 6000 063 200 | 80 A | 91,15 | ● 5 6001 063 200 | 40 B | 91,15 |
| 63 | 2,50 | 16 | ● 5 6000 063 250 | 64 A | 110,05 | ● 5 6001 063 250 | 32 B | 60,95 |
| 63 | 3,00 | 16 | ● 5 6000 063 300 | 64 A | 124,65 | ● 5 6001 063 300 | 32 B | 124,65 |
| 63 | 3,50 | 16 | ● 5 6000 063 350 | 64 A | 144,80 | - | - | - |
| 63 | 4,00 | 16 | ● 5 6000 063 400 | 64 A | 160,70 | ● 5 6001 063 400 | 32 B | 160,70 |
| 63 | 5,00 | 16 | ● 5 6000 063 500 | 48 A | 193,60 | ● 5 6001 063 500 | 24 B | 193,60 |
| 63 | 6,00 | 16 | ● 5 6000 063 600 | 48 A | 226,50 | ● 5 6001 063 600 | 24 B | 125,40 |
| 80 | 0,30 | 22 | ● 5 6000 080 030 | 160 A | 67,90 | - | - | - |
| 80 | 0,35 | 22 | - | - | - | - | - | - |
| 80 | 0,40 | 22 | ● 5 6000 080 040 | 160 A | 95,75 | - | - | - |
| 80 | 0,45 | 22 | - | - | - | - | - | - |
| 80 | 0,50 | 22 | ● 5 6000 080 050 | 128 A | 86,45 | ● 5 6001 080 050 | 64 B | 40,60 |
| 80 | 0,60 | 22 | ● 5 6000 080 060 | 128 A | 83,80 | ● 5 6001 080 060 | 64 B | 83,80 |
| 80 | 0,70 | 22 | ● 5 6000 080 070 | 128 A | 50,45 | ● 5 6001 080 070 | 64 B | 50,45 |
| 80 | 0,80 | 22 | ● 5 6000 080 080 | 128 A | 91,15 | ● 5 6001 080 080 | 64 B | 91,15 |
| 80 | 0,90 | 22 | ● 5 6000 080 090 | 100 A | 52,70 | - | - | - |
| 80 | 1,00 | 22 | ● 5 6000 080 100 | 100 A | 95,20 | ● 5 6001 080 100 | 48 B | 95,20 |
| 80 | 1,10 | 22 | ● 5 6000 080 110 | 100 A | 97,85 | - | - | - |
| 80 | 1,20 | 22 | ● 5 6000 080 120 | 100 A | 101,90 | ● 5 6001 080 120 | 48 B | 101,90 |
| 80 | 1,30 | 22 | ● 5 6000 080 130 | 100 A | 105,85 | - | - | - |
| 80 | 1,40 | 22 | ● 5 6000 080 140 | 100 A | 109,90 | - | - | - |
| 80 | 1,50 | 22 | ● 5 6000 080 150 | 100 A | 111,05 | ● 5 6001 080 150 | 48 B | 111,05 |
| 80 | 1,60 | 22 | ● 5 6000 080 160 | 100 A | 62,90 | ● 5 6001 080 160 | 48 B | 113,65 |
| 80 | 1,70 | 22 | ● 5 6000 080 170 | 80 A | 123,85 | - | - | - |
| 80 | 1,80 | 22 | ● 5 6000 080 180 | 80 A | 125,10 | ● 5 6001 080 180 | 40 B | 125,10 |
| 80 | 1,90 | 22 | ● 5 6000 080 190 | 80 A | 71,25 | - | - | - |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

1066

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Index

Anwendung siehe Seite
Application see page

1062



1062

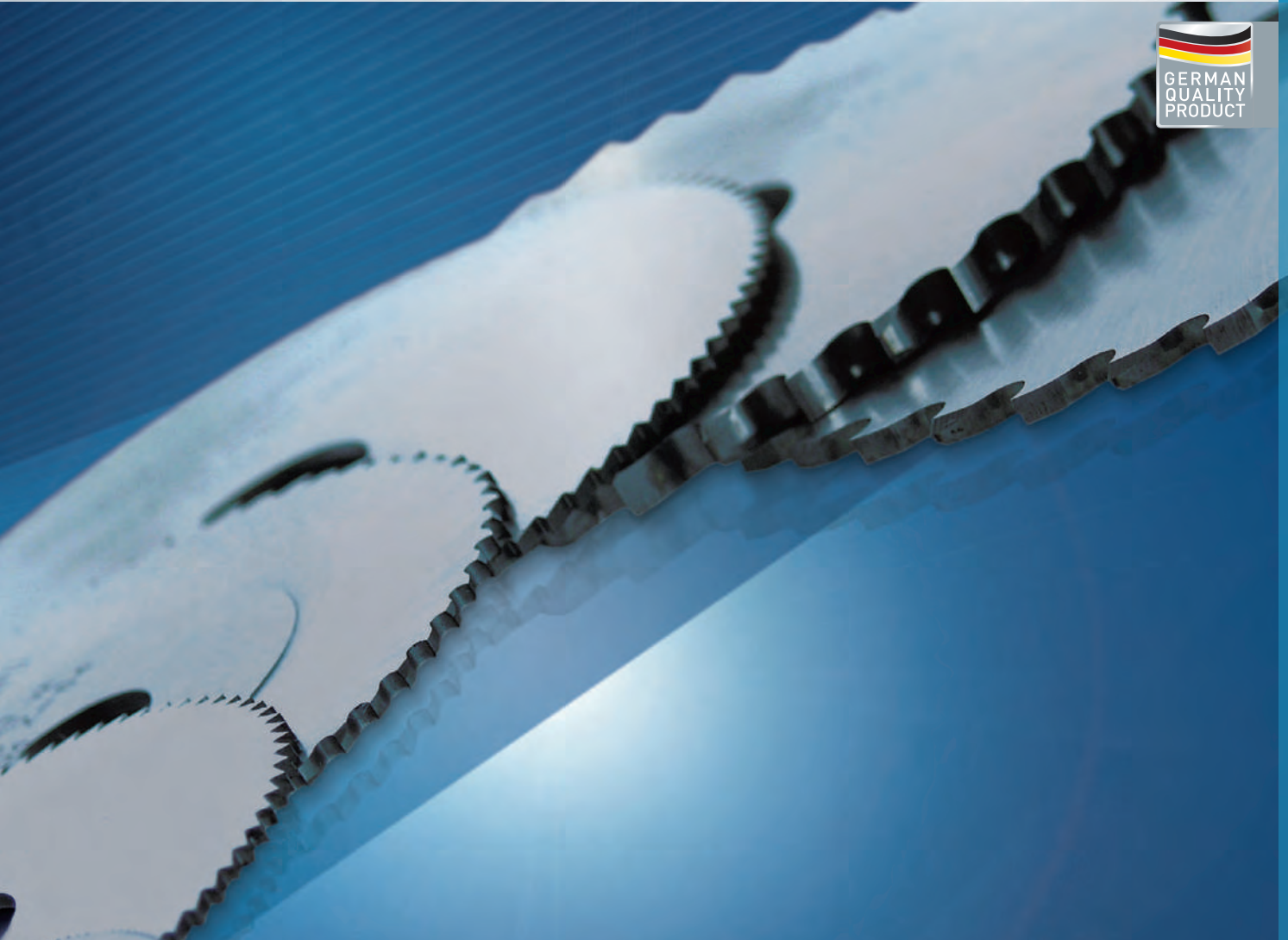


| Ø | Stärke Thickness | Bohrung Bore | Art. | DIN 1837A | € | Art. | DIN 1838B | € |
|-----|---------------------|-----------------|------------------|-----------|--------|------------------|-----------|--------|
| | | | 5 6000 | | | 5 6001 | | |
| 80 | ± 0,1 | ± 0,01 | | | | | | |
| 80 | 2,00 | 22 | • 5 6000 080 200 | 80 A | 132,70 | • 5 6001 080 200 | 40 B | 132,70 |
| 80 | 2,50 | 22 | • 5 6000 080 250 | 80 A | 156,75 | • 5 6001 080 250 | 40 B | 156,75 |
| 80 | 3,00 | 22 | • 5 6000 080 300 | 80 A | 178,65 | • 5 6001 080 300 | 40 B | 178,65 |
| 80 | 3,50 | 22 | • 5 6000 080 350 | 64 A | 207,75 | - | - | - |
| 80 | 4,00 | 22 | • 5 6000 080 400 | 64 A | 233,60 | % 5 6001 080 400 | 32 B | 129,30 |
| 80 | 5,00 | 22 | % 5 6000 080 500 | 64 A | 159,70 | % 5 6001 080 500 | 32 B | 153,85 |
| 80 | 6,00 | 22 | % 5 6000 080 600 | 64 A | 183,10 | % 5 6001 080 600 | 32 B | 183,10 |
| 100 | 0,50 | 22 | • 5 6000 100 050 | 160 A | 158,15 | - | - | - |
| 100 | 0,60 | 22 | • 5 6000 100 060 | 160 A | 152,80 | % 5 6001 100 060 | 80 B | 84,60 |
| 100 | 0,70 | 22 | • 5 6000 100 070 | 128 A | 146,10 | % 5 6001 100 070 | 64 B | 80,90 |
| 100 | 0,80 | 22 | • 5 6000 100 080 | 128 A | 128,95 | • 5 6001 100 080 | 64 B | 128,95 |
| 100 | 0,90 | 22 | % 5 6000 100 090 | 128 A | 72,70 | • 5 6001 100 090 | 64 B | 131,30 |
| 100 | 1,00 | 22 | • 5 6000 100 100 | 128 A | 126,35 | • 5 6001 100 100 | 64 B | 126,35 |
| 100 | 1,10 | 22 | % 5 6000 100 110 | 128 A | 74,95 | - | - | - |
| 100 | 1,20 | 22 | • 5 6000 100 120 | 128 A | 137,85 | • 5 6001 100 120 | 64 B | 137,85 |
| 100 | 1,30 | 22 | % 5 6000 100 130 | 100 A | 80,60 | - | - | - |
| 100 | 1,40 | 22 | • 5 6000 100 140 | 100 A | 150,65 | - | - | - |
| 100 | 1,50 | 22 | • 5 6000 100 150 | 100 A | 155,75 | • 5 6001 100 150 | 48 B | 155,75 |
| 100 | 1,60 | 22 | • 5 6000 100 160 | 100 A | 160,85 | • 5 6001 100 160 | 48 B | 160,85 |
| 100 | 1,70 | 22 | % 5 6000 100 170 | 100 A | 93,50 | - | - | - |
| 100 | 1,80 | 22 | - | - | - | - | - | - |
| 100 | 1,90 | 22 | • 5 6000 100 190 | 100 A | 191,45 | - | - | - |
| 100 | 2,00 | 22 | • 5 6000 100 200 | 100 A | 194,05 | • 5 6001 100 200 | 48 B | 194,05 |
| 100 | 2,50 | 22 | % 5 6000 100 250 | 100 A | 125,80 | % 5 6001 100 250 | 48 B | 125,80 |
| 100 | 3,00 | 22 | • 5 6000 100 300 | 80 A | 270,55 | • 5 6001 100 300 | 40 B | 270,55 |
| 100 | 3,50 | 22 | % 5 6000 100 350 | 80 A | 171,70 | - | - | - |
| 100 | 4,00 | 22 | • 5 6000 100 400 | 80 A | 348,40 | % 5 6001 100 400 | 40 B | 192,90 |
| 100 | 5,00 | 22 | % 5 6000 100 500 | 80 A | 226,65 | - | - | - |
| 100 | 6,00 | 22 | % 5 6000 100 600 | 64 A | 268,85 | % 5 6001 100 600 | 32 B | 268,85 |
| 125 | 0,60 | 22 | • 5 6000 125 060 | 160 A | 235,45 | - | - | - |
| 125 | 0,70 | 22 | - | - | - | - | - | - |
| 125 | 0,80 | 22 | • 5 6000 125 080 | 160 A | 227,30 | % 5 6001 125 080 | 80 B | 125,85 |
| 125 | 0,90 | 22 | • 5 6000 125 090 | 160 A | 223,25 | - | - | - |
| 125 | 1,00 | 22 | • 5 6000 125 100 | 160 A | 208,80 | % 5 6001 125 100 | 80 B | 115,60 |
| 125 | 1,10 | 22 | - | - | - | - | - | - |
| 125 | 1,20 | 22 | • 5 6000 125 120 | 128 A | 221,65 | • 5 6001 125 120 | 64 B | 221,65 |
| 125 | 1,40 | 22 | % 5 6000 125 140 | 128 A | 131,85 | - | - | - |
| 125 | 1,50 | 22 | • 5 6000 125 150 | 128 A | 247,60 | - | - | - |
| 125 | 1,60 | 22 | % 5 6000 125 160 | 128 A | 142,35 | • 5 6001 125 160 | 64 B | 257,15 |
| 125 | 1,80 | 22 | - | - | - | - | - | - |
| 125 | 2,00 | 22 | • 5 6000 125 200 | 128 A | 300,40 | • 5 6001 125 200 | 64 B | 300,40 |
| 125 | 2,50 | 22 | • 5 6000 125 250 | 100 A | 353,15 | % 5 6001 125 250 | 48 B | 195,50 |
| 125 | 3,00 | 22 | % 5 6000 125 300 | 100 A | 230,70 | • 5 6001 125 300 | 48 B | 416,70 |
| 125 | 3,50 | 22 | % 5 6000 125 350 | 100 A | 265,15 | - | - | - |
| 125 | 4,00 | 22 | % 5 6000 125 400 | 100 A | 301,85 | • 5 6001 125 400 | 48 B | 545,25 |
| 125 | 5,00 | 22 | % 5 6000 125 500 | 100 A | 333,00 | • 5 6001 125 500 | 40 B | 601,55 |
| 125 | 6,00 | 22 | - | - | - | % 5 6001 125 600 | 40 B | 407,30 |
| 150 | 1,00 | 32 | ○ 5 6000 150 100 | 150 A | - | - | - | - |
| 150 | 1,20 | 32 | ○ 5 6000 150 120 | 150 A | - | - | - | - |
| 150 | 1,50 | 32 | ○ 5 6000 150 150 | 150 A | - | - | - | - |
| 150 | 1,60 | 32 | ○ 5 6000 150 160 | 150 A | - | - | - | - |
| 150 | 1,80 | 32 | ○ 5 6000 150 180 | 128 A | - | - | - | - |
| 150 | 2,00 | 32 | ○ 5 6000 150 200 | 128 A | - | - | - | - |
| 150 | 2,50 | 32 | ○ 5 6000 150 250 | 128 A | - | - | - | - |
| 150 | 3,00 | 32 | ○ 5 6000 150 300 | 128 A | - | - | - | - |
| 150 | 4,00 | 32 | ○ 5 6000 150 400 | 100 A | - | - | - | - |
| 160 | 1,00 | 32 | ○ 5 6000 160 100 | 160 A | - | - | - | - |
| 160 | 1,20 | 32 | ○ 5 6000 160 120 | 160 A | - | - | - | - |
| 160 | 1,50 | 32 | % 5 6000 160 150 | 160 A | 169,95 | - | - | - |
| 160 | 1,60 | 32 | - | - | - | - | - | - |
| 160 | 1,80 | 32 | % 5 6000 160 180 | 128 A | 195,75 | - | - | - |
| 160 | 2,00 | 32 | - | - | - | - | - | - |
| 160 | 2,50 | 32 | - | - | - | - | - | - |
| 160 | 3,00 | 32 | ○ 5 6000 160 300 | 128 A | - | - | - | - |
| 160 | 4,00 | 32 | ○ 5 6000 160 400 | 128 A | - | - | - | - |
| 200 | 1,20 | 32 | ○ 5 6000 200 120 | 200 A | - | - | - | - |
| 200 | 1,50 | 32 | ○ 5 6000 200 150 | 160 A | - | - | - | - |
| 200 | 1,60 | 32 | ○ 5 6000 200 160 | 160 A | - | - | - | - |
| 200 | 1,80 | 32 | ○ 5 6000 200 180 | 160 A | - | - | - | - |
| 200 | 2,00 | 32 | ○ 5 6000 200 200 | 160 A | - | - | - | - |
| 200 | 2,50 | 32 | ○ 5 6000 200 250 | 160 A | - | - | - | - |
| 200 | 3,00 | 32 | ○ 5 6000 200 300 | 128 A | - | - | - | - |
| 200 | 4,00 | 32 | ○ 5 6000 200 400 | 128 A | - | - | - | - |



DIN-HSS-SÄGEN

DIN-HSS-SAW BLADES



1



2



3



4



5



6



7



8



9



Index

DIN-HSS

5.4

KONTAKT | CONTACT

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5 5000

DIN 1837A Blätter kommen mit feingezahnten Winkelzähnen.

Hauptanwendungsgebiet:

- Feine Schlitz- und Trennarbeiten (Feinmechanik, Schmuckindustrie).
- Ideal auch zum Schlitzten von Schrauben.
- Zum Trennen/Schlitzten von dünnwandigen Profilen und kurzspanenden Werkstücken aus Stahl, Guss, Nichteisenmetalle, Kunststoffe.

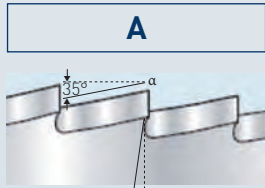
Maximal empfohlene Schnitttiefe ca. 3 mm

DIN 1837A blades comes with fine teeth and tooth shape form A.

Main field of application:

- This shape is mostly used for fine slotting and cutting works (micro-mechanics and jewellery).
- Excellent also for screw slotting.
- For cutting and slotting thin walled profiles and short chipping work pieces made of steel, cast iron, non ferrous metals, plastics.

Maximum recommended cutting depth approx. 3 mm



5 5001

DIN 1838B Blätter kommen mit grobgezahnten Bogenzähnen.

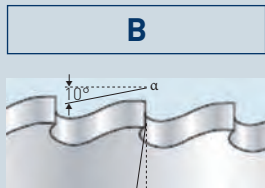
Hauptanwendungsgebiet:

- Die am meisten verwendete Universalverzahnung für Schlitz- und Trennarbeiten von dickwandigen Profilen / Vollmaterial **ab ca. 3 mm**.
- Generell für Arbeiten an langspanenden Werkstücken aus Stahl, Guss, Nichteisenmetalle.

DIN 1838B blades comes with rough teeth and tooth form B.

Main field of application:

- The most widely used universal toothing for slotting and cutting thick walled profiles and solid material **from 3 mm**.
- In general for cutting long chipping work pieces made of steel, cast iron, non ferrous metals.



5 5002

DIN 1838C Blätter kommen je nach Durchmesser mit grobgezahnten Bogenzähnen wechselseitig angefast (Zahnform BW) oder mit Vor- und Nachschneider (Zahnform C).

Diese Zahnformen reduzieren die Schnittkräfte und erlauben hierdurch eine deutlich erhöhte Zerspanleistung gegenüber DIN 1838B

Hauptanwendungsgebiet:

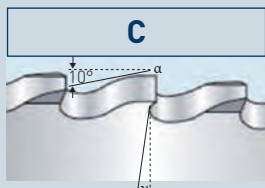
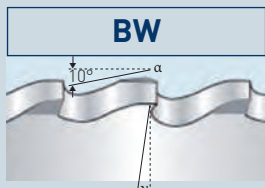
- Für Schlitz- und Trennarbeiten von dick bis sehr dickwandigen Profilen ab ca. 3 mm.
- Speziell hervorragend für Vollmaterial **ab ca. 3 mm**.
- Generell für Arbeiten an langspanenden Werkstücken aus Stahl, Guss, Nichteisenmetalle.

DIN 1838C blades comes with rough teeth and tooth form B additionally, depending on the diameter, alternative top beveled (tooth shape BW) or with precut and finishing cut tooth (tooth shape C).

This tooth forms reduce cutting forces and thus allow a significantly increased cutting performance compared to DIN 1838B






Main field of application:

- For slotting and cutting thick, up to very thick profiles from 3 mm.
- Especially excellent for cutting solid material **from 3 mm**.
- In general for slotting and cutting long chipping work pieces made of steel, cast iron, non ferrous metals.





ANWENDUNG · APPLICATION

| | | | | |
|--|---|---|---|---|
|  |  |  |  |  |
| Stahl Steel | Grauguss Grey cast iron | Alu Alu | Kupfer, Kupfer- legierungen Copper, copper alloys | Zinklegierung Zinc alloy |
| < 800 N | | | | |

Metallkreissägeblätter nach DIN 1840, Typ N sind grundsätzlich für mittelharte Metalle, Stähle bis zu 800 N/mm² anwendbar. Für besonders harte und zähe Werkstoffe empfehlen wir Typ "H" (Preis und Lieferzeit auf Anfrage). Für besonders weiche und zähe Werkstoffe empfehlen wir Typ "W" (Preis und Lieferzeit auf Anfrage).

Metal-circular saw blades according DIN 1840, type N are for medium hard metals and steels up to 800 N/mm². For particularly tough and hard and tough materials we recommend type "H" (Price and delivery time on request). For very soft and tough materials we recommend type "W" (Price and delivery time on request).

Richtwerte für den Einsatz HSS-DIN 1840 Typ "N" Kreissägeblätter
Recommended cutting data for HSS-DIN 1840 Typ "N" circular saws

| Werkstoffe Materials | | V _c (m/min) Schnittgeschwindigkeit Cutting speed | f _z (mm/z) Vorschub pro Zahn Feed per tooth |
|---|-------------------------|---|--|
| Stahl • Steel | < 500 N/mm ² | 25 - 50 | 0,02 - 0,04 |
| | < 800 N/mm ² | 15 - 30 | 0,02 - 0,03 |
| Guss • Cast Iron | | 15 - 25 | 0,02 - 0,05 |
| Aluminium Vollmaterial • Aluminum Solid | | 400 - 800 | 0,03 - 0,10 |
| Aluminium Profile • Aluminum Profile | | 800 - 1600 | 0,02 - 0,05 |
| Bronze • Bronze | | 200 - 400 | 0,02 - 0,06 |
| Kupfer • Copper | | 160 - 200 | 0,02 - 0,05 |
| Messing • Brass | | 200 - 400 | 0,02 - 0,04 |
| Zinklegierungen • Zinc Alloy | | 30 - 100 | 0,02 - 0,08 |

Festlegung der Schnittgeschwindigkeit V_c
Determination of cutting speed V_c

$$V_c \text{ (m/min)} = \frac{D \cdot \pi \cdot n}{1000}$$

- f_z (mm/z) = Vorschub pro Zahn · Feed per tooth
- D (mm) = Sägendurchmesser · Saw blade diameter
- Z = Anzahl der Zähne · Number of teeth
- n (min⁻¹) = Drehzahl · rpm

Festlegung der Vorschubgeschwindigkeit V_f
Determination of feed rate V_f

$$V_f \text{ (mm/min)} = f_z \cdot n \cdot Z$$

Festlegung der Drehzahl n
Determination of revolution speed n

$$n \text{ (min}^{-1}\text{)} = \frac{V_c \cdot 1000}{D \cdot \pi}$$



Karnasch® METALLKREISSÄGEBLÄTTER NACH DIN METAL CIRCULAR SAW BLADES ACCORDING DIN

Anwendung siehe Seite
Application see page

1070

1070

1070

| Ø | Stärke Thickness | Bohrung Bore | Bund Hub | Art. | DIN 1837A | € | Art. | DIN 1838B | € | Art. | DIN 1838C | € |
|----|---------------------|-----------------|-------------|------------------|-----------|-------|---------------|-----------|---|---------------|-------------|---|
| | | | | 5 5000 | "A" | | 5 5001 | "B" | | 5 5002 | "BW" "C" | |
| 20 | 0,20 | 5 | 10 | % 5 5000 020 020 | 80 A | 5,10 | - | - | - | - | - | - |
| 20 | 0,30 | 5 | 10 | • 5 5000 020 030 | 64 A | 12,85 | - | - | - | - | - | - |
| 20 | 0,40 | 5 | 10 | - | - | - | - | - | - | - | - | - |
| 20 | 0,50 | 5 | 10 | • 5 5000 020 050 | 48 A | 12,30 | - | - | - | - | - | - |
| 20 | 0,60 | 5 | 10 | % 5 5000 020 060 | 48 A | 4,40 | - | - | - | - | - | - |
| 20 | 0,80 | 5 | 10 | % 5 5000 020 080 | 48 A | 4,40 | - | - | - | - | - | - |
| 20 | 1,00 | 5 | 10 | • 5 5000 020 100 | 40 A | 12,55 | - | - | - | - | - | - |
| 20 | 1,20 | 5 | 10 | % 5 5000 020 120 | 40 A | 4,45 | - | - | - | - | - | - |
| 20 | 1,60 | 5 | 10 | % 5 5000 020 160 | 40 A | 5,45 | - | - | - | - | - | - |
| 20 | 2,00 | 5 | 10 | • 5 5000 020 200 | 32 A | 15,05 | - | - | - | - | - | - |
| 20 | 2,50 | 5 | 10 | % 5 5000 020 250 | 32 A | 6,00 | - | - | - | - | - | - |
| 20 | 3,00 | 5 | 10 | % 5 5000 020 300 | 32 A | 6,50 | - | - | - | - | - | - |
| 20 | 4,00 | 5 | 10 | % 5 5000 020 400 | 24 A | 9,20 | - | - | - | - | - | - |
| 25 | 0,20 | 8 | 12 | • 5 5000 025 020 | 80 A | 14,40 | - | - | - | - | - | - |
| 25 | 0,25 | 8 | 12 | % 5 5000 025 025 | 80 A | 5,20 | - | - | - | - | - | - |
| 25 | 0,30 | 8 | 12 | % 5 5000 025 030 | 80 A | 4,90 | - | - | - | - | - | - |
| 25 | 0,40 | 8 | 12 | % 5 5000 025 040 | 64 A | 4,90 | - | - | - | - | - | - |
| 25 | 0,50 | 8 | 12 | % 5 5000 025 050 | 64 A | 4,90 | - | - | - | - | - | - |
| 25 | 0,60 | 8 | 12 | • 5 5000 025 060 | 64 A | 12,45 | - | - | - | - | - | - |
| 25 | 0,80 | 8 | 12 | • 5 5000 025 080 | 48 A | 12,20 | - | - | - | - | - | - |
| 25 | 1,00 | 8 | 12 | • 5 5000 025 100 | 48 A | 13,20 | - | - | - | - | - | - |
| 25 | 1,20 | 8 | 12 | % 5 5000 025 120 | 48 A | 5,25 | - | - | - | - | - | - |
| 25 | 1,60 | 8 | 12 | % 5 5000 025 160 | 40 A | 5,50 | - | - | - | - | - | - |
| 25 | 2,00 | 8 | 12 | % 5 5000 025 200 | 40 A | 6,45 | - | - | - | - | - | - |
| 25 | 2,50 | 8 | 12 | % 5 5000 025 250 | 40 A | 7,15 | - | - | - | - | - | - |
| 25 | 3,00 | 8 | 12 | % 5 5000 025 300 | 32 A | 8,65 | - | - | - | - | - | - |
| 25 | 4,00 | 8 | 12 | - | - | - | - | - | - | - | - | - |
| 25 | 5,00 | 8 | 12 | % 5 5000 025 500 | 32 A | 12,50 | - | - | - | - | - | - |
| 25 | 6,00 | 8 | 12 | % 5 5000 025 600 | 24 A | 13,70 | - | - | - | - | - | - |
| 32 | 0,20 | 8 | 14 | % 5 5000 032 020 | 100 A | 5,30 | - | - | - | - | - | - |
| 32 | 0,25 | 8 | 14 | % 5 5000 032 025 | 100 A | 5,30 | - | - | - | - | - | - |
| 32 | 0,30 | 8 | 14 | % 5 5000 032 030 | 80 A | 4,95 | - | - | - | - | - | - |
| 32 | 0,40 | 8 | 14 | % 5 5000 032 040 | 80 A | 4,95 | - | - | - | - | - | - |
| 32 | 0,50 | 8 | 14 | % 5 5000 032 050 | 80 A | 4,95 | - | - | - | - | - | - |
| 32 | 0,60 | 8 | 14 | % 5 5000 032 060 | 64 A | 4,95 | - | - | - | - | - | - |
| 32 | 0,80 | 8 | 14 | % 5 5000 032 080 | 64 A | 5,05 | - | - | - | - | - | - |
| 32 | 1,00 | 8 | 14 | % 5 5000 032 100 | 64 A | 5,05 | - | - | - | - | - | - |
| 32 | 1,20 | 8 | 14 | % 5 5000 032 120 | 48 A | 5,30 | - | - | - | - | - | - |
| 32 | 1,60 | 8 | 14 | • 5 5000 032 160 | 48 A | 15,55 | - | - | - | - | - | - |
| 32 | 2,00 | 8 | 14 | • 5 5000 032 200 | 48 A | 16,70 | - | - | - | - | - | - |
| 32 | 2,50 | 8 | 14 | • 5 5000 032 250 | 40 A | 18,70 | - | - | - | - | - | - |
| 32 | 3,00 | 8 | 14 | • 5 5000 032 300 | 40 A | 21,30 | - | - | - | - | - | - |
| 32 | 4,00 | 8 | 14 | % 5 5000 032 400 | 40 A | 11,10 | - | - | - | - | - | - |
| 32 | 5,00 | 8 | 14 | % 5 5000 032 500 | 32 A | 12,30 | - | - | - | - | - | - |
| 32 | 6,00 | 8 | 14 | - | - | - | - | - | - | - | - | - |
| 40 | 0,20 | 10 | 18 | % 5 5000 040 020 | 128 A | 5,90 | - | - | - | - | - | - |
| 40 | 0,25 | 10 | 18 | % 5 5000 040 025 | 100 A | 5,90 | - | - | - | - | - | - |
| 40 | 0,30 | 10 | 18 | % 5 5000 040 030 | 100 A | 5,65 | - | - | - | - | - | - |
| 40 | 0,40 | 10 | 18 | % 5 5000 040 040 | 100 A | 5,65 | - | - | - | - | - | - |
| 40 | 0,50 | 10 | 18 | • 5 5000 040 050 | 80 A | 14,95 | - | - | - | - | - | - |
| 40 | 0,60 | 10 | 18 | • 5 5000 040 060 | 80 A | 14,55 | - | - | - | - | - | - |
| 40 | 0,80 | 10 | 18 | % 5 5000 040 080 | 80 A | 5,30 | - | - | - | - | - | - |
| 40 | 1,00 | 10 | 18 | • 5 5000 040 100 | 64 A | 14,55 | - | - | - | - | - | - |
| 40 | 1,20 | 10 | 18 | • 5 5000 040 120 | 64 A | 15,15 | - | - | - | - | - | - |

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1072

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- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

Anwendung siehe Seite
Application see page

| Anwendung siehe Seite Application see page | | | | 1070 | | | 1070 | | | 1070 | | |
|---|---------------------|-----------------|-------------|-----------------------|------------------|-------|-----------------------|------------------|-------|-----------------------|--------------------------|-------|
| Ø | Stärke Thickness | Bohrung Bore | Bund Hub | Art. 5 5000 | DIN 1837A "A" | € | Art. 5 5001 | DIN 1838B "B" | € | Art. 5 5002 | DIN 1838C "BW" "C" | € |
| 40 | 1,60 | 10 | 18 | ● 5 5000 040 160 | 64 A | 15,95 | - | - | - | - | - | - |
| 40 | 2,00 | 10 | 18 | ● 5 5000 040 200 | 48 A | 17,25 | - | - | - | - | - | - |
| 40 | 2,50 | 10 | 18 | ⊗ 5 5000 040 250 | 48 A | 7,55 | - | - | - | - | - | - |
| 40 | 3,00 | 10 | 18 | ⊗ 5 5000 040 300 | 48 A | 9,00 | - | - | - | - | - | - |
| 40 | 4,00 | 10 | 18 | ⊗ 5 5000 040 400 | 40 A | 11,45 | - | - | - | - | - | - |
| 40 | 5,00 | 10 | 18 | ⊗ 5 5000 040 500 | 40 A | 13,75 | - | - | - | - | - | - |
| 40 | 6,00 | 10 | 18 | ⊗ 5 5000 040 600 | 40 A | 14,95 | - | - | - | - | - | - |
| 50 | 0,20 | 13 | 32 | ⊗ 5 5000 050 020 | 128 A | 7,30 | - | - | - | - | - | - |
| 50 | 0,30 | 13 | 25 | - | - | - | - | - | - | - | - | - |
| 50 | 0,40 | 13 | 25 | ⊗ 5 5000 050 040 | 100 A | 6,65 | - | - | - | - | - | - |
| 50 | 0,50 | 13 | 25 | ● 5 5000 050 050 | 100 A | 16,25 | ⊗ 5 5001 050 050 | 48 B | 6,65 | - | - | - |
| 50 | 0,60 | 13 | 25 | ● 5 5000 050 060 | 100 A | 16,05 | ⊗ 5 5001 050 060 | 48 B | 6,65 | - | - | - |
| 50 | 0,80 | 13 | 25 | ● 5 5000 050 080 | 80 A | 15,65 | ● 5 5001 050 080 | 40 B | 15,65 | - | - | - |
| 50 | 1,00 | 13 | 25 | ● 5 5000 050 100 | 80 A | 16,05 | ● 5 5001 050 100 | 40 B | 16,05 | ● 5 5002 050 100 | 40 BW | 14,05 |
| 50 | 1,20 | 13 | 25 | ● 5 5000 050 120 | 80 A | 16,50 | ⊗ 5 5001 050 120 | 40 B | 6,45 | ⊗ 5 5002 050 120 | 40 BW | 8,05 |
| 50 | 1,60 | 13 | 25 | ● 5 5000 050 160 | 64 A | 18,15 | ⊗ 5 5001 050 160 | 32 B | 6,90 | ⊗ 5 5002 050 160 | 32 BW | 9,00 |
| 50 | 2,00 | 13 | 25 | ● 5 5000 050 200 | 64 A | 19,70 | - | - | - | ⊗ 5 5002 050 200 | 32 BW | 9,85 |
| 50 | 2,50 | 13 | 25 | ⊗ 5 5000 050 250 | 64 A | 9,60 | ⊗ 5 5001 050 250 | 32 B | 9,60 | ⊗ 5 5002 050 250 | 32 C | 12,00 |
| 50 | 3,00 | 13 | 25 | - | - | - | ⊗ 5 5001 050 300 | 24 B | 10,00 | ⊗ 5 5002 050 300 | 24 C | 12,50 |
| 50 | 4,00 | 13 | 25 | ● 5 5000 050 400 | 48 A | 31,70 | ⊗ 5 5001 050 400 | 24 B | 12,95 | ⊗ 5 5002 050 400 | 24 C | 16,15 |
| 50 | 5,00 | 13 | 25 | ⊗ 5 5000 050 500 | 48 A | 15,35 | ⊗ 5 5001 050 500 | 24 B | 15,35 | ⊗ 5 5002 050 500 | 24 C | 19,15 |
| 50 | 6,00 | 13 | 25 | ⊗ 5 5000 050 600 | 40 A | 16,55 | ⊗ 5 5001 050 600 | 20 B | 16,55 | ⊗ 5 5002 050 600 | 20 C | 20,65 |
| 63 | 0,25 | 16 | 32 | ⊗ 5 5000 063 025 | 128 A | 7,40 | - | - | - | - | - | - |
| 63 | 0,30 | 16 | 32 | ⊗ 5 5000 063 030 | 128 A | 7,40 | - | - | - | - | - | - |
| 63 | 0,40 | 16 | 32 | ⊗ 5 5000 063 040 | 128 A | 7,40 | - | - | - | - | - | - |
| 63 | 0,50 | 16 | 32 | ● 5 5000 063 050 | 128 A | 18,30 | ● 5 5001 063 050 | 64 B | 18,30 | - | - | - |
| 63 | 0,60 | 16 | 32 | ● 5 5000 063 060 | 100 A | 18,15 | ⊗ 5 5001 063 060 | 48 B | 7,40 | - | - | - |
| 63 | 0,80 | 16 | 32 | ● 5 5000 063 080 | 100 A | 17,80 | ● 5 5001 063 080 | 48 B | 17,80 | - | - | - |
| 63 | 1,00 | 16 | 32 | ● 5 5000 063 100 | 100 A | 18,15 | ⊗ 5 5001 063 100 | 48 B | 7,10 | ⊗ 5 5002 063 100 | 48 BW | 8,85 |
| 63 | 1,20 | 16 | 32 | ⊗ 5 5000 063 120 | 80 A | 7,25 | ⊗ 5 5001 063 120 | 40 B | 7,25 | ● 5 5002 063 120 | 40 BW | 17,75 |
| 63 | 1,50 | 16 | 32 | ● 5 5000 063 150 | 80 A | 20,50 | - | - | - | - | - | - |
| 63 | 1,60 | 16 | 32 | ● 5 5000 063 160 | 80 A | 20,50 | ● 5 5001 063 160 | 40 B | 20,50 | ● 5 5002 063 160 | 40 BW | 21,35 |
| 63 | 2,00 | 16 | 32 | ● 5 5000 063 200 | 80 A | 22,45 | ⊗ 5 5001 063 200 | 40 B | 8,85 | ● 5 5002 063 200 | 40 BW | 21,75 |
| 63 | 2,50 | 16 | 32 | ● 5 5000 063 250 | 64 A | 25,50 | ⊗ 5 5001 063 250 | 32 B | 10,45 | ⊗ 5 5002 063 250 | 32 C | 13,05 |
| 63 | 3,00 | 16 | 32 | ● 5 5000 063 300 | 64 A | 27,25 | ⊗ 5 5001 063 300 | 32 B | 11,15 | - | - | - |
| 63 | 4,00 | 16 | 32 | ⊗ 5 5000 063 400 | 64 A | 13,85 | ⊗ 5 5001 063 400 | 32 B | 13,85 | ⊗ 5 5002 063 400 | 32 BW | 17,30 |
| 63 | 5,00 | 16 | 32 | ⊗ 5 5000 063 500 | 48 A | 16,55 | ⊗ 5 5001 063 500 | 24 B | 16,55 | ⊗ 5 5002 063 500 | 32 BW | 20,65 |
| 63 | 6,00 | 16 | 32 | ⊗ 5 5000 063 600 | 48 A | 17,95 | ⊗ 5 5001 063 600 | 24 B | 17,95 | ⊗ 5 5002 063 600 | 24 C | 22,45 |
| 80 | 0,30 | 22 | 36 | ● 5 5000 080 030 | 160 A | 23,10 | - | - | - | - | - | - |
| 80 | 0,40 | 22 | 36 | ● 5 5000 080 040 | 160 A | 23,10 | - | - | - | - | - | - |
| 80 | 0,50 | 22 | 36 | ● 5 5000 080 050 | 128 A | 21,65 | ● 5 5001 080 050 | 64 B | 21,65 | - | - | - |
| 80 | 0,60 | 22 | 36 | ● 5 5000 080 060 | 128 A | 21,65 | ⊗ 5 5001 080 060 | 64 B | 8,85 | - | - | - |
| 80 | 0,80 | 22 | 36 | ● 5 5000 080 080 | 128 A | 21,65 | - | - | - | - | - | - |
| 80 | 1,00 | 22 | 36 | ● 5 5000 080 100 | 100 A | 21,65 | ● 5 5001 080 100 | 48 B | 21,65 | ● 5 5002 080 100 | 48 BW | 20,60 |
| 80 | 1,20 | 22 | 36 | ● 5 5000 080 120 | 100 A | 23,10 | ⊗ 5 5001 080 120 | 48 B | 9,40 | ⊗ 5 5002 080 120 | 48 BW | 12,35 |
| 80 | 1,50 | 22 | 36 | ● 5 5000 080 150 | 100 A | 24,15 | - | - | - | - | - | - |
| 80 | 1,60 | 22 | 36 | ● 5 5000 080 160 | 100 A | 24,15 | ● 5 5001 080 160 | 48 B | 24,15 | ● 5 5002 080 160 | 48 BW | 24,10 |
| 80 | 2,00 | 22 | 36 | ● 5 5000 080 200 | 80 A | 27,15 | ● 5 5001 080 200 | 40 B | 27,15 | ● 5 5002 080 200 | 40 BW | 27,25 |
| 80 | 2,50 | 22 | 36 | ● 5 5000 080 250 | 80 A | 30,25 | ● 5 5001 080 250 | 40 B | 30,25 | ⊗ 5 5002 080 250 | 40 C | 15,40 |
| 80 | 3,00 | 22 | 36 | ● 5 5000 080 300 | 80 A | 33,65 | ⊗ 5 5001 080 300 | 40 B | 13,75 | ⊗ 5 5002 080 300 | 40 BW | 17,15 |
| 80 | 4,00 | 22 | 36 | ● 5 5000 080 400 | 64 A | 40,65 | - | - | - | ⊗ 5 5002 080 400 | 32 BW | 20,70 |
| 80 | 5,00 | 22 | 36 | ⊗ 5 5000 080 500 | 64 A | 18,30 | ⊗ 5 5001 080 500 | 32 B | 18,30 | ⊗ 5 5002 080 500 | 32 BW | 22,85 |
| 80 | 6,00 | 22 | 36 | ⊗ 5 5000 080 600 | 64 A | 20,70 | ⊗ 5 5001 080 600 | 32 B | 20,70 | ⊗ 5 5002 080 600 | 32 C | 25,85 |
| 100 | 0,50 | 22 | 40 | ● 5 5000 100 050 | 160 A | 25,60 | ● 5 5001 100 050 | 80 B | 25,60 | - | - | - |

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Karnasch® METALLKREISSÄGEBLÄTTER NACH DIN METAL CIRCULAR SAW BLADES ACCORDING DIN

Anwendung siehe Seite
Application see page

1070

1070

1070

| Ø | Stärke Thickness | Bohrung Bore | Bund Hub | Art. 5 5000 | | | Art. 5 5001 | | | Art. 5 5002 | | |
|-----|---------------------|-----------------|-------------|------------------|-------|--------|------------------|-------|--------|------------------|-------|--------|
| | | | | DIN 1837A | € | % | DIN 1838B | € | % | DIN 1838C | € | % |
| | | | | "A" | | | | "B" | | | | |
| | | | | "C" | | | | | | | | |
| 100 | 0,60 | 22 | 40 | • 5 5000 100 060 | 160 A | 25,60 | % 5 5001 100 060 | 80 B | 10,45 | - | - | - |
| 100 | 0,80 | 22 | 40 | • 5 5000 100 080 | 128 A | 25,60 | • 5 5001 100 080 | 64 B | 25,60 | - | - | - |
| 100 | 1,00 | 22 | 40 | • 5 5000 100 100 | 128 A | 25,60 | • 5 5001 100 100 | 64 B | 25,60 | • 5 5002 100 100 | 64 BW | 24,40 |
| 100 | 1,20 | 22 | 40 | % 5 5000 100 120 | 128 A | 11,05 | % 5 5001 100 120 | 64 B | 11,05 | % 5 5002 100 120 | 64 BW | 14,50 |
| 100 | 1,50 | 22 | 40 | • 5 5000 100 150 | 100 A | 30,15 | - | - | - | - | - | - |
| 100 | 1,60 | 22 | 40 | % 5 5000 100 160 | 100 A | 12,30 | % 5 5001 100 160 | 48 B | 12,30 | • 5 5002 100 160 | 48 BW | 30,05 |
| 100 | 2,00 | 22 | 40 | • 5 5000 100 200 | 100 A | 33,50 | • 5 5001 100 200 | 48 B | 33,50 | • 5 5002 100 200 | 48 BW | 33,55 |
| 100 | 2,50 | 22 | 40 | % 5 5000 100 250 | 100 A | 15,00 | % 5 5001 100 250 | 48 B | 15,00 | • 5 5002 100 250 | 48 BW | 36,85 |
| 100 | 3,00 | 22 | 40 | • 5 5000 100 300 | 80 A | 41,55 | % 5 5001 100 300 | 40 B | 17,00 | % 5 5002 100 300 | 40 BW | 22,25 |
| 100 | 4,00 | 22 | 40 | • 5 5000 100 400 | 80 A | 54,25 | • 5 5001 100 400 | 40 B | 54,25 | % 5 5002 100 400 | 40 BW | 26,75 |
| 100 | 5,00 | 22 | 40 | % 5 5000 100 500 | 80 A | 22,95 | % 5 5001 100 500 | 40 B | 22,95 | % 5 5002 100 500 | 40 BW | 28,65 |
| 100 | 6,00 | 22 | 40 | - | - | - | % 5 5001 100 600 | 32 B | 25,45 | % 5 5002 100 600 | 32 BW | 31,85 |
| 125 | 0,60 | 22 | 40 | % 5 5000 125 060 | 160 A | 14,80 | • 5 5001 125 060 | 80 B | 36,40 | - | - | - |
| 125 | 0,80 | 22 | 40 | • 5 5000 125 080 | 160 A | 36,25 | % 5 5001 125 080 | 80 B | 14,40 | - | - | - |
| 125 | 1,00 | 22 | 40 | • 5 5000 125 100 | 160 A | 36,40 | • 5 5001 125 100 | 80 B | 36,40 | • 5 5002 125 100 | 80 BW | 33,60 |
| 125 | 1,20 | 22 | 40 | • 5 5000 125 120 | 128 A | 36,80 | • 5 5001 125 120 | 64 B | 36,80 | • 5 5002 125 120 | 64 BW | 36,85 |
| 125 | 1,60 | 22 | 40 | • 5 5000 125 160 | 128 A | 40,70 | % 5 5001 125 160 | 64 B | 16,60 | • 5 5002 125 160 | 64 BW | 40,80 |
| 125 | 2,00 | 22 | 40 | • 5 5000 125 200 | 128 A | 43,70 | • 5 5001 125 200 | 64 B | 43,70 | • 5 5002 125 200 | 64 BW | 43,80 |
| 125 | 2,50 | 22 | 40 | • 5 5000 125 250 | 100 A | 47,75 | % 5 5001 125 250 | 48 B | 19,50 | % 5 5002 125 250 | 48 BW | 25,60 |
| 125 | 3,00 | 22 | 40 | • 5 5000 125 300 | 100 A | 53,85 | % 5 5001 125 300 | 48 B | 22,00 | • 5 5002 125 300 | 48 BW | 53,95 |
| 125 | 4,00 | 22 | 40 | • 5 5000 125 400 | 100 A | 70,75 | % 5 5001 125 400 | 48 B | 26,50 | • 5 5002 125 400 | 48 BW | 65,10 |
| 125 | 5,00 | 22 | 40 | % 5 5000 125 500 | 80 A | 30,20 | % 5 5001 125 500 | 40 B | 30,20 | % 5 5002 125 500 | 40 BW | 37,75 |
| 125 | 6,00 | 22 | 40 | % 5 5000 125 600 | 80 A | 34,60 | % 5 5001 125 600 | 40 B | 34,60 | % 5 5002 125 600 | 40 BW | 43,25 |
| 160 | 1,00 | 32 | 63 | • 5 5000 160 100 | 160 A | 58,80 | • 5 5001 160 100 | 80 B | 58,80 | % 5 5002 160 100 | 80 C | 24,20 |
| 160 | 1,20 | 32 | 63 | • 5 5000 160 120 | 160 A | 59,15 | • 5 5001 160 120 | 80 B | 59,15 | % 5 5002 160 120 | 80 C | 25,40 |
| 160 | 1,60 | 32 | 63 | • 5 5000 160 160 | 160 A | 59,70 | • 5 5001 160 160 | 80 B | 59,70 | % 5 5002 160 160 | 80 C | 27,15 |
| 160 | 2,00 | 32 | 63 | • 5 5000 160 200 | 128 A | 61,35 | % 5 5001 160 200 | 64 B | 23,65 | % 5 5002 160 200 | 64 C | 31,00 |
| 160 | 2,50 | 32 | 63 | % 5 5000 160 250 | 128 A | 26,90 | % 5 5001 160 250 | 64 B | 26,90 | % 5 5002 160 250 | 64 C | 35,30 |
| 160 | 3,00 | 32 | 63 | • 5 5000 160 300 | 128 A | 75,45 | % 5 5001 160 300 | 64 B | 30,80 | • 5 5002 160 300 | 64 C | 75,55 |
| 160 | 4,00 | 32 | 63 | % 5 5000 160 400 | 100 A | 37,70 | % 5 5001 160 400 | 48 B | 37,70 | % 5 5002 160 400 | 48 C | 49,45 |
| 160 | 5,00 | 32 | 63 | % 5 5000 160 500 | 100 A | 43,55 | % 5 5001 160 500 | 48 B | 43,55 | % 5 5002 160 500 | 48 C | 54,40 |
| 160 | 6,00 | 32 | 63 | % 5 5000 160 600 | 100 A | 51,35 | - | - | - | % 5 5002 160 600 | 48 C | 64,15 |
| 200 | 1,00 | 32 | 63 | % 5 5000 200 100 | 200 A | 27,35 | % 5 5001 200 100 | 100 B | 27,35 | • 5 5002 200 100 | 100 C | 63,90 |
| 200 | 1,20 | 32 | 63 | % 5 5000 200 120 | 200 A | 27,35 | • 5 5001 200 120 | 100 B | 75,05 | % 5 5002 200 120 | 100 C | 35,85 |
| 200 | 1,60 | 32 | 63 | • 5 5000 200 160 | 160 A | 78,15 | % 5 5001 200 160 | 80 B | 28,55 | • 5 5002 200 160 | 80 C | 70,05 |
| 200 | 2,00 | 32 | 63 | % 5 5000 200 200 | 160 A | 30,80 | % 5 5001 200 200 | 80 B | 30,80 | • 5 5002 200 200 | 80 C | 75,55 |
| 200 | 2,50 | 32 | 63 | % 5 5000 200 250 | 160 A | 35,15 | % 5 5001 200 250 | 80 B | 35,15 | % 5 5002 200 250 | 80 C | 46,10 |
| 200 | 3,00 | 32 | 63 | % 5 5000 200 300 | 128 A | 40,55 | % 5 5001 200 300 | 64 B | 40,55 | • 5 5002 200 300 | 64 C | 99,45 |
| 200 | 4,00 | 32 | 63 | % 5 5000 200 400 | 128 A | 53,45 | % 5 5001 200 400 | 64 B | 53,45 | % 5 5002 200 400 | 64 C | 70,10 |
| 200 | 5,00 | 32 | 63 | % 5 5000 200 500 | 128 A | 61,55 | % 5 5001 200 500 | 64 B | 61,55 | % 5 5002 200 500 | 64 C | 76,95 |
| 200 | 6,00 | 32 | 63 | % 5 5000 200 600 | 100 A | 66,95 | % 5 5001 200 600 | 48 B | 66,95 | % 5 5002 200 600 | 48 C | 83,65 |
| 250 | 1,60 | 32 | 63 | - | - | - | - | - | - | % 5 5002 250 160 | 100 C | 54,05 |
| 250 | 2,00 | 32 | 63 | - | - | - | % 5 5001 250 200 | 100 B | 42,35 | % 5 5002 250 200 | 100 C | 52,90 |
| 250 | 2,50 | 32 | 63 | % 5 5000 250 250 | 160 A | 47,45 | - | - | - | - | - | - |
| 250 | 3,00 | 32 | 63 | % 5 5000 250 300 | 160 A | 53,75 | % 5 5001 250 300 | 80 B | 53,75 | % 5 5002 250 300 | 80 C | 67,20 |
| 250 | 4,00 | 32 | 63 | % 5 5000 250 400 | 160 A | 70,55 | % 5 5001 250 400 | 80 B | 70,55 | % 5 5002 250 400 | 80 C | 88,20 |
| 250 | 5,00 | 32 | 63 | % 5 5000 250 500 | 128 A | 82,25 | % 5 5001 250 500 | 64 B | 82,25 | - | - | - |
| 250 | 6,00 | 32 | 63 | % 5 5000 250 600 | 128 A | 98,75 | % 5 5001 250 600 | 64 B | 98,75 | - | - | - |
| 315 | 2,50 | 40 | 80 | - | - | - | - | - | - | - | - | - |
| 315 | 3,00 | 40 | 80 | % 5 5000 315 300 | 200 A | 86,75 | % 5 5001 315 300 | 100 B | 86,75 | - | - | - |
| 315 | 4,00 | 40 | 80 | - | - | - | - | - | - | - | - | - |
| 315 | 5,00 | 40 | 80 | % 5 5000 315 500 | 160 A | 129,05 | - | - | - | % 5 5002 315 500 | - | 161,30 |
| 315 | 6,00 | 40 | 80 | - | - | - | % 5 5001 315 600 | 80 B | 150,65 | - | - | - |

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HSS-Co5 Cobalt + **Kx beschichtet**: Zum Sägen von Rohren aus Edelstahl, Stahl, Ne-Metalle.
Durch **Kx-Beschichtung** werden höchste Standzeiten erreicht (auch bei nicht optimaler Kühlung)

HSS-Co5 Cobalt + **Kx coating**: For cutting pipes made of stainless steel, steel, non ferrous metals.
By **Kx coating** excellent tool life (even at sub-optimal cooling)

| Art. | Passend für Maschine Suitable for machine | | | | | Für Wandstärken For pipe thickness | € |
|----------------|--|------|-----|----|--------|---------------------------------------|-------|
| 5 3990 063 010 | GF, Axxair, Orbitalum | ● 63 | 1,6 | 16 | 64 BW | 1-3 mm | 29,60 |
| 5 3990 063 020 | GF, Axxair, Orbitalum | ● 63 | 1,6 | 16 | 100 BW | 0,6-1,5 mm | 29,60 |
| 5 3990 068 010 | GF, Axxair, Orbitalum | ● 68 | 1,6 | 16 | 44 BW | 2-7 mm | 31,50 |
| 5 3990 068 020 | GF, Axxair, Orbitalum | ● 68 | 1,6 | 16 | 72 BW | 1-3 mm | 31,50 |
| 5 3990 080 010 | GF, Axxair, Orbitalum | ● 80 | 2,0 | 16 | 34 BW | 5-12 mm | 18,95 |
| 5 3990 080 020 | GF, Axxair, Orbitalum | ● 80 | 2,0 | 16 | 54 BW | 2-7 mm | 40,55 |
| 5 3990 080 030 | GF, Axxair, Orbitalum | ● 80 | 2,0 | 16 | 80 BW | 1-3 mm | 40,55 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

Für höchste Standzeiten siehe neue Artikel 5 3965 nächste Seite / For maximum tool life see new article 5 3965 next page
Protom: Preis und Lieferzeit auf Anfrage / Protom: price and delivery on request

5 3980



HSS-Co5 Cobalt: Zum Sägen von Rohren aus Edelstahl, Stahl, Ne-Metalle

HSS-Co5 Cobalt: For cutting pipes made of stainless steel, steel, non ferrous metals

| Art. | Passend für Maschine Suitable for machine | | | | | Für Wandstärken For pipe thickness | € |
|----------------|--|------|-----|----|--------|---------------------------------------|-------|
| 5 3980 063 010 | GF, Axxair, Orbitalum | ● 63 | 1,6 | 16 | 64 BW | 1-3 mm | 22,80 |
| 5 3980 063 020 | GF, Axxair, Orbitalum | ● 63 | 1,6 | 16 | 100 BW | 0,6-1,5 mm | 22,80 |
| 5 3980 068 010 | GF, Axxair, Orbitalum | ● 68 | 1,6 | 16 | 44 BW | 2-7 mm | 24,75 |
| 5 3980 068 020 | GF, Axxair, Orbitalum | ● 68 | 1,6 | 16 | 72 BW | 1-3 mm | 24,75 |
| 5 3980 080 010 | GF, Axxair, Orbitalum | ● 80 | 2,0 | 16 | 34 BW | 5-12 mm | 14,80 |
| 5 3980 080 020 | GF, Axxair, Orbitalum | ● 80 | 2,0 | 16 | 54 BW | 2-7 mm | 31,75 |
| 5 3980 080 030 | GF, Axxair, Orbitalum | ● 80 | 2,0 | 16 | 80 BW | 1-3 mm | 31,75 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

Für höchste Standzeiten siehe neue Artikel 5 3965 nächste Seite / For maximum tool life see new article 5 3965 next page
Protom: Preis und Lieferzeit auf Anfrage / Protom: price and delivery on request

5 4000



HSS-DMo5: Zum Sägen von Rohren aus Stahl, Ne-Metalle

HSS-DMo5: For cutting pipes made of steel, non ferrous metals

| Art. | Passend für Maschine Suitable for machine | | | | | Für Wandstärken For pipe thickness | € |
|----------------|--|------|-----|----|-------|---------------------------------------|------|
| 5 4000 063 010 | GF, Orbitalum | ● 63 | 1,6 | 16 | 44 BW | 2-7 mm | 8,20 |
| 5 4000 068 010 | GF, Orbitalum | ● 68 | 1,6 | 16 | 44 BW | 2-7 mm | 8,85 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

Ersatzartikel siehe oben Artikel 5 3980 / Alternative article see above article 5 3980

5 4010



HSS-Co5 Cobalt: Zum Sägen von Rohren aus Edelstahl, Stahl, Ne-Metalle

HSS-Co5 Cobalt: For cutting pipes made of stainless steel, steel, non ferrous metals

| Art. | Passend für Maschine Suitable for machine | | | | | Für Wandstärken For pipe thickness | € |
|----------------|--|------|-----|----|-------|---------------------------------------|------|
| 5 4010 063 010 | GF, Orbitalum | ● 63 | 1,6 | 16 | 44 BW | 2-7 mm | 9,65 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat. Special price / sale article. While stocks last.

Ersatzartikel siehe oben Artikel 5 3980 / 5 3990 / Alternative article see above article 5 3980 / 5 3990

Orbitale Rohrkreissägeblätter für: Georg Fischer (GF), Axxair, Protém, Orbitalum
 Orbital pipe cutting circular saw blades for: Georg Fischer (GF), Axxair, Protém, Orbitalum

5 3965



Kreissägeblatt **Cermet (Keramik)** bestückt für **höchste Standzeit**. Zum Sägen von Rohren aus **Edelstahl, säurebeständigem Stahl, Stahl, Kupfer, Aluminium und Kunststoff**

Circular saw blades **Cermet (Ceramic)** tipped for **maximum tool life**. For cutting pipes made of **stainless steel, acid-resistant steel, steel, copper, aluminum and plastic**

| Art. | Passend für Maschine Suitable for machine | | | | | Hinweis Comment | € |
|----------------|--|-------|---------|----|-------|--|-------|
| 5 3965 063 010 | Axxair, GF, Protém, Orbitalum | • 63 | 2,0/1,6 | 16 | 28 BW | Für Stahl, Ne-Metalle, Kunststoffe mit Wandstärke 2-7 mm For steel, non ferrous metals, plastics with wall thickness 2-7 mm | 37,25 |
| 5 3965 063 020 | Axxair, GF, Protém, Orbitalum | • 63 | 1,8/1,4 | 16 | 32 BW | Für alle oben genannten Materialien mit Wandstärke 1-3 mm For all above mentioned materials with wall thickness 1-3 mm | 38,75 |
| 5 3965 068 010 | Axxair, GF, Protém, Orbitalum | • 68 | 2,0/1,6 | 16 | 28 BW | Für Stahl, Ne-Metalle, Kunststoffe mit Wandstärke 2-7 mm For steel, non ferrous metals, plastics with wall thickness 2-7 mm | 37,55 |
| 5 3965 068 020 | Axxair, GF, Protém, Orbitalum | • 68 | 1,8/1,4 | 16 | 32 BW | Für alle oben genannten Materialien mit Wandstärke 1-3 mm For all above mentioned materials with wall thickness 1-3 mm | 39,95 |
| 5 3965 090 010 | Axxair, GF, Protém, Orbitalum | • 90 | 2,2/1,8 | 16 | 28 BW | Für Stahl, Ne-Metalle, Kunststoffe mit Wandstärke 2-7 mm For steel, non ferrous metals, plastics with wall thickness 2-7 mm | 40,25 |
| 5 3965 090 020 | Axxair, GF, Protém, Orbitalum | • 90 | 2,0/1,6 | 16 | 36 BW | Für alle oben genannten Materialien mit Wandstärke 1-3 mm For all above mentioned materials with wall thickness 1-3 mm | 43,25 |
| 5 3965 125 010 | Axxair, GF, Protém, Orbitalum | • 125 | 1,5/1,2 | 16 | 52 BW | Für alle oben genannten Materialien mit Wandstärke 1-3 mm For all above mentioned materials with wall thickness 1-3 mm | 58,25 |

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Orbitale Rohrkreissägeblätter für: Georg Fischer (GF), Orbitalum, Exact, Rothenberger Pipecut Turbo
Orbital pipe cutting circular saw blades for: Georg Fischer (GF), Orbitalum, Exact, Rothenberger Pipecut Turbo

5 3960 CERMET



Kreissägeblatt **Cermet (Keramik)** bestückt für **höchste Standzeit**. Ideal zum Sägen von Rohren aus **Stahl und Edelstahl**. Auch geeignet zum Sägen von **Aluminium, Kupfer und Kunststoff**. Speziell für Kunststoff empfehlen wir Artikelgruppe 5 3951 (siehe Seite 1079). Speziell für Aluminium und Kupfer empfehlen wir Artikelgruppe 5 3952 (siehe Seite 1079)

Circular saw blade **Cermet (Ceramic)** tipped for **maximum tool life**. Ideal for cutting pipes made of **steel and stainless steel**. Also suitable for **aluminum, copper and plastic**. Especially for plastic we suggest our article group 5 3951 (see page 1079). Especially for aluminum and copper we suggest article group 5 3952 (see page 1079).

| Art. | Passend für Maschine Suitable for machine | | | | | € |
|----------------|---|-------|---------|----|--------|-------|
| 5 3960 140 020 | Exact PipeCut 200, 22U, 360, 360U, Georg Fischer (GF), Orbitalum, SCORP 170, 170E, 220Plus, 360, Rothenberger PipeCut 170, 170E, 200, 360, T-Drill PCS 6, 8+, 14, Victaulic PIPECUT 170, 200, 360 | • 140 | 1,8/1,4 | 62 | 48 WWF | 55,25 |
| 5 3960 165 010 | Exact PC 280E, 360E | • 165 | 1,8/1,4 | 62 | 54 WWF | 63,35 |

5 3961 CERMET DÜNNSCNITT AKKU / CERMET THIN-CUT BATTERY



Kreissägeblatt **Cermet (Keramik)** bestückt **Dünnschnitt** vorzugsweise für **Akkumaschinen**. Durch dünne Schnittbreite weniger Kraftaufwand, geringerer Verschleiß und längere Akkulaufzeit. Zum Sägen von Rohren aus **Stahl, Edelstahl, Aluminium, Kupfer und Kunststoff**.

Circular saw blade **Cermet (Ceramic)** tipped **thin-cut** preferably for **battery tools**. Due to the small cutting width less cutting pressure, less cutting waste and longer battery life. For cutting pipes made of **steel, stainless steel, aluminum, copper and plastic**.

| Art. | Passend für Maschine Suitable for machine | | | | | € |
|----------------|--|-------|---------|----|--------|-------|
| 5 3961 140 010 | Exact PC 170 Battery | • 140 | 1,4/1,2 | 62 | 46 WWF | 67,55 |

5 3950 HARTMETALL-BESTÜCKT / CARBIDE TIPPED



Kreissägeblatt **Hartmetall-bestückt** zum Sägen von Rohren aus **Stahl**. Auch geeignet zum Sägen von **Aluminium, Kupfer und Kunststoff**. Speziell für Kunststoff empfehlen wir Artikelgruppe 5 3951 (siehe Seite 1079). Speziell für Aluminium und Kupfer empfehlen wir Artikelgruppe 5 3952 (siehe Seite 1079)

Carbide tipped circular saw blade for cutting pipes made of **steel**. Also suitable for **aluminum, copper and plastic**. Especially for plastic we suggest our article group 5 3951 (see page 1079). Especially for aluminum and copper we suggest article group 5 3952 (see page 1079).

| Art. | Passend für Maschine Suitable for machine | | | | | € |
|----------------|---|-------|---------|----|--------|-------|
| 5 3950 140 020 | Exact PipeCut 200, 22U, 360, 360U, Georg Fischer (GF), Orbitalum, SCORP 170, 170E, 220Plus, 360, Rothenberger PipeCut 170, 170E, 200, 360, T-Drill PCS 6, 8+, 14, Victaulic PIPECUT 170, 200, 360 | • 140 | 1,8/1,4 | 62 | 48 WWF | 42,95 |
| 5 3950 165 010 | Exact PC 280E, 360E | • 165 | 1,8/1,4 | 62 | 54 WWF | 58,85 |

Orbitale Rohrkreissägeblätter für: Georg Fischer (GF), Orbitalum, Exact, SCORP, Rothenberger PipeCut Turbo, T-Drill, Victaulic
 Orbital pipe cutting circular saw blades for: Georg Fischer (GF), Orbitalum, Exact, SCORP, Rothenberger PipeCut Turbo, T-Drill, Victaulic

HARTMETALL-BESTÜCKT KUNSTSTOFF / CARBIDE TIPPED PLASTIC

5 3951



Kreissägeblatt **Hartmetall-bestückt** speziell zum Sägen von Rohren aus **Kunststoffen (PE, PP, PVC, etc.)**

Carbide tipped circular saw blade especially for cutting pipes made of **plastics (PE, PP, PVC, etc.)**

| Art. | Passend für Maschine Suitable for machine | | | | | € |
|----------------|---|-------|---------|----|-------|-------|
| 5 3951 140 010 | Exact PipeCut 200, 22U, 360, 360U, Georg Fischer (GF), Orbitalum, SCORP 170, 170E, 220Plus, 360, Rothenberger PipeCut 170, 170E, 200, 360, T-Drill PCS 6, 8+, 14, Victaulic PIPECUT 170, 200, 360 | • 140 | 1,8/1,4 | 62 | 38 WZ | 51,05 |
| 5 3951 165 010 | Exact PC 280E, 360E | • 165 | 1,8/1,4 | 62 | 40 WZ | 54,95 |

HARTMETALL-BESTÜCKT ALUMINIUM, KUPFER / CARBIDE TIPPED ALUMINUM, COPPER

5 3952



Kreissägeblatt **Hartmetall-bestückt** speziell zum Sägen von Rohren aus **Aluminium und Kupfer**

Carbide tipped circular saw blade especially for cutting pipes made of **aluminum and copper**

| Art. | Passend für Maschine Suitable for machine | | | | | € |
|----------------|---|-------|---------|----|--------|-------|
| 5 3952 140 010 | Exact PipeCut 200, 22U, 360, 360U, Georg Fischer (GF), Orbitalum, SCORP 170, 170E, 220Plus, 360, Rothenberger PipeCut 170, 170E, 200, 360, T-Drill PCS 6, 8+, 14, Victaulic PIPECUT 170, 200, 360 | • 140 | 2,5/1,8 | 62 | 36 TFP | 61,55 |
| 5 3952 165 010 | Exact PC 280E, 360E | • 165 | 2,5/1,8 | 62 | 40 TFP | 67,85 |

DIAMANT-BESTREUT / DIAMOND-GRIT

5 3970



Diamantbestreutes Kreissägeblatt zum Sägen von Rohren aus **Gusseisen, Sphäroguss (GGG), Gusseisen mit Betonschicht, Glasfaser (GFK), Kohlefaser (CFK)**

Diamond-Grit circular saw blade for cutting pipes made of **cast iron, ductile cast iron (GGG), cast iron with layer of concrete, fiber glass (FRP), carbon fiber (CFRP)**

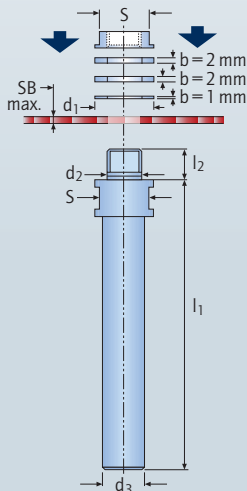
| Art. | Passend für Maschine Suitable for machine | | | | | € |
|----------------|---|-------|---------|----|--|-------|
| 5 3970 140 010 | Exact PipeCut 200, 22U, 360, 360U, Georg Fischer (GF), Orbitalum, SCORP 170, 170E, 220Plus, 360, Rothenberger PipeCut 170, 170E, 200, 360, T-Drill PCS 6, 8+, 14, Victaulic PIPECUT 170, 200, 360 | • 140 | 2,7/1,5 | 62 | | 55,45 |
| 5 3970 165 010 | Exact PC 280E, 360E | • 165 | 2,7/1,5 | 62 | | 67,00 |



5 6100

"Vorderseitige Aufspannung"
Circular saw blade retainer – front side securing

HSS



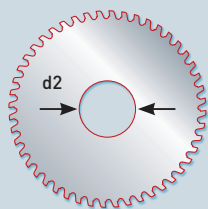
| Art. | d2 h6 | d3 h6 | d1 | l1 | l2 | SB max. | S | € |
|------------------|-------|-------|-----|-----|------|---------|----|--------|
| 5 6100 03 05 | • 3 | 5 | 5 | 60 | 8,0 | 3 | 4 | 83,70 |
| 5 6100 05 06 | • 5 | 6 | 10 | 70 | 10,0 | 6 | 8 | 83,70 |
| 5 6100 05 06 075 | • 5 | 6 | 7,5 | 70 | 7,0 | 3 | 6 | 83,70 |
| 5 6100 05 10 | • 5 | 10 | 10 | 80 | 10,0 | 6 | 8 | 83,70 |
| 5 6100 06 10 | • 6 | 10 | 12 | 80 | 10,5 | 6 | 10 | 91,75 |
| 5 6100 08 10 | • 8 | 10 | 15 | 80 | 10,0 | 6 | 13 | 95,95 |
| 5 6100 08 12 | • 8 | 12 | 15 | 90 | 11,0 | 6 | 13 | 95,95 |
| 5 6100 10 06 | • 10 | 6 | 18 | 80 | 10,5 | 6 | 15 | 99,45 |
| 5 6100 10 10 | • 10 | 10 | 18 | 80 | 10,5 | 6 | 15 | 99,45 |
| 5 6100 10 16 | • 10 | 16 | 18 | 100 | 11,5 | 6 | 15 | 99,45 |
| 5 6100 13 16 | • 13 | 16 | 22 | 110 | 12,0 | 6 | 19 | 111,70 |
| 5 6100 16 10 | • 16 | 10 | 22 | 80 | 8,0 | 3 | 19 | 128,50 |
| 5 6100 16 20 | • 16 | 20 | 26 | 120 | 13,0 | 6 | 22 | 128,50 |
| 5 6100 22 16 | • 22 | 16 | 32 | 120 | 13,0 | 6 | 27 | 128,50 |

Abstandsringe / Distance ring

| Art. | d2 | d1 | b | € |
|------------------|------|-----|---|-------|
| 5 6110 05 03 01 | • 3 | 5 | 1 | 8,65 |
| 5 6110 05 03 02 | • 3 | 5 | 2 | 8,65 |
| 5 6110 10 05 01 | • 5 | 10 | 1 | 8,65 |
| 5 6110 10 05 02 | • 5 | 10 | 2 | 8,65 |
| 5 6110 075 05 01 | • 5 | 7,5 | 1 | 8,65 |
| 5 6110 075 05 02 | • 5 | 7,5 | 2 | 8,65 |
| 5 6110 12 06 01 | • 6 | 12 | 1 | 8,65 |
| 5 6110 12 06 02 | • 6 | 12 | 2 | 8,65 |
| 5 6110 15 08 01 | • 8 | 15 | 1 | 10,90 |
| 5 6110 15 08 02 | • 8 | 15 | 2 | 10,90 |
| 5 6110 18 10 01 | • 10 | 18 | 1 | 10,90 |
| 5 6110 18 10 02 | • 10 | 18 | 2 | 10,90 |
| 5 6110 22 13 01 | • 13 | 22 | 1 | 13,05 |
| 5 6110 22 13 02 | • 13 | 22 | 2 | 13,05 |
| 5 6110 22 16 01 | • 16 | 22 | 1 | 13,05 |
| 5 6110 22 16 02 | • 16 | 22 | 2 | 13,05 |
| 5 6110 26 16 01 | • 16 | 26 | 1 | 13,05 |
| 5 6110 26 16 02 | • 16 | 26 | 2 | 13,05 |
| 5 6110 32 22 01 | • 22 | 32 | 1 | 13,05 |
| 5 6110 32 22 02 | • 22 | 32 | 2 | 13,05 |

Mutter / Nut

| Art. | d2 | d1 | S | € |
|--------------|------|-----|----|-------|
| 5 6111 03 04 | • 3 | 4 | 4 | 17,35 |
| 5 6111 05 08 | • 5 | 10 | 8 | 17,35 |
| 5 6111 05 06 | • 5 | 7,5 | 6 | 17,35 |
| 5 6111 06 10 | • 6 | 12 | 10 | 17,35 |
| 5 6111 08 13 | • 8 | 15 | 13 | 19,55 |
| 5 6111 10 15 | • 10 | 18 | 15 | 21,70 |
| 5 6111 13 19 | • 13 | 22 | 19 | 23,85 |
| 5 6111 16 19 | • 16 | 22 | 19 | 26,00 |
| 5 6111 16 22 | • 16 | 26 | 22 | 26,00 |
| 5 6111 22 27 | • 22 | 32 | 27 | 26,00 |

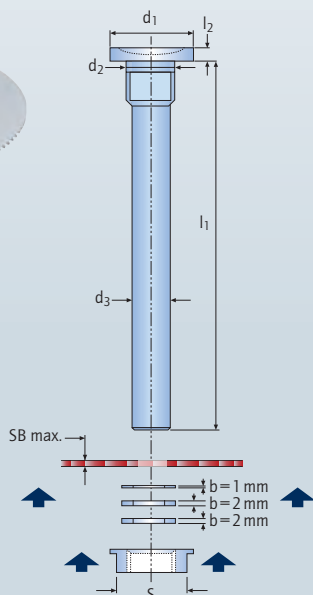


d2 = Sägeblattbohrung / Saw blade bore
d1 = Flanschdurchmesser / Flange diameter
d3 = Schaftdurchmesser / Shank diameter

5 6101

"Rückseitige Aufspannung" · Circular saw blade retainer – rear side securing

HSS



| Art. | d2 h6 | d3 h6 | d1 | l1 | l2 | SB max. | S | € |
|--------------|-------|-------|----|-----|-----|---------|----|--------|
| 5 6101 05 04 | • 5 | 4 | 10 | 50 | 2,0 | 6 | 8 | 83,70 |
| 5 6101 06 05 | • 6 | 5 | 12 | 60 | 2,0 | 6 | 10 | 78,65 |
| 5 6101 08 06 | • 8 | 6 | 15 | 70 | 2,0 | 6 | 13 | 95,95 |
| 5 6101 08 07 | • 8 | 7 | 15 | 80 | 2,0 | 6 | 13 | 95,95 |
| 5 6101 10 06 | • 10 | 6 | 18 | 70 | 2,5 | 6 | 15 | 99,45 |
| 5 6101 10 08 | • 10 | 8 | 18 | 90 | 2,5 | 6 | 15 | 99,45 |
| 5 6101 13 10 | • 13 | 10 | 22 | 110 | 2,5 | 6 | 19 | 111,70 |
| 5 6101 16 12 | • 16 | 12 | 26 | 120 | 2,5 | 6 | 22 | 128,50 |

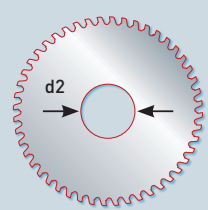
Abstandsringe / Distance ring

| Art. | d2 | d1 | b | € |
|-----------------|------|----|---|-------|
| 5 6120 10 05 01 | • 5 | 10 | 1 | 8,65 |
| 5 6120 10 05 02 | • 5 | 10 | 2 | 8,65 |
| 5 6120 12 06 01 | • 6 | 12 | 1 | 8,65 |
| 5 6120 12 06 02 | • 6 | 12 | 2 | 8,65 |
| 5 6120 15 08 01 | • 8 | 15 | 1 | 10,90 |
| 5 6120 15 08 02 | • 8 | 15 | 2 | 10,90 |
| 5 6120 18 10 01 | • 10 | 18 | 1 | 10,90 |
| 5 6120 18 10 02 | • 10 | 18 | 2 | 10,90 |
| 5 6120 22 13 01 | • 13 | 22 | 1 | 13,05 |
| 5 6120 22 13 02 | • 13 | 22 | 2 | 13,05 |
| 5 6120 26 16 01 | • 16 | 26 | 1 | 13,05 |
| 5 6120 26 16 02 | • 16 | 26 | 2 | 13,05 |

Mutter / Nut

| Art. | d2 | d1 | S | € |
|--------------|------|----|----|-------|
| 5 6121 05 08 | • 5 | 10 | 8 | 17,35 |
| 5 6121 06 10 | • 6 | 12 | 10 | 17,35 |
| 5 6121 08 13 | • 8 | 15 | 13 | 19,55 |
| 5 6121 10 15 | • 10 | 18 | 15 | 21,70 |
| 5 6121 13 19 | • 13 | 22 | 19 | 23,85 |
| 5 6121 16 22 | • 16 | 26 | 22 | 26,00 |

☞ Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.



d2 = Sägeblattbohrung / Saw blade bore
d1 = Flanschdurchmesser / Flange diameter
d3 = Schaftdurchmesser / Shank diameter

6 MASCHINEN MACHINES

MAGNET-KERNBOHRMASCHINEN
MAGNETIC HOLE CUTTING MACHINES

6.1



1083-1106

DRUCKLUFT-GERADSCHLEIFER
PNEUMATIC STRAIGHT GRINDER

6.2



1107-1140

1



2



3



4



5



6



7



8



9

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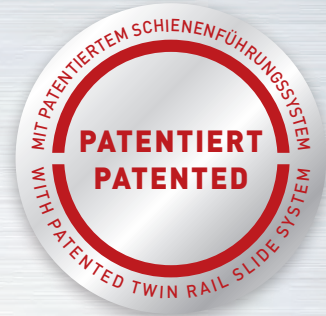
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MAGNET-KERNBOHRMASCHINEN

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- 1
- 2
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- 4
- 5
- 6
- 7
- 8
- 9

6.1

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|--|---|---|--|---|---|


KA 35 SILVER-MAG BEST SELLER TWIN SLIDE 20 8013 EUROPE 21 8013 USA 22 8013 UK  1086-1087

| | | | | | | |
|---|---|------------------------------------|-------------------------------------|---|---|---|
|  | <p>Ø 12-35 mm Ø 5/32-1.3/8"</p> | <p>Ø 3-18 mm Ø 3/16-45/64"</p> | <p>Ø 10-30 mm Ø 3/8-1.3/16"</p> | | | |
| | <p>Schnitttiefe max. 110 mm Cutting depth max. 4"</p> | | | - | - | - |


KA 38 BLUE-MAG BEST SELLER SENSOR · TWIN-RAIL SLIDE 20 8020 010 EUROPE 20 8020 020 USA 20 8020 030 UK  1093

| | | | | | | |
|---|---|------------------------------------|-------------------------------------|---|---|---|
|  | <p>Ø 12-38 mm Ø 5/32-1.1/2"</p> | <p>Ø 3-18 mm Ø 3/16-45/64"</p> | <p>Ø 10-30 mm Ø 3/8-1.3/16"</p> | | | |
| | <p>Schnitttiefe max. 110 mm Cutting depth max. 4"</p> | | | - | - | ✓ |


KA 40 BLUE-MAG BEST SELLER SENSOR · TWIN-RAIL SLIDE 20 8021 010 EUROPE 20 8021 020 USA 20 8021 030 UK  1094

| | | | | | | |
|--|---|------------------------------------|-------------------------------------|---|---|---|
|  | <p>Ø 12-40 mm Ø 5/32-1.37/64"</p> | <p>Ø 3-18 mm Ø 3/16-45/64"</p> | <p>Ø 10-30 mm Ø 3/8-1.3/16"</p> | | | |
| | <p>Schnitttiefe max. 110 mm Cutting depth max. 4"</p> | | | - | - | ✓ |


KAS 40 BLUE-MAG BEST SELLER SENSOR · TWIN-RAIL SLIDE 20 8022 010 EUROPE 20 8022 020 USA 20 8022 030 UK  1095

| | | | | | | |
|---|---|------------------------------------|-------------------------------------|---|---|---|
|  | <p>Ø 12-40 mm Ø 5/32-1.37/64"</p> | <p>Ø 3-18 mm Ø 3/16-45/64"</p> | <p>Ø 10-30 mm Ø 3/8-1.3/16"</p> | | | |
| | <p>Schnitttiefe max. 110 mm Cutting depth max. 4"</p> | | | - | ✓ | ✓ |


KA 50 BLUE-MAG BEST SELLER SENSOR · TWIN-RAIL SLIDE 20 8023 010 EUROPE 20 8023 020 USA 20 8023 030 UK  1096

| | | | | | | |
|---|---|------------------------------------|--------------------------------------|---|---|---|
|  | <p>Ø 12-50 mm Ø 5/32-1.31/32"</p> | <p>Ø 3-23 mm Ø 3/16-29/32"</p> | <p>Ø 10-40 mm Ø 3/8-1.37/64"</p> | | | |
| | <p>Schnitttiefe max. 110 mm Cutting depth max. 4"</p> | | | - | - | ✓ |

KAS 50 BLUE-MAG BEST SELLER SENSOR · TWIN-RAIL SLIDE 20 8024 010 EUROPE 20 8024 020 USA 20 8024 030 UK  1097

| | | | | | | |
|---|---|------------------------------------|--------------------------------------|---|---|---|
|  | <p>Ø 12-50 mm Ø 5/32-1.31/32"</p> | <p>Ø 3-23 mm Ø 3/16-29/32"</p> | <p>Ø 10-40 mm Ø 3/8-1.37/64"</p> | | | |
| | <p>Schnitttiefe max. 110 mm Cutting depth max. 4"</p> | | | - | ✓ | ✓ |

KATV 55 BLUE-MAG BEST SELLER SENSOR · TWIN-RAIL SLIDE 20 8025 010 EUROPE 20 8025 020 USA 20 8025 030 UK  1098

| | | | | | | |
|---|---|------------------------------------|--------------------------------------|-------------------------------------|---|---|
|  | <p>Ø 12-55 mm Ø 5/32-2.11/64"</p> | <p>Ø 3-23 mm Ø 3/16-29/32"</p> | <p>Ø 10-40 mm Ø 3/8-1.37/64"</p> | <p>Ø 6-20 mm Ø 15/64-25/32"</p> | | |
| | <p>Schnitttiefe max. 110 mm Cutting depth max. 4"</p> | | | | - | ✓ |

- 1 
- 2 
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- 9 



KATSV 55 BLUE-MAG BEST SELLER SENSOR · TWIN-RAIL SLIDE **20 8026 010 EUROPE** **20 8026 020 USA** **20 8026 030 UK** 1099

| | | | | | | |
|--|---|----------------------------|------------------------------|-----------------------------|---|---|
| | Ø 12–55 mm Ø 5/32–2.11/64" | Ø 3–23 mm Ø 3/16–29/32" | Ø 10–40 mm Ø 3/8–1.37/64" | Ø 6–20 mm Ø 15/64–25/32" | | |
| | Schnitttiefe max. 110 mm Cutting depth max. 4" | | | | ✓ | ✓ |

KA 100 BLUE-MAG BEST SELLER SENSOR · TWIN-RAIL SLIDE **20 8027 010 EUROPE** **20 8027 020 USA** **20 8027 030 UK** 1100

| | | | | | | |
|--|---|------------------------------|------------------------------|---|---|---|
| | Ø 12–100 mm Ø 15/32–3.15/16" | Ø 3–32 mm Ø 3/16–1.17/64" | Ø 10–55 mm Ø 3/8–2.11/64" | | | |
| | Schnitttiefe max. 210 mm Cutting depth max. 7.7/8" | | | - | - | - |

KAS 100 BLUE-MAG BEST SELLER SENSOR · TWIN-RAIL SLIDE **20 8028 010 EUROPE** **20 8028 020 USA** **20 8028 030 UK** 1101

| | | | | | | |
|--|---|------------------------------|------------------------------|---|---|---|
| | Ø 12–100 mm Ø 15/32–3.15/16" | Ø 3–32 mm Ø 3/16–1.17/64" | Ø 10–55 mm Ø 3/8–2.11/64" | | | |
| | Schnitttiefe max. 240 mm Cutting depth max. 9.27/32" | | | - | ✓ | - |

KATV 100 BLUE-MAG BEST SELLER SENSOR · TWIN-RAIL SLIDE **20 8029 010 EUROPE** **20 8029 020 USA** **20 8029 030 UK** 1102

| | | | | | | |
|--|---|------------------------------|------------------------------|-------------------------------|---|---|
| | Ø 12–100 mm Ø 15/32–3.15/16" | Ø 3–32 mm Ø 3/16–1.17/64" | Ø 10–55 mm Ø 3/8–2.11/64" | Ø 6–32 mm Ø 15/64–1.17/64" | | |
| | Schnitttiefe max. 220 mm Cutting depth max. 8.21/32" | | | | - | - |

KATSV 100 BLUE-MAG BEST SELLER SENSOR · TWIN-RAIL SLIDE **20 8030 010 EUROPE** **20 8030 020 USA** **20 8030 030 UK** 1103

| | | | | | | |
|--|---|------------------------------|------------------------------|-------------------------------|---|---|
| | Ø 12–100 mm Ø 15/32–3.15/16" | Ø 3–32 mm Ø 3/16–1.17/64" | Ø 10–55 mm Ø 3/8–2.11/64" | Ø 6–32 mm Ø 15/64–1.17/64" | | |
| | Schnitttiefe max. 240 mm Cutting depth max. 9.27/32" | | | | ✓ | - |

KALP 45 BLUE-MAG BEST SELLER SENSOR **20 8031 010 EUROPE** **20 8031 020 USA** **20 8031 030 UK** 1104

| | | | | | | |
|--|--|---------------------------|-----------------------------|---|---|---|
| | Ø 12–45 mm Ø 15/32–1.49/64" | Ø 6–16 mm Ø 15/64–5/8" | Ø 10–30 mm Ø 3/8–1.3/16" | | | |
| | Schnitttiefe max. 55 mm Cutting depth max. 2.11/64" | | | - | - | - |

KATV 140 BLUE-MAG BEST SELLER SENSOR · TWIN-RAIL SLIDE **20 8032 010 EUROPE** **20 8032 020 USA** **20 8032 030 UK** 1105

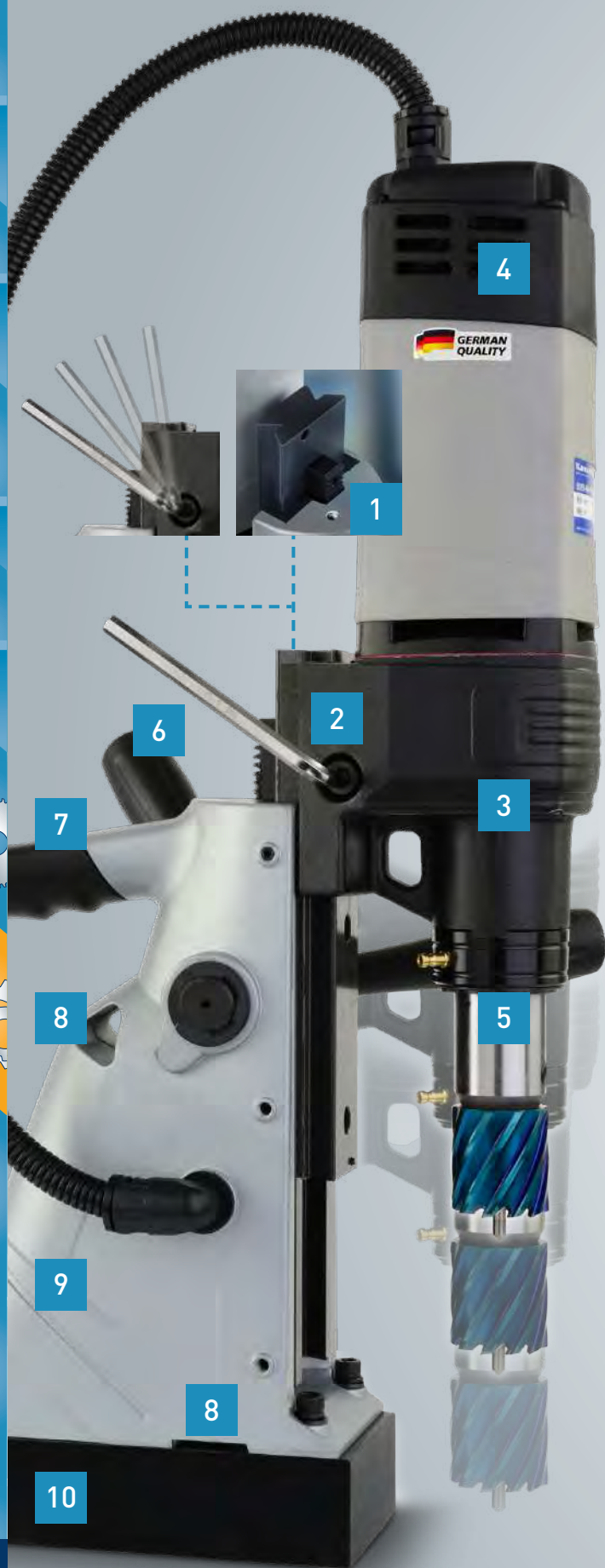
| | | | | | | |
|--|---|------------------------------|-----------------------------|-------------------------------|---|---|
| | Ø 12–140 mm Ø 15/32–5.33/64" | Ø 3–50 mm Ø 3/16–1.31/32" | Ø 10–80 mm Ø 3/8–3.5/32" | Ø 6–44 mm Ø 15/64–1.47/64" | | |
| | Schnitttiefe max. 240 mm Cutting depth max. 9.27/32" | | | | - | - |

NEW Bis Ø 200 mm möglich / Up to Ø 200 mm possible 1106



KA 35 SILVER-MAG · TWIN SLIDE

BESCHREIBUNG · SPECIFICATION



- 1** BLACKDUR gehärteter Schlitten. Daher mehr als 5× höhere Lebensdauer des Schienenführsystems gegenüber konventionellen Schwalbenschwanzführungen.

BLACKDUR hardened sliding rail. This results to more than 5 times longer lifetime than conventional dovetail slides.
- 2** Doppeltes-Schienenführsystem. Die Motorhöhe ist damit verstellbar. Je nach Anforderung kann der Hub somit bis auf 210 mm erweitert werden. Weiterhin kann die gewünschte Motorhöhe/Hub fixiert werden. Unabsichtliches verstellen und somit Bruch des Bohrers wird somit vermieden.

Two-way sliding rails, which make the motor height be adjustable according to the different requirement. Stroke up to 210 mm. Rail position function, which can make the motor stop at any position to prevent selfrig decline and damage cutter.
- 3** Interne „Selbstschmierfunktion“ erhöht wesentlich die Lebensdauer des Getriebes.

Design of internal self-lubricating function ensures extended life of the gear.
- 4** Die Lufteinlässe sind so konstruiert das keine Flüssigkeiten oder Schmutz in den Motor gelangen können.

Tilt protection design for motor air inlet avoid liquid or debris falling into the inside of he motor.
- 5** Automatisches inneres Kühlsystem. Der externe Kühlring ist so gestaltet, dass Kühlflüssigkeit nicht in das Getriebe gelangen kann.

Automatic internal cooling system. The external cooling ring design prevents cooling liquid overflow into the gear box.
- 6** Ergonomisch konstruierte Griffe für hervorragende Kontrolle der Drehbewegung.

Ergonomically designed handles for excellent control of the rotary movement.
- 7** Offener Griff. Optimal für leichte Maschinen. Die Maschine ist mühelos auf der zu bohrenden Oberfläche zu verschieben. Leicht zu tragen. Ergonomisch.

Open handle. Ideal for light machines. The machine can be moved easily on the surface.
- 8** Schwerpunktmäßig optimal positionierte Bohrungen im Aluminiumguss zum Befestigen des Sicherungsseiles. Maschinen welche an Wänden/Decken magnetisch befestigt werden sollten unbedingt gesichert werden.

Design of overall aerial lifting holes and safety rope holes guarantee double protection for the safety of the aerial personal and equipment.
- 9** Die Konstruktion des gesamten Bohrständers ist auf eine hohe Steifigkeit zur Verbesserung der Bohrqualität ausgelegt.

The design of the entire body is designed for high rigidity to improve drilling quality.
- 10** Die Magnet-Standflächen kommen in einem Verschleißreduzierten Design. Die Standflächen der Magnete erhalten hierdurch eine wesentlich längere Lebensdauer. Die Magnethaltekraft beträgt bis zu 10 000 N / 1000 kg für zuverlässiges und sicheres Bohren.

Magnetic bottom wear design, which reduces the wear of the magnet bottom and extend service life. Magnetic base with maximum magnetic adhesion up to 10 000 N ensure the safety and reliability during drilling operations.



KA 35 SILVER-MAG · TWIN SLIDE

EUROPE-VERSION

230 VOLT · VOLTS

USA-VERSION

110 VOLT · VOLTS

UK-VERSION

110 VOLT · VOLTS

20 8013

€ 599,00

21 8013

€ 599,00

22 8013

€ 599,00

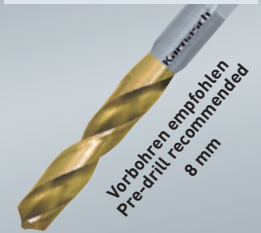
Kernbohren
Core drilling



Ø 12-35 mm
5/32"-1.3/8"

362-487, 506-520

Spiralbohren
Twist drilling



Ø 3-18 mm
3/16"-45/64"

622

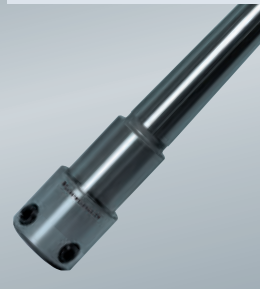
Senken
Countersinking



Ø 10-30 mm
3/8"-1.3/16"

634-663

Zubehör
Accessories



521-523, 528

Lastdrehzahl
Speed full load

Getriebestufen
Gear stages

1 = 450 min⁻¹

Die angegebenen maximalen Durchmesser / Schnitttiefen der Kernbohrmaschinen, können wir nur mit **original** Karnasch Bohrwerkzeugen garantieren.
The specified maximum diameter / cutting depths of the magnetic hole cutting machines, can only be guaranteed with **original** Karnasch drilling tools.

* Mit der Maschine sind **55 mm Schnitttiefe** erreichbar. Bei Verwendung 2-teiliger Auswerferstifte (Beschreibung siehe Seite 370) sind bis zu **110 mm Schnitttiefe** möglich ab Durchmesser 18 mm.

* The machines are supplied as standard with **55 mm cutting depth** holder. Please use our 2-part pins (explanation see page 370) for cutters from 18 mm if you need **cutting depth up to 110 mm**.

Besonderheiten
Special Characteristics

Dank doppeltem Schienenführungssystem kann der Hub problemlos auf **210 mm** erweitert werden (Beschreibung siehe S. 1088).

Thanks to Two-way sliding System stroke up to **210 mm** possible. (Description on page 1088).

Enthaltenes Zubehör
Included Accessories

- Sicherungsgurt
- 3 Inbusschlüssel
- 2 Gummidichtungen
- Kühlmittelflasche mit Schlauch
- safety belt
- 3 hex keys
- 2 rubber seals
- coolant bottle with hose



370-550 mm Gesamthöhe / Overall height

BEST SELLER

125 mm Gesamtbreite, gemessen am Drehritzel* / Overall width measured on pinion drive*

275 mm Gesamtlänge / Overall length

| | |
|---|---|
| Motorleistung Watt Motor Power Watts | 1100 |
| Aufnahme Tool holder | Direktaufnahme Weldon 19 mm Directly Weldon 19 mm (3/4") |
| Kühlmittelzufuhr Coolant supply | Integriert, automatisch Internal, automatically |
| Hub Stroke | 120 mm bis 210 mm möglich 120 mm up to 210 mm possible 4.23/32" up to 8.17/64" possible |
| Spannung Voltage | 230 Volt / 110 Volt 230 Volts / 110 Volts |
| Magnethaltekraft Magnetic adhesion | 1000 kg 2200 lb |
| Magnetfuß Magnetic foot | 80 x 168 mm Starr Fixed |
| Gewicht Weight | 10,50 kg 23,00 lb |

Film
Movie



NEU
NEW

230 Volt Maschine als Vorführgerät erhältlich.
Bitte kontaktieren Sie uns per E-Mail info@karnasch.tools
230 Volt demonstration models available.
Please send a mail to info@karnasch.tools

Bestseller - preisreduziert
Bestseller - price reduced



1087



Index



1



Dies fängt beim Wichtigsten an: DEM MOTOR. Eibenstock Motoren zu 100% MADE IN GERMANY sind und bleiben die beste Wahl, wenn es um leistungsstarke Motoren mit hohem Drehmoment und geringer Wartung geht.

This starts with the most important, THE MOTOR. Eibenstock motors 100% Made in Germany are and will remain the best choice when it comes to performance and reliability, motors with high torque and low maintenance.

2



Dies geht weiter mit der Führung. Unser „HEAVY-DUTY“ Schienenführungssystem (**PATENTIERT**) ist den gängigen Schwalbenschwanzführungen an Stabilität und Präzision bei Weitem überlegen.

This goes on with the slide. Our "HEAVY-DUTY" Twin Rail Slide System (**PATENTED**) is by far superior to standard dovetail slides in the points of stability and precision.

3



Das Herz unserer Magnet-Kernbohrmaschinen: Robuste Elektronik-Schalteneinheiten. Verwechslungsfreie und ergonomisch richtige Anordnung der Schalter POWER und Magnethaltekraft. Eingebaute Sicherheits-Elektronikeinheiten erlauben den Motorstart nur bei eingeschaltetem Magnet.

MAG-TEC SENSOR: Der Sensor erkennt wie gut der Magnet die Maschine am Untergrund hält. Er ist direkt mit dem Motor verbunden. Leuchtet der Sensor „ROT“ ist der Untergrund verunreinigt (Rost, Lackreste, Späne), das Material dünner als 6 mm oder der Vorschub beim Bohren ist zu hoch. Die Maschine hat somit keinen sicheren Stand. Der Motor wird nicht starten oder schaltet sich ab. Leuchtet der Sensor „GRÜN“ ist die Magnethaltekraft optimal und die Nutzung der Maschine ist sicher.

The heart of our magnetic hole cutting machines robust electronic switching units with ergonomically designed switch panels. Controlled by Hightech P.C.B Electronic circuitry built with safety in mind. We have interlocking systems ensuring that magnet must be energized before motor can be started. This high-tech P.C.B control system is common to all models.

MAG-TEC SENSOR: The sensor detects how well the magnet keeps the machine on the ground. It is directly connected to the engine. If the sensor is illuminating "RED", the ground is dirty (rust, varnish residues, chips), the material is thinner than 6 mm or the feed rate is too high. The machine does not have a safe stand. The engine does not start or turns off. If the sensor is illuminating "GREEN", the magnetic holding force is optimal and the use of the machine is safe.

4



Alle Maschinen sind mit einem Stabilisator ausgestattet für noch mehr Haltekraft.

All models of machines are equipped with a rear stabilizer for even more holding power and stability.

5



Abnehmbarer, magnetbestückter Kühlmitteltank ebenfalls für externe Befestigung. Kühlmittel mit Schnellwechsel-Schlauchsystem und Kühlmittel-Feinjustierung. Durchdacht und praktisch.

Removable coolant tank for external mounting with magnetic clip supplied. Coolant tank with quick release hose system and coolant fine adjustment. Well thought out and practical.

6



Konsequent "NUR DAS BESTE"



7



8



9

Index

Kompakte und robuste Gehäuse aus solidem Aluminiumguss.
Bei Platzproblemen ist das komplette Drehkreuz/Griff abnehmbar und auf die andere Seite innerhalb von Sekunden montierbar.
Für KA 38, KA 40, KAS 40, KA 50, KAS 50, KATV 55, KATSV 55

Compact and robust main body housing made of high grade cast aluminum.
In case of place problems, the complete handle can be removed and mounted on the other side within seconds.
For KA 38, KA 40, KAS 40, KA 50, KAS 50, KATV 55, KATSV 55

Ergonomische 2-fach Griffe zum „ausbalancierten“ Halten / Befestigen der Maschine.

Ergonomic designed two way handle for perfect balance when handling and positioning machine.

Alle Maschinen mit automatischer Kühlmittelzufuhr / Weldon 19 mm (3/4") oder Weldon 32 mm (1.1/4").

All machines equipped with automatic internal coolant supply through 19 mm (3/4") Weldon or 32 mm (1.1/4") Weldon arbors.

Konsequent nur die besten Transport/Aufbewahrungsboxen. Alle Maschinen kommen in hochbelastbaren, staub- und wasserdicht versiegelten Boxen. Idealer Schutz der Maschinen im harten Einsatz.

Consistently only the best transport/storage boxes. All machines supplied in heavy-Duty, dust and waterproof sealed boxes with internal protective lining. Ideal protection of machines in tough conditions.

Fast alle Modelle erhältlich mit 360° drehbarem Fuß. Bei größeren Modellen ist der Fuß zusätzlich bis zu 22 / 16 mm vor und zurück verschiebbar. Das ergibt größtmögliche Flexibilität bei der Positionierung der Maschine.

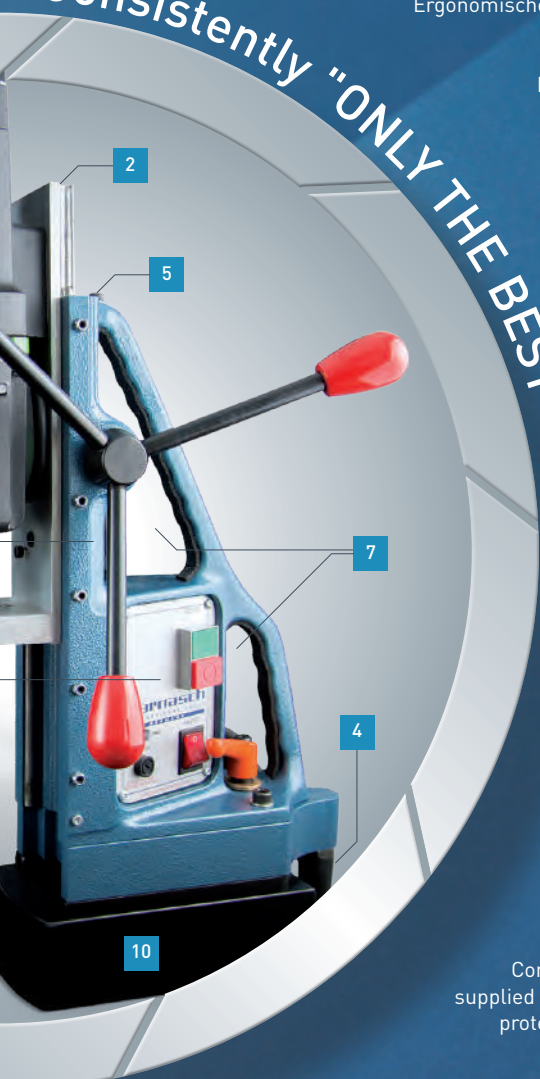
- A. Maschine aufsetzen
- B. Mit Magnet sichern
- C. Nachträglich punktgenau positionieren

Almost all models available with swivel base 360 degrees and larger models with additional 16 mm or 22 mm forward/back sliding and lock, for maximum flexibility when positioning the machine.

- A. Place the machine
- B. Secure with magnet
- C. Subsequently positioned precisely and locked ready to drill

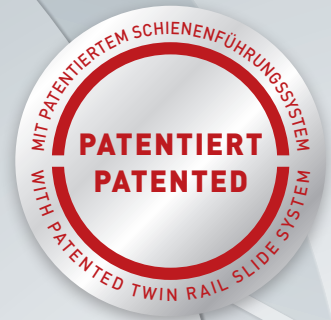


Consistently "ONLY THE BEST"



HEAVY-DUTY

SCHIENENFÜHRUNGSSYSTEM · TWIN RAIL SLIDE SYSTEM



Neues System "HEAVY-DUTY" Vorteile gegenüber Maschinen mit veralteter Schwalbenschwanzführung.

- Bis zu 10-fach höhere Stabilität
- Extrem enge Führungstoleranzen durch die runden Schienen
- Der Führungsblock hat keinen direkten Kontakt zum Maschinenkorpus sondern wird ausschließlich durch das hochpräzise und stabile runde Schienensystem geführt.
 - Dadurch weniger Reibung und Verschleiß
 - Geringere Wartungskosten und höhere Zuverlässigkeit

Daraus resultiert:

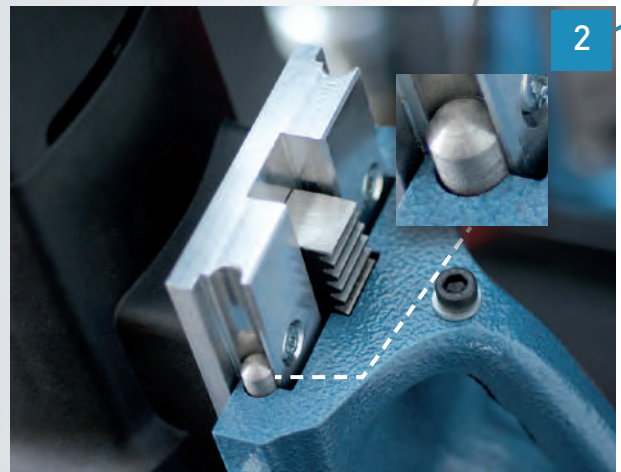
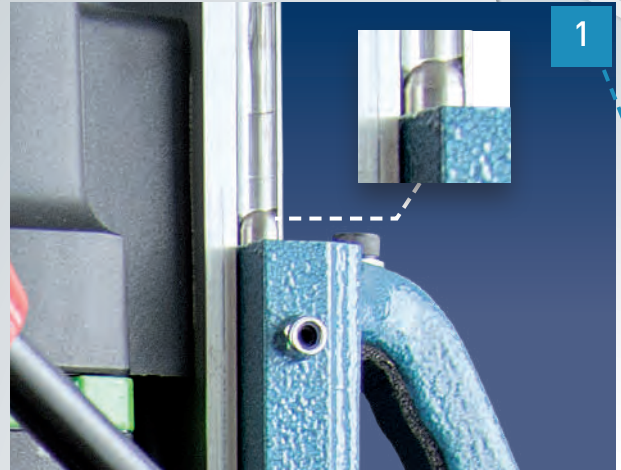
- Höhere Standzeit der Bohrer
- Weniger Bruch der Bohrer
- Genauere Bohrtoleranzen
- Bessere Oberfläche der Bohrungen
- Bis zu 110 mm Schnitttiefe möglich, auch bei kleinen Kernbohrmaschinen

Advantages of New Twin Rail Slide System "HEAVY-DUTY" over machines with old dovetail system.

- Up to 10 times better stability.
- Extremely tight tolerances of the slide through the round Twin Rail system.
- The slide has no contact with the main body of the machine. The whole construction is connected only by the highly precise and extremely stable rail system.
 - Reduced friction / less wear
 - Low maintenance / better reliability

Result:

- Improved cutter life
- Reduced cutter breakage
- Improved hole tolerances
- Improved hole surface quality
- Up to 110 mm cutting depth possible already with small machines



Altes System Schwalbenschwanzführung
Old dove tail system

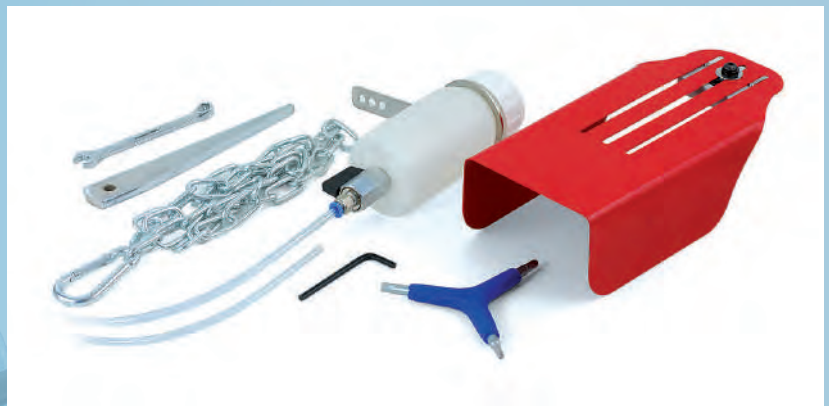


Index



Die Maschinen werden sofort einsatzbereit geliefert. Komplett mit allen nötigen Werkzeugen und Zusatzteilen.

The machines are delivered instantly ready to use. Complete with all necessary tools and additional parts.



Werkzeuge und Zusatzteile: Alle notwendigen Werkzeuge, Späneschutz, Keil, Sicherheitskette, Kühlmittelflasche mit Magnethalter.

Tools and additional parts: Safety chain/carabina, coolant bottle with fixing bracket and magnetic holder.



Konsequent "NUR DAS BESTE" an Maschinen benötigt konsequent "NUR DAS BESTE" an Transportkästen. Alle Maschinen kommen in hochbelastbaren, staub- und wasserdicht versiegelten Transportkästen. Idealer Schutz der Maschinen im harten Einsatz.

Consistently "ONLY THE BEST" machinery requires only the best available transport boxes. All machines supplied in heavy-duty dust and water proof sealed transport containers with internal protection. Ideal for machines used in tough conditions.



1



2



3



4



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7



8



9

Index

JETZT ONLINE VERFÜGBAR. NOW AVAILABLE ONLINE.



→ Bedienungsanleitungen
Operating instructions

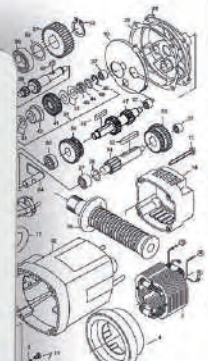
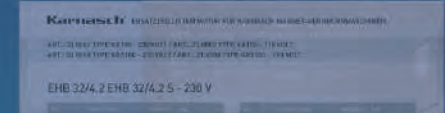
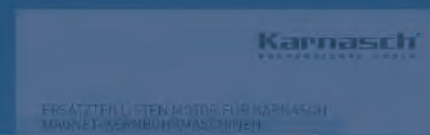


→ Sicherheitsanleitungen
Safety instructions

→ Ersatzteillisten Motor
Spare parts lists motor



→ Ersatzteillisten Magnetständer
Spare parts lists magnetic stand



Hier öffnen · Open here

POWER.
PRECISION.
PERFORMANCE.

Karnasch[®]
PROFESSIONAL TOOLS

KA 38 BLUE-MAG · SENSOR · TWIN-RAIL SLIDE

EUROPE-VERSION

230 VOLT · VOLTS

USA-VERSION

110 VOLT · VOLTS

UK-VERSION

110 VOLT · VOLTS

20 8020 010

€ 819,05

20 8020 020

€ 819,05

20 8020 030

€ 819,05

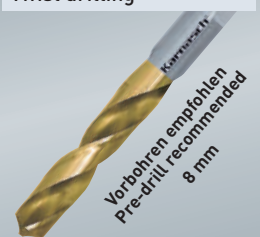
Kernbohren
Core drilling



Ø 12-38 mm
5/32"-1.1/2"

362-487, 506-520

Spiralbohren
Twist drilling



Ø 3-18 mm
3/16"-45/64"

622

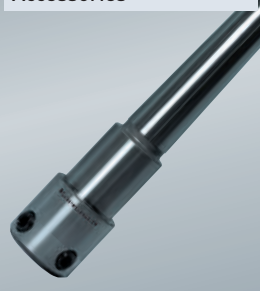
Senken
Countersinking



Ø 10-30 mm
3/8"-1.3/16"

634-663

Zubehör
Accessories



521-523, 528

Lastdrehzahl
Speed full load



Getriebestufen
Gear stages

1 = 450 min⁻¹

Die angegebenen maximalen Durchmesser / Schnittiefen der Kernbohrmaschinen, können wir nur mit **original** Karnasch Bohrwerkzeugen garantieren.
The specified maximum diameter / cutting depths of the magnetic hole cutting machines, can only be guaranteed with **original** Karnasch drilling tools.

* Mit der Maschine sind **55 mm Schnitttiefe** erreichbar. Bei Verwendung 2-teiliger Auswerferstifte (Beschreibung siehe Seite 370) sind bis zu **110 mm Schnitttiefe** möglich ab Durchmesser 18 mm.

* The machines are supplied as standard with **55 mm cutting depth** holder. Please use our 2-part pins (explanation see page 370) for cutters from 18 mm if you need **cutting depth up to 110 mm**.

Besonderheiten
Special Characteristics



Sensor

Dank "HEAVY-DUTY" Schienenführungssystem problemlos **110 mm** Schnitttiefe erreichbar (Beschreibung siehe S. 1088).

Thanks to "HEAVY-DUTY" Twin Rail Slide System easily **110 mm** cutting depth possible. (Description on page 1088).



Motorleistung Watt
Motor Power Watts

1100

Aufnahme
Tool holder

Direktaufnahme Weldon 19 mm
Directly Weldon 19 mm (3/4")

Kühlmittelzufuhr
Coolant supply

Integriert, automatisch
Internal, automatically

Hub
Stroke

170 mm | 6.5/8"

Spannung
Voltage

230 Volt / 110 Volt
230 Volts / 110 Volts

Magnethaltekraft
Magnetic adhesion

1100 kg | 2425 lb

Magnetfuß
Magnetic foot

85 x 170 mm

Starr
Fixed

Gewicht
Weight

10,50 kg
23,00 lb

Film
Movie



Bestseller – preisreduziert
Bestseller – price reduced



1093

NEU
NEW

230 Volt Maschine als Vorführgerät erhältlich.
Bitte kontaktieren Sie uns per E-Mail info@karnasch.tools
230 Volt demonstration models available.
Please send a mail to info@karnasch.tools



Index

KA 40 BLUE-MAG · SENSOR · TWIN-RAIL SLIDE

| | | | | | |
|-----------------------|------------------|--------------------|------------------|-------------------|------------------|
| EUROPE-VERSION | 230 VOLT · VOLTS | USA-VERSION | 110 VOLT · VOLTS | UK-VERSION | 110 VOLT · VOLTS |
| 20 8021 010 | • € 907,25 | 20 8021 020 | • € 907,25 | 20 8021 030 | ○ € 907,25 |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Kernbohren
Core drilling



110 mm *
4°

Ø 12-40 mm
5/32" - 1.37/64"

Spiralbohren
Twist drilling



Vorböhrern empfohlen
Pre-drill recommended
8 mm

Ø 3-18 mm
3/16" - 45/64"

Senken
Countersinking



Ø 10-30 mm
3/8" - 1.3/16"

Zubehör
Accessories



Lastdrehzahl
Speed full load

Getriebestufen
Gear stages

1 = 450 min⁻¹

362-487, 506-520 622 634-663 521-523, 528

Die angegebenen maximalen Durchmesser / Schnitttiefen der Kernbohrmaschinen, können wir nur mit **original** Karnasch Bohrwerkzeugen garantieren.
The specified maximum diameter / cutting depths of the magnetic hole cutting machines, can only be guaranteed with **original** Karnasch drilling tools.

* Mit der Maschine sind **55 mm Schnitttiefe** erreichbar. Bei Verwendung 2-teiliger Auswerferstifte (Beschreibung siehe Seite 370) sind bis zu **110 mm Schnitttiefe** möglich ab Durchmesser 18 mm.
* The machines are supplied as standard with **55 mm cutting depth** holder. Please use our 2-part pins (explanation see page 370) for cutters from 18 mm if you need **cutting depth up to 110 mm**.

Besonderheiten
Special Characteristics

Dank "HEAVY-DUTY" Schienenführungssystem problemlos **110 mm Schnitttiefe** erreichbar (Beschreibung siehe S. 1088).
Thanks to "HEAVY-DUTY" Twin Rail Slide System easily **110 mm cutting depth** possible. (Description on page 1088).

Sensor




BEST SELLER

330-510 mm Gesamthöhe / Overall height

120 mm Gesamtbreite, gemessen am Drehritzel* / Overall width measured on pinion drive*

280 mm Gesamtlänge / Overall length

| | |
|---|--|
| Motorleistung Watt Motor Power Watts | 1100 |
| Aufnahme Tool holder | Direktaufnahme Weldon 19 mm Directly Weldon 19 mm |
| Kühlmittelzufuhr Coolant supply | Integriert, automatisch Internal, automatically |
| Hub Stroke | 170 mm 6.5/8" |
| Spannung Voltage | 230 Volt / 110 Volt 230 Volts / 110 Volts |
| Magnethaltekraft Magnetic adhesion | 1100 kg 2425 lb |
| Magnetfuß Magnetic foot | 85 x 170 mm Starr Fixed |
| Gewicht Weight | 11,50 kg 25,00 lb |

Bestseller – preisreduziert
Bestseller – price reduced



NEU NEW

230 Volt Maschine als Vorführgerät erhältlich.
Bitte kontaktieren Sie uns per E-Mail info@karnasch.tools
230 Volt demonstration models available.
Please send a mail to info@karnasch.tools

KAS 40 BLUE-MAG · SENSOR · TWIN-RAIL SLIDE

EUROPE-VERSION

230 VOLT · VOLTS

USA-VERSION

110 VOLT · VOLTS

UK-VERSION

110 VOLT · VOLTS

20 8022 010

€ 970,25

20 8022 020

€ 970,25

20 8022 030

€ 970,25

Kernbohren
Core drilling



110 mm
4"

Ø 12-40 mm
5/32" - 1.37/64"

Spiralbohren
Twist drilling



Vorböhrern empfohlen
Pre-drill recommended
8 mm

Ø 3-18 mm
3/16" - 45/64"

Senken
Countersinking



Ø 10-30 mm
3/8" - 1.3/16"

Zubehör
Accessories



Lastdrehzahl
Speed full load

Getriebestufen
Gear stages

1 = 450 min⁻¹

362-487, 506-520

622

634-663

521-523, 528

Die angegebenen maximalen Durchmesser / Schnitttiefen der Kernbohrmaschinen, können wir nur mit **original** Karnasch Bohrwerkzeugen garantieren.
The specified maximum diameter / cutting depths of the magnetic hole cutting machines, can only be guaranteed with **original** Karnasch drilling tools.

* Mit der Maschine sind **55 mm Schnitttiefe** erreichbar. Bei Verwendung 2-teiliger Auswerferstifte (Beschreibung siehe Seite 370) sind bis zu **110 mm Schnitttiefe** möglich ab Durchmesser 18 mm.

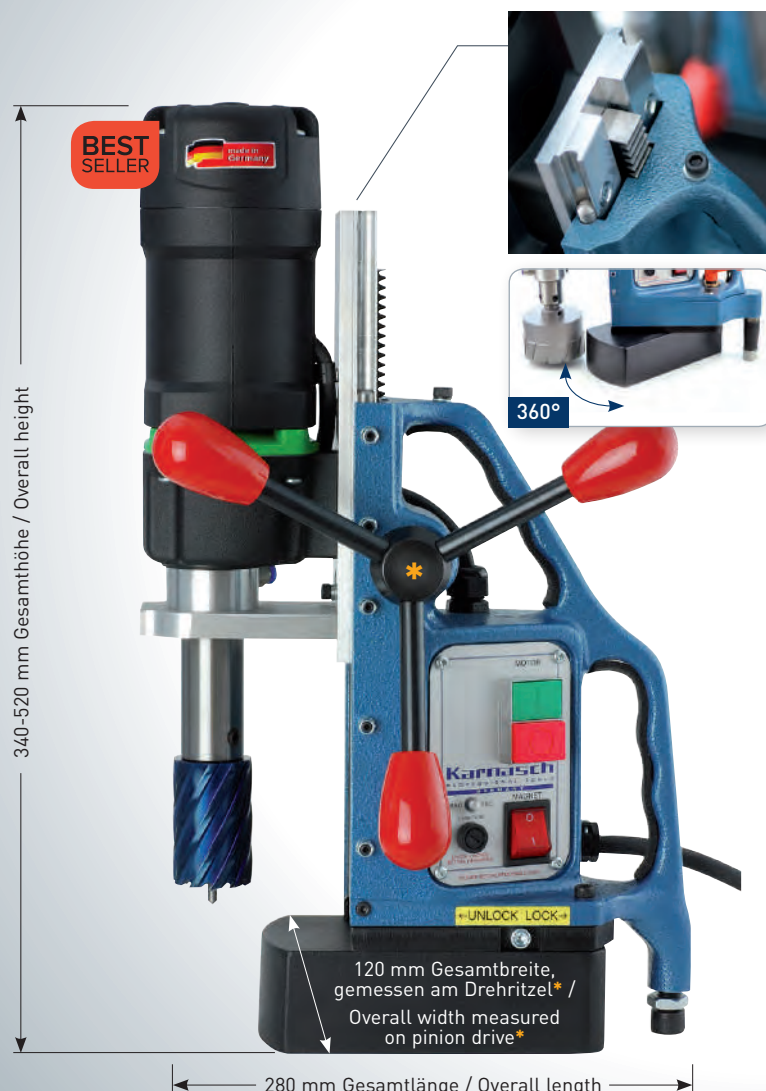
* The machines are supplied as standard with **55 mm cutting depth** holder. Please use our 2-part pins (explanation see page 370) for cutters from 18 mm if you need **cutting depth up to 110 mm**.

Besonderheiten
Special Characteristics



Dank "HEAVY-DUTY" Schienenführungssystem problemlos **110 mm** Schnitttiefe erreichbar (Beschreibung siehe S. 1088).

Thanks to "HEAVY-DUTY" Twin Rail Slide System easily **110 mm** cutting depth possible. (Description on page 1088).



Motorleistung Watt
Motor Power Watts

1100

Aufnahme
Tool holder

Direktaufnahme Weldon 19 mm
Directly Weldon 19 mm

Kühlmittelzufuhr
Coolant supply

Integriert, automatisch
Internal, automatically

Hub
Stroke

180 mm | 6.31/32"

Spannung
Voltage

230 Volt / 110 Volt
230 Volts / 110 Volts

Magnethaltekraft
Magnetic adhesion

1100 kg | 2425 lb

Magnetfuß
Magnetic foot

85 x 170 mm Fuß drehbar
Swivel rotates 360°

Gewicht
Weight

12,00 kg
26,00 lb

Film
Movie



Bestseller - preisreduziert
Bestseller - price reduced



NEU
NEW

230 Volt Maschine als Vorführgerät erhältlich.
Bitte kontaktieren Sie uns per E-Mail info@karnasch.tools
230 Volt demonstration models available.
Please send a mail to info@karnasch.tools



1095

KA 50 BLUE-MAG · SENSOR · TWIN-RAIL SLIDE

| | | | | | |
|-----------------------|------------------|--------------------|------------------|-------------------|------------------|
| EUROPE-VERSION | 230 VOLT · VOLTS | USA-VERSION | 110 VOLT · VOLTS | UK-VERSION | 110 VOLT · VOLTS |
| 20 8023 010 | € 1222,25 | 20 8023 020 | € 1222,25 | 20 8023 030 | € 1222,25 |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Kernbohren
Core drilling



110 mm *
4°

Ø 12-50 mm
5/32" - 1.31/32"

Spiralbohren
Twist drilling



Vorbohren empfohlen
Pre-drill recommended
8 mm

Ø 3-23 mm
3/16" - 29/32"

Senken
Countersinking



Ø 10-40 mm
3/8" - 1.37/64"

Zubehör
Accessories



Lastdrehzahl
Speed full load

Getriebestufen
Gear stages

1 = 250 min⁻¹
2 = 450 min⁻¹

362-487, 506-520 622 634-663 521-523, 528

Die angegebenen maximalen Durchmesser / Schnitttiefen der Kernbohrmaschinen, können wir nur mit **original** Karnasch Bohrwerkzeugen garantieren.
The specified maximum diameter / cutting depths of the magnetic hole cutting machines, can only be guaranteed with **original** Karnasch drilling tools.

* Die Maschine wird standardmäßig mit einer Aufnahme **Schnitttiefe 55 mm** geliefert. Benötigen Sie eine **Schnitttiefe bis 110 mm** verwenden Sie bitte extra lange Aufnahmehalter siehe Seite 522/523, oder 2-teilige Auswerferstifte für Kernbohrer ab Durchmesser 18 mm. (Erklärung siehe Seite 370). Größere Schnitttiefen auf Anfrage möglich.
* The machines are supplied as standard with a **55 mm cutting depth** holder. For **cutting depth up to 110 mm** please use our extra long holders see page 522/523, or see our 2-part pins (explanation see page 370) for cutters from 18 mm. For cutting depth more than 110 mm please ask us.

Besonderheiten
Special Characteristics

Dank "HEAVY-DUTY" Schienenführungssystem problemlos **110 mm** Schnitttiefe erreichbar (Beschreibung siehe S. 1088).
Thanks to "HEAVY-DUTY" Twin Rail Slide System easily **110 mm** cutting depth possible. (Description on page 1088).

Sensor




| | |
|---|--|
| Motorleistung Watt Motor Power Watts | 1150 |
| Aufnahme Tool holder | Morsekonus 2 mit Weldon 19 mm Morse taper 2 with Weldon 19 mm |
| Kühlmittelzufuhr Coolant supply | Integriert, automatisch Internal, automatically |
| Hub Stroke | 170 mm 6.5/8" |
| Spannung Voltage | 230 Volt / 110 Volt 230 Volts / 110 Volts |
| Magnethaltekraft Magnetic adhesion | 1250 kg 2755 lb |
| Magnetfuß Magnetic foot | 85 x 180 mm Starr Fixed |
| Gewicht Weight | 13,00 kg 28,00 lb |



Bestseller – preisreduziert
Bestseller – price reduced

1096 **NEU NEW**
230 Volt Maschine als Vorführgerät erhältlich.
Bitte kontaktieren Sie uns per E-Mail info@karnasch.tools
230 Volt demonstration models available.
Please send a mail to info@karnasch.tools

KAS 50 BLUE-MAG · SENSOR · TWIN-RAIL SLIDE

EUROPE-VERSION

230 VOLT · VOLTS

USA-VERSION

110 VOLT · VOLTS

UK-VERSION

110 VOLT · VOLTS

20 8024 010

• € 1285,25

20 8024 020

• € 1285,25

20 8024 030

○ € 1285,25


Kernbohren
Core drilling



110 mm
4"

Ø 12-50 mm
5/32"-1.31/32"

Spiralbohren
Twist drilling



Vorbohren empfohlen
Pre-drill recommended
8 mm

Ø 3-23 mm
3/16"-29/32"

Senken
Countersinking



Ø 10-40 mm
3/8"-1.37/64"

Zubehör
Accessories



Lastdrehzahl
Speed full load



Getriebestufen
Gear stages

1 = 250 min⁻¹
2 = 450 min⁻¹

362-487, 506-520

622

634-663

521-523, 528

Die angegebenen maximalen Durchmesser / Schnitttiefen der Kernbohrmaschinen, können wir nur mit **original** Karnasch Bohrwerkzeugen garantieren.
The specified maximum diameter / cutting depths of the magnetic hole cutting machines, can only be guaranteed with **original** Karnasch drilling tools.

* Die Maschine wird standardmäßig mit einer Aufnahme **Schnitttiefe 55 mm** geliefert. Benötigen Sie eine **Schnitttiefe bis 110 mm** verwenden Sie bitte extra lange Aufnahmehalter siehe Seite 522/523, oder 2-teilige Auswerferstifte für Kernbohrer ab Durchmesser 18 mm. (Erklärung siehe Seite 370). Größere Schnitttiefen auf Anfrage möglich.

* The machines are supplied as standard with a **55 mm cutting depth** holder. For **cutting depth up to 110 mm** please use our extra long holders see page 522/523, or see our 2-part pins (explanation see page 370) for cutters from 18 mm. For cutting depth more than 110 mm please ask us.

Besonderheiten
Special Characteristics



Dank "HEAVY-DUTY" Schienenführungssystem problemlos **110 mm** Schnitttiefe erreichbar (Beschreibung siehe S. 1088).

Thanks to "HEAVY-DUTY" Twin Rail Slide System easily **110 mm** cutting depth possible. (Description on page 1088).



| | |
|---|--|
| Motorleistung Watt Motor Power Watts | 1150 |
| Aufnahme Tool holder | Morsekonus 2 mit Weldon 19 mm Morse taper 2 with Weldon 19 mm |
| Kühlmittelzufuhr Coolant supply | Integriert, automatisch Internal, automatically |
| Hub Stroke | 180 mm 6.31/32" |
| Spannung Voltage | 230 Volt / 110 Volt 230 Volts / 110 Volts |
| Magnethaltekraft Magnetic adhesion | 1250 kg 2755 lb |
| Magnetfuß Magnetic foot | 85 x 170 mm Fuß drehbar Swivel rotates 360° |
| Gewicht Weight | 13,50 kg 29,80 lb |

Film
Movie



Bestseller – preisreduziert
Bestseller – price reduced



1097



Index

NEU
NEW

230 Volt Maschine als Vorführgerät erhältlich.
Bitte kontaktieren Sie uns per E-Mail info@karnasch.tools
230 Volt demonstration models available.
Please send a mail to info@karnasch.tools

KATV 55 BLUE-MAG • SENSOR • TWIN-RAIL SLIDE

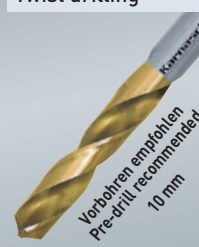
| EUROPE-VERSION | 230 VOLT · VOLTS | USA-VERSION | 110 VOLT · VOLTS | UK-VERSION | 110 VOLT · VOLTS |
|----------------|------------------|-------------|------------------|-------------|------------------|
| 20 8025 010 | • € 1297,85 | 20 8025 020 | • € 1297,85 | 20 8025 030 | ○ € 1297,85 |

Kernbohren
Core drilling



Ø 12-55 mm
5/32"-2.11/64"

Spiralbohren
Twist drilling



Ø 3-23 mm
3/16"-29/32"


Vorbohren empfohlen
Pre-drill recommended
10 mm

Senken
Countersinking



Ø 10-40 mm
3/8"-1.37/64"

Gewindebohren
Tapping



Ø 6-20 mm
15/64"-25/32"

Zubehör
Accessories



Lastdrehzahl
Speed full load



Getriebestufen
Gear stages

1 = 100-250 min⁻¹
2 = 180-450 min⁻¹

362-487, 506-520 622 634-663 623 521-523, 528

Die angegebenen maximalen Durchmesser / Schnitttiefen der Kernbohrmaschinen, können wir nur mit **original** Karnasch Bohrwerkzeugen garantieren.
The specified maximum diameter / cutting depths of the magnetic hole cutting machines, can only be guaranteed with **original** Karnasch drilling tools.

* Die Maschine wird standardmäßig mit einer Aufnahme **Schnitttiefe 55 mm** geliefert. Benötigen Sie eine **Schnitttiefe bis 110 mm** verwenden Sie bitte extra lange Aufnahmehalter siehe Seite 522/523, oder 2-teilige Auswerferstifte für Kernbohrer ab Durchmesser 18 mm. (Erklärung siehe Seite 370). Größere Schnitttiefen auf Anfrage möglich.
* The machines are supplied as standard with a **55 mm cutting depth** holder. For **cutting depth up to 110 mm** please use our extra long holders see page 522/523, or see our 2-part pins (explanation see page 370) for cutters from 18 mm. For cutting depth more than 110 mm please ask us.

Besonderheiten
Special Characteristics

Dank "HEAVY-DUTY" Schienenführungssystem problemlos **110 mm** Schnitttiefe erreichbar (Beschreibung siehe S. 1088).
Thanks to "HEAVY-DUTY" Twin Rail Slide System easily **110 mm** cutting depth possible. (Description on page 1088).

 Rechts-Linkslauf
Right/left running

 Vollwellenregel-Elektronik
Full wave electronic

 Thermoschutz
Thermal/overheat protection

 Sensor



| | |
|---|--|
| Motorleistung Watt Motor Power Watts | 1250 |
| Aufnahme Tool holder | Morsekonus 2 mit Weldon 19 mm Morse taper 2 with Weldon 19 mm |
| Kühlmittelzufuhr Coolant supply | Integriert, automatisch Internal, automatically |
| Hub Stroke | 170 mm 6.5/8" |
| Spannung Voltage | 230 Volt / 110 Volt 230 Volts / 110 Volts |
| Magnethaltekraft Magnetic adhesion | 1250 kg 2755 lb |
| Magnetfuß Magnetic foot | 85 x 180 mm Starr Fixed |
| Gewicht Weight | 13,00 kg 28,00 lb |

Konstantes Drehmoment vorwärts und rückwärts **mit eingebauter Zeitverzögerung** für den Motorstart. Gibt Motor- und Getriebschutz beim Umschalten von vorwärts auf rückwärts beim Gewindebohren oder Reiben.
Constant torque forward and reverse **with build in time delay** for motor start. Gives motor and gearbox protection when switching from forward to reverse when tapping or reaming.

Bestseller – preisreduziert
Bestseller – price reduced



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

1098 **NEU NEW**
230 Volt Maschine als Vorführgerät erhältlich.
Bitte kontaktieren Sie uns per E-Mail info@karnasch.tools
230 Volt demonstration models available.
Please send a mail to info@karnasch.tools

KATSV 55 BLUE-MAG • SENSOR • TWIN-RAIL SLIDE

EUROPE-VERSION

230 VOLT · VOLTS

USA-VERSION

110 VOLT · VOLTS

UK-VERSION

110 VOLT · VOLTS

20 8026 010

€ 1386,05

20 8026 020

€ 1386,05

20 8026 030

€ 1386,05

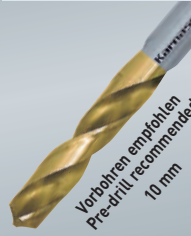
Kernbohren
Core drilling



110 mm
4"

Ø 12-55 mm
5/32"-2.11/64"

Spiralbohren
Twist drilling



Vorbohren empfohlen
Pre-drill recommended
10 mm

Ø 3-23 mm
3/16"-29/32"

Senken
Countersinking



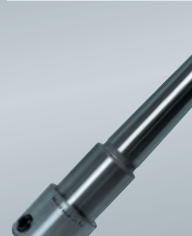
Ø 10-40 mm
3/8"-1.37/64"

Gewindebohren
Tapping



Ø 6-20 mm
15/64"-25/32"

Zubehör
Accessories



Lastdrehzahl
Speed full load

Getriebestufen
Gear stages



1 = 100-250 min⁻¹
2 = 180-450 min⁻¹

362-487, 506-520

622

634-663

623

521-523, 528

Die angegebenen maximalen Durchmesser / Schnittiefen der Kernbohrmaschinen, können wir nur mit **original** Karnasch Bohrwerkzeugen garantieren.
The specified maximum diameter / cutting depths of the magnetic hole cutting machines, can only be guaranteed with **original** Karnasch drilling tools.

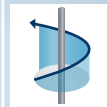
* Die Maschine wird standardmäßig mit einer Aufnahme **Schnittiefe 55 mm** geliefert. Benötigen Sie eine **Schnittiefe bis 110 mm** verwenden Sie bitte extra lange Aufnahmehalter siehe Seite 522/523, oder 2-teilige Auswerferstifte für Kernbohrer ab Durchmesser 18 mm. (Erklärung siehe Seite 370). Größere Schnittiefen auf Anfrage möglich.

* The machines are supplied as standard with a **55 mm cutting depth holder**. For **cutting depth up to 110 mm** please use our extra long holders see page 522/523, or see our 2-part pins (explanation see page 370) for cutters from 18 mm. For cutting depth more than 110 mm please ask us.

Besonderheiten
Special Characteristics



Rechts-Linkslauf
Right/left running



Vollwellenregel-Elektronik
Full wave electronic



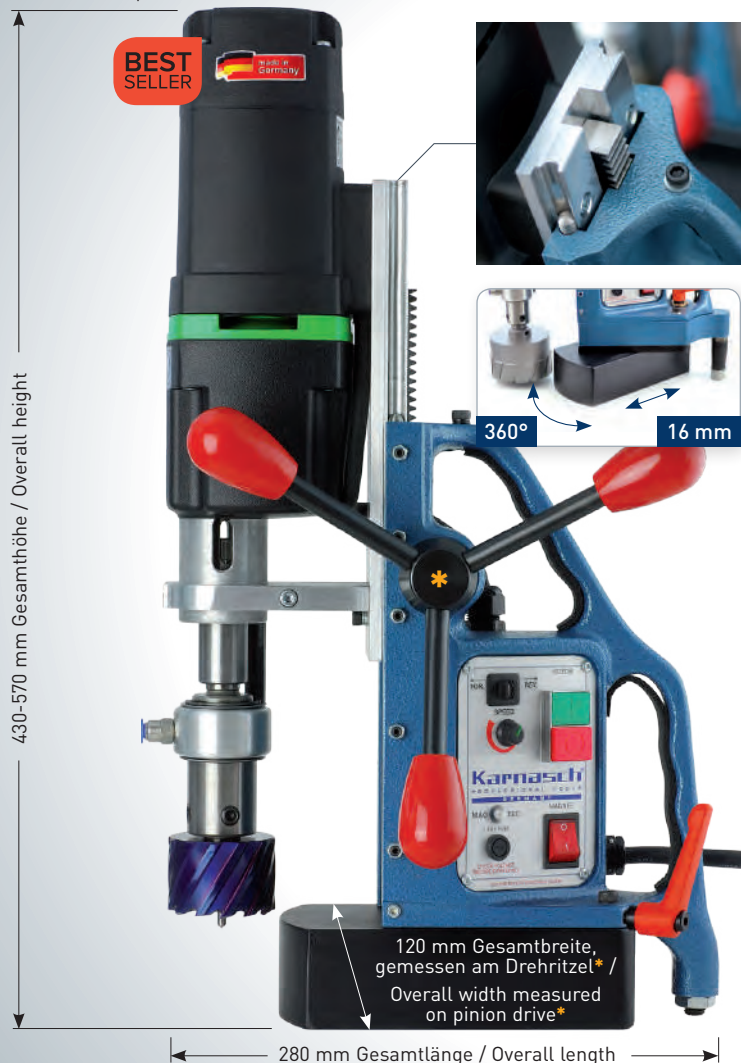
Thermoschutz
Thermal/overheat protection



Sensor

Dank "HEAVY-DUTY" Schienenführungssystem problemlos **110 mm** Schnittiefe erreichbar (Beschreibung siehe S. 1088).

Thanks to "HEAVY-DUTY" Twin Rail Slide System easily **110 mm** cutting depth possible. (Description on page 1088).



| | |
|---|--|
| Motorleistung Watt Motor Power Watts | 1250 |
| Aufnahme Tool holder | Morsekonus 2 mit Weldon 19 mm Morse taper 2 with Weldon 19 mm |
| Kühlmittelzufuhr Coolant supply | Integriert, automatisch Internal, automatically |
| Hub Stroke | 195 mm 7.7/8" |
| Spannung Voltage | 230 Volt / 110 Volt 230 Volts / 110 Volts |
| Magnethaltekraft Magnetic adhesion | 1250 kg 2755 lb |
| Magnetfuß Magnetic foot | 85 x 180 mm Fuß 360° drehbar, verschiebbar vor & zurück 16 mm Rotates 360°, moveable 16 mm forward & backwards |
| Gewicht Weight | 13,50 kg 29,80 lb |

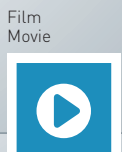
Konstantes Drehmoment vorwärts und rückwärts **mit eingebauter Zeitverzögerung** für den Motorstart. Gibt Motor- und Getriebe-schutz beim Umschalten von vorwärts auf rückwärts beim Gewindebohren oder Reiben.

Constant torque forward and reverse **with build in time delay** for motor start. Gives motor and gearbox protection when switching from forward to reverse when tapping or reaming.

NEU NEW

230 Volt Maschine als Vorführgerät erhältlich. Bitte kontaktieren Sie uns per E-Mail info@karnasch.tools
230 Volt demonstration models available. Please send a mail to info@karnasch.tools

Bestseller – preisreduziert
Bestseller – price reduced



Film

Movie

1099

Index



KA 100 BLUE-MAG · SENSOR · TWIN-RAIL SLIDE

EUROPE-VERSION

230 VOLT · VOLTS

USA-VERSION

110 VOLT · VOLTS

UK-VERSION

110 VOLT · VOLTS

20 8027 010

€ 1670,45

20 8027 020

€ 1670,45

20 8027 030

€ 1670,45

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Kernbohren
Core drilling



200 mm
7.716"

Ø 12-100 mm
15/32" - 3.15/16"

Spiralbohren
Twist drilling



Vorbohren empfohlen
Pre-drill recommended
12 mm

Ø 3-32 mm
3/16" - 1.17/64"

Senken
Countersinking



Ø 10-55 mm
3/8" - 2.11/64"

Zubehör
Accessories



Lastdrehzahl
Speed full load



Getriebestufen
Gear stages

- 1 = 110 min⁻¹
- 2 = 175 min⁻¹
- 3 = 245 min⁻¹
- 4 = 385 min⁻¹

362-487, 506-520

622


634-663

521-523, 528


Die angegebenen maximalen Durchmesser / Schnitttiefen der Kernbohrmaschinen, können wir nur mit **original** Karnasch Bohrwerkzeugen garantieren.
The specified maximum diameter / cutting depths of the magnetic hole cutting machines, can only be guaranteed with **original** Karnasch drilling tools.

* Die Maschine wird standardmäßig mit einer Aufnahme **Schnitttiefe 55 mm** geliefert. Benötigen Sie eine **Schnitttiefe bis 110 mm** verwenden Sie bitte extra lange Aufnahmehalter siehe Seite 522/523, oder 2-teilige Auswerferstifte für Kernbohrer ab Durchmesser 18 mm. (Erklärung siehe Seite 370). Größere Schnitttiefen auf Anfrage möglich.
* The machines are supplied as standard with a **55 mm cutting depth** holder. For **cutting depth up to 110 mm** please use our extra long holders see page 522/523, or see our 2-part pins (explanation see page 370) for cutters from 18 mm. For cutting depth more than 110 mm please ask us.

Besonderheiten
Special Characteristics



Mechanische Rutschkupplung
Mechanical clutch



Sensor

"HEAVY-DUTY" Schienenführungssystem ermöglicht bis zu **200 mm** Schnitttiefe. (Beschreibung siehe S. 1088).
Thanks to "HEAVY-DUTY" Twin Rail Slide System easily **200 mm** cutting depth possible (Description on page 1088).



BEST SELLER

480-690 mm Gesamthöhe / Overall height

130 mm Gesamtbreite, gemessen am Drehritzel* / Overall width measured on pinion drive*

340 mm Gesamtlänge / Overall length

| | | |
|---|--|----------------|
| Motorleistung Watt Motor Power Watts | 1700 | |
| Aufnahme in Maschine Holder in Machine | Morsekonus 3 mit Weldon 19 mm (3/4") für Kernbohrer Ø 12-60 mm Morsekonus für Ø = 61-100 mm, siehe Zubehör, Seite 521-523 Morse taper 3 with Weldon 19 mm (3/4") for annular cutter Ø 12-60 mm Morse taper for Ø = 61-100 mm, see accessories, page 521-523 | |
| Kühlmittelzufuhr Coolant supply | Integriert, automatisch Internal, automatically | |
| Hub Stroke | 255 mm 10.15/64" | |
| Spannung Voltage | 230 Volt / 110 Volt 230 Volts / 110 Volts | |
| Magnethaltekraft Magnetic adhesion | 2050 kg 4520 lb | |
| Magnetfuß Magnetic foot | 102 x 212 mm | Starr Fixed |
| Gewicht Weight | 21,00 kg 46,00 lb | Film Movie |

Index

1100

NEU NEW

230 Volt Maschine als Vorführgerät erhältlich.
Bitte kontaktieren Sie uns per E-Mail info@karnasch.tools
230 Volt demonstration models available.
Please send a mail to info@karnasch.tools

Bestseller – preisreduziert
Bestseller – price reduced



KAS 100 BLUE-MAG · SENSOR · TWIN-RAIL SLIDE

EUROPE-VERSION

230 VOLT · VOLTS

USA-VERSION

110 VOLT · VOLTS

UK-VERSION

110 VOLT · VOLTS

20 8028 010

€ 1872,05

20 8028 020

€ 1872,05

20 8028 030

€ 1872,05

Kernbohren
Core drilling

240 mm
9.2°/13.2°

Ø 12-100 mm
15/32"-3.15/16"

Spiralbohren
Twist drilling

Vorbohren empfohlen
Pre-drill recommended
12 mm

Ø 3-32 mm
3/16"-1.17/64"

Senken
Countersinking

Ø 10-55 mm
3/8"-2.11/64"

Zubehör
Accessories

Lastdrehzahl
Speed full load

Getriebestufen
Gear stages

1 = 110 min⁻¹
2 = 175 min⁻¹
3 = 245 min⁻¹
4 = 385 min⁻¹

362-487, 506-520

622

634-663

521-523, 528

Die angegebenen maximalen Durchmesser / Schnitttiefen der Kernbohrmaschinen, können wir nur mit **original** Karnasch Bohrwerkzeugen garantieren.
The specified maximum diameter / cutting depths of the magnetic hole cutting machines, can only be guaranteed with **original** Karnasch drilling tools.

* Die Maschine wird standardmäßig mit einer Aufnahme **Schnitttiefe 55 mm** geliefert. Benötigen Sie eine **Schnitttiefe bis 110 mm** verwenden Sie bitte extra lange Aufnahmehalter siehe Seite 522/523, oder 2-teilige Auswerferstifte für Kernbohrer ab Durchmesser 18 mm. (Erklärung siehe Seite 370). Größere Schnitttiefen auf Anfrage möglich.

* The machines are supplied as standard with a **55 mm cutting depth** holder. For **cutting depth up to 110 mm** please use our extra long holders see page 522/523, or see our 2-part pins (explanation see page 370) for cutters from 18 mm. For cutting depth more than 110 mm please ask us.

Besonderheiten
Special Characteristics

Mechanische Rutschkupplung
Mechanical clutch

Sensor

"HEAVY-DUTY" Schienenführungssystem ermöglicht bis zu **240 mm** Schnitttiefe. (Beschreibung siehe S. 1088).

Thanks to "HEAVY-DUTY" Twin Rail Slide System easily **240 mm** cutting depth possible (Description on page 1088).



Motorleistung Watt
Motor Power Watts

1700

Aufnahme in Maschine
Holder in Machine

Morsekonus 3 mit Weldon 19 mm [3/4"] für Kernbohrer Ø 12-60 mm
Morsekonus für Ø = 61-100 mm, siehe Zubehör, Seite 521-523

Morse taper 3 with Weldon 19 mm [3/4"] for annular cutter Ø 12-60 mm
Morse taper for Ø = 61-100 mm, see accessories, page 521-523

Kühlmittelzufuhr
Coolant supply

Integriert, automatisch
Internal, automatically

Hub
Stroke

295 mm | 12"

Spannung
Voltage

230 Volt / 110 Volt
230 Volts / 110 Volts

Magnethaltekraft
Magnetic adhesion

2050 kg | 4520 lb

Magnetfuß
Magnetic foot

102 x 212 mm
Fuß 360° drehbar, verschiebbar vor & zurück 22 mm
Rotates 360°, moveable 22 mm forward & backwards

Gewicht
Weight

22,50 kg
49,00 lb

Film
Movie



Bestseller – preisreduziert
Bestseller – price reduced



NEU
NEW

230 Volt Maschine als Vorführgerät erhältlich.
Bitte kontaktieren Sie uns per E-Mail info@karnasch.tools
230 Volt demonstration models available.
Please send a mail to info@karnasch.tools

KATV 100 BLUE-MAG • SENSOR • TWIN-RAIL SLIDE

| EUROPE-VERSION | 230 VOLT · VOLTS | USA-VERSION | 110 VOLT · VOLTS | UK-VERSION | 110 VOLT · VOLTS |
|----------------|------------------|-------------|------------------|-------------|------------------|
| 20 8029 010 | • € 1909,85 | 20 8029 020 | • € 1909,85 | 20 8029 030 | ○ € 1909,85 |

| | | | | | |
|--|--|--|--|--|---|
| Kernbohren Core drilling  <p>220 mm 8.21/32"*</p> <p>Ø 12-100 mm 15/32" - 3.15/16"</p> <p>362-487, 506-520</p> | Spiralbohren Twist drilling  <p>Vorbohren empfohlen Pre-drill recommended 12 mm</p> <p>Ø 3-32 mm 3/16" - 1.17/64"</p> <p>622</p> | Senken Countersinking  <p>Ø 10-55 mm 3/8 - 2.11/64"</p> <p>634-663</p> | Gewindebohren Tapping  <p>Ø 6-32 mm 15/64" - 1.17/64"</p> <p>623</p> | Zubehör Accessories  <p>521-523, 528</p> | Lastdrehzahl Speed full load  <p>Getriebestufen Gear stages</p> <p>1 = 60-140 min⁻¹ 2 = 200-470 min⁻¹</p> |
|--|--|--|--|--|---|

Die angegebenen maximalen Durchmesser / Schnitttiefen der Kernbohrmaschinen, können wir nur mit **original** Karnasch Bohrwerkzeugen garantieren.
The specified maximum diameter / cutting depths of the magnetic hole cutting machines, can only be guaranteed with **original** Karnasch drilling tools.




* Die Maschine wird standardmäßig mit einer Aufnahme **Schnitttiefe 55 mm** geliefert. Benötigen Sie eine **Schnitttiefe bis 110 mm** verwenden Sie bitte extra lange Aufnahmehalter siehe Seite 522/523, oder 2-teilige Auswerferstifte für Kernbohrer ab Durchmesser 18 mm. (Erklärung siehe Seite 370). Größere Schnitttiefen auf Anfrage möglich.

* The machines are supplied as standard with a **55 mm cutting depth** holder. For **cutting depth up to 110 mm** please use our extra long holders see page 522/523, or see our 2-part pins (explanation see page 370) for cutters from 18 mm. For cutting depth more than 110 mm please ask us.

Besonderheiten Special Characteristics

"HEAVY-DUTY" Schienenführungssystem ermöglicht bis zu **220 mm** Schnitttiefe. (Beschreibung siehe S. 1088).

Thanks to "HEAVY-DUTY" Twin Rail Slide System easily **220 mm** cutting depth possible (Description on page 1088).

| | |
|---|--|
|  | Rechts-Linkslauf Right/left running |
|  | Vollwellenregel-Elektronik Full wave electronic |
|  | Thermoschutz Thermal/overheat protection |
|  | Mechanische Rutschkupplung Mechanical clutch |
|  | Sensor |

| | |
|---|--|
| Motorleistung Watt Motor Power Watts | 1800 |
| Aufnahme in Maschine Holder in Machine | Morsekonus 3 mit Weldon 19 mm (3/4") für Kernbohrer Ø 12-60 mm Morsekonus für Ø = 61-100 mm, siehe Zubehör, Seite 521-523 Morse taper 3 with Weldon 19 mm (3/4") for annular cutter Ø 12-60 mm Morse taper for Ø = 61-100 mm, see accessories, page 521-523 |
| Kühlmittelzufuhr Coolant supply | Integriert, automatisch Internal, automatically |
| Hub Stroke | 255 mm 10.15/64" |
| Spannung Voltage | 230 Volt / 110 Volt 230 Volts / 110 Volts |
| Magnethaltekraft Magnetic adhesion | 2050 kg 4520 lb |
| Magnetfuß Magnetic foot | 85 x 180 mm Starr Fixed |
| Gewicht Weight | 20,50 kg 45,00 lb |

Film
Movie



- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 



Konstantes Drehmoment vorwärts und rückwärts **mit eingebauter Zeitverzögerung** für den Motorstart. Gibt Motor- und Getriebschutz beim Umschalten von vorwärts auf rückwärts beim Gewindebohren oder Reiben.

Constant torque forward and reverse **with build in time delay** for motor start. Gives motor and gearbox protection when switching from forward to reverse when tapping or reaming.

Bestseller – preisreduziert
Bestseller – price reduced

**NEU
NEW**

230 Volt Maschine als Vorführgerät erhältlich.
Bitte kontaktieren Sie uns per E-Mail info@karnasch.tools
230 Volt demonstration models available.
Please send a mail to info@karnasch.tools

KATSV 100 BLUE-MAG • SENSOR • TWIN-RAIL SLIDE

EUROPE-VERSION

230 VOLT · VOLTS

USA-VERSION

110 VOLT · VOLTS

UK-VERSION

110 VOLT · VOLTS

20 8030 010

• € 2048,45

20 8030 020

• € 2048,45

20 8030 030

o € 2048,45

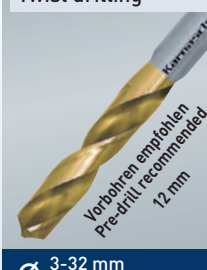
Kernbohren
Core drilling



240 mm
9.271/32"

Ø 12-100 mm
15/32"-3.15/16"

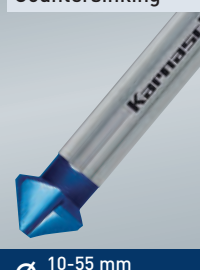
Spiralbohren
Twist drilling



Vorbohren empfohlen
Pre-drill recommended
12 mm


Ø 3-32 mm
3/16"-1.17/64"

Senken
Countersinking



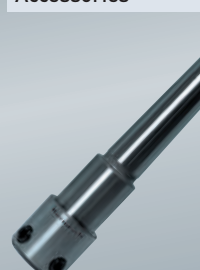
Ø 10-55 mm
3/8"-2.11/64"

Gewindebohren
Tapping



Ø 6-32 mm
15/64"-1.17/64"

Zubehör
Accessories



Lastdrehzahl
Speed full load



Getriebestufen
Gear stages

1 = 60-140 min⁻¹
2 = 200-470 min⁻¹

362-487, 506-520

622

634-663

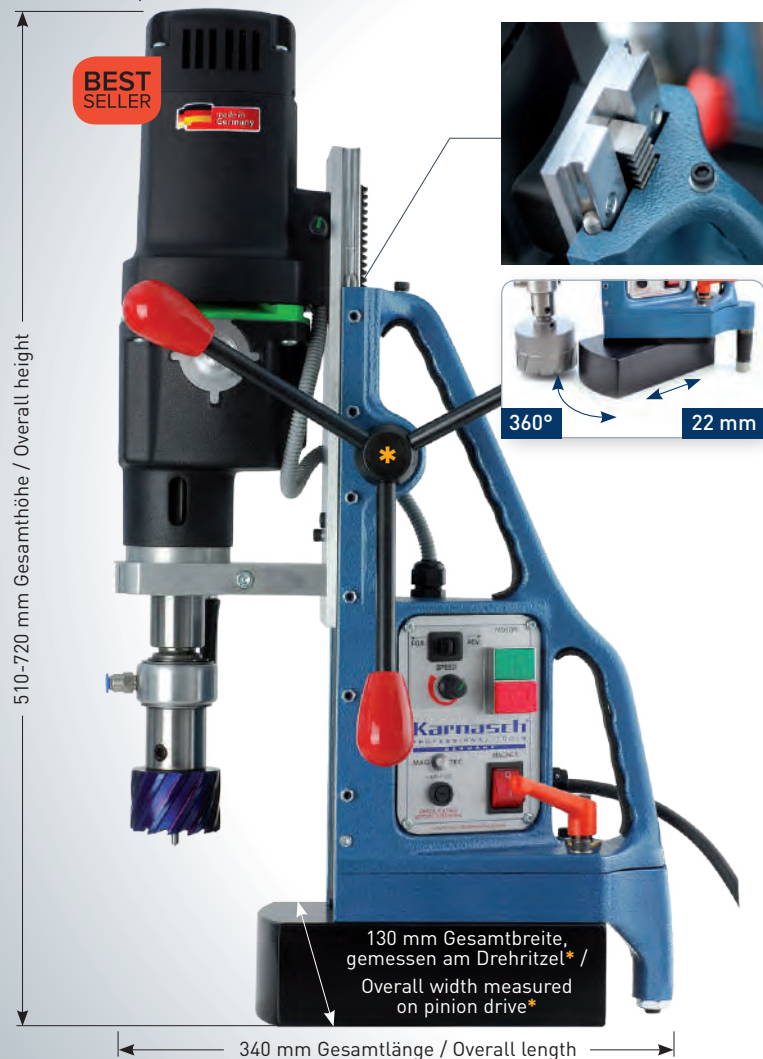
623

521-523, 528

Die angegebenen maximalen Durchmesser / Schnitttiefen der Kernbohrmaschinen, können wir nur mit **original** Karnasch Bohrwerkzeugen garantieren.
The specified maximum diameter / cutting depths of the magnetic hole cutting machines, can only be guaranteed with **original** Karnasch drilling tools.

* Die Maschine wird standardmäßig mit einer Aufnahme **Schnitttiefe 55 mm** geliefert. Benötigen Sie eine **Schnitttiefe bis 110 mm** verwenden Sie bitte extra lange Aufnahmehalter siehe Seite 522/523, oder 2-teilige Auswerferstifte für Kernbohrer ab Durchmesser 18 mm. (Erklärung siehe Seite 370). Größere Schnitttiefen auf Anfrage möglich.

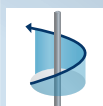
* The machines are supplied as standard with a **55 mm cutting depth holder**. For **cutting depth up to 110 mm** please use our extra long holders see page 522/523, or see our 2-part pins (explanation see page 370) for cutters from 18 mm. For cutting depth more than 110 mm please ask us.



Besonderheiten
Special Characteristics



Rechts-Linkslauf
Right/left running



Vollwellenregel-Elektronik
Full wave electronic



Thermoschutz
Thermal/overheat protection



Mechanische Rutschkupplung
Mechanical clutch



Sensor

"HEAVY-DUTY" Schienenführungssystem ermöglicht bis zu **240 mm** Schnitttiefe. (Beschreibung siehe S. 1088).

Thanks to "HEAVY-DUTY" Twin Rail Slide System easily **240 mm** cutting depth possible (Description on page 1088).

Motorleistung Watt
Motor Power Watts

1800

Aufnahme in Maschine
Holder in Machine

Morsekonus 3 mit Weldon 19 mm (3/4") für Kernbohrer Ø 12-60 mm
Morsekonus für Ø = 61-100 mm, siehe Zubehör, Seite 521-523
Morse taper 3 with Weldon 19 mm (3/4") for annular cutter Ø 12-60 mm
Morse taper for Ø = 61-100 mm, see accessories, page 521-523

Kühlmittelzufuhr
Coolant supply

Integriert, automatisch
Internal, automatically

Hub
Stroke

295 mm | 12"

Spannung
Voltage

230 Volt / 110 Volt
230 Volts / 110 Volts

Magnethaltekraft
Magnetic adhesion

2050 kg | 4520 lb

Magnetfuß
Magnetic foot

85 x 180 mm
Fuß 360° drehbar, verschiebbar vor & zurück 22 mm
Rotates 360°, moveable 22 mm forward & backwards

Gewicht
Weight

25,50 kg
56,00 lb

Film
Movie



Konstantes Drehmoment vorwärts und rückwärts **mit eingebauter Zeitverzögerung** für den Motorstart. Gibt Motor- und Getriebschutz beim Umschalten von vorwärts auf rückwärts beim Gewindebohren oder Reiben.

Constant torque forward and reverse with **build in time delay** for motor start. Gives motor and gearbox protection when switching from forward to reverse when tapping or reaming.

NEU NEW

230 Volt Maschine als Vorführgerät erhältlich. Bitte kontaktieren Sie uns per E-Mail info@karnasch.tools
230 Volt demonstration models available. Please send a mail to info@karnasch.tools

Bestseller – preisreduziert
Bestseller – price reduced



1103

Index

KALP 45 BLUE-MAG · SENSOR

| | | | | | |
|-----------------------|------------------|--------------------|------------------|-------------------|------------------|
| EUROPE-VERSION | 230 VOLT · VOLTS | USA-VERSION | 110 VOLT · VOLTS | UK-VERSION | 110 VOLT · VOLTS |
| 20 8031 010 | € 1285,25 | 20 8031 020 | € 1285,25 | 20 8031 030 | € 1285,25 |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Kernbohren
Core drilling



55 mm
2.11 1/4" *

Ø 12-45 mm
15/32" - 1.49/64"

Spiralbohren
Twist drilling

Nur Bohrer Art. 20 1710 möglich



Only possible with twist drill Art. 20 1710

Ø 6-16 mm
15/64" - 5/8"

Senken
Countersinking



Ø 10-30 mm
3/8" - 1.3/16"

Zubehör
Accessories



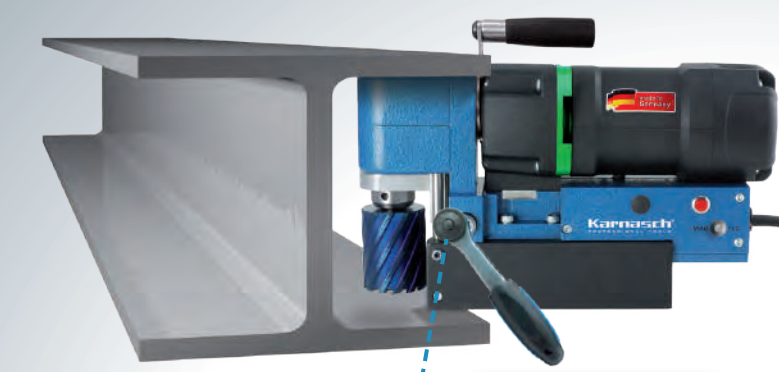
Lastdrehzahl
Speed full load

Getriebestufen
Gear stages

1 = 450 min⁻¹

362-487, 506-520 520 634-663 521-523, 528

Die angegebenen maximalen Durchmesser / Schnitttiefen der Kernbohrmaschinen, können wir nur mit **original** Karnasch Bohrwerkzeugen garantieren.
The specified maximum diameter / cutting depths of the magnetic hole cutting machines, can only be guaranteed with **original** Karnasch drilling tools.



Vorschub mittels Ratschenhebels, umsteckbar für rechts- und links Betätigung

Feed via ratchet lever. Changeable for right and left hand operation.

Maschine mit 360° drehbarem Fuß möglich. Preis auf Anfrage
Machine rotates 360° possible. Price on request


Griff verschiebbar
Handle removeable / moveable



Besonderheiten
Special Characteristics

Bis zu **55 mm** Schnitttiefe sind erreichbar mit Höhe der Maschine von nur **178 mm**. Vermutlich die niedrigste Maschine mit der höchsten Schnitttiefe auf dem Markt.
Up to **55 mm** cutting depth can be achieved with machine height of only **178 mm**. Probably the lowest machine with the largest cutting depth on the market.

Sensor



Enthaltenes Zubehör
Included Accessories

- Sicherungsgurt
- Ratsche
- Inbusschlüssel
- Sprühflasche
- safety belt
- ratched
- hex keys
- aerosols

| | |
|---|--|
| Motorleistung Watt Motor Power Watts | 1100 |
| Aufnahme Tool holder | Direktaufnahme Weldon 19 mm Directly Weldon 19 mm |
| Kühlmittelzufuhr Coolant supply | Manuell Manual |
| Hub Stroke | 63 mm 2.1/2" |
| Spannung Voltage | 230 Volt / 110 Volt 230 Volts / 110 Volts |
| Magnethaltekraft Magnetic adhesion | 1200 kg 2645 lb |
| Magnetfuß Magnetic foot | 86 x 196 mm Starr Fixed |
| Gewicht Weight | 11,00 kg 24,00 lb |



Bestseller – preisreduziert
Bestseller – price reduced

1104 **NEU NEW** 230 Volt Maschine als Vorführgerät erhältlich. Bitte kontaktieren Sie uns per E-Mail info@karnasch.tools
230 Volt demonstration models available. Please send a mail to info@karnasch.tools

KATV 140 BLUE-MAG • SENSOR • TWIN-RAIL SLIDE

EUROPE-VERSION

230 VOLT · VOLTS

USA-VERSION

110 VOLT · VOLTS

UK-VERSION

110 VOLT · VOLTS

20 8032 010

€ 3865,00

20 8032 020

€ 3865,00

20 8032 030

€ 3865,00

Kernbohren
Core drilling

240 mm
9.27/32"

Ø 12-140 mm
15/32"-5.33/64"

Spiralbohren
Twist drilling

Vorbohren empfohlen
Pre-drill recommended
12 mm + 12 mm

Ø 3-50 mm
3/16"-1.31/32"

Senken
Countersinking

Ø 10-80 mm
3/8"-3.5/32"

Gewindebohren
Tapping

Ø 6-44 mm
15/64"-1.47/64"

Zubehör
Accessories

Lastdrehzahl
Speed full load

Getriebestufen
Gear stages

- 1 = 30-80 min⁻¹
- 2 = 50-120 min⁻¹
- 3 = 130-350 min⁻¹
- 4 = 210-550 min⁻¹

362-487, 506-520

622

634-663

623

521-523, 528

Die angegebenen maximalen Durchmesser / Schnitttiefen der Kernbohrmaschinen, können wir nur mit **original** Karnasch Bohrwerkzeugen garantieren.
The specified maximum diameter / cutting depths of the magnetic hole cutting machines, can only be guaranteed with **original** Karnasch drilling tools.

* Die Maschine wird standardmäßig mit einer Aufnahme **Schnitttiefe 55 mm** geliefert. Benötigen Sie eine **Schnitttiefe bis 110 mm** verwenden Sie bitte extra lange Aufnahmehalter siehe Seite 522/523, oder 2-teilige Auswerferstifte für Kernbohrer ab Durchmesser 18 mm. (Erklärung siehe Seite 370). Größere Schnitttiefen auf Anfrage möglich.

* The machines are supplied as standard with a **55 mm cutting depth holder**. For **cutting depth up to 110 mm** please use our extra long holders see page 522/523, or see our 2-part pins (explanation see page 370) for cutters from 18 mm. For cutting depth more than 110 mm please ask us.

Besonderheiten
Special Characteristics

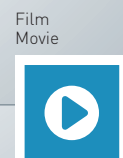
- Rechts-Linkslauf
Right/left running
- Vollwellenregel-Elektronik
Full wave electronic
- Thermoschutz
Thermal/overheat protection
- Mechanische Rutschkupplung
Mechanical clutch
- Sensor

"HEAVY-DUTY" Schienenführungssystem ermöglicht bis zu **240 mm** Schnitttiefe. (Beschreibung siehe S. 1088).

Thanks to "HEAVY-DUTY" Twin Rail Slide System easily **240 mm** cutting depth possible (Description on page 1088).



| | |
|---|---|
| Motorleistung Watt Motor Power Watts | 2300 |
| Zubehör in Maschine Accessories in machine | Adapter Weldon 32 mm auf 19 mm Für Kernbohrer Ø 12-60 mm Morsekonus 4 mit Weldon 32 mm (1.1/4") Für Kernbohrer Ø 61-140 mm Adapter weldon 32 mm to 19 mm For annular cutter Ø 12-60 mm Morse taper 4 with weldon 32 mm (1.1/4") For annular cutter Ø 61-140 mm |
| Kühlmittelzufuhr Coolant supply | Integriert, automatisch Internal, automatically |
| Hub Stroke | 320 mm 12" |
| Spannung Voltage | 230 Volt / 110 Volt 230 Volts / 110 Volts |
| Magnethaltekraft Magnetic adhesion | 2675 kg 5897 lb |
| Magnetfuß Magnetic foot | 120 x 240 mm Starr Fixed |
| Gewicht Weight | 35,00 kg 73,00 lb |



Film
Movie

Bestseller – preisreduziert
Bestseller – price reduced



Achtung! Lieferung innerhalb Deutschlands nur per Spedition möglich. Die Versandkosten werden im Bestellverlauf ausgewiesen

1105

NEU NEW

230 Volt Maschine als Vorführgerät erhältlich.
Bitte kontaktieren Sie uns per E-Mail info@karnasch.tools
230 Volt demonstration models available.
Please send a mail to info@karnasch.tools

Index



KATV 200 BLUE-MAG • SENSOR • TWIN-RAIL SLIDE

| | | | | | |
|-----------------------|--|--------------------|--|--------------------|--|
| EUROPE-VERSION | 230 VOLT · VOLTS | USA-VERSION | 110 VOLT · VOLTS | UK-VERSION | 110 VOLT · VOLTS |
| 20 8033 010 | <input type="radio"/> Auf Anfrage / On request | 20 8033 020 | <input type="radio"/> Auf Anfrage / On request | 20 8033 030 | <input type="radio"/> Auf Anfrage / On request |

- 1
- 2
- 3
- 4
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- 6
- 7
- 8
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| | | | | | |
|--|--|--|--|---|--|
| Kernbohren Core drilling 240 mm 9.27/32" Ø 12-200 mm 15/32" - 7.7/8" 362-487, 506-520 | Spiralbohren Twist drilling Vorbohren empfohlen Pre-drill recommended 12 mm + 12 mm Ø 3-50 mm 3/16" - 1.31/32" 622 | Senken Countersinking Ø 10-80 mm 3/8" - 3.5/32" 634-663 | Gewindebohren Tapping Ø 6-44 mm 15/64" - 1.47/64" 623 | Zubehör Accessories 521-523, 528 | Lastdrehzahl Speed full load Getriebestufen Gear stages 1 = 30-80 min ⁻¹ 2 = 50-120 min ⁻¹ 3 = 130-350 min ⁻¹ 4 = 210-550 min ⁻¹ |
|--|--|--|--|---|--|

Die angegebenen maximalen Durchmesser / Schnitttiefen der Kernbohrmaschinen, können wir nur mit **original** Karnasch Bohrwerkzeugen garantieren.
The specified maximum diameter / cutting depths of the magnetic hole cutting machines, can only be guaranteed with **original** Karnasch drilling tools.

* Die Maschine wird standardmäßig mit einer Aufnahme **Schnitttiefe 55 mm** geliefert. Benötigen Sie eine **Schnitttiefe bis 110 mm** verwenden Sie bitte extra lange Aufnahmehalter siehe Seite 522/523, oder 2-teilige Auswerferstifte für Kernbohrer ab Durchmesser 18 mm. (Erklärung siehe Seite 370). Größere Schnitttiefen auf Anfrage möglich.
* The machines are supplied as standard with a **55 mm cutting depth** holder. For **cutting depth up to 110 mm** please use our extra long holders see page 522/523, or see our 2-part pins (explanation see page 370) for cutters from 18 mm. For cutting depth more than 110 mm please ask us.

Sie suchen eine Magnetkernbohrmaschine bis Ø 200 mm?
Wir haben das passende Modell. Bitte kontaktieren Sie uns für mehr Details.
You are looking on a machine up to Ø 200 mm?
We have a suitable model. Please contact us for more details.

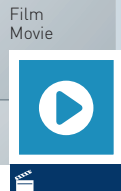
Besonderheiten
Special Characteristics

"HEAVY-DUTY" Schienenführungssystem ermöglicht bis zu **240 mm** Schnitttiefe. (Beschreibung siehe S. 1088).
Thanks to "HEAVY-DUTY" Twin Rail Slide System easily **240 mm** cutting depth possible (Description on page 1088).

| | |
|--|--|
| | Rechts-Linkslauf Right/left running |
| | Vollwellenregel-Elektronik Full wave electronic |
| | Thermoschutz Thermal/overheat protection |
| | Mechanische Rutschkupplung Mechanical clutch |
| | Sensor |



| | |
|---|---|
| Motorleistung Watt Motor Power Watts | 2300 |
| Zubehör in Maschine Accessories in machine | Adapter Weldon 32 mm auf 19 mm Für Kernbohrer Ø 12-60 mm Morsekonus 4 mit Weldon 32 mm (1.1/4") Für Kernbohrer Ø 61-200 mm Adapter weldon 32 mm to 19 mm For annular cutter Ø 12-60 mm Morse taper 4 with weldon 32 mm (1.1/4") For annular cutter Ø 61-200 mm |
| Kühlmittelzufuhr Coolant supply | Integriert, automatisch Internal, automatically |
| Hub Stroke | 320 mm 12" |
| Spannung Voltage | 230 Volt / 110 Volt 230 Volts / 110 Volts |
| Magnethaltekraft Magnetic adhesion | 4100 kg 9039 lb |
| Magnetfuß Magnetic foot | 205 x 210 mm Starr Fixed |
| Gewicht Weight | 45,00 kg 99,20 lb |



DRUCKLUFT-GERADSCHLEIFER

PNEUMATIC STRAIGHT GRINDER



Index

6.2

KONTAKT | CONTACT

KARNASCH PROFESSIONAL TOOLS[®]
INDUSTRIAL TOOLS DIVISION

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D-15848 Tauche/OT Görzdorf
mail@karnasch.tools

+49 (0) 33675 - 7265-0

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Quality products for metalworking.

HOCHLEISTUNG FÜR JEDEN ANWENDUNGSBEREICH

High performance in every application area



1



2



3



4



5



6



7



8



9



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1



2



3



4



5



6



7



8



9

VORWORT:

Bei Karnasch Geradschleifern handelt es sich um rein professionelle Maschinen für den harten Dauereinsatz konzipiert.

- Kompakte, ergonomische Bauform
- Geringes Gewicht
- Technisch ausgereift
- Hohe Leistung im Vergleich zum Gewicht
- Keine Überlastungsgefahr, da bis zum Motorstillstand belastbar
- Kälte- und vibrationsisolierte Gehäuse
- Wartungsarm
- Servicefreundlich (Ersatzmotoren leicht zu wechseln)
- Wirtschaftlich

Zubehör und Ersatzteile siehe Seite 1138-1139

PREFACE:

Karnasch straight grinders are professional machines & are designed for applications ranging from light deburring to heavy grinding


- Compact ergonomic construction
- Light weight
- Technically proven
- High power to weight ratio
- Air motor cannot be overloaded as it will stop if excessive pressure is applied
- Casing insulates from cold & vibration
- Low maintenance
- Easily serviced (spare motors easily replaced)
- Economical

Accessories and spare parts see page 1138-1139

Karnasch DIE HOCHTOURIGEN. KÖNNEN GEHALTEN WERDEN WIE EIN STIFT
THE HIGH-SPEEDER. HOLDS LIKE A PEN




Index

| | | | | | |
|--------------|---------------------------|---------|-------------|---|----------------|
| TYPE KA 1000 | 100.000 min ⁻¹ | 40 WATT | max. Ø 3 mm |  | 11 4705 |
|--------------|---------------------------|---------|-------------|---|----------------|




1112

| | | | | | |
|--------------|---------------------------|---------|-------------|---|----------------|
| TYPE KA 100R | 100.000 min ⁻¹ | 63 WATT | max. Ø 3 mm |  | 11 4714 |
|--------------|---------------------------|---------|-------------|---|----------------|




1114

| | | | | | |
|-------------|--------------------------|----------|-------------|---|----------------|
| TYPE KA 75R | 75.000 min ⁻¹ | 110 WATT | max. Ø 3 mm |  | 11 4703 |
|-------------|--------------------------|----------|-------------|---|----------------|




1116

| | | | | | |
|-------------|--------------------------|----------|-------------|---|----------------|
| TYPE KA 60R | 60.000 min ⁻¹ | 110 WATT | max. Ø 6 mm |  | 11 4706 |
|-------------|--------------------------|----------|-------------|---|----------------|



1118

| | | | | | |
|-------------|--------------------------|----------|-------------|---|----------------|
| TYPE KA 45R | 45.000 min ⁻¹ | 150 WATT | max. Ø 6 mm |  | 11 4707 |
|-------------|--------------------------|----------|-------------|---|----------------|




1120

DIE KOMPAKTEN. FÜR DEN UNIVERSELLEN EINSATZ
THE COMPACT RANGE. FOR UNIVERSAL USE

| | | | | | |
|--------------|--------------------------|----------|---------------|---|----------------|
| TYPE KA 37LR | 37.000 min ⁻¹ | 300 WATT | max. Ø 4-8 mm |  | 11 4708 |
|--------------|--------------------------|----------|---------------|---|----------------|




1122

| | | | | | |
|--------------|--------------------------|----------|----------------|---|----------------|
| TYPE KA 30LR | 30.000 min ⁻¹ | 300 WATT | max. Ø 6-10 mm |  | 11 4709 |
|--------------|--------------------------|----------|----------------|---|----------------|




1124

| | | | | | |
|-------------|--------------------------|----------|----------------|---|----------------|
| TYPE K 25/2 | 25.000 min ⁻¹ | 370 WATT | max. Ø 8-12 mm |  | 11 4704 |
|-------------|--------------------------|----------|----------------|---|----------------|



1126

TYPE KAMD 25LR 25.000 min⁻¹ 820 WATT HIGH-POWER Ø 8-12 mm  **11 4710**

 1130



TYPE KAM 25LR 25.000 min⁻¹ 820 WATT HIGH-POWER Ø 8-12 mm  **11 4711**

 1132



TYPE KAM 16LR 16.000 min⁻¹ 820 WATT HIGH-POWER Ø 10-20 mm  **11 4712**

 1134



TYPE KAM 10LR 10.000 min⁻¹ 820 WATT HIGH-POWER Ø 12-25 mm  **11 4713**

 1136



11 4705

€ 450,60

TYPE KA 1000 100.000 min⁻¹ max. Ø 3 mm



Bestseller – preisreduziert
Bestseller – price reduced



Kein Öl
No oil

WICHTIGSTE DATEN

- Hochgeschwindigkeits-Turbinenmotor
- Hochpräzise Spindellagerung ergibt exzellente Rundlaufgenauigkeit
- Wartungsfreier Motor – keine Schmierung erforderlich
- Kein Ölniederschlag auf dem Werkstück
- Abluft vorne entfernt die Späne
- Leicht, einfache Handhabung
- Kann wie ein Stift gehalten werden
- 100.000 min⁻¹ für sehr feine Oberflächengüte

ANWENDUNGSBEREICHE

Luft- und Raumfahrt · Automobilindustrie · Werkzeug- und Formenbau

EINSATZGEBIETE

Feinfräsen · Schleifen · Gravieren

EMPFOHLENE EINSATZWERKZEUGE

Hartmetall-Frässtifte bis Ø 3 mm · Schleifstifte · Polierstifte

Anwendungsdaten

| | |
|-------------------------------------|---|
| Drehzahl | 100.000 min ⁻¹ |
| Leistung | 40 Watt |
| Spannzange | 3 mm |
| Abluftaustritt | Vorne |
| Ventilausführung | Dreh |
| Gewicht | 0,24 kg |
| Luftverbrauch (m ³ /min) | 0,17 |
| Mitgeliefertes Zubehör | 2 m Zuluftschlauch, Spannzange 3 mm, 2 Spannschlüssel |

KEY POINTS

- High-speed turbine motor
- High-precision spindle bearing ensures high concentricity
- Maintenance free motor – no lubrication required
- No oil deposits on the workpiece
- Front exhaust deflects chips
- Light, easy to handle
- Holds like a pen
- 100.000 ppm gives very fine finish

APPLICATION SECTORS

Aerospace · Automotive · Die and mould

AREAS OF USE

Fine milling · Grinding · Engraving

RECOMMENDED CONSUMABLES

Tungsten carbide burs up to Ø 3 mm · Mounted points · Polishing points

Application

| | |
|---------------------------------|--|
| Speed | 100.000 min ⁻¹ |
| Power | 40 Watt |
| Collet | 3 mm |
| Exhaust | Front |
| Control | Roll throttle |
| Weight | 0,24 kg |
| Air usage (m ³ /min) | 0,17 |
| Including accessories | 2 m air supply hose, collet 3 mm, 2 keys |

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Film
Movie



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index


Spannzange · Collet

| | Art. | Größe · Size | € |
|---|---------|--------------|-------|
|  | 11 4750 | 3,0 mm | 18,05 |

Druckluftschläuche · Pneumatic hose

Druckluftschläuche sind gemacht aus Hochleistungs-PVC Material mit faserverstärktem Polyester.

Compressed air hoses are made of high-performance PVC material with fibre-reinforced polyester.

| | Art. | Beschreibung · Description | € |
|---|---------|---|-------|
|  | 11 4760 | Zuluftschlauch 2 m × 6 mm Air supply hose 2 m × 6 mm | 29,65 |

Weiteres Zubehör siehe Seite 1138-1139

More accessories see page 1138-1139



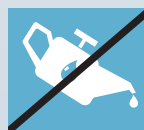
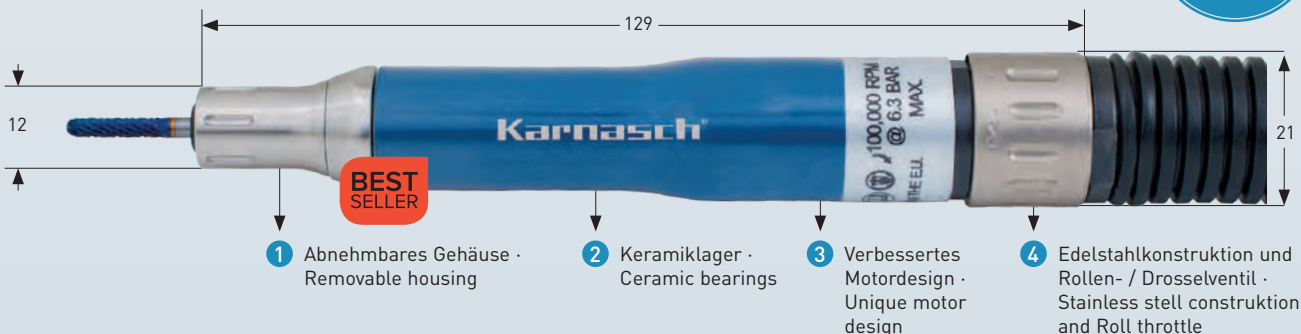
11 4714

€ 710,00

TYPE KA 100R 100.000 min⁻¹ max. Ø 3 mm



Bestseller – preisreduziert
Bestseller – price reduced



Kein Öl
No oil

WICHTIGSTE DATEN

- 1 Abnehmbare Spindel um in enger Geometrie zu arbeiten
- 2 Keramiklager sorgt für lange Nutzungsdauer
- 3 Durch verbessertes Motordesign geringe Wartungs- und Reparaturkosten, da der Motor keine Lamellen, Rotoren oder Zylinder enthält
- 4 Für Dauerbetrieb bestens geeignet durch das neu entwickelte Rollen-Drosselventil

WEITERE VORTEILE

- Wird ohne Öl eingesetzt, daher keine Verunreinigung des Werkstücks
- Sehr hohe Drehzahl, optimal für feines entgraten
- Gleichmäßige Materialabnahme
- Durch leichtes und schmales Gehäuse, besserer Zugang und gute Kontrolle
- Kann wie ein Stift gehalten werden
- Abluft hinten mit Schalldämpfung für ruhiges arbeiten auch bei sehr hoher Drehzahl

ANWENDUNGSBEREICHE

Luft- und Raumfahrt · Automobilindustrie · Werkzeug- und Formenbau

EINSATZGEBIETE

Präzisionsentgraten · Feinfräsen

EMPFOHLENE EINSATZWERKZEUGE

Hartmetall-Frässtifte bis Ø 3 mm · Schleifstifte · Polierstifte

KEY POINTS

- 1 Removable collet guard to work in narrow geometries
- 2 Ceramic bearings offers for extended service life
- 3 Through unique motor design low maintenance and repair costs, Motor has no vanes, rotor or cylinder
- 4 Ideal for continuous use through roll throttle

MORE BENEFITS

- Used without oil, no contamination of workpiece
- Very high speed, ideal for fine deburring
- Consistent stock removal
- Through light weight and narrow housing, accommodates improved access, control and spindle protection
- Rear exhaust with overhoser provides quiet operation, also by very high speed

APPLICATION SECTORS

Aerospace · Automotive · Die and mould

AREAS OF USE

For precision deburring and fine grinding

RECOMMENDED CONSUMABLES

Tungsten carbide burrs up to Ø 3 mm · Mounted points · Polishing points

Anwendungsdaten

| | |
|-------------------------------------|---|
| Drehzahl | 100.000 min ⁻¹ |
| Leistung | 63 Watt |
| Spannzange | 3 mm |
| Abluftaustritt | Hinten |
| Ventilausführung | Dreh |
| Gewicht | 0,15 kg |
| Luftverbrauch (m ³ /min) | 0,17 |
| Mitgeliefertes Zubehör | 2 m Zuluftschlauch, 0,6 m Abluftschlauch, Spannzange 3 mm, 2 Spannschlüssel |

Application

| | |
|---------------------------------|--|
| Speed | 100.000 min ⁻¹ |
| Power | 63 Watt |
| Collet | 3 mm |
| Exhaust | Rear |
| Control | Roll throttle |
| Weight | 0,15 kg |
| Air usage (m ³ /min) | 0,17 |
| Including accessories | 2 m air supply hose, 0,6 m exhaust hose, collet 3 mm, 2 keys |

Film Movie



Index

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Spannzange · Collet

| | Art. | Größe · Size | € |
|---|---------|--------------|-------|
|  | 11 4750 | 3,0 mm | 18,05 |

Druckluftschläuche · Pneumatic hose

Druckluftschläuche sind gemacht aus Hochleistungs-PVC Material mit faserverstärktem Polyester. Bei Schläuchen wo die Abluft nach hinten austritt, reduzieren spezielle Schalldämpfer den Geräuschpegel.

Compressed air hoses are made of high-performance PVC material with fibre-reinforced polyester. For hoses where exhaust escapes from rear, special mufflers reduce the sound level.

| | Art. | Beschreibung · Description | € |
|---|---------|---|-------|
|  | 11 4761 | Abluftschlauch 600 mm × 16 mm Exhaust hose 600 mm × 16 mm | 10,35 |
|  | 11 4760 | Zuluftschlauch 2 m × 6 mm Air supply hose 2 m × 6 mm | 29,65 |
|  | 11 4762 | Zuluftschlauch 2 m × 6 mm und Abluftschlauch 600 mm × 16 mm Air supply hose 2 m × 6 mm and exhaust hose 600 mm × 16 mm | 49,80 |

Weiteres Zubehör siehe Seite 1138-1139
More accessories see page 1138-1139



11 4703

€ 383,05

TYPE KA 75R

75.000 min⁻¹

max. Ø 3 mm



Bestseller – preisreduziert
Bestseller – price reduced



1 Tropfen/min. (Öl siehe Seite 1139)
1 drop/min. (Oil see page 1139)

WICHTIGSTE DATEN

- Hohe Drehzahl für feines Entgraten
- Abluft hinten mit Schalldämpfung für ruhiges Arbeiten
- Sehr leichter und schmaler Körper garantiert leichteste Handhabung
- Kann wie ein Stift gehalten werden
- Abnehmbare Spindelhülse um in engen Geometrien zu arbeiten
- Hochpräzise Spindellagerung ergibt exzellente Rundlaufgenauigkeit

ANWENDUNGSBEREICHE

Luft- und Raumfahrt · Automobilindustrie · Werkzeug- und Formenbau

EINSATZGEBIETE

Präzisionsentgraten · Feinfräsen

EMPFOHLENE EINSATZWERKZEUGE

Hartmetall-Frässtifte bis Ø 3 mm · Schleifstifte · Polierstifte

KEY POINTS

- High-speed enable precise deburring
- Rear exhaust with overhose provides quiet operation
- Very light and slim body, easy to handle
- Holds like a pen
- Protective spindle cap can be removed for work in narrow geometries
- Spindle bearing ensures high concentricity

APPLICATION SECTORS

Aerospace · Automotive · Die and mould

AREAS OF USE

For precision deburring and fine grinding

RECOMMENDED CONSUMABLES

Tungsten carbide burrs up to Ø 3 mm · Mounted points · Polishing points

Anwendungsdaten

| | |
|-------------------------------------|---|
| Drehzahl | 75.000 min ⁻¹ |
| Leistung | 110 Watt |
| Spannzange | 3 mm |
| Abluftaustritt | Hinten |
| Ventilausführung | Dreh |
| Gewicht | 0,15 kg |
| Luftverbrauch (m ³ /min) | 0,20 |
| Mitgeliefertes Zubehör | 2 m Zuluftschlauch, 0,6 m Abluftschlauch, Spannzange 3 mm, 2 Spanschlüssel |

Application

| | |
|---------------------------------|--|
| Speed | 75.000 min ⁻¹ |
| Power | 110 Watt |
| Collet | 3 mm |
| Exhaust | Rear |
| Control | Roll throttle |
| Weight | 0,15 kg |
| Air usage (m ³ /min) | 0,20 |
| Including accessories | 2 m air supply hose, 0,6 m exhaust hose, collet 3 mm, 2 keys |

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Film
Movie



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index


Spannzange · Collet

| | Art. | Größe · Size | € |
|---|---------|--------------|-------|
|  | 11 4750 | 3,0 mm | 18,05 |

Druckluftschläuche · Pneumatic hose

Druckluftschläuche sind gemacht aus Hochleistungs-PVC Material mit faserverstärktem Polyester. Bei Schläuchen wo die Abluft nach hinten austritt, reduzieren spezielle Schalldämpfer den Geräuschpegel.

Compressed air hoses are made of high-performance PVC material with fibre-reinforced polyester. For hoses where exhaust escapes from rear, special mufflers reduce the sound level.

| | Art. | Beschreibung · Description | € |
|---|---------|---|-------|
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Weiteres Zubehör siehe Seite 1138-1139
More accessories see page 1138-1139



11 4706

€ 383,05

TYPE KA 60R

60.000 min⁻¹

max. Ø 6 mm



Bestseller – preisreduziert
Bestseller – price reduced



1 Tropfen/min. (Öl siehe Seite 1139)
1 drop/min. (Oil see page 1139)

WICHTIGSTE DATEN

- Hohe Drehzahl für feines Entgraten
- Abluft hinten mit Schalldämpfung für ruhiges Arbeiten
- Sehr leichter und schmaler Körper garantiert leichteste Handhabung
- Kann wie ein Stift gehalten werden
- Abnehmbare Spindelhülse um in engen Geometrien zu arbeiten
- Hochpräzise Spindellagerung ergibt exzellente Rundlaufgenauigkeit

ANWENDUNGSBEREICHE

Luft- und Raumfahrt · Automobilindustrie · Werkzeug- und Formenbau

EINSATZGEBIETE

Präzisionsentgraten · Feinfräsen

EMPFOHLENE EINSATZWERKZEUGE

Hartmetall-Frässtifte bis Ø 6 mm · Schleifstifte · Polierstifte

KEY POINTS

- High-speed enable precise deburring
- Rear exhaust with overhose provides quiet operation
- Very light and slim body, easy to handle
- Holds like a pen
- Protective spindle cap can be removed for work in narrow geometries
- Spindle bearing ensures high concentricity

APPLICATION SECTORS

Aerospace · Automotive · Die and mould

AREAS OF USE

For precision deburring and fine grinding

RECOMMENDED CONSUMABLES

Tungsten carbide burs up to Ø 6 mm · Mounted points · Polishing points

Anwendungsdaten

| | |
|-------------------------------------|--|
| Drehzahl | 60.000 min ⁻¹ |
| Leistung | 110 Watt |
| Spannzange | 3 mm |
| Abluftaustritt | Hinten |
| Ventilausführung | Dreh |
| Gewicht | 0,15 kg |
| Luftverbrauch (m ³ /min) | 0,20 |
| Mitgeliefertes Zubehör | 2 m Zuluftschlauch, 0,6 m Abluftschlauch, Spannzange 3 mm, 2 Spannschlüssel |

Application

| | |
|---------------------------------|--|
| Speed | 60.000 min ⁻¹ |
| Power | 110 Watt |
| Collet | 3 mm |
| Exhaust | Rear |
| Control | Roll throttle |
| Weight | 0,15 kg |
| Air usage (m ³ /min) | 0,20 |
| Including accessories | 2 m air supply hose, 0,6 m exhaust hose, collet 3 mm, 2 keys |

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Film
Movie



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index




Spannzange · Collet

| | Art. | Größe · Size | € |
|---|---------|--------------|-------|
|  | 11 4750 | 3,0 mm | 18,05 |

Druckluftschläuche · Pneumatic hose

Druckluftschläuche sind gemacht aus Hochleistungs-PVC Material mit faserverstärktem Polyester. Bei Schläuchen wo die Abluft nach hinten austritt, reduzieren spezielle Schalldämpfer den Geräuschpegel.

Compressed air hoses are made of high-performance PVC material with fibre-reinforced polyester. For hoses where exhaust escapes from rear, special mufflers reduce the sound level.

| | Art. | Beschreibung · Description | € |
|---|---------|---|-------|
|  | 11 4761 | Abluftschlauch 600 mm × 16 mm Exhaust hose 600 mm × 16 mm | 10,35 |
|  | 11 4760 | Zuluftschlauch 2 m × 6 mm Air supply hose 2 m × 6 mm | 29,65 |
|  | 11 4762 | Zuluftschlauch 2 m × 6 mm und Abluftschlauch 600 mm × 16 mm Air supply hose 2 m × 6 mm and exhaust hose 600 mm × 16 mm | 49,80 |

Weiteres Zubehör siehe Seite 1138-1139
More accessories see page 1138-1139



11 4707

€ 551,00

TYPE KA 45R

45.000 min⁻¹

max. Ø 6 mm



ZUBEHÖR
ACCESSORIES



4-5 Tropfen/min. (Öl siehe Seite 1139)
4-5 drops/min. (Oil see page 1139)

WICHTIGSTE DATEN

- Durch ideale Drehzahl und leistungsstarkem Motor extrem universell einsetzbar.
- Für Schaft 3 und 6 mm Einsatzwerkzeuge
- Robustes Vollstahlmodell
- Leicht, einfache Handhabung
- Kann wie ein Stift gehalten werden
- Abluft hinten mit Schalldämpfung für ruhiges Arbeiten

ANWENDUNGSBEREICHE

Luft- und Raumfahrt · Automobilindustrie · Werkzeug- und Formenbau

EINSATZGEBIETE

Präzisionsentgraten · Feinfräsen · Generell für alle leichten Schleif- und Fräsarbeiten

EMPFOHLENE EINSATZWERKZEUGE

Hartmetall-Frässtifte bis Ø 6 mm · Schleifstifte · Polierstifte

KEY POINTS

- Universally applicable due to the ideal speed and powerful motor
- For consumables shank 3 and 6 mm
- Robust all-steel model
- Light, easy to handle
- Holds like a pen
- Rear exhaust with overhose provides quiet operation

APPLICATION SECTORS

Aerospace · Automotive · Die and mould

AREAS OF USE

For precision deburring and fine grinding · In general for all light milling and grinding works

RECOMMENDED CONSUMABLES

Tungsten carbide burs up to Ø 6 mm · Mounted points · Polishing points

Anwendungsdaten

| | |
|-------------------------------------|--|
| Drehzahl | 45.000 min ⁻¹ |
| Leistung | 150 Watt |
| Spannzange | 3 mm |
| Abluftaustritt | Hinten |
| Ventilausführung | Dreh |
| Gewicht | 0,24 kg |
| Luftverbrauch (m ³ /min) | 0,23 |
| Mitgeliefertes Zubehör | 2 m Zuluftschlauch, 0,6 m Abluftschlauch, Spannzange 3 mm, 2 Spannschlüssel |

Application

| | |
|---------------------------------|--|
| Speed | 45.000 min ⁻¹ |
| Power | 150 Watt |
| Collet | 3 mm |
| Exhaust | Rear |
| Control | Roll throttle |
| Weight | 0,24 kg |
| Air usage (m ³ /min) | 0,23 |
| Including accessories | 2 m air supply hose, 0,6 m exhaust hose, collet 3 mm, 2 keys |

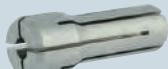
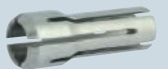
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Film
Movie






Spannzange · Collet

| | Art. | Größe · Size | € |
|---|---------|--------------|-------|
|  | 11 4751 | 3,0 mm | 10,10 |
|  | 11 4752 | 6,0 mm | 10,10 |

Druckluftschläuche · Pneumatic hose

Druckluftschläuche sind gemacht aus Hochleistungs-PVC Material mit faserverstärktem Polyester. Bei Schläuchen wo die Abluft nach hinten austritt, reduzieren spezielle Schalldämpfer den Geräuschpegel.

Compressed air hoses are made of high-performance PVC material with fibre-reinforced polyester. For hoses where exhaust escapes from rear, special mufflers reduce the sound level.

| | Art. | Beschreibung · Description | € |
|---|---------|---|-------|
|  | 11 4761 | Abluftschlauch 600 mm x 16 mm Exhaust hose 600 mm x 16 mm | 10,35 |
|  | 11 4760 | Zuluftschlauch 2 m x 6 mm Air supply hose 2 m x 6 mm | 29,65 |
|  | 11 4762 | Zuluftschlauch 2 m x 6 mm und Abluftschlauch 600 mm x 16 mm Air supply hose 2 m x 6 mm and exhaust hose 600 mm x 16 mm | 49,80 |

Weiteres Zubehör siehe Seite 1138-1139

More accessories see page 1138-1139



11 4708

€ 433,85

TYPE KA 37LR

37.000 min⁻¹

Ø 4-8 mm



ZUBEHÖR
ACCESSORIES

Bestseller – preisreduziert
Bestseller – price reduced



4-5 Tropfen/min. (Öl siehe Seite 1139)
4-5 drops/min. (Oil see page 1139)

WICHTIGSTE DATEN

- Extrem kompaktes und leistungsstarkes Vollstahlmodell
- Handlich und leicht zu führen
- Exzellent auch bei Einhandbedienung
- Abluft hinten mit Schalldämpfung für ruhiges Arbeiten

ANWENDUNGSBEREICHE

Luft- und Raumfahrt · Automobilindustrie · Werkzeug- und Formenbau

EINSATZGEBIETE

Präzisionsentgraten · Feinfräsen · Generell für alle leichten bis schweren Schleif- und Fräsarbeiten

EMPFOHLENE EINSATZWERKZEUGE

Hartmetall-Frässtifte Ø 4-8 mm · Schleifstifte · Polierstifte

KEY POINTS

- Extremely compact and powerful all-steel model
- Light, easy to handle
- Excellent also for one-handed operation
- Rear exhaust with overhose provides quiet operation

APPLICATION SECTORS

Aerospace · Automotive · Die and mould

AREAS OF USE

For precision deburring and fine grinding · In general for all mild to moderate grinding and milling works.

RECOMMENDED CONSUMABLES

Tungsten carbide burrs Ø 4-8 mm · Mounted points · Polishing points

Anwendungsdaten

| | |
|-------------------------------------|--|
| Drehzahl | 37.000 min ⁻¹ |
| Leistung | 300 Watt |
| Spannzange | 6 mm |
| Abluftaustritt | Hinten |
| Ventilausführung | Sicherheitshebel |
| Gewicht | 0,46 kg |
| Luftverbrauch (m ³ /min) | 0,57 |
| Mitgeliefertes Zubehör | 2 m Zuluftschlauch, 1 m Abluftschlauch, Spannzange 6 mm, 2 Spannschlüssel |

Application

| | |
|---------------------------------|--|
| Speed | 37.000 min ⁻¹ |
| Power | 300 Watt |
| Collet | 6 mm |
| Exhaust | Rear |
| Control | Safety lever |
| Weight | 0,46 kg |
| Air usage (m ³ /min) | 0,57 |
| Including accessories | 2 m air supply hose, 1 m exhaust hose, collet 6 mm, 2 keys |

NEU
NEW

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Film
Movie



Spannzange · Collet

| | Art. | Größe · Size | € |
|---|----------------|--------------|-------|
|  | 11 4752 | 6,0 mm | 10,10 |

Druckluftschläuche · Pneumatic hose

Druckluftschläuche sind gemacht aus Hochleistungs-PVC Material mit faserverstärktem Polyester. Bei Schläuchen wo die Abluft nach hinten austritt, reduzieren spezielle Schalldämpfer den Geräuschpegel.

Compressed air hoses are made of high-performance PVC material with fibre-reinforced polyester. For hoses where exhaust escapes from rear, special mufflers reduce the sound level.

| | Art. | Beschreibung · Description | € |
|---|----------------|---|-------|
|  | 11 4763 | Abluftschlauch 1 m × 22 mm Exhaust hose 1 m × 22 mm | 11,40 |
|  | 11 4764 | Zuluftschlauch 3 m × 8 mm Air supply hose 3 m × 8 mm | 30,65 |
|  | 11 4765 | Zuluftschlauch 2 m × 8 mm und Abluftschlauch 1 m × 22 mm Air supply hose 2 m × 8 mm and exhaust hose 1 m × 22 mm | 40,20 |

Weiteres Zubehör siehe Seite 1138-1139
More accessories see page 1138-1139



11 4709

€ 484,35

TYPE KA 30LR

30.000 min⁻¹

Ø 6-10 mm



ZUBEHÖR
ACCESSORIES



4-5 Tropfen/min. (Öl siehe Seite 1139)
4-5 drops/min. (Oil see page 1139)

WICHTIGSTE DATEN

- Extrem kompaktes und leistungsstarkes Vollstahlmodell
- Handlich und leicht zu führen
- Exzellent auch bei Einhandbedienung
- Abluft hinten mit Schalldämpfung für ruhiges Arbeiten

ANWENDUNGSBEREICHE

Luft- und Raumfahrt · Automobilindustrie · Werkzeug- und Formenbau

EINSATZGEBIETE

Präzisionsentgraten · Feinfräsen · Generell für alle leichten bis schweren Schleif- und Fräsarbeiten

EMPFOHLENE EINSATZWERKZEUGE

Hartmetall-Frässtifte Ø 6-10 mm · Schleifstifte · Polierstifte

KEY POINTS

- Extremely compact and powerful all-steel model
- Light, easy to handle
- Excellent also for one-handed operation
- Rear exhaust with overhose provides quiet operation

APPLICATION SECTORS

Aerospace · Automotive · Die and mould

AREAS OF USE

For precision deburring and fine grinding · In general for all mild to moderate grinding and milling works.

RECOMMENDED CONSUMABLES

Tungsten carbide burs Ø 6-10 mm · Mounted points · Polishing points

Anwendungsdaten

| | |
|-------------------------------------|--|
| Drehzahl | 30.000 min ⁻¹ |
| Leistung | 300 Watt |
| Spannzange | 6 mm |
| Abluftaustritt | Hinten |
| Ventilausführung | Sicherheitshebel |
| Gewicht | 0,46 kg |
| Luftverbrauch (m ³ /min) | 0,57 |
| Mitgeliefertes Zubehör | 2 m Zuluftschlauch, 1 m Abluftschlauch, Spannzange 6 mm, 2 Spannschlüssel |

Application

| | |
|---------------------------------|--|
| Speed | 30.000 min ⁻¹ |
| Power | 300 Watt |
| Collet | 6 mm |
| Exhaust | Rear |
| Control | Safety lever |
| Weight | 0,46 kg |
| Air usage (m ³ /min) | 0,57 |
| Including accessories | 2 m air supply hose, 1 m exhaust hose, collet 6 mm, 2 keys |

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Film
Movie



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index

Spannzange · Collet

| | Art. | Größe · Size | € |
|---|----------------|--------------|-------|
|  | 11 4752 | 6,0 mm | 10,10 |

Druckluftschläuche · Pneumatic hose

Druckluftschläuche sind gemacht aus Hochleistungs-PVC Material mit faserverstärktem Polyester. Bei Schläuchen wo die Abluft nach hinten austritt, reduzieren spezielle Schalldämpfer den Geräuschpegel.

Compressed air hoses are made of high-performance PVC material with fibre-reinforced polyester. For hoses where exhaust escapes from rear, special mufflers reduce the sound level.

| | Art. | Beschreibung · Description | € |
|---|----------------|---|-------|
|  | 11 4763 | Abluftschlauch 1 m × 22 mm Exhaust hose 1 m × 22 mm | 11,40 |
|  | 11 4764 | Zuluftschlauch 3 m × 8 mm Air supply hose 3 m × 8 mm | 30,65 |
|  | 11 4765 | Zuluftschlauch 2 m × 8 mm und Abluftschlauch 1 m × 22 mm Air supply hose 2 m × 8 mm and exhaust hose 1 m × 22 mm | 40,20 |

Weiteres Zubehör siehe Seite 1138-1139
More accessories see page 1138-1139



11 4704

€ 446,20

TYPE K 25/2

25.000 min⁻¹

Ø 8-12 mm



ZUBEHÖR
ACCESSORIES



4-5 Tropfen/min. (Öl siehe Seite 1139)
4-5 drops/min. (Oil see page 1139)

WICHTIGSTE DATEN

- Extrem kompaktes und leistungsstarkes Vollstahlmodell
- Handlich und leicht zu führen
- Exzellent auch bei Einhandbedienung
- Abluft vorne entfernt die Späne

ANWENDUNGSBEREICHE

Luft- und Raumfahrt · Automobilindustrie · Werkzeug- und Formenbau

EINSATZGEBIETE

Präzisionsentgraten · Feinfräsen · Generell für alle leichten bis schweren Schleif- und Fräsarbeiten

EMPFOHLENE EINSATZWERKZEUGE

Hartmetall-Frässtifte Ø 8-12 mm · Schleifstifte · Polierstifte

KEY POINTS

- Extremely compact and powerful all-steel model
- Light, easy to handle
- Excellent also for one-handed operation
- Front exhaust deflects chips

APPLICATION SECTORS

Aerospace · Automotive · Die and mould

AREAS OF USE

For precision deburring and fine grinding · In general for all mild to moderate grinding and milling works.

RECOMMENDED CONSUMABLES

Tungsten carbide burs Ø 8-12 mm · Mounted points · Polishing points

Anwendungsdaten

| | |
|-------------------------------------|--|
| Drehzahl | 25.000 min ⁻¹ |
| Leistung | 370 Watt |
| Spannzange | 6 mm |
| Abluftaustritt | Vorne |
| Ventilausführung | Sicherheitshebel |
| Gewicht | 0,70 kg |
| Luftverbrauch (m ³ /min) | 0,57 |
| Mitgeliefertes Zubehör | 2 m Zuluftschlauch, Spannzange 6 mm, 2 Spanschlüssel |

Application

| | |
|---------------------------------|---|
| Speed | 25.000 min ⁻¹ |
| Power | 370 Watt |
| Collet | 6 mm |
| Exhaust | Front |
| Control | Safety lever |
| Weight | 0,70 kg |
| Air usage (m ³ /min) | 0,57 |
| Including accessories | 2 m air supply hose, collet 6 mm, 2 keys |

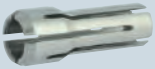
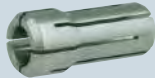
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Movie




Spannzange · Collet

| | Art. | Größe · Size | € |
|---|---------|--------------|-------|
|  | 11 4753 | 6,0 mm | 10,10 |
|  | 11 4754 | 8,0 mm | 10,10 |

Druckluftschläuche · Pneumatic hose

Druckluftschläuche sind gemacht aus Hochleistungs-PVC Material mit faserverstärktem Polyester. Bei Schläuchen wo die Abluft nach hinten austritt, reduzieren spezielle Schalldämpfer den Geräuschpegel.

Compressed air hoses are made of high-performance PVC material with fibre-reinforced polyester. For hoses where exhaust escapes from rear, special mufflers reduce the sound level.

| | Art. | Beschreibung · Description | € |
|---|---------|---|-------|
|  | 11 4764 | Zuluftschlauch 3 m x 8 mm Air supply hose 3 m x 8 mm | 30,65 |

Weiteres Zubehör siehe Seite 1138-1139
More accessories see page 1138-1139



1



2



3



4



5



6



7



8



9


Index

11 4710 11 4711 11 4712 11 4713



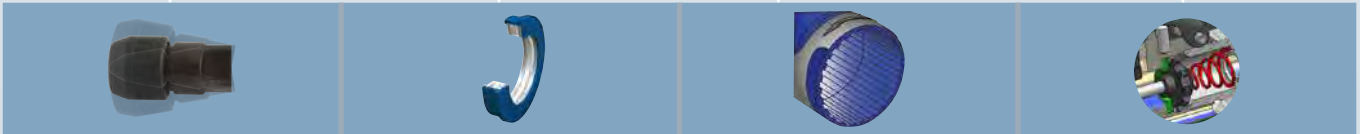
| | | | |
|--|--|---|--|
| | | | |
| <p>Elastisch gelagerte Spindel</p> <p>Speziell für den Einsatz von Hartmetall-Frässtiften</p> <p>Verringert die Schlageinwirkung auf dem Frässtift. Daher hervorragend für Arbeiten in engen Radien.</p> <p>Ergibt gute Oberflächengüte</p> <p>Gilt nur für Modell Art. 11 4710</p> | <p>Das vordere Schwingungs-Dämpfungssystem arbeitet in Verbindung mit der hinteren Aufhängungseinheit.</p> <p>Dies reduziert signifikant Vibrationen am Geradschleifer und am Frässtift.</p> <p>Der Anwender erhält somit ein Höchstmaß an Sicherheit und Komfort.</p> <p>Gilt nur für das Modell Art. 11 4710</p> | <p>Das komplett neu gestaltete, aus 2 Form-Komponenten zusammengefügte Gehäuse schützt exzellent vor Vibrationen und Kälte der Druckluft.</p> <p>Dies gilt für alle 820 Watt High-Power Modelle Art. 11 4710, 11 4711, 11 4712, 11 4713</p> | <p>Ein neu konstruierter Sicherheitshebel erhöht den Bedienungskomfort und den Luftdurchlass zum Motor.</p> <p>Weiterhin ermöglicht das neue Drosselungs-Ventil einen kontrollierten und langsamen Start des Schleifvorgangs.</p> <p>Dies reduziert erheblich Schäden am Werkstück und am Frässtift.</p> <p>Dies gilt für alle 820 Watt High-Power Modelle Art. 11 4710, 11 4711, 11 4712, 11 4713</p> |
| <p>Rubber-mounted spindle</p> <p>Specially for the use of burrs</p> <p>Lessens the impact effect on the burr</p> <p>Therefore also ideal for working in confined spaces. Applies only for Art. 11 4710</p> | <p>The front vibration dampening system works in conjunction with the rear suspension unit to absorb process and consumable vibration.</p> <p>Thus significantly improving user safety and comfort.</p> <p>Applies only for model 11 4710</p> | <p>The impressively designed all new 2 component moulded body provides excellent insulation from the harmful effects of vibration and the extremely cold temperatures of compressed air.</p> <p>Applies to all 820 Watt High-Power models Art. 11 4710, 11 4711, 11 4712, 11 4713</p> | <p>Contoured safety lever for operator comfort and the new throttle design not only provides increased levels of airflow, but also enables a highly controlled slow start to your grinding processes to significantly reduce work piece and consumable damage.</p> <p>Applies to all 820 Watt High-Power models Art. 11 4710, 11 4711, 11 4712, 11 4713</p> |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

TYPE KAMD 25LR 25.000 min⁻¹ 820 WATT HIGH-POWER Ø 8-12 mm  **11 4710**



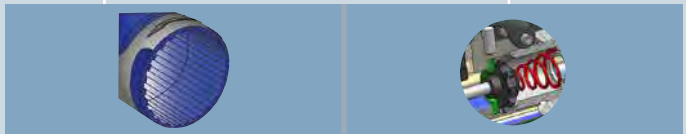
**BEST
SELLER**



TYPE KAM 25LR 25.000 min⁻¹ 820 WATT HIGH-POWER Ø 8-12 mm  **11 4711**



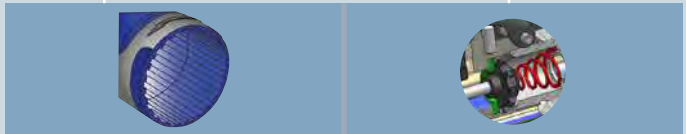
**BEST
SELLER**



TYPE KAM 16LR 16.000 min⁻¹ 820 WATT HIGH-POWER Ø 10-20 mm  **11 4712**



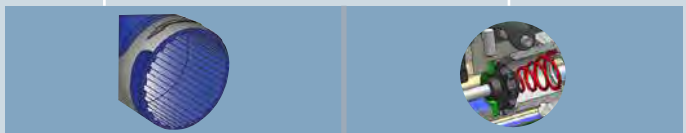
**BEST
SELLER**



TYPE KAM 10LR 10.000 min⁻¹ 820 WATT HIGH-POWER Ø 12-25 mm  **11 4713**



**BEST
SELLER**



Index

11 4710

€ 781,95

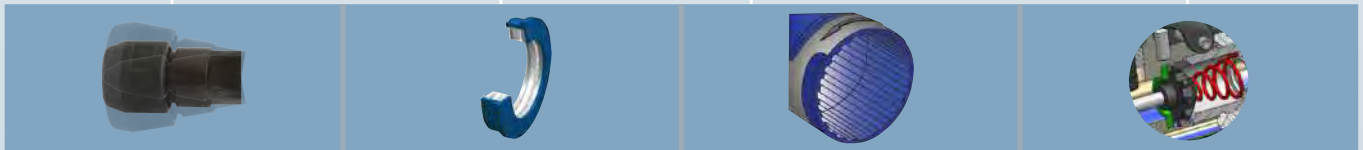
TYPE KAMD 25LR

25.000 min⁻¹

Ø 8-12 mm



Bestseller – preisreduziert
Bestseller – price reduced



4-5 Tropfen/min. (Öl siehe Seite 1139)
4-5 drops/min. (Oil see page 1139)

WICHTIGSTE DATEN

- Extrem leistungsstarker Motor
- Für schwerste Schleif- und Fräsarbeiten
- Kann ein- und zweihändig bedient werden
- Abluft hinten mit Schalldämpfung für ruhiges Arbeiten

ANWENDUNGSBEREICHE: Luft- und Raumfahrt · Automobilindustrie · Werkzeug- und Formenbau · Schiffbau · Gießereien

EINSATZGEBIETE: Generell für schwerste Schleif- und Fräsarbeiten · Auch an kompliziert geformten/engen Werkstücken dank elastischer Spindel

EMPFOHLENE EINSATZWERKZEUGE: **Speziell hervorragend für Hartmetall-Frässtifte Ø 8-12 mm, da durch flexible Spindel Bruch minimiert wird**

Schleifstifte bis Ø 40 mm mit Breite bis 50 mm · Trennschleifscheiben bis Ø 50 mm · Fächerschleifer bis Ø 30 mm · Schleifhülsen bis Ø 22 mm · Polierstifte · Schleifscheiben bis Ø 50 mm · Trennscheiben bis Ø 50 mm

KEY POINTS

- Extremely powerful motor
- For heavy grinding and milling works
- Can be operated with one hand and two-handed
- Rear exhaust with silencer provides quiet operation

APPLICATION SECTORS: Aerospace · Automotive · Die and mould · Ship building · Foundries · Fabrication

AREAS OF USE: Generally for heavy grinding and milling works · Also on complicated shaped and narrow workpieces thanks to elastic spindle

RECOMMENDED CONSUMABLES: **Specially suited for tungsten carbide burrs Ø 8-12 mm because due to flexible spindle breakage is minimized**

Mounted point heads up to Ø 40 mm, width up to 50 mm · Flap wheels up to Ø 30 mm · Sanding bands up to Ø 22 mm · Polishing points · Grinding Discs up to Ø 50 mm · Cut off Discs up to Ø 50 mm

Anwendungsdaten

| | |
|-------------------------------------|---|
| Drehzahl | 25.000 min ⁻¹ |
| Leistung | 820 Watt |
| Spannzange | 6 mm |
| Abluftaustritt | Hinten |
| Ventilausführung | Sicherheitshebel |
| Gewicht | 0,73 kg |
| Luftverbrauch (m ³ /min) | 0,62 |
| Mitgeliefertes Zubehör | 2 m Zuluftschlauch, 1 m Abluftschlauch, Spannzange 6 mm, 2 Spannschlüssel |

Application

| | |
|---------------------------------|--|
| Speed | 25.000 min ⁻¹ |
| Power | 820 Watt |
| Collet | 6 mm |
| Exhaust | Rear |
| Control | Safety lever |
| Weight | 0,73 kg |
| Air usage (m ³ /min) | 0,62 |
| Including accessories | 2 m air supply hose, 1 m exhaust hose, collet 6 mm, 2 keys |

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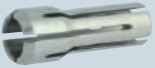

Film
Movie



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index




Spannzange · Collet

| | Art. | Größe · Size | € |
|---|----------------|--------------|-------|
|  | 11 4753 | 6,0 mm | 10,10 |
|  | 11 4754 | 8,0 mm | 10,10 |

Druckluftschläuche · Pneumatic hose

Druckluftschläuche sind gemacht aus Hochleistungs-PVC Material mit faserverstärktem Polyester. Bei Schläuchen wo die Abluft nach hinten austritt, reduzieren spezielle Schalldämpfer den Geräuschpegel.

Compressed air hoses are made of high-performance PVC material with fibre-reinforced polyester. For hoses where exhaust escapes from rear, special mufflers reduce the sound level.

| | Art. | Beschreibung · Description | € |
|---|----------------|---|-------|
|  | 11 4766 | Abluftschlauch 1 m × 35 mm Exhaust hose 1 m × 35 mm | 25,30 |
|  | 11 4768 | Zuluftschlauch 2 m × 8 mm Air supply hose 2 m × 8 mm | 59,25 |
|  | 11 4767 | Zuluftschlauch 2 m × 8 mm und Abluftschlauch 1 m × 35 mm Air supply hose 2 m × 8 mm and exhaust hose 1 m × 35 mm | 25,30 |

Weiteres Zubehör siehe Seite 1138-1139

More accessories see page 1138-1139



11 4711

€ 626,75

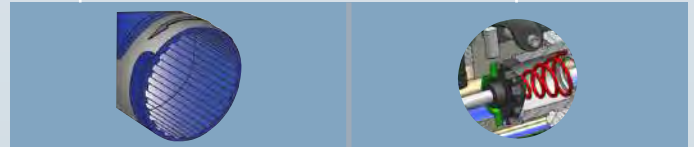
TYPE KAM 25LR

25.000 min⁻¹

Ø 8-12 mm



Bestseller – preisreduziert
Bestseller – price reduced



4-5 Tropfen/min. (Öl siehe Seite 1139)
4-5 drops/min. (Oil see page 1139)

WICHTIGSTE DATEN

- Extrem leistungsstarker Motor
- Für schwerste Schleif- und Fräsarbeiten
- Kann ein- und zweihändig bedient werden
- Abluft hinten mit Schalldämpfung für ruhiges Arbeiten

ANWENDUNGSBEREICHE

Luft- und Raumfahrt · Automobilindustrie · Werkzeug- und Formenbau · Schiffbau · Gießereien

EINSATZGEBIETE

Generell für schwerste Schleif- und Fräsarbeiten

EMPFOHLENE EINSATZWERKZEUGE

Hartmetall-Frässtifte Ø 8-12 mm

Schleifstifte bis Ø 40 mm mit Breite bis 50 mm · Fächerschleifer bis Ø 30 mm · Schleifhülsen bis Ø 22 mm · Polierstifte · Schleifscheiben bis Ø 50 mm · Trennscheiben bis Ø 50 mm

KEY POINTS

- Extremely powerful motor
- For heavy grinding and milling works
- Can be operated with one hand and two-handed
- Rear exhaust with silencer provides quiet operation

APPLICATION SECTORS

Aerospace · Automotive · Die and mould · Ship building · Foundries · Fabrication

AREAS OF USE

Generally for heavy grinding and milling works

RECOMMENDED CONSUMABLES

Tungsten carbide burs Ø 8-12 mm

Mounted point heads up to Ø 40 mm, width up to 50 mm · Flap wheels up to Ø 30 mm · Sanding bands up to Ø 22 mm · Polishing points · Grinding Discs up to Ø 50 mm · Cut off Discs up to Ø 50 mm

Anwendungsdaten

| | |
|-------------------------------------|--------------------------|
| Drehzahl | 25.000 min ⁻¹ |
| Leistung | 820 Watt |
| Spannzange | 6 mm |
| Abluftaustritt | Hinten |
| Ventilausführung | Sicherheitshebel |
| Gewicht | 0,73 kg |
| Luftverbrauch (m ³ /min) | 0,62 |

Mitgeliefertes Zubehör 2 m Zuluftschlauch, 1 m Abluftschlauch, Spannzange 6 mm, 2 Spannschlüssel

Application

| | |
|---------------------------------|--------------------------|
| Speed | 25.000 min ⁻¹ |
| Power | 820 Watt |
| Collet | 6 mm |
| Exhaust | Rear |
| Control | Safety lever |
| Weight | 0,73 kg |
| Air usage (m ³ /min) | 0,62 |

Including accessories 2 m air supply hose, 1 m exhaust hose, collet 6 mm, 2 keys

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Film
Movie



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index




Spannzange · Collet

| | Art. | Größe · Size | € |
|---|---------|--------------|-------|
|  | 11 4753 | 6,0 mm | 10,10 |
|  | 11 4754 | 8,0 mm | 10,10 |

Druckluftschläuche · Pneumatic hose

Druckluftschläuche sind gemacht aus Hochleistungs-PVC Material mit faserverstärktem Polyester. Bei Schläuchen wo die Abluft nach hinten austritt, reduzieren spezielle Schalldämpfer den Geräuschpegel.

Compressed air hoses are made of high-performance PVC material with fibre-reinforced polyester. For hoses where exhaust escapes from rear, special mufflers reduce the sound level.

| | Art. | Beschreibung · Description | € |
|---|---------|---|-------|
|  | 11 4766 | Abluftschlauch 1 m × 35 mm Exhaust hose 1 m × 35 mm | 25,30 |
|  | 11 4768 | Zuluftschlauch 2 m × 8 mm Air supply hose 2 m × 8 mm | 59,25 |
|  | 11 4767 | Zuluftschlauch 2 m × 8 mm und Abluftschlauch 1 m × 35 mm Air supply hose 2 m × 8 mm and exhaust hose 1 m × 35 mm | 25,30 |

Weiteres Zubehör siehe Seite 1138-1139

More accessories see page 1138-1139



11 4712

€ 668,55

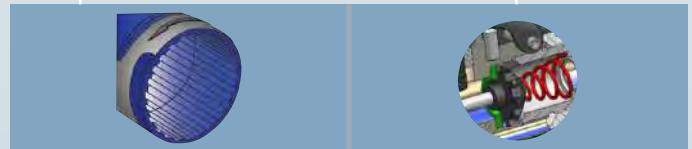
TYPE KAM 16LR

16.000 min⁻¹

Ø 10-20 mm



Bestseller – preisreduziert
Bestseller – price reduced



4-5 Tropfen/min. (Öl siehe Seite 1139)
4-5 drops/min. (Oil see page 1139)

WICHTIGSTE DATEN

- Extrem leistungsstarker Motor
- Für schwerste Schleif- und Fräsarbeiten
- Kann ein- und zweihändig bedient werden
- Abluft hinten mit Schalldämpfung für ruhiges Arbeiten

ANWENDUNGSBEREICHE

Luft- und Raumfahrt · Automobilindustrie · Werkzeug- und Formenbau · Schiffbau · Gießereien

EINSATZGEBIETE

Generell für schwerste Schleif- und Fräsarbeiten

EMPFOHLENE EINSATZWERKZEUGE

Hartmetall-Frässtifte Ø 10-20 mm

Schleifstifte bis Ø 50 mm mit Breite bis 50 mm · Fächerschleifer bis Ø 40 mm · Schleifhülsen bis Ø 30 mm · Polierstifte

KEY POINTS

- Extremely powerful motor
- For heavy grinding and milling works
- Can be operated with one hand and two-handed
- Rear exhaust with silencer provides quiet operation

APPLICATION SECTORS

Aerospace · Automotive · Die and mould · Ship building · Foundries · Fabrication

AREAS OF USE

Generally for heavy grinding and milling works

RECOMMENDED CONSUMABLES

Tungsten carbide burs Ø 10-20 mm

Mounted point heads up to Ø 50 mm, width up to 50 mm · Flap wheels up to Ø 40 mm · Sanding bands up to Ø 30 mm · Polishing points

Anwendungsdaten

| | |
|-------------------------------------|--|
| Drehzahl | 16.000 min ⁻¹ |
| Leistung | 820 Watt |
| Spannzange | 6 mm |
| Abluftaustritt | Hinten |
| Ventilausführung | Sicherheitshebel |
| Gewicht | 0,73 kg |
| Luftverbrauch (m ³ /min) | 0,62 |
| Mitgeliefertes Zubehör | 2 m Zuluftschlauch, 1 m Abluftschlauch, Spannzange 6 mm, 2 Spannschlüssel |

Application

| | |
|---------------------------------|--|
| Speed | 16.000 min ⁻¹ |
| Power | 820 Watt |
| Collet | 6 mm |
| Exhaust | Rear |
| Control | Safety lever |
| Weight | 0,73 kg |
| Air usage (m ³ /min) | 0,62 |
| Including accessories | 2 m air supply hose, 1 m exhaust hose, collet 6 mm, 2 keys |

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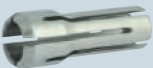

Film
Movie



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index




Spannzange · Collet

| | Art. | Größe · Size | € |
|---|---------|--------------|-------|
|  | 11 4753 | 6,0 mm | 10,10 |
|  | 11 4754 | 8,0 mm | 10,10 |

Druckluftschläuche · Pneumatic hose

Druckluftschläuche sind gemacht aus Hochleistungs-PVC Material mit faserverstärktem Polyester. Bei Schläuchen wo die Abluft nach hinten austritt, reduzieren spezielle Schalldämpfer den Geräuschpegel.

Compressed air hoses are made of high-performance PVC material with fibre-reinforced polyester. For hoses where exhaust escapes from rear, special mufflers reduce the sound level.

| | Art. | Beschreibung · Description | € |
|---|---------|---|-------|
|  | 11 4766 | Abluftschlauch 1 m × 35 mm Exhaust hose 1 m × 35 mm | 25,30 |
|  | 11 4768 | Zuluftschlauch 2 m × 8 mm Air supply hose 2 m × 8 mm | 59,25 |
|  | 11 4767 | Zuluftschlauch 2 m × 8 mm und Abluftschlauch 1 m × 35 mm Air supply hose 2 m × 8 mm and exhaust hose 1 m × 35 mm | 25,30 |

Weiteres Zubehör siehe Seite 1138-1139

More accessories see page 1138-1139



11 4713

€ 668,55

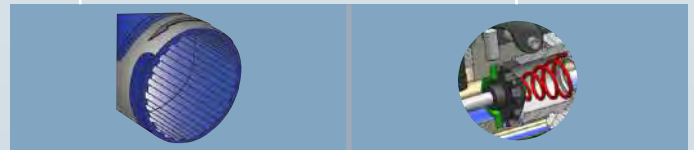
TYPE KAM 10LR

10.000 min⁻¹

Ø 12-25 mm



Bestseller – preisreduziert
Bestseller – price reduced



4-5 Tropfen/min. (Öl siehe Seite 1139)
4-5 drops/min. (Oil see page 1139)

WICHTIGSTE DATEN

- Extrem leistungsstarker Motor
- Für schwerste Schleif- und Fräsarbeiten
- Kann ein- und zweihändig bedient werden
- Abluft hinten mit Schalldämpfung für ruhiges Arbeiten

ANWENDUNGSBEREICHE

Luft- und Raumfahrt · Automobilindustrie · Werkzeug- und Formenbau · Schiffbau · Gießereien

EINSATZGEBIETE

Generell für schwerste Schleif- und Fräsarbeiten

EMPFOHLENE EINSATZWERKZEUGE

Hartmetall-Frässtifte Ø 12-25 mm

Schleifstifte bis Ø 50 mm mit Breite bis 50 mm · Fächerschleifer
Ø 50-60 mm · Schleifhülsen Ø 35-60 mm · Polierstifte

KEY POINTS

- Extremely powerful motor
- For heavy grinding and milling works
- Can be operated with one hand and two-handed
- Rear exhaust with silencer provides quiet operation

APPLICATION SECTORS

Aerospace · Automotive · Die and mould · Ship building · Foundries · Fabrication

AREAS OF USE

Generally for heavy grinding and milling works

RECOMMENDED CONSUMABLES

Tungsten carbide burrs Ø 12-25 mm

Mounted point heads up to Ø 50 mm, width up to 50 mm · Flap wheels
Ø 50-60 mm · Sanding bands Ø 35-60 mm · Polishing points

Anwendungsdaten

| | |
|-------------------------------------|--|
| Drehzahl | 10.000 min ⁻¹ |
| Leistung | 820 Watt |
| Spannzange | 6 mm |
| Abluftaustritt | Hinten |
| Ventilausführung | Sicherheitshebel |
| Gewicht | 0,73 kg |
| Luftverbrauch (m ³ /min) | 0,62 |
| Mitgeliefertes Zubehör | 2 m Zuluftschlauch, 1 m Abluftschlauch, Spannzange 6 mm, 2 Spannschlüssel |

Application

| | |
|---------------------------------|--|
| Speed | 10.000 min ⁻¹ |
| Power | 820 Watt |
| Collet | 6 mm |
| Exhaust | Rear |
| Control | Safety lever |
| Weight | 0,73 kg |
| Air usage (m ³ /min) | 0,62 |
| Including accessories | 2 m air supply hose, 1 m exhaust hose, collet 6 mm, 2 keys |

NEU NEW Maschine als Vorführgerät erhältlich.
Bitte kontaktieren Sie uns per E-Mail info@karnasch.tools
Demonstration models available.
Please send a mail to info@karnasch.tools

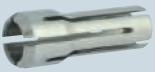

Film
Movie



- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Index




Spannzange · Collet

| | Art. | Größe · Size | € |
|---|---------|--------------|-------|
|  | 11 4753 | 6,0 mm | 10,10 |
|  | 11 4754 | 8,0 mm | 10,10 |

Druckluftschläuche · Pneumatic hose

Druckluftschläuche sind gemacht aus Hochleistungs-PVC Material mit faserverstärktem Polyester. Bei Schläuchen wo die Abluft nach hinten austritt, reduzieren spezielle Schalldämpfer den Geräuschpegel.

Compressed air hoses are made of high-performance PVC material with fibre-reinforced polyester. For hoses where exhaust escapes from rear, special mufflers reduce the sound level.

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Weiteres Zubehör siehe Seite 1138-1139

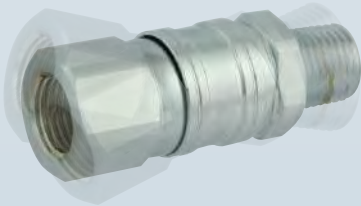
More accessories see page 1138-1139



Schwenkverbindung · Swivel Connection

Die Schwenkverbindung ist anwendbar für alle Geradschleifer mit einem Schlauchanschluss für ¼" Die Schwenkverbindung ermöglicht durch einen ruhigen Lauf, ein leichteres Arbeiten an schwierigen Stellen und verringert die Belastung. Es entsteht kein Druckverlust da das Werkzeug um 360 Grad schwenkbar ist und um 25 Grad biegsam.

The swivel connection can be used for any horizontal grinders with a hose connection for ¼". The swivel connection permits easier work at difficult angles through smooth operation and reduces stress. No pressure loss arises because the tool can be turned 360 degrees and flexed 25 degrees.



| Art. | Beschreibung · Description | € |
|----------------|---|---------------|
| 11 4770 | Schlauchanschluss ¼" passend für Artikel: Inlet thread ¼" suitable for article: 11 4704, 11 4708, 11 4709, 11 4710, 11 4711, 11 4712, 11 4713 | 112,30 |

Wartungsgeräte · Maintenance Devices

Wartungseinheiten haben die Aufgabe Feuchtigkeit und schädliche Stoffe zu entfernen und die vom Verdichter kommende Luft aufzubereiten. Somit ist eine Funktionssicherheit und lange Lebensdauer gewährleistet. Weiterhin versorgt ein Öler die Druckluft mit Schmierstoff um Korrosion zu verhindern.

Maintenance units have the task of removing moisture and harmful substances and preparing the air coming from the condenser. This ensures functional safety and a long service life. Furthermore, an oiler supplies the compressed air with lubricant to prevent corrosion.



| Art. | Beschreibung · Description | Schlauchanschluss / Hose | € |
|----------------|---|---|---------------|
| 11 4771 | Automatischer Entleerungsfilter mit Regler, Messgerät, (Sprühnebel) Öler und Halterung Automatic drain filter with regulator, gauge, micro fog lubricator and mounting bracket | ¼" passend für Artikel: ¼" suitable for article: 11 4704, 11 4708, 11 4709, 11 4710, 11 4711, 11 4712, 11 4713 | 396,35 |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Ersatzhebel · Lever



| Art. | Beschreibung · Description | € |
|----------------|--|-------|
| 11 4772 | Ersatzhebel für die Kompaktmodelle Art.: 11 4708/11 4709/11 4704 Spare lever for the compact models, item: 11 4708/11 4709/11 4704 | 40,95 |
| 11 4773 | Ersatzhebel für die 820 Watt High-Power Serie Art.: 11 4710/11 4711/11 4712/11 4713 Spare lever for the 820 Watt High-Power series, item: 11 4710/11 4711/11 4712/11 4713 | 48,85 |
| 11 4774 | Austreiber zum Entfernen des Hebelstifts Punch for removing lever pin | 27,10 |

Schmierstoffe · Lubricants



| Art. | Beschreibung · Description | € |
|----------------|---|-------|
| 60 1300 | Karnasch Motoren-/Hydrauliköl ISO VG10 – 1 Ltr. Karnasch Motor-/Hydraulic oil ISO VG10 – 1 litre | 12,70 |

Für alle angebotenen Schmierstoffe/Schneidöle erhalten Sie auf Anfrage das entsprechende DIN Sicherheitsdatenblatt (DIN 52900).

The corresponding safety data sheet (DIN 52900) for all of the lubricants/cutting oils offered is available on request.

1



2



3



4



5



6



7



8



9

Index

7 KÜHLMITTEL · REINIGER LUBRICANTS · CLEANER

SCHMIERSTOFFE · SCHNEIDÖL · UNIVERSALREINIGER · ENTFETTER
LUBRICANTS · CUTTING OIL · BIO-UNIVERSAL CLEANER · DEGREASER



7.1

☎ 1143-1150

1



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9



Ihre Notizen & Zeichnungen Your notices & drafts

1



2



3



4



5



6



7

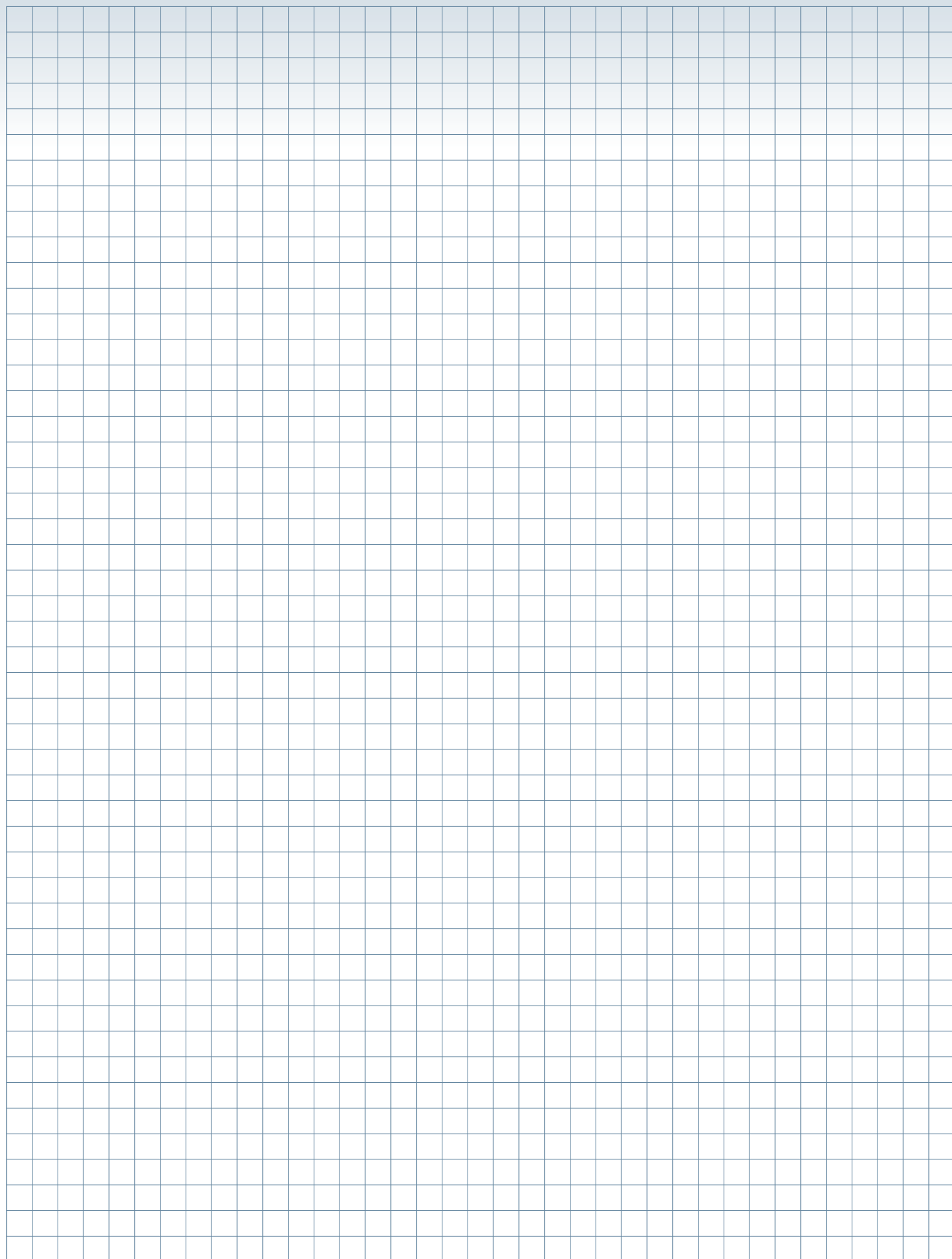


8



9

Index



SCHMIERSTOFFE · SCHNEIDÖL · UNIVERSALREINIGER · ENTFETTER

LUBRICANTS · CUTTING OIL · BIO-UNIVERSAL CLEANER · DEGREASER



7.1

KONTAKT | CONTACT

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INDUSTRIAL TOOLS DIVISION

Straße des Friedens 10
D-15848 Tauche/OT Görsdorf
mail@karnasch.tools

+49 (0) 33675 - 7265-0

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NOW ONLINE FOR YOU!

<http://shop.karnasch.tools>



ONLINE



MECUTOIL 100

10 l

€ 92,30

60 1100 10

5 l

€ 46,20

60 1100 5

2,5 l

€ 23,50

60 1100 25



10 l

5 l

2,5 l

HOCHLEISTUNGS-KÜHLSCHMIER-KONZENTRAT. SILIKONFREI

Ist in Wasser zu verrühren

Das Öl wird durch ständiges rühren mit Wasser vermischt. (ÖL in Wasser geben). Es entsteht ein hervorragendes und hochergiebiges Universal-Kühlschmier-Öl.

Eigenschaften:

- Mineralisches Öl das im Sinne verkehrsrechtlicher Bestimmung kein Gefahrgut ist
- Rostschützend
- Enthält keine Schwermetalle
- Nitrit- und Chlorfrei

Verwendung:

Erhöht signifikant die Standzeiten und Oberflächengüte beim: SÄGEN, FRÄSEN, GEWINDESCHNEIDEN, REIBEN, BOHREN, DREHEN.

Mischung:

5% Öl in Wasser für Stähle geringer Festigkeit (Baustähle) sowie Ne-Metalle (Alu, Kupfer, Messing)
10% Öl in Wasser geben für hochlegierte Stähle (Edelstähle). Bei schwierigsten Zerspanproblemen den Ölanteil erhöhen oder nur das reine Öl verwenden.

MECUT-MMKS-MQL / STEEL+ALU

10 l

€ 199,00

60 1154

5 l

€ 99,00

60 1153



10 l

5 l

BIO-HOCHLEISTUNGS-MINIMALMENGENSCHMIERÖL FÜR SCHWIERIGE SPANABHEBENDE SOWIE SPANLOSE VERARBEITUNG.

Basisöl auf pflanzliche Produkte aufgebaut (Kokosöl, Rapsöl). Umweltschonend. Chlorfrei.

Verwendung: Zum Sägen, Fräsen, Bohren, Drehen, Reiben und Gewindeschneiden hervorragend geeignet. Ebenfalls für die spanlose Bearbeitung wie Walzen, Tiefziehen, Drahtziehen, Rohrbiegen geeignet.

Anwendung: Besonders geeignet für die Bearbeitung von schwer zerspanbaren Werkstoffen wie rost- und hitzebeständige Stähle, Nickellegierungen, Titan, Stahl, Alu- und Alulegierungen.

Für die Bearbeitung von Kupfer- sowie Bronzelegierungen, Messingguss und Rotguss siehe MECUT-MMKS-MQL / STEEL/ALU/COPPER „EASY-CLEAN“ Art. 601162 + 601163

Einsatzhinweis: Hervorragendes Kühlschmiermittel speziell für Minimalmengen-Kühl-Schmiersysteme entwickelt (auch in Sprayflaschen erhältlich. Siehe hierzu unser Mecutspray Art. 60 1150, Seite 1146)

Eigenschaften:

- sehr hohe Werkzeugstandzeiten
- Verbesserte Oberflächengüte
- Wirkt antikorrosiv
- Biologisch abbaubar (Anlieferungszustand)

MECUT-MMKS-MQL STEEL/ALU/COPPER „EASY-CLEAN“

10 l

€ 152,95

60 1163

5 l

€ 84,95

60 1162



10 l

5 l

MINERALÖLFREIES-HOCHLEISTUNGS-MINIMALMENGENSCHMIERÖL FÜR MITTELSCHWERE SPANABHEBENDE SOWIE SPANLOSE VERARBEITUNG.

Mineralölfrei. Mit Wasser abwaschbar. Keine flüchtigen Chlorwasserstoffe.

Verwendung: Zum Sägen, Fräsen, Bohren, Drehen, Reiben und Gewindeschneiden hervorragend geeignet.

Ebenfalls für Spanlose Bearbeitung wie Walzen, Tiefziehen, Drahtziehen, Rohrbiegen.

Anwendung: Besonders geeignet für die mittelschwere Zerspannung von allen Stählen, Edelstähle (Chrom-Nickel-Legierungen) und NE-Metalle wie Alu, Kupfer, Messing unlegiert oder legiert.

Alle Gussorten wie Stahlguss, Temporguss, Druckguss, Messingguss, Rotguss usw.

Einsatzhinweis: Hervorragendes Kühlschmiermittel mit Schwerpunkt auf die Kühlwirkung. Fertigteile mit Wasser abwaschbar. Für Minimalmengen-Kühl-Schmiersysteme entwickelt.

Eigenschaften:

- Kein Verharzen der Fertigteile. Mit Wasser abwaschbar
- Sehr dünnflüssig dadurch geringer Verbrauch und sehr gute Kühlwirkung
- Pumpenfördermöglich
- Hohe Schnittgeschwindigkeiten möglich, geringer Verschleiß der Werkzeuge

MECUTOIL 100

HIGH PERFORMANCE COOLING LUBRICANT CONCENTRATE. SILICONE FREE

To be mixed in water

The oil is mixed by constant stirring with water. (pour the oil into the water). The result is an excellent and highly productive Universal cutting oil.

Properties:

- Mineral oil that is not hazardous under traffic law provision
- Rust-Protective
- Does not contain heavy metals
- No Nitrite and chlorine

Application:

Increases tool life and surface finish significantly when: SAWING, MILLING, TAPPING, GRINDING, DRILLING.

Mixture:

5% Oil in water for low strength steels (structural steel) and non-ferrous metals (aluminum, copper, brass)
10% Oil in water for high-alloy steels (stainless steels). Increase the oil content for most difficult machining or use only the pure oil.



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MECUT-MMKS-MQL / STEEL+ALU

BIO-HIGH-PERFORMANCE-MINIMAL QUANTITY LUBRICATION OIL FOR DIFFICULT CUTTING AND NON CUTTING OPERATIONS.

Basic oil based on vegetable products (coconut oil, rapeseed oil). Environmentally friendly. Chlorine-free.

Use:

Ideal for sawing, milling, drilling, turning, grinding and thread-cutting. Also suitable for non-cutting processing such as rolling, deep drawing, wire drawing, tube bending.

Application:

Particularly suitable for machining difficult materials such as rust and heat resistant steels, nickel alloys, titanium, steel, aluminum and aluminum alloys. For machining copper and bronze alloys, cast brass, gunmetal refer to MECUT-MMKS-MQL / STEEL/ALU/COPPER "EASY-CLEAN" Part No. 601162 + 601163

Instructions for use:

Excellent coolant specially designed for minimum quantity cooling lubrication systems. (Also available in spray bottles. See our Mecutspray Art. 60 1150, page 1146)

Properties:

- very long tool life
- improved surface quality
- anti-corrosive
- Biologically degradable (as delivered)



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MECUT-MMKS-MQL STEEL/ALU/COPPER "EASY-CLEAN"

MINERAL OIL FREE HIGH-PERFORMANCE FLUID FOR MINIMUM QUANTITY LUBRICATION FOR MEDIUM DIFFICULT CUTTING AND NON CUTTING OPERATIONS.

Mineral oil free. Washable with water. No volatile hydrogen chloride.

Use:

Ideal for sawing, milling, drilling, turning, grinding and thread-cutting. Also for non-cutting processing such as rolling, deep drawing, wire drawing, tube bending.

Application:

Particularly suitable for medium-heavy duty machining of all steels, stainless steels (chrome-nickel alloys) and non-ferrous metals such as aluminum, copper, brass unalloyed or alloyed. All types of castings such as cast steel, malleable cast iron, die-cast, brass, gunmetal, etc.

Instructions for use:

Excellent coolant with focus on cooling effect. Finished parts washable with water. Designed for minimum volume cooling lubrication systems.

Properties:

- No gumming of the finished parts. Washable with water
- Very low viscosity, thus low consumption and very good cooling effect.
- Pump supply possible
- High cutting speeds possible, minimal tool wear



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MECUTSPRAY

€ 9,85 **60 1150**



500 ml

MECUTSPRAY BIO-HOCHLEISTUNGS-SCHNEIDÖL FÜR SCHWIERIGE, SPANABHEBENDE VERARBEITUNG. SILIKONFREI

Auf pflanzlichem Rohstoff aufgebaut. Umweltschonendes Sprühöl. Treibgasfrei.

Verwendung: Zum Sägen, Fräsen, Bohren, Drehen, Reiben und Gewindeschneiden hervorragend geeignet.

Vorteile: Mit schmierfördernden Additiven – frei von Mineralölanteilen. Enthält korrosionsschützende Zusätze – alterungsstabil.

Einsatzhinweis: Unmittelbar auf Werkstück/Werkzeug aufbringen. Kurze Zeit einwirken lassen, gegebenenfalls Vorgang wiederholen.

Eigenschaften:

- Sehr hohe Werkzeugstandzeiten
- Verbesserte Oberflächengüte
- Wirkt antikorrosiv
- 100% Wirkstoffgehalt
- Treibgasfrei
- Umweltschonend
- Biologischer Abbau >90%
- Gemäß CEC-L-33-T-82
- Für Minimalschmierung geeignet

Besonders geeignet bei Bearbeitung von schwer zerspanbaren Werkstoffen, wie rost- und hitzebeständige Stähle, Nickellegierungen, Titan, Stahl, Alu- und Alulegierungen.

MECUTFOAM

€ 12,70 **60 1152**



400 ml

MECUT FOAM HOCHLEISTUNGS-SCHAUMSPRAY. SILIKONFREI

- Schaum haftet am Werkzeug
- Kein Tropfen und Umherspritzen

Ideal zum Arbeiten in Zwangslagen wie z.B. „Überkopfeinsatz“ und bei Maschinen ohne Kühlmittleinrichtung.

Eigenschaften:

- Kein Verharzen der Fertigteile. Mit Wasser abwaschbar
- Schwefelfrei
- Mineralölfrei
- sehr gutes Haftvermögen

Verwendung: Erhöht signifikant die Standzeiten und Oberflächengüte beim: SÄGEN, FRÄSEN, GEWINDESCHNEIDEN, REIBEN, BOHREN, DREHEN

Zum Zerspanen aller Stahlsorten sowie Ne-Metalle wie Alu, Kupfer, Messing.

SCHNEIDPASTE

125 g € 6,95 **60 1159**

750 g € 25,45 **60 1157**



750 g

125 g

UNIVERSAL SCHNEIDPASTE CHLORFREI. SILIKONFREI

- Paste haftet am Werkzeug.
- Kein Tropfen und Umherspritzen.

Ideal zum Arbeiten in Zwangslagen wie z.B. „Überkopfeinsatz“ und bei Maschinen ohne Kühlmittleinrichtung.

Verwendung: Erhöht signifikant die Standzeiten und Oberflächengüte beim: SÄGEN, FRÄSEN, GEWINDESCHNEIDEN, REIBEN, BOHREN, DREHEN.

Zum Zerspanen aller Stähle sowie schwierigster Materialien wie Titan-, Mangan-, Stahlguss-, Chrom-Nickel oder Molybdän-Stählen.

Hervorragend auch für alle Nichteisenmetalle wie Alu, Kupfer, Messing.

MECUTSPRAY

MECUTSPRAY BIO-HIGH PERFORMANCE-CUTTING OIL FOR DIFFICULT MACHINING. SILICONE FREE

Only plant-based raw materials. Environmentally friendly spray oil. Propellant-free.

Application: Excellent useable for sawing, milling, drilling, turning, reaming and thread cutting.

Advantages: Lubricating promoting additives – free of mineral oil components contains corrosion protective additives – aging-resistant.

Application reference: Adding immediately onto the workpiece/tool. Let it impact for a short time and possibly repeat the operation.

Properties:

- Very long tool-life
- Improving surface quality
- Anti-corrosive working
- 100% active substance
- Propellant-free
- Environmentally friendly
- Biologically degradable >90%
- According to CEC-L-33-T-82
- Useable for minimum lubrication

Especially useable for cutting difficult materials like acid-, and heat-resistant steels, nickel alloys, titanium, steel, aluminum, aluminum alloys.



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MECUTFOAM

MECUT FOAM HIGH PERFORMANCE COOLING LUBRICANT FOAM SPRAY. SILICONE FREE

- The foam sticks to the tool
- No dripping or splashing

Ideal for working under difficult circumstances e.g. "Overhead use" and for machines without cooling device.

Properties:

- No gumming of the finished parts. Washable with water
- Sulfur-free
- Petroleum-Free
- Very good adhesion

Application: Increases tool life and surface finish significantly when: SAWING, MILLING, TAPPING, GRINDING, DRILLING.

For cutting all types of steel and non-ferrous metals like aluminum, copper, brass.



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CUTTING PASTE

UNIVERSAL CUTTING PASTE WITHOUT CHLORINE. SILICONE FREE

- The paste sticks to the tool.
- No dripping or splashing

Ideal for working under difficult circumstances e.g. "Overhead use" and for machines without cooling device.

Application: Increases tool life and surface finish significantly when: SAWING, MILLING, TAPPING, GRINDING, DRILLING.

For machining all kind of steels. Also excellent for extremely difficult materials such as titanium-, manganese-, cast steel-, chrome-nickel or molybdenum steels.

Also excellent for all non-ferrous metals such as aluminum, copper, brass.



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MECUTWAX

€ 9,55 60 1200

MECUT WAX HOCHLEISTUNGS-KÜHLSCHMIERSTIFT

Silikonfrei

- Wachs haftet am Werkzeug.
- Kein Tropfen und Umherspritzen

Ideal zum Arbeiten in Zwangslagen wie z.B. „Überkopfeinsatz“ und bei Maschinen ohne Kühlmitteleinrichtung.

Verwendung:

Erhöht signifikant die Standzeiten und Oberflächengüte beim:

- SÄGEN
- FRÄSEN
- GEWINDESCHNEIDEN
- REIBEN
- BOHREN
- DREHEN

Zum Zerspanen aller Stahlsorten sowie Ne-Metalle wie Alu, Kupfer, Messing.



350 g

BIO-UNIVERSALREINIGER / ENTFETTER

10 l

€ 215,50 60 1161

5 l

€ 116,20 60 1160

METALLENTFETTUNGS- SOWIE REINIGUNGSKONZENTRAT MIT KORROSIONSSCHUTZ

Verwendung:

- Für die Metallentfettung/Reinigung als Vorbereitung für die Lackierung sowie Pulverbeschichtung.
- Löst hervorragend Korrosionsschutzöle, Fette sowie synthetische und natürliche Wachse.
- Kann in Sprüh-, Tauch- und Pinselverfahren heiß oder kalt eingesetzt werden.
- Hervorragend geeignet auch für Ultraschall-Reinigungsanlagen.

Einsatzhinweis:

Je nach Verunreinigung empfehlen wir eine Verdünnung:

Stärkste Verschmutzung (z.B. Walzfett, Korrosionsschutzöle, Synthetische Öle) = 1:5-1:10

Mittelstarke Verschmutzung = 1:10-1:20

Leichte Verschmutzung = 1:20-1:40

Beim Einsatz mit Hochdruckreinigern (bis 90°) verstärkt sich aufgrund der enthaltenen waschaktiven Substanzen die Reinigungskraft um den Faktor 5.

Nach der Einwirkzeit, die sich nach der Verunreinigung richtet, ist der angelöste Schmutz einfach mit Wasser abzuspülen bzw. abzuspitzen. Je nach Verschmutzungsgrad konzentriert oder bis 40-fach verdünnt anwenden. Nach dem Auftragen einwirken lassen, nötigenfalls mit einem Lappen nachwischen und mit einem scharfen Wasserstrahl absprühen.

Eigenschaften:

- Wesentlich hautfreundlicher als lösemittelhaltige Reiniger
- Korrosionsschützend (wirkt nach der Reinigung einem kurzfristigen Nachrost entgegen).
- Tenside sind biologisch abbaubar gem. EG-Verordnung
- Kostengünstig durch hohe Verdünnbarkeit.
- Demulgierend und ölabscheidgerecht.
- Unterliegt nicht der VOC-Verordnung.

HINWEIS:

Nicht geeignet für Aluminium, eloxierte bzw. verzinkte Flächen.

Aufgrund der Vielzahl an verwendeten Kaltwalzfetten und Korrosionsschutzölen empfehlen wir jedoch in jedem Fall einen Test auf der zu reinigenden Flächen durchzuführen.



10 l

5 l

Für alle angebotenen Schmierstoffe/Schneidöle erhalten Sie auf Anfrage das entsprechende DIN Sicherheitsdatenblatt (DIN 52900).

The corresponding safety data sheet (DIN 52900) for all of the lubricants/cutting oils offered is available on request.

MECUTWAX

MECUT WAX HIGH PERFORMANCE COOLING-LUBRICANT STICK

Silicone free

- The wax sticks to the tool.
- No dripping or splashing

Ideal for working under difficult circumstances e.g. "Overhead use" and for machines without cooling device.

Application:

Increases tool life and surface finish significantly when:

- SAWING
- MILLING
- TAPPING
- GRINDING
- DRILLING
- TURNING

For cutting all types of steel and non-ferrous metals like aluminum, copper, brass.



1



2



3



BIO-UNIVERSAL CLEANER/DEGREASER

METAL DEGREASING AND CLEANING CONCENTRATE WITH CORROSION PROTECTION

Use:

- For metal degreasing / cleaning in preparation for painting and powder coating.
- Removes slushing oils and greases as well as synthetic and natural waxes.
- Can be used hot or cold in spray, dipping and brushing processes.
- Excellent for ultrasonic cleaning systems too.

Instructions for use:

Dilution is recommended depending on the contamination:

Highest contamination (e.g. rolling grease, slushing oils, synthetic oils) = 1:5-1:10

Medium level contamination = 1:10-1:20

Light contamination = 1:20-1:40

When used with high pressure cleaners (up to 90°), cleaning performance increases due to the detergent substances contained by a factor of 5.

After the exposure time, which depends on the contamination, the loosened dirt is easy to rinse or spray off with water. Depending on the degree of contamination use concentrated or diluted up to 40 times. Let it work in after application, if required use a cloth to wipe off and spray off with a high pressure jet.

Properties:

- Much gentler on the skin than solvent-based cleaners
- Corrosion protection (acts after cleaning as short term rust protection).
- Tensides are biodegradable as per EC Regulations
- Cost-effective due to being highly dilutable.
- Demulsifying and suitable for oil separation.
- Not subject to VOC regulations.

NOTE:

Not suitable for aluminum, anodised or galvanised surfaces.

Due to the large number of cold rolling greases and slushing oils used however, we recommend performing a test on the surfaces to be cleaned in all cases.



4



5



6



7



8



9

Index

Qualitätsprodukte für die Metallbearbeitung.
Quality products for metalworking.

HIGH-TECH

FÜR PRÄZISION AUF DAS μ GENAU

High-tech for micro-precision



1



2



3



4



5



6



7



8



9

Index



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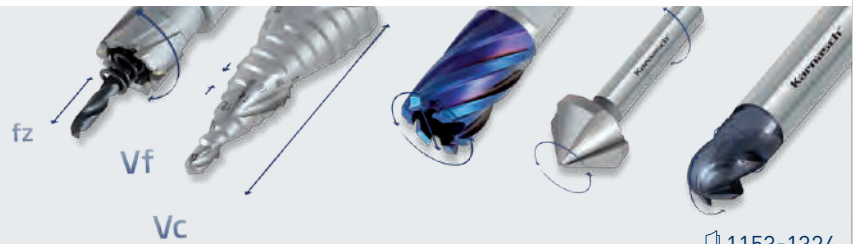
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8 | SCHNITTDATEN CUTTING DATA

SCHNITTDATEN · TECHNISCHE INFORMATIONEN
CUTTING DATA · TECHNICAL INFORMATION



8.1

1153-1324

1



2



3



4



5



6



7



8



9



- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

VHM-SCHAFTFRÄSER
SOLID CARBIDE END MILLS



1154-1240

VHM-GEWINDEWIRBLER
GEWINDEFÄHRER
SOLID CARBIDE WHIRLING
THREAD CUTTERS
THREAD MILLS



1270

WERKZEUGE FÜR COMPOSITES
CFK / GFK - TITAN - KUNSTSTOFF

TOOLS FOR COMPOSITES
CFRP / GFRP - TITANIUM -
PLASTICS



1214
1221-1214
1264-1269

VHM-BOHRER
SOLID CARBIDE TWIST DRILL



1241-1257

VHM-REIBAHLN
SOLID CARBIDE REAMERS



1258-1263

SPATEN-BOHRER
SPADE DRILLS



1302

KERNBOHRER
ANNULAR CUTTERS



1295

LOCHSÄGEN
HOLE SAWS



1312

STUFEN- UND BLECHSCHÄL-
BOHRER

STEP-DRILLS, TUBE AND
SHEET DRILLS



1320

KEGELSENKER, FLACHSENKER,
STUFENBOHRER

COUNTERSINKS,
COUNTERBORES,
SUBLAND DRILLS



1317-1319

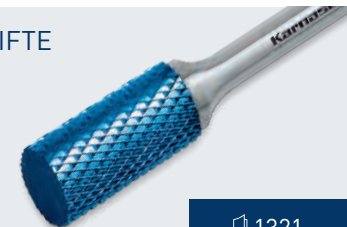
KEGELSENKER FÜR
CNC-MASCHINEN

COUNTERSINK FOR
CNC-MACHINES



1203

FRÄSSTIFTE
BURRS



1321

KREISSÄGE-
BLÄTTER

CIRCULAR
SAW BLADES



1322-1323

SCHNITTDATEN · TECHNISCHE INFORMATIONEN

CUTTING DATA · TECHNICAL INFORMATION



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ONLINE



Nuten Slot milling

| Werkstoffgruppe Material group | Werkstoff Material | HSC Nuten Slot milling | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|-----------------------|------------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 4.1/4.3 Aluminium <6% Si | AL 99,9 Mg 0,5 | ae mm | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 1,5 | 2,0 | 2,5 | 3,0 | 4,0 | 4,5 | 5,0 |
| | | Vc m/min | 900 | 900 | 950 | 1.000 | 1.200 | 1.300 | 1.400 |
| | | n min ⁻¹ | 48.000 | 36.000 | 31.000 | 27.000 | 24.000 | 24.000 | 23.000 |
| | | fz mm | 0,100 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 | 0,250 |
| | | Vf mm/min | 9.550 | 7.878 | 7.258 | 11.141 | 11.459 | 11.035 | 13.369 |

| Werkstoffgruppe Material group | Werkstoff Material | Nuten Slot milling 0,5xØ | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|-----------------------|--------------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 4.1/4.3 Aluminium <6% Si | AL 99,9 Mg 0,5 | ae mm | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 |
| | | Vc m/min | 600 | 600 | 600 | 650 | 680 | 700 | 900 |
| | | n min ⁻¹ | 32.000 | 24.000 | 20.000 | 18.000 | 14.000 | 13.000 | 15.000 |
| | | fz mm | 0,070 | 0,075 | 0,085 | 0,090 | 0,120 | 0,130 | 0,150 |
| | | Vf mm/min | 4.456 | 3.581 | 3.247 | 4.655 | 7.870 | 4.828 | 6.446 |

| Werkstoffgruppe Material group | Werkstoff Material | Nuten Slot milling 1,0xØ | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|-----------------------|--------------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 4.1/4.3 Aluminium <6% Si | AL 99,9 Mg 0,5 | ae mm | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | Vc m/min | 300 | 300 | 300 | 350 | 350 | 360 | 420 |
| | | n min ⁻¹ | 16.000 | 12.000 | 10.000 | 10.000 | 7.000 | 7.000 | 7.000 |
| | | fz mm | 0,035 | 0,045 | 0,055 | 0,065 | 0,080 | 0,090 | 0,120 |
| | | Vf mm/min | 1.114 | 1.074 | 1.050 | 1.810 | 1.671 | 1.719 | 2.406 |

| Werkstoffgruppe Material group | Werkstoff Material | Nuten / Slot milling Max. Schneidenlänge Max. Cutting length | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|-----------------------|--|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 4.1/4.3 Aluminium <6% Si | AL 99,9 Mg 0,5 | ae mm | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 |
| | | Vc m/min | 150 | 160 | 170 | 190 | 200 | 220 | 250 |
| | | n min ⁻¹ | 8.000 | 7.000 | 6.000 | 6.000 | 4.000 | 4.000 | 4.000 |
| | | fz mm | 0,020 | 0,025 | 0,030 | 0,035 | 0,040 | 0,050 | 0,060 |
| | | Vf mm/min | 318 | 318 | 325 | 529 | 477 | 584 | 716 |

Umfangfräsen Side milling

| Werkstoffgruppe Material group | Werkstoff Material | HSC Umfangfräsen Side milling | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|-----------------------|-------------------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 4.1/4.3 Aluminium <6% Si | AL 99,9 Mg 0,5 | ae mm | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 1,8 | 2,0 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 |
| | | Vc m/min | 900 | 900 | 950 | 100 | 1.200 | 1.300 | 1.500 |
| | | n min ⁻¹ | 48.000 | 36.000 | 31.000 | 27.000 | 34.000 | 23.000 | 24.000 |
| | | fz mm | 0,120 | 0,130 | 0,150 | 0,160 | 0,180 | 0,200 | 0,220 |
| | | Vf mm/min | 11.459 | 9.311 | 9.072 | 12.733 | 12.892 | 13.794 | 15.757 |

| Werkstoffgruppe Material group | Werkstoff Material | Umfangfräsen Side milling 0,1xØ | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|-----------------------|---------------------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 4.1/4.3 Aluminium <6% Si | AL 99,9 Mg 0,5 | ae mm | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 1,8 | 2,0 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 |
| | | Vc m/min | 600 | 600 | 600 | 700 | 720 | 750 | 950 |
| | | n min ⁻¹ | 32.000 | 24.000 | 2.000 | 19.000 | 15.000 | 14.000 | 16.000 |
| | | fz mm | 0,075 | 0,090 | 0,100 | 0,110 | 0,135 | 0,145 | 0,180 |
| | | Vf mm/min | 4.775 | 4.297 | 3.820 | 6.128 | 5.801 | 5.770 | 8.165 |

| Werkstoffgruppe Material group | Werkstoff Material | Umfangfräsen Side milling 0,5xØ | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|-----------------------|---------------------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 4.1/4.3 Aluminium <6% Si | AL 99,9 Mg 0,5 | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 |
| | | Vc m/min | 300 | 300 | 350 | 350 | 380 | 400 | 450 |
| | | n min ⁻¹ | 16.000 | 12.000 | 12.000 | 1.000 | 8.000 | 8.000 | 8.000 |
| | | fz mm | 0,040 | 0,045 | 0,060 | 0,070 | 0,100 | 0,110 | 0,150 |
| | | Vf mm/min | 1.273 | 1.074 | 1.337 | 1.950 | 2.268 | 2.334 | 3.223 |

| Werkstoffgruppe Material group | Werkstoff Material | Umfangfräsen Side milling Max. Schneidenlänge Max. Cutting length | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|-----------------------|--|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 4.1/4.3 Aluminium <6% Si | AL 99,9 Mg 0,5 | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 |
| | | ap mm | 16,0 | 22,0 | 25,0 | 28,0 | 36,0 | 36,0 | 40,0 |
| | | Vc m/min | 200 | 220 | 230 | 240 | 250 | 275 | 300 |
| | | n min ⁻¹ | 11.000 | 9.000 | 8.000 | 7.000 | 5.000 | 5.000 | 5.000 |
| | | fz mm | 0,030 | 0,035 | 0,040 | 0,045 | 0,050 | 0,060 | 0,080 |
| | | Vf mm/min | 637 | 613 | 586 | 859 | 746 | 875 | 1.146 |

Schnittdaten für Vollhartmetall „Alu-Kunststoff-Holz“ HSC-Fräser
Recommended cutting data for „alu-plastic-wood“ solid carbide HSC end mills

30 6232

| Nuten Slot milling | | | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|------------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Werkstoffgruppe Material group | Werkstoff Material | HSC Nuten Slot milling | | | | | | | |
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 1,5 | 2,0 | 2,5 | 3,0 | 4,0 | 4,5 | 5,0 |
| | | Vc m/min | 600 | 630 | 660 | 660 | 700 | 700 | 750 |
| | | n min ⁻¹ | 32.000 | 26.000 | 22.000 | 18.000 | 14.000 | 13.000 | 12.000 |
| | | fz mm | 0,100 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 | 0,250 |
| | | Vf mm/min | 6.366 | 6.016 | 6.303 | 9.454 | 8.356 | 8.170 | 8.953 |

| Nuten Slot milling 0,5xØ | | | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|------------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Werkstoffgruppe Material group | Werkstoff Material | HSC Nuten Slot milling | | | | | | | |
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 |
| | | Vc m/min | 450 | 460 | 470 | 790 | 520 | 520 | 550 |
| | | n min ⁻¹ | 24.000 | 19.000 | 15.000 | 13.000 | 11.000 | 10.000 | 9.000 |
| | | fz mm | 0,060 | 0,070 | 0,080 | 0,100 | 0,120 | 0,120 | 0,160 |
| | | Vf mm/min | 2.865 | 2.562 | 2.394 | 3.899 | 3.724 | 3.311 | 4.202 |

| Nuten Slot milling 1,0xØ | | | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|------------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Werkstoffgruppe Material group | Werkstoff Material | HSC Nuten Slot milling | | | | | | | |
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | Vc m/min | 300 | 310 | 320 | 340 | 360 | 360 | 400 |
| | | n min ⁻¹ | 16.000 | 13.000 | 11.000 | 10.000 | 8.000 | 7.000 | 7.000 |
| | | fz mm | 0,036 | 0,045 | 0,055 | 0,080 | 0,100 | 0,120 | 0,150 |
| | | Vf mm/min | 1.146 | 1.110 | 1.120 | 2.165 | 2.149 | 2.292 | 2.865 |

| Nuten / Slot milling Max. Schneidenlänge Max. Cutting length | | | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|--|--|-----------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Werkstoffgruppe Material group | Werkstoff Material | HSC Nuten / Slot milling | | | | | | | |
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 |
| | | Vc m/min | 150 | 160 | 170 | 190 | 200 | 220 | 250 |
| | | n min ⁻¹ | 8.000 | 7.000 | 6.000 | 6.000 | 4.000 | 4.000 | 4.000 |
| | | fz mm | 0,020 | 0,025 | 0,030 | 0,035 | 0,040 | 0,050 | 0,060 |
| | | Vf mm/min | 318 | 318 | 325 | 529 | 477 | 584 | 716 |

Umfangfräsen
Side milling

| HSC Umfangfräsen Side milling | | | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-------------------------------------|--|---------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Werkstoffgruppe Material group | Werkstoff Material | HSC Umfangfräsen | | | | | | | |
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 1,8 | 2,0 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 |
| | | Vc m/min | 800 | 820 | 850 | 850 | 900 | 900 | 1.000 |
| | | n min ⁻¹ | 43.000 | 33.000 | 28.000 | 23.000 | 18.000 | 16.000 | 16.000 |
| | | fz mm | 0,120 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 | 0,280 |
| | | Vf mm/min | 10.186 | 7.831 | 8.117 | 12.176 | 10.743 | 10.505 | 13.369 |

| Umfangfräsen Side milling 0,1xØ | | | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|---------------------------------------|--|---------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Werkstoffgruppe Material group | Werkstoff Material | HSC Umfangfräsen | | | | | | | |
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 1,8 | 2,0 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 |
| | | Vc m/min | 450 | 460 | 470 | 490 | 520 | 520 | 550 |
| | | n min ⁻¹ | 24.000 | 19.000 | 15.000 | 13.000 | 11.000 | 10.000 | 9.000 |
| | | fz mm | 0,120 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 | 0,280 |
| | | Vf mm/min | 5.730 | 4.393 | 4.488 | 7.019 | 6.207 | 6.069 | 7.353 |

| Umfangfräsen Side milling 0,5xØ | | | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|---------------------------------------|--|---------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Werkstoffgruppe Material group | Werkstoff Material | HSC Umfangfräsen | | | | | | | |
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 |
| | | Vc m/min | 310 | 320 | 330 | 350 | 370 | 370 | 410 |
| | | n min ⁻¹ | 17.000 | 13.000 | 11.000 | 10.000 | 8.000 | 7.000 | 7.000 |
| | | fz mm | 0,040 | 0,050 | 0,060 | 0,085 | 0,110 | 0,130 | 0,165 |
| | | Vf mm/min | 1.316 | 1.273 | 1.261 | 2.367 | 2.429 | 2.552 | 3.230 |

| Umfangfräsen Side milling Max. Schneidenlänge Max. Cutting length | | | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|--|--|---------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Werkstoffgruppe Material group | Werkstoff Material | HSC Umfangfräsen | | | | | | | |
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 |
| | | ap mm | 16,0 | 22,0 | 25,0 | 28,0 | 36,0 | 36,0 | 40,0 |
| | | Vc m/min | 170 | 190 | 215 | 230 | 240 | 265 | 280 |
| | | n min ⁻¹ | 10.000 | 8.000 | 7.000 | 7.000 | 5.000 | 5.000 | 5.000 |
| | | fz mm | 0,030 | 0,035 | 0,040 | 0,045 | 0,050 | 0,060 | 0,080 |
| | | Vf mm/min | 541 | 529 | 548 | 824 | 716 | 844 | 1.070 |



Nuten Slot milling

| Werkstoffgruppe Material group | Werkstoff Material | HSC Nuten Slot milling | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|------------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.2 Duroplaste/ Preßstoffe | MF/ Pertinax/ Resopal/ Polysulfen | ae mm | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 1,5 | 2,0 | 2,5 | 3,0 | 4,0 | 4,5 | 5,0 |
| | | Vc m/min | 650 | 675 | 700 | 750 | 800 | 900 | 1.000 |
| | | n min ⁻¹ | 35.000 | 27.000 | 23.000 | 20.000 | 16.000 | 16.000 | 16.000 |
| | | fz mm | 0,100 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 | 0,250 |
| | | Vf mm/min | 6.897 | 6.446 | 6.685 | 10.743 | 9.950 | 10.505 | 11.937 |

| Werkstoffgruppe Material group | Werkstoff Material | Nuten Slot milling 0,5xØ | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|--------------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.2 Duroplaste/ Preßstoffe | MF/ Pertinax/ Resopal/ Polysulfen | ae mm | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 |
| | | Vc m/min | 450 | 460 | 470 | 490 | 520 | 520 | 550 |
| | | n min ⁻¹ | 24.000 | 19.000 | 15.000 | 13.000 | 11.000 | 10.000 | 9.000 |
| | | fz mm | 0,100 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 | 0,250 |
| | | Vf mm/min | 4.775 | 4.393 | 4.488 | 7.019 | 6.207 | 6.069 | 6.565 |

| Werkstoffgruppe Material group | Werkstoff Material | Nuten Slot milling 1,0xØ | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|--------------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.2 Duroplaste/ Preßstoffe | MF/ Pertinax/ Resopal/ Polysulfen | ae mm | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 |
| | | Vc m/min | 400 | 400 | 420 | 420 | 420 | 450 | 500 |
| | | n min ⁻¹ | 22.000 | 16.000 | 14.000 | 12.000 | 9.000 | 8.000 | 8.000 |
| | | fz mm | 0,050 | 0,065 | 0,090 | 0,120 | 0,150 | 0,150 | 0,200 |
| | | Vf mm/min | 2.122 | 2.069 | 2.406 | 4.011 | 3.760 | 3.581 | 4.775 |

| Werkstoffgruppe Material group | Werkstoff Material | Nuten / Slot milling Max. Schneidenlänge Max. Cutting length | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|--|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.2 Duroplaste/ Preßstoffe | MF/ Pertinax/ Resopal/ Polysulfen | ae mm | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 |
| | | Vc m/min | 170 | 190 | 215 | 230 | 240 | 265 | 280 |
| | | n min ⁻¹ | 10.000 | 8.000 | 7.000 | 7.000 | 5.000 | 5.000 | 5.000 |
| | | fz mm | 0,030 | 0,035 | 0,040 | 0,045 | 0,050 | 0,060 | 0,080 |
| | | Vf mm/min | 541 | 529 | 548 | 824 | 716 | 844 | 1.070 |

Umfangfräsen Side milling

| Werkstoffgruppe Material group | Werkstoff Material | HSC Umfangfräsen Side milling | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|-------------------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.2 Duroplaste/ Preßstoffe | MF/ Pertinax/ Resopal/ Polysulfen | ae mm | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 1,8 | 2,0 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 | 62,0 | 36,0 | 40,0 |
| | | Vc m/min | 650 | 675 | 700 | 750 | 800 | 900 | 1.000 |
| | | n min ⁻¹ | 35.000 | 27.000 | 23.000 | 20.000 | 16.000 | 16.000 | 16.000 |
| | | fz mm | 0,120 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 | 0,280 |
| | | Vf mm/min | 8.276 | 6.446 | 6.685 | 10.743 | 9.550 | 10.505 | 13.369 |

| Werkstoffgruppe Material group | Werkstoff Material | Umfangfräsen Side milling 0,1xØ | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|---------------------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.2 Duroplaste/ Preßstoffe | MF/ Pertinax/ Resopal/ Polysulfen | ae mm | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 1,8 | 2,0 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 | 62,0 | 36,0 | 40,0 |
| | | Vc m/min | 450 | 470 | 510 | 540 | 570 | 600 | 630 |
| | | n min ⁻¹ | 24.000 | 19.000 | 17.000 | 15.000 | 12.000 | 11.000 | 11.000 |
| | | fz mm | 0,120 | 0,120 | 0,150 | 0,180 | 0,200 | 0,220 | 0,280 |
| | | Vf mm/min | 5.730 | 4.488 | 4.870 | 7.735 | 6.804 | 7.003 | 8.423 |

| Werkstoffgruppe Material group | Werkstoff Material | Umfangfräsen Side milling 0,5xØ | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|---------------------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.2 Duroplaste/ Preßstoffe | MF/ Pertinax/ Resopal/ Polysulfen | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 32,0 | 40,0 |
| | | Vc m/min | 200 | 225 | 250 | 265 | 290 | 310 | 335 |
| | | n min ⁻¹ | 11.000 | 9.000 | 8.000 | 8.000 | 6.000 | 6.000 | 6.000 |
| | | fz mm | 0,060 | 0,070 | 0,080 | 0,100 | 0,120 | 0,120 | 0,160 |
| | | Vf mm/min | 1.273 | 1.253 | 1.273 | 2.109 | 2.077 | 1.974 | 2.559 |

| Werkstoffgruppe Material group | Werkstoff Material | Umfangfräsen Side milling Max. Schneidenlänge Max. Cutting length | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|--|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.2 Duroplaste/ Preßstoffe | MF/ Pertinax/ Resopal/ Polysulfen | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 |
| | | ap mm | 16,0 | 22,0 | 25,0 | 28,0 | 36,0 | 36,0 | 41,0 |
| | | Vc m/min | 200 | 220 | 230 | 250 | 270 | 300 | 320 |
| | | n min ⁻¹ | 11.000 | 9.000 | 8.000 | 7.000 | 6.000 | 6.000 | 6.000 |
| | | fz mm | 0,050 | 0,065 | 0,080 | 0,100 | 0,120 | 0,120 | 1,150 |
| | | Vf mm/min | 1.061 | 1.138 | 1.171 | 1.989 | 1.934 | 1.910 | 2.292 |

Schnittdaten für Vollhartmetall „Alu-Kunststoff-Holz“ HSC-Fräser
Recommended cutting data for „alu-plastic-wood“ solid carbide HSC end mills

30 6233

30 6234

**Nuten
Slot milling**

| Werkstoffgruppe Material group | Werkstoff Material | HSC Nuten Slot milling | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 | |
|-----------------------------------|-----------------------|------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------|
| 4.1/4.3 Aluminium <6% Si | AL 99,9 Mg 0,5 | ae mm | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 | |
| | | ap mm | 1,0 | 1,2 | 1,5 | 2,0 | 2,5 | 3,0 | 4,0 | 4,5 | 5,0 | |
| | | Vc m/min | 800 | 850 | 880 | 900 | 900 | 950 | 950 | 950 | 1.000 | 1.000 |
| | | n min ⁻¹ | 64.000 | 55.000 | 47.000 | 36.000 | 29.000 | 26.000 | 19.000 | 17.000 | 16.000 | 16.000 |
| | | fz mm | 0,048 | 0,060 | 0,072 | 0,084 | 0,100 | 0,072 | 0,084 | 0,090 | 0,100 | 0,100 |
| | | Vf mm/min | 6.112 | 6.494 | 6.723 | 6.016 | 5.730 | 5.443 | 4.763 | 4.536 | 4.775 | 4.775 |

| Werkstoffgruppe Material group | Werkstoff Material | Nuten Slot milling 0,5xØ | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 | |
|-----------------------------------|-----------------------|--------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------|
| 4.1/4.3 Aluminium <6% Si | AL 99,9 Mg 0,5 | ae mm | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 | |
| | | ap mm | 2,0 | 2,5 | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 | |
| | | Vc m/min | 450 | 460 | 480 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| | | n min ⁻¹ | 36.000 | 30.000 | 26.000 | 20.000 | 16.000 | 14.000 | 10.000 | 10.000 | 9.000 | 8.000 |
| | | fz mm | 0,030 | 0,035 | 0,045 | 0,060 | 0,072 | 0,060 | 0,072 | 0,080 | 0,080 | 0,090 |
| | | Vf mm/min | 2.149 | 2.050 | 2.292 | 2.387 | 2.292 | 2.387 | 2.149 | 2.122 | 2.149 | 2.149 |

| Werkstoffgruppe Material group | Werkstoff Material | Nuten Slot milling 1,0xØ | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 | |
|-----------------------------------|-----------------------|--------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------|
| 4.1/4.3 Aluminium <6% Si | AL 99,9 Mg 0,5 | ae mm | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 | |
| | | ap mm | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 | |
| | | Vc m/min | 300 | 310 | 330 | 350 | 370 | 400 | 400 | 400 | 400 | 400 |
| | | n min ⁻¹ | 24.000 | 20.000 | 18.000 | 14.000 | 12.000 | 11.000 | 8.000 | 8.000 | 8.000 | 7.000 |
| | | fz mm | 0,025 | 0,030 | 0,035 | 0,042 | 0,048 | 0,040 | 0,050 | 0,055 | 0,060 | 0,060 |
| | | Vf mm/min | 1.194 | 1.184 | 1.226 | 1.170 | 1.131 | 1.273 | 1.194 | 1.167 | 1.146 | 1.146 |

**Umfangfräsen
Side milling**

| Werkstoffgruppe Material group | HSC Umfangfräsen Side milling | HSC Walzen | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 | |
|-----------------------------------|-------------------------------------|---------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------|
| 4.1/4.3 Aluminium <6% Si | AL 99,9 Mg 0,5 | ae mm | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 | |
| | | ap mm | 8,0 | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 | |
| | | Vc m/min | 850 | 880 | 900 | 900 | 950 | 1.000 | 1.050 | 1.100 | 1.200 | 1.200 |
| | | n min ⁻¹ | 68.000 | 57.000 | 48.000 | 36.000 | 31.000 | 27.000 | 21.000 | 20.000 | 20.000 | 20.000 |
| | | fz mm | 0,076 | 0,095 | 0,120 | 0,150 | 0,070 | 0,139 | 0,156 | 0,173 | 0,200 | 0,200 |
| | | Vf mm/min | 10.282 | 10.645 | 11.459 | 10.743 | 10.282 | 11.062 | 9.776 | 10.096 | 11.459 | 11.459 |

| Werkstoffgruppe Material group | Werkstoff Material | Umfangfräsen Side milling 0,3xØ | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 | |
|-----------------------------------|-----------------------|---------------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--------|
| 4.1/4.3 Aluminium <6% Si | AL 99,9 Mg 0,5 | ae mm | 1,2 | 1,5 | 1,8 | 2,4 | 3,0 | 3,6 | 4,8 | 5,4 | 6,0 | |
| | | ap mm | 8,0 | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 | |
| | | Vc m/min | 500 | 520 | 550 | 600 | 600 | 650 | 650 | 650 | 650 | 650 |
| | | n min ⁻¹ | 40.000 | 34.000 | 30.000 | 24.000 | 20.000 | 18.000 | 13.000 | 12.000 | 11.000 | 11.000 |
| | | fz mm | 0,044 | 0,055 | 0,066 | 0,072 | 0,090 | 0,080 | 0,090 | 0,100 | 0,120 | 0,120 |
| | | Vf mm/min | 3.502 | 3.642 | 3.852 | 3.438 | 3.438 | 4.138 | 3.492 | 3.448 | 3.724 | 3.724 |

| Werkstoffgruppe Material group | Werkstoff Material | Umfangfräsen Side milling 0,5xØ | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 | |
|-----------------------------------|-----------------------|---------------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------|
| 4.1/4.3 Aluminium <6% Si | AL 99,9 Mg 0,5 | ae mm | 2,0 | 42,5 | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 | |
| | | ap mm | 8,0 | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 | |
| | | Vc m/min | 320 | 330 | 350 | 400 | 400 | 420 | 450 | 450 | 450 | 450 |
| | | n min ⁻¹ | 26.000 | 22.000 | 19.000 | 16.000 | 13.000 | 12.000 | 9.000 | 8.000 | 8.000 | 8.000 |
| | | fz mm | 0,028 | 0,032 | 0,040 | 0,046 | 0,050 | 0,040 | 0,050 | 0,060 | 0,070 | 0,070 |
| | | Vf mm/min | 1.426 | 1.345 | 1.485 | 1.464 | 1.273 | 1.337 | 1.343 | 1.432 | 1.504 | 1.504 |

1



2



3



4



5



6



7



8



9



Index

Nuten Slot milling

| Werkstoffgruppe Material group | Werkstoff Material | HSC Nuten Slot milling | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 1,0 | 1,2 | 1,5 | 2,0 | 2,5 | 3,0 | 4,0 | 4,5 | 5,0 |
| | | Vc m/min | 450 | 470 | 785 | 500 | 520 | 540 | 570 | 570 | 590 |
| | | n min ⁻¹ | 38.000 | 31.000 | 26.000 | 20.000 | 17.000 | 15.000 | 12.000 | 11.000 | 10.000 |
| | | fz mm | 0,070 | 0,084 | 0,116 | 0,140 | 0,160 | 0,180 | 0,200 | 0,200 | 0,250 |
| | | Vf mm/min | 5.014 | 5.027 | 5.970 | 5.571 | 5.297 | 7.735 | 6.804 | 6.048 | 7.043 |

| Werkstoffgruppe Material group | Werkstoff Material | Nuten Slot milling 0,5xØ | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|--------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 2,0 | 2,5 | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 |
| | | Vc m/min | 450 | 470 | 485 | 500 | 520 | 540 | 570 | 570 | 590 |
| | | n min ⁻¹ | 36.000 | 30.000 | 26.000 | 20.000 | 17.000 | 15.000 | 12.000 | 11.000 | 10.000 |
| | | fz mm | 0,050 | 0,059 | 0,082 | 0,100 | 0,118 | 0,140 | 0,160 | 0,160 | 0,200 |
| | | Vf mm/min | 3.581 | 3.531 | 4.220 | 3.979 | 3.906 | 6.016 | 5.443 | 4.838 | 5.634 |

| Werkstoffgruppe Material group | Werkstoff Material | Nuten Slot milling 1,0xØ | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|--------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | Vc m/min | 450 | 470 | 785 | 500 | 520 | 540 | 540 | 550 | 550 |
| | | n min ⁻¹ | 36.000 | 30.000 | 26.000 | 20.000 | 17.000 | 15.000 | 11.000 | 10.000 | 9.000 |
| | | fz mm | 0,035 | 0,042 | 0,058 | 0,070 | 0,084 | 0,100 | 0,130 | 0,140 | 0,160 |
| | | Vf mm/min | 2.507 | 2.513 | 2.985 | 2.785 | 2.781 | 4.297 | 4.190 | 4.085 | 4.202 |

| Werkstoffgruppe Material group | Werkstoff Material | Nuten / Slot milling Max. Schneidlänge Max. Cutting length | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|--|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 8,0 | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 |
| | | Vc m/min | 200 | 200 | 210 | 230 | 250 | 265 | 290 | 310 | 335 |
| | | n min ⁻¹ | 16.000 | 13.000 | 12.000 | 10.000 | 8.000 | 8.000 | 6.000 | 6.000 | 6.000 |
| | | fz mm | 0,025 | 0,030 | 0,038 | 0,046 | 0,052 | 0,045 | 0,055 | 0,060 | 0,070 |
| | | Vf mm/min | 796 | 764 | 847 | 842 | 828 | 949 | 952 | 987 | 1.120 |

Umfangfräsen Side milling

| Werkstoffgruppe Material group | Werkstoff Material | HSC Umfangfräsen Side milling | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|-------------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 0,4 | 0,5 | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 1,8 | 2,0 |
| | | ap mm | 8,0 | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 |
| | | Vc m/min | 465 | 475 | 490 | 500 | 530 | 560 | 600 | 600 | 620 |
| | | n min ⁻¹ | 38.000 | 31.000 | 26.000 | 20.000 | 17.000 | 15.000 | 12.000 | 11.000 | 10.000 |
| | | fz mm | 0,110 | 0,132 | 0,180 | 0,210 | 0,240 | 0,180 | 0,240 | 0,250 | 0,300 |
| | | Vf mm/min | 8.141 | 7.983 | 9.359 | 8.356 | 8.089 | 8.022 | 8.595 | 7.958 | 8.881 |

| Werkstoffgruppe Material group | Werkstoff Material | Umfangfräsen Side milling 0,3xØ | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|---------------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 1,2 | 1,5 | 1,8 | 2,4 | 3,0 | 3,6 | 4,8 | 5,4 | 6,0 |
| | | ap mm | 8,0 | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 |
| | | Vc m/min | 465 | 475 | 490 | 500 | 530 | 560 | 600 | 600 | 620 |
| | | n min ⁻¹ | 38.000 | 31.000 | 26.000 | 20.000 | 17.000 | 15.000 | 12.000 | 11.000 | 10.000 |
| | | fz mm | 0,070 | 0,084 | 0,116 | 0,140 | 0,160 | 0,180 | 0,200 | 0,200 | 0,250 |
| | | Vf mm/min | 5.181 | 5.080 | 6.031 | 5.571 | 5.399 | 8.022 | 7.162 | 6.366 | 7.401 |

| Werkstoffgruppe Material group | Werkstoff Material | Umfangfräsen Side milling 0,5xØ | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|---------------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 2,0 | 2,5 | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 |
| | | ap mm | 8,0 | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 32,0 | 40,0 |
| | | Vc m/min | 465 | 475 | 490 | 500 | 530 | 540 | 550 | 550 | 560 |
| | | n min ⁻¹ | 38.000 | 31.000 | 26.000 | 20.000 | 17.000 | 15.000 | 11.000 | 10.000 | 9.000 |
| | | fz mm | 0,050 | 0,066 | 0,088 | 0,110 | 0,130 | 0,120 | 0,160 | 0,160 | 0,200 |
| | | Vf mm/min | 3.700 | 3.992 | 4.575 | 4.377 | 4.386 | 5.157 | 5.252 | 4.669 | 5.348 |

| Werkstoffgruppe Material group | Werkstoff Material | Umfangfräsen Side milling Max. Schneidlänge Max. Cutting length | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|--|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.1 Thermoplaste | ABS/ EP/ PA/ PC/ PMMA/ Polyamid | ae mm | 2,0 | 2,5 | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 |
| | | ap mm | 11,0 | 13,0 | 16,0 | 22,0 | 25,0 | 28,0 | 36,0 | 36,0 | 41,0 |
| | | Vc m/min | 300 | 310 | 330 | 350 | 370 | 400 | 400 | 420 | 450 |
| | | n min ⁻¹ | 24.000 | 20.000 | 18.000 | 14.000 | 12.000 | 11.000 | 8.000 | 8.000 | 8.000 |
| | | fz mm | 0,040 | 0,048 | 0,056 | 0,062 | 0,070 | 0,063 | 0,072 | 0,075 | 0,088 |
| | | Vf mm/min | 1.910 | 1.895 | 1.961 | 1.727 | 1.649 | 2.005 | 1.719 | 1.671 | 1.716 |

Schnittdaten für Vollhartmetall „Alu-Kunststoff-Holz“ HSC-Fräser
Recommended cutting data for „alu-plastic-wood“ solid carbide HSC end mills

30 6233

30 6234

| Nuten Slot milling | | HSC Nuten Slot milling | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.2 Duroplaste/ Preißstoffe | MF/ Pertinax/ Resopal/ Polysulfon | ae mm | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 1,0 | 1,2 | 1,5 | 2,0 | 2,5 | 3,0 | 4,0 | 4,5 | 5,0 |
| | | Vc m/min | 450 | 470 | 785 | 500 | 520 | 540 | 570 | 570 | 590 |
| | | n min ⁻¹ | 36.000 | 30.000 | 26.000 | 20.000 | 17.000 | 15.000 | 12.000 | 11.000 | 10.000 |
| | | fz mm | 0,064 | 0,080 | 0,096 | 0,116 | 0,125 | 0,140 | 0,160 | 0,180 | 0,200 |
| | | Vf mm/min | 4.584 | 4.788 | 4.940 | 4.616 | 4.138 | 6.016 | 5.443 | 5.443 | 5.634 |

| Nuten Slot milling | | HSC Nuten Slot milling | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.2 Duroplaste/ Preißstoffe | MF/ Pertinax/ Resopal/ Polysulfon | ae mm | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 2,0 | 2,5 | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 |
| | | Vc m/min | 450 | 470 | 485 | 500 | 520 | 540 | 570 | 570 | 590 |
| | | n min ⁻¹ | 36.000 | 30.000 | 26.000 | 20.000 | 17.000 | 15.000 | 12.000 | 11.000 | 10.000 |
| | | fz mm | 0,045 | 0,056 | 0,068 | 0,084 | 0,106 | 0,120 | 0,140 | 0,145 | 0,160 |
| | | Vf mm/min | 3.223 | 3.351 | 3.499 | 3.342 | 3.509 | 5.157 | 4.763 | 4.385 | 4.507 |

| Nuten Slot milling | | HSC Nuten Slot milling | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.2 Duroplaste/ Preißstoffe | MF/ Pertinax/ Resopal/ Polysulfon | ae mm | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | ap mm | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 18,0 | 20,0 |
| | | Vc m/min | 450 | 470 | 485 | 500 | 520 | 540 | 540 | 550 | 550 |
| | | n min ⁻¹ | 36.000 | 30.000 | 26.000 | 20.000 | 14.000 | 15.000 | 15.000 | 11.000 | 10.000 |
| | | fz mm | 0,032 | 0,040 | 0,048 | 0,060 | 0,075 | 0,085 | 0,072 | 0,084 | 0,096 |
| | | Vf mm/min | 2.292 | 2.394 | 2.470 | 2.387 | 2.483 | 3.653 | 2.321 | 1.451 | 2.521 |

Umfangfräsen
Side milling

| Umfangfräsen Side milling | | HSC Umfangfräsen Side milling | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|-------------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.2 Duroplaste/ Preißstoffe | MF/ Pertinax/ Resopal/ Polysulfon | ae mm | 0,4 | 0,5 | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 1,8 | 2,0 |
| | | ap mm | 8,0 | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 36,0 | 40,0 |
| | | Vc m/min | 465 | 475 | 490 | 500 | 530 | 560 | 600 | 600 | 620 |
| | | n min ⁻¹ | 38.000 | 31.000 | 26.000 | 20.000 | 17.000 | 15.000 | 12.000 | 11.000 | 10.000 |
| | | fz mm | 0,095 | 0,110 | 0,132 | 0,168 | 0,210 | 0,180 | 0,210 | 0,225 | 0,250 |
| | | Vf mm/min | 7.031 | 6.653 | 6.863 | 6.685 | 7.086 | 8.022 | 7.520 | 7.162 | 7.401 |

| Umfangfräsen Side milling | | HSC Umfangfräsen Side milling | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|-------------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.2 Duroplaste/ Preißstoffe | MF/ Pertinax/ Resopal/ Polysulfon | ae mm | 1,2 | 1,5 | 1,8 | 2,4 | 3,0 | 3,6 | 4,8 | 5,4 | 6,0 |
| | | ap mm | 8,0 | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 32,0 | 40,0 |
| | | Vc m/min | 465 | 475 | 490 | 500 | 530 | 540 | 550 | 550 | 560 |
| | | n min ⁻¹ | 38.000 | 31.000 | 26.000 | 20.000 | 17.000 | 15.000 | 12.000 | 11.000 | 10.000 |
| | | fz mm | 0,065 | 0,078 | 0,088 | 0,100 | 0,120 | 0,132 | 0,156 | 0,182 | 0,208 |
| | | Vf mm/min | 4.811 | 4.717 | 4.575 | 3.979 | 4.049 | 5.883 | 5.587 | 5.793 | 6.158 |

| Umfangfräsen Side milling | | HSC Umfangfräsen Side milling | Ø 4,0 l3 = 20 Z2 | Ø 5,0 l3 = 20 Z2 | Ø 6,0 l3 = 21 Z2 | Ø 8,0 l3 = 27 Z2 | Ø 10,0 l3 = 32 Z2 | Ø 12,0 l3 = 38 Z3 | Ø 16,0 l3 = 44 Z3 | Ø 18,0 l3 = 44 Z3 | Ø 20,0 l3 = 54 Z3 |
|-----------------------------------|--|-------------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 8.2 Duroplaste/ Preißstoffe | MF/ Pertinax/ Resopal/ Polysulfon | ae mm | 2,0 | 2,5 | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 9,0 | 10,0 |
| | | ap mm | 8,0 | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 | 32,0 | 32,0 | 40,0 |
| | | Vc m/min | 465 | 475 | 490 | 500 | 530 | 540 | 550 | 550 | 560 |
| | | n min ⁻¹ | 38.000 | 31.000 | 26.000 | 20.000 | 17.000 | 15.000 | 11.000 | 10.000 | 9.000 |
| | | fz mm | 0,048 | 0,061 | 0,068 | 0,077 | 0,093 | 0,105 | 0,120 | 0,140 | 0,160 |
| | | Vf mm/min | 3.552 | 3.689 | 3.535 | 3.064 | 6.138 | 4.512 | 3.939 | 4.085 | 4.278 |

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30 6222

Richtwerte für den Einsatz von Vollhartmetall Schruppfräser für Alu
Recommended cutting data for solid carbide roughing end mills

| Werkstoffgruppe Material group | Werkstoff Material | | d1 = 5,0 mm | d1 = 6,0 mm | d1 = 8,0 mm | d1 = 10,0 mm | d1 = 12,0 mm |
|-----------------------------------|--|----------|-------------|-------------|-------------|--------------|--------------|
| 9.1-9.2 | 3.0255-3.3315-3.3535-3.0615-3.1645 Aluminium / aluminum | ae mm | 0,25 | 0,3 | 0,4 | 0,5 | 0,6 |
| | | ap mm | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 |
| | | Vc m/min | 350-550 | 350-550 | 350-550 | 350-550 | 350-550 |
| | | fz mm | 0,035 | 0,040 | 0,040 | 0,050 | 0,050 |
| 9.3-9.5 | 3.1841-3.2161-3.2373-3.3241-3.5812 Aluminium / aluminum | ae mm | 0,25 | 0,3 | 0,4 | 0,5 | 0,6 |
| | | ap mm | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 |
| | | Vc m/min | 200-500 | 200-500 | 200-500 | 200-500 | 200-500 |
| | | fz mm | 0,035 | 0,040 | 0,040 | 0,050 | 0,050 |
| 10.1-10.2 | 2.0290-2.0401-2.1096-2.0220-2.0240-2.0280-2.0380-2.0596 Kupfer / copper | ae mm | 0,25 | 0,3 | 0,4 | 0,5 | 0,6 |
| | | ap mm | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 |
| | | Vc m/min | 90-180 | 90-180 | 90-180 | 90-180 | 90-180 |
| | | fz mm | 0,035 | 0,040 | 0,040 | 0,050 | 0,050 |
| 10.3 | 2.0082-2.0872-2.0936-2.1086 Kupfer / copper | ae mm | 0,25 | 0,3 | 0,4 | 0,5 | 0,6 |
| | | ap mm | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 |
| | | Vc m/min | 90-150 | 90-150 | 90-150 | 90-150 | 90-150 |
| | | fz mm | 0,035 | 0,040 | 0,040 | 0,050 | 0,050 |
| 10.1-10.3 | Messing / brass | ae mm | 0,25 | 0,3 | 0,4 | 0,5 | 0,6 |
| | | ap mm | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 |
| | | Vc m/min | 100-250 | 100-250 | 100-250 | 100-250 | 100-250 |
| | | fz mm | 0,035 | 0,040 | 0,040 | 0,050 | 0,050 |
| 10.3 | Bronze / bronze | ae mm | 0,25 | 0,3 | 0,4 | 0,5 | 0,6 |
| | | ap mm | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 |
| | | Vc m/min | 90-150 | 90-150 | 90-150 | 90-150 | 90-150 |
| | | fz mm | 0,035 | 0,040 | 0,040 | 0,050 | 0,050 |
| | Ampco / ampco | ae mm | 0,25 | 0,3 | 0,4 | 0,5 | 0,6 |
| | | ap mm | 10,0 | 12,0 | 16,0 | 20,0 | 24,0 |
| | | Vc m/min | 40-80 | 40-80 | 40-80 | 40-80 | 40-80 |
| | | fz mm | 0,035 | 0,040 | 0,040 | 0,050 | 0,050 |

30 6223

Richtwerte für den Einsatz von Vollhartmetall-HPC Schaftfräser für Alu
Recommended cutting data for solid carbide HPC End mills for Aluminum

| Werkstoffgruppe Material group | Werkstoff Material | | d1 = 3,0 mm | d1 = 4,0 mm | d1 = 5,0 mm | d1 = 6,0 mm | d1 = 8,0 mm | d1 = 10,0 mm | d1 = 12,0 mm |
|-----------------------------------|--|----------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|
| 9.1-9.2 | 3.0255-3.3315-3.3535-3.0615-3.1645 Aluminium / aluminum | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 |
| | | ap mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 |
| | | Vc m/min | 650 | 650 | 650 | 650 | 650 | 650 | 650 |
| | | fz mm | 0,035 | 0,035 | 0,055 | 0,060 | 0,060 | 0,070 | 0,070 |
| 9.3-9.5 | 3.1841-3.2161-3.2373-3.3241-3.5812 Aluminium / aluminum | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 |
| | | ap mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 |
| | | Vc m/min | 400 | 400 | 400 | 400 | 400 | 400 | 400 |
| | | fz mm | 0,030 | 0,030 | 0,045 | 0,050 | 0,050 | 0,070 | 0,070 |
| 10.1-10.2 | 2.0290-2.0401-2.1096-2.0220-2.0240-2.0280-2.0380-2.0596 Kupfer / copper | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 |
| | | ap mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 |
| | | Vc m/min | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| | | fz mm | 0,020 | 0,020 | 0,040 | 0,040 | 0,040 | 0,060 | 0,060 |
| 10.3 | 2.0082-2.0872-2.0936-2.1086 Kupfer / copper | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 |
| | | ap mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 |
| | | Vc m/min | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| | | fz mm | 0,020 | 0,020 | 0,040 | 0,040 | 0,040 | 0,060 | 0,060 |
| 10.1-10.3 | Messing / brass | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 |
| | | ap mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 |
| | | Vc m/min | 200 | 200 | 200 | 200 | 200 | 200 | 200 |
| | | fz mm | 0,020 | 0,020 | 0,035 | 0,040 | 0,040 | 0,060 | 0,060 |
| 10.3 | Bronze / bronze | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 |
| | | ap mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 |
| | | Vc m/min | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| | | fz mm | 0,020 | 0,020 | 0,035 | 0,040 | 0,040 | 0,060 | 0,060 |
| | Ampco / ampco | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 |
| | | ap mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 |
| | | Vc m/min | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| | | fz mm | 0,020 | 0,020 | 0,035 | 0,040 | 0,040 | 0,060 | 0,060 |

30 6224

Richtwerte für den Einsatz von Vollhartmetall Schaftfräser – Superfinish Alu
Recommended cutting data for solid carbide end mills – Superfinish – Aluminum

| Werkstoffgruppe Material group | Werkstoff Material | | d1 = 6,0 mm | d1 = 8,0 mm | d1 = 10,0 mm | d1 = 12,0 mm |
|-----------------------------------|--|----------|-------------|-------------|--------------|--------------|
| 9.1-9.2 | 3.0255-3.3315-3.3535-3.0615-3.1645 Aluminium / aluminum | ae mm | 0,3 | 0,4 | 0,5 | 0,6 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 |
| | | Vc m/min | 380 | 380 | 380 | 380 |
| | | fz mm | 0,040 | 0,050 | 0,050 | 0,060 |
| 9.3-9.5 | 3.1841-3.2161-3.2373-3.3241-3.5812 Aluminium / aluminum | ae mm | 0,4 | 0,5 | 0,5 | 0,6 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 |
| | | Vc m/min | 250 | 250 | 250 | 250 |
| | | fz mm | 0,020 | 0,025 | 0,030 | 0,050 |
| 10.1-10.2 | 2.0290-2.0401-2.1096-2.0220-2.0240-2.0280-2.0380-2.0596 Kupfer / copper | ae mm | 0,3 | 0,4 | 0,5 | 0,6 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 |
| | | Vc m/min | 100 | 100 | 100 | 100 |
| | | fz mm | 0,020 | 0,030 | 0,030 | 0,050 |
| 10.3 | 2.0082-2.0872-2.0936-2.1086 Kupfer / copper | ae mm | 0,3 | 0,4 | 0,5 | 0,6 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 |
| | | Vc m/min | 90 | 90 | 90 | 90 |
| | | fz mm | 0,020 | 0,030 | 0,030 | 0,050 |
| 10.1-10.3 | Messing / brass | ae mm | 0,3 | 0,4 | 0,5 | 0,6 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 |
| | | Vc m/min | 130 | 130 | 130 | 130 |
| | | fz mm | 0,020 | 0,025 | 0,030 | 0,050 |
| 10.3 | Bronze / bronze | ae mm | 0,3 | 0,4 | 0,5 | 0,6 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 |
| | | Vc m/min | 100 | 100 | 100 | 100 |
| | | fz mm | 0,020 | 0,025 | 0,030 | 0,050 |
| | Ampco / ampco | ae mm | 0,3 | 0,4 | 0,5 | 0,6 |
| | | ap mm | 12,0 | 16,0 | 20,0 | 24,0 |
| | | Vc m/min | 55 | 55 | 55 | 55 |
| | | fz mm | 0,020 | 0,025 | 0,030 | 0,050 |

| Werkstoffgruppe Material group | | 9.1 – 9.2 – 10.1 – 10.2 – 10.3 Alu, Kupfer, Messing Aluminum, copper, brass | | | |
|-----------------------------------|-------|---|-----------|-------|-------|
| d1 | l3 | min ¹ | Vf mm/min | fz mm | ap mm |
| 0,05 | 0,10 | 70.000 | 100 | 0,002 | 0,005 |
| 0,06 | 0,12 | 70.000 | 180 | 0,002 | 0,006 |
| 0,08 | 0,16 | 70.000 | 240 | 0,003 | 0,008 |
| 0,10 | 0,20 | 60.000 | 280 | 0,003 | 0,010 |
| 0,10 | 0,30 | 60.000 | 420 | 0,003 | 0,008 |
| 0,10 | 0,40 | 60.000 | 280 | 0,002 | 0,005 |
| 0,10 | 0,50 | 60.000 | 280 | 0,002 | 0,003 |
| 0,12 | 0,24 | 60.000 | 300 | 0,003 | 0,012 |
| 0,15 | 0,30 | 60.000 | 400 | 0,004 | 0,015 |
| 0,20 | 0,50 | 60.000 | 900 | 0,006 | 0,020 |
| 0,20 | 1,00 | 60.000 | 700 | 0,014 | 0,015 |
| 0,20 | 1,50 | 60.000 | 600 | 0,012 | 0,010 |
| 0,20 | 2,00 | 60.000 | 600 | 0,010 | 0,008 |
| 0,30 | 1,00 | 60.000 | 750 | 0,007 | 0,060 |
| 0,30 | 1,50 | 60.000 | 700 | 0,020 | 0,050 |
| 0,30 | 2,00 | 60.000 | 350 | 0,020 | 0,040 |
| 0,30 | 2,50 | 60.000 | 600 | 0,015 | 0,030 |
| 0,30 | 3,00 | 60.000 | 600 | 0,013 | 0,020 |
| 0,40 | 1,00 | 50.000 | 900 | 0,008 | 0,100 |
| 0,40 | 1,50 | 50.000 | 900 | 0,020 | 0,090 |
| 0,40 | 2,00 | 50.000 | 800 | 0,007 | 0,080 |
| 0,40 | 3,00 | 50.000 | 800 | 0,020 | 0,060 |
| 0,40 | 4,00 | 50.000 | 700 | 0,015 | 0,060 |
| 0,50 | 1,00 | 50.000 | 1.000 | 0,010 | 0,150 |
| 0,50 | 2,00 | 50.000 | 1.000 | 0,010 | 0,100 |
| 0,50 | 3,00 | 50.000 | 1.000 | 0,010 | 0,100 |
| 0,50 | 4,00 | 50.000 | 900 | 0,009 | 0,090 |
| 0,50 | 5,00 | 48.000 | 900 | 0,009 | 0,080 |
| 0,50 | 6,00 | 48.000 | 900 | 0,009 | 0,060 |
| 0,60 | 1,50 | 50.000 | 1.700 | 0,017 | 0,180 |
| 0,60 | 2,00 | 50.000 | 1.700 | 0,017 | 0,170 |
| 0,60 | 3,00 | 50.000 | 1.550 | 0,016 | 0,130 |
| 0,60 | 4,00 | 50.000 | 1.500 | 0,015 | 0,100 |
| 0,60 | 5,00 | 50.000 | 1.500 | 0,015 | 0,080 |
| 0,60 | 6,00 | 50.000 | 1.400 | 0,014 | 0,060 |
| 0,60 | 8,00 | 48.000 | 1.200 | 0,013 | 0,030 |
| 0,70 | 2,00 | 50.000 | 900 | 0,012 | 0,065 |
| 0,70 | 4,00 | 50.000 | 600 | 0,010 | 0,050 |
| 0,75 | 2,00 | 50.000 | 900 | 0,010 | 0,065 |
| 0,80 | 2,00 | 50.000 | 1.800 | 0,018 | 0,280 |
| 0,80 | 4,00 | 50.000 | 1.600 | 0,016 | 0,240 |
| 0,80 | 6,00 | 50.000 | 1.500 | 0,015 | 0,150 |
| 0,80 | 8,00 | 50.000 | 1.400 | 0,014 | 0,100 |
| 0,80 | 9,00 | 50.000 | 1.300 | 0,013 | 0,080 |
| 0,85 | 2,00 | 50.000 | 1.100 | 0,015 | 0,100 |
| 0,90 | 2,50 | 50.000 | 1.400 | 0,016 | 0,100 |
| 0,90 | 6,00 | 50.000 | 1.200 | 0,016 | 0,070 |
| 0,95 | 2,50 | 50.000 | 1.400 | 0,016 | 0,100 |
| 1,00 | 2,00 | 45.000 | 3.000 | 0,033 | 0,330 |
| 1,00 | 3,00 | 45.000 | 2.500 | 0,028 | 0,300 |
| 1,00 | 4,00 | 45.000 | 2.500 | 0,028 | 0,300 |
| 1,00 | 5,00 | 45.000 | 2.400 | 0,027 | 0,250 |
| 1,00 | 6,00 | 45.000 | 2.200 | 0,024 | 0,200 |
| 1,00 | 8,00 | 45.000 | 2.100 | 0,023 | 0,160 |
| 1,00 | 9,00 | 45.000 | 1.900 | 0,021 | 0,150 |
| 1,00 | 10,00 | 40.000 | 1.700 | 0,021 | 0,120 |
| 1,00 | 12,00 | 40.000 | 1.600 | 0,020 | 0,110 |
| 1,00 | 15,00 | 40.000 | 1.300 | 0,016 | 0,090 |
| 1,05 | 3,00 | 45.000 | 1.600 | 0,018 | 0,120 |
| 1,10 | 3,00 | 45.000 | 1.600 | 0,018 | 0,120 |
| 1,15 | 3,00 | 45.000 | 1.600 | 0,018 | 0,120 |
| 1,20 | 4,00 | 40.000 | 2.500 | 0,031 | 0,320 |
| 1,20 | 6,00 | 40.000 | 2.200 | 0,028 | 0,230 |
| 1,20 | 9,00 | 40.000 | 1.900 | 0,024 | 0,180 |
| 1,20 | 12,00 | 38.000 | 1.600 | 0,020 | 0,130 |

| Werkstoffgruppe Material group | | 9.1 – 9.2 – 10.1 – 10.2 – 10.3 Alu, Kupfer, Messing Aluminum, copper, brass | | | |
|-----------------------------------|-------|---|-----------|-------|-------|
| d1 | l3 | min ¹ | Vf mm/min | fz mm | ap mm |
| 1,25 | 4,00 | 40.000 | 1.400 | 0,022 | 0,090 |
| 1,40 | 4,00 | 32.000 | 1.500 | 0,025 | 0,140 |
| 1,40 | 6,00 | 32.000 | 1.300 | 0,025 | 0,130 |
| 1,40 | 9,00 | 32.000 | 1.300 | 0,025 | 0,100 |
| 1,50 | 4,00 | 40.000 | 3.000 | 0,038 | 0,500 |
| 1,50 | 6,00 | 40.000 | 2.000 | 0,025 | 0,450 |
| 1,50 | 8,00 | 36.000 | 1.800 | 0,025 | 0,400 |
| 1,50 | 9,00 | 36.000 | 1.800 | 0,025 | 0,300 |
| 1,50 | 10,00 | 36.000 | 1.600 | 0,022 | 0,200 |
| 1,50 | 12,00 | 36.000 | 1.500 | 0,021 | 0,250 |
| 1,50 | 14,00 | 32.000 | 1.400 | 0,022 | 0,200 |
| 1,50 | 16,00 | 32.000 | 1.200 | 0,019 | 0,160 |
| 1,50 | 18,00 | 32.000 | 1.100 | 0,017 | 0,150 |
| 1,50 | 20,00 | 30.000 | 1.000 | 0,017 | 0,120 |
| 1,60 | 5,00 | 30.000 | 1.300 | 0,026 | 0,150 |
| 1,80 | 9,00 | 25.000 | 1.300 | 0,030 | 0,220 |
| 1,80 | 12,00 | 25.000 | 1.300 | 0,030 | 0,110 |
| 1,90 | 5,00 | 25.000 | 1.400 | 0,030 | 0,200 |
| 2,00 | 4,00 | 30.000 | 3.000 | 0,050 | 0,650 |
| 2,00 | 5,00 | 30.000 | 2.300 | 0,038 | 0,630 |
| 2,00 | 6,00 | 30.000 | 2.100 | 0,035 | 0,620 |
| 2,00 | 8,00 | 30.000 | 2.000 | 0,033 | 0,600 |
| 2,00 | 9,00 | 30.000 | 1.900 | 0,032 | 0,550 |
| 2,00 | 10,00 | 30.000 | 1.700 | 0,028 | 0,500 |
| 2,00 | 12,00 | 25.000 | 1.600 | 0,032 | 0,400 |
| 2,00 | 15,00 | 25.000 | 1.300 | 0,026 | 0,300 |
| 2,00 | 20,00 | 25.000 | 1.200 | 0,024 | 0,250 |
| 3,00 | 10,00 | 25.000 | 2.400 | 0,048 | 0,600 |
| 3,00 | 15,00 | 25.000 | 2.000 | 0,040 | 0,600 |
| 3,00 | 20,00 | 20.000 | 1.600 | 0,040 | 0,500 |
| 3,00 | 25,00 | 20.000 | 1.450 | 0,036 | 0,300 |
| 3,00 | 30,00 | 18.000 | 1.400 | 0,039 | 0,200 |
| 4,00 | 10,00 | 20.000 | 3.000 | 0,075 | 1,300 |
| 4,00 | 15,00 | 20.000 | 3.000 | 0,075 | 1,000 |
| 4,00 | 20,00 | 18.000 | 2.600 | 0,072 | 0,800 |
| 4,00 | 25,00 | 16.000 | 2.400 | 0,075 | 0,650 |
| 4,00 | 30,00 | 16.000 | 2.200 | 0,069 | 0,500 |
| 5,00 | 20,00 | 16.000 | 2.800 | 0,088 | 0,800 |
| 5,00 | 30,00 | 16.000 | 2.500 | 0,078 | 0,700 |
| 5,00 | 40,00 | 14.000 | 2.200 | 0,079 | 0,600 |
| 6,00 | 20,00 | 16.000 | 3.000 | 0,094 | 1,000 |
| 6,00 | 30,00 | 14.000 | 2.800 | 0,100 | 0,900 |
| 6,00 | 40,00 | 12.000 | 2.600 | 0,108 | 0,850 |
| 6,00 | 50,00 | 12.000 | 2.400 | 0,100 | 0,800 |



Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden.
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
If the rpm available is lower than recommended please reduce the feed rate to the same ratio.

30 6212 30 6203

Richtwerte für den Einsatz von Karnasch Vollhartmetall-Fräsern für HSC/HPC-Bearbeitung
Recommended cutting data for solid carbide end mills HSC/HPC

| Werkstoffgruppe Material group | | 9.1 – 9.2 – 10.1 – 10.2 – 10.3 Alu, Kupfer, Messing Aluminum, copper, brass | | | |
|-----------------------------------|-----|---|-----------|-------|-------|
| d1 | l3 | min ¹ | Vf mm/min | fz mm | ap mm |
| 0,1 | 0,2 | 70.000 | 1.400 | 0,010 | 0,010 |
| 0,1 | 0,3 | 70.000 | 1.120 | 0,008 | 0,008 |
| 0,1 | 0,4 | 70.000 | 700 | 0,005 | 0,005 |
| 0,2 | 0,5 | 60.000 | 1.900 | 0,016 | 0,020 |
| 0,2 | 1 | 60.000 | 1.900 | 0,016 | 0,014 |
| 0,2 | 1,5 | 60.000 | 1.440 | 0,012 | 0,010 |
| 0,2 | 2 | 60.000 | 1.200 | 0,010 | 0,006 |
| 0,3 | 1 | 58.000 | 2.400 | 0,021 | 0,018 |
| 0,3 | 1,5 | 56.000 | 2.240 | 0,020 | 0,015 |
| 0,3 | 2 | 52.000 | 2.050 | 0,020 | 0,012 |
| 0,3 | 2,5 | 48.000 | 1.728 | 0,018 | 0,010 |
| 0,3 | 3 | 45.000 | 1.450 | 0,016 | 0,008 |
| 0,3 | 5 | 38.000 | 900 | 0,012 | 0,005 |
| 0,4 | 1 | 52.000 | 2.600 | 0,025 | 0,030 |
| 0,4 | 1,5 | 50.000 | 2.300 | 0,023 | 0,028 |
| 0,4 | 2 | 48.000 | 2.000 | 0,021 | 0,026 |
| 0,4 | 3 | 45.000 | 1.800 | 0,020 | 0,018 |
| 0,4 | 4 | 43.000 | 1.600 | 0,019 | 0,010 |
| 0,4 | 6 | 43.000 | 1.600 | 0,019 | 0,005 |
| 0,5 | 1 | 52.000 | 2.600 | 0,025 | 0,030 |
| 0,5 | 2 | 48.000 | 2.880 | 0,030 | 0,020 |
| 0,5 | 3 | 42.000 | 2.200 | 0,026 | 0,018 |
| 0,5 | 4 | 42.000 | 2.200 | 0,026 | 0,016 |
| 0,5 | 5 | 42.000 | 2.200 | 0,026 | 0,013 |
| 0,5 | 6 | 40.000 | 1.840 | 0,023 | 0,010 |
| 0,6 | 2 | 42.000 | 2.800 | 0,033 | 0,022 |
| 0,6 | 3 | 42.000 | 2.772 | 0,033 | 0,022 |
| 0,6 | 4 | 42.000 | 2.800 | 0,033 | 0,022 |
| 0,6 | 5 | 42.000 | 2.772 | 0,033 | 0,018 |
| 0,6 | 6 | 42.000 | 2.800 | 0,033 | 0,015 |
| 0,6 | 8 | 42.000 | 2.800 | 0,033 | 0,010 |
| 0,7 | 6 | 48.000 | 2.600 | 0,027 | 0,040 |
| 0,7 | 10 | 40.000 | 1.800 | 0,022 | 0,030 |
| 0,8 | 2 | 52.000 | 4.160 | 0,040 | 0,060 |
| 0,8 | 4 | 48.000 | 2.700 | 0,028 | 0,040 |
| 0,8 | 5 | 48.000 | 2.688 | 0,028 | 0,036 |
| 0,8 | 6 | 48.000 | 2.700 | 0,028 | 0,034 |
| 0,8 | 8 | 48.000 | 2.700 | 0,028 | 0,030 |
| 0,8 | 10 | 42.000 | 2.200 | 0,026 | 0,022 |
| 0,9 | 6 | 36.000 | 2.600 | 0,036 | 0,035 |
| 0,9 | 12 | 34.000 | 2.250 | 0,033 | 0,025 |
| 1,0 | 2 | 45.000 | 4.500 | 0,050 | 0,070 |
| 1,0 | 3 | 44.000 | 3.500 | 0,040 | 0,065 |
| 1,0 | 4 | 40.000 | 3.200 | 0,040 | 0,040 |
| 1,0 | 5 | 38.000 | 2.900 | 0,038 | 0,040 |
| 1,0 | 6 | 38.000 | 3.040 | 0,040 | 0,040 |
| 1,0 | 7 | 38.000 | 2.900 | 0,038 | 0,040 |
| 1,0 | 8 | 38.000 | 3.040 | 0,040 | 0,030 |
| 1,0 | 9 | 38.000 | 2.736 | 0,036 | 0,028 |
| 1,0 | 10 | 38.000 | 2.700 | 0,036 | 0,025 |
| 1,0 | 12 | 33.000 | 2.200 | 0,033 | 0,025 |
| 1,0 | 15 | 33.000 | 1.850 | 0,028 | 0,015 |
| 1,0 | 20 | 26.000 | 1.350 | 0,026 | 0,010 |
| 1,0 | 25 | 21.000 | 750 | 0,018 | 0,008 |
| 1,2 | 6 | 38.000 | 2.900 | 0,038 | 0,040 |
| 1,2 | 8 | 38.000 | 2.900 | 0,038 | 0,040 |
| 1,2 | 10 | 38.000 | 2.700 | 0,036 | 0,025 |
| 1,2 | 12 | 33.000 | 2.200 | 0,033 | 0,025 |
| 1,2 | 18 | 24.000 | 1.250 | 0,026 | 0,010 |
| 1,2 | 25 | 21.000 | 750 | 0,018 | 0,008 |
| 1,4 | 8 | 38.000 | 2.900 | 0,038 | 0,045 |
| 1,4 | 16 | 33.000 | 1.700 | 0,026 | 0,030 |

| Werkstoffgruppe Material group | | 9.1 – 9.2 – 10.1 – 10.2 – 10.3 Alu, Kupfer, Messing Aluminum, copper, brass | | | |
|-----------------------------------|----|---|-----------|-------|-------|
| d1 | l3 | min ¹ | Vf mm/min | fz mm | ap mm |
| 1,5 | 4 | 33.000 | 2.400 | 0,036 | 0,060 |
| 1,5 | 6 | 32.000 | 2.300 | 0,036 | 0,060 |
| 1,5 | 8 | 31.000 | 2.200 | 0,036 | 0,055 |
| 1,5 | 10 | 31.000 | 2.200 | 0,036 | 0,055 |
| 1,5 | 12 | 30.000 | 2.100 | 0,036 | 0,050 |
| 1,5 | 14 | 28.000 | 1.848 | 0,033 | 0,040 |
| 1,5 | 16 | 26.000 | 1.700 | 0,033 | 0,035 |
| 1,5 | 18 | 26.000 | 1.560 | 0,030 | 0,030 |
| 1,5 | 20 | 26.000 | 1.350 | 0,026 | 0,030 |
| 1,5 | 25 | 24.000 | 1.000 | 0,021 | 0,025 |
| 1,6 | 8 | 31.000 | 2.200 | 0,036 | 0,060 |
| 1,6 | 16 | 26.000 | 1.700 | 0,033 | 0,037 |
| 1,8 | 10 | 31.000 | 2.200 | 0,036 | 0,060 |
| 1,8 | 20 | 26.000 | 1.700 | 0,033 | 0,037 |
| 2,0 | 5 | 25.000 | 3.200 | 0,065 | 0,200 |
| 2,0 | 6 | 25.000 | 3.000 | 0,060 | 0,160 |
| 2,0 | 8 | 25.000 | 3.000 | 0,060 | 0,140 |
| 2,0 | 10 | 24.000 | 2.800 | 0,060 | 0,100 |
| 2,0 | 12 | 22.000 | 2.600 | 0,060 | 0,080 |
| 2,0 | 15 | 22.000 | 2.600 | 0,060 | 0,080 |
| 2,0 | 20 | 22.000 | 2.600 | 0,060 | 0,050 |
| 2,0 | 25 | 20.000 | 2.000 | 0,050 | 0,025 |
| 2,0 | 30 | 20.000 | 2.000 | 0,050 | 0,016 |
| 2,5 | 10 | 24.000 | 2.800 | 0,060 | 0,100 |
| 2,5 | 20 | 22.000 | 2.600 | 0,060 | 0,060 |
| 3,0 | 5 | 20.000 | 2.600 | 0,066 | 0,300 |
| 3,0 | 10 | 20.000 | 2.600 | 0,066 | 0,210 |
| 3,0 | 15 | 20.000 | 2.600 | 0,066 | 0,120 |
| 3,0 | 20 | 17.000 | 2.000 | 0,060 | 0,120 |
| 3,0 | 25 | 17.000 | 2.000 | 0,060 | 0,100 |
| 3,0 | 30 | 14.000 | 2.000 | 0,060 | 0,080 |
| 4,0 | 10 | 15.000 | 3.000 | 0,100 | 0,300 |
| 4,0 | 15 | 15.000 | 3.000 | 0,100 | 0,250 |
| 4,0 | 20 | 13.000 | 2.300 | 0,090 | 0,200 |
| 4,0 | 25 | 13.000 | 2.300 | 0,090 | 0,130 |
| 4,0 | 30 | 11.000 | 1.800 | 0,090 | 0,100 |
| 5,0 | 10 | 11.000 | 2.600 | 0,120 | 0,400 |
| 5,0 | 20 | 11.000 | 2.600 | 0,120 | 0,380 |
| 5,0 | 30 | 11.000 | 2.600 | 0,120 | 0,200 |
| 5,0 | 40 | 10.000 | 2.000 | 0,110 | 0,120 |
| 6,0 | 10 | 11.000 | 2.600 | 0,120 | 0,400 |
| 6,0 | 20 | 10.000 | 3.000 | 0,150 | 0,300 |
| 6,0 | 30 | 10.000 | 2.800 | 0,140 | 0,250 |
| 6,0 | 40 | 8.000 | 2.000 | 0,130 | 0,240 |
| 6,0 | 50 | 7.000 | 1.800 | 0,130 | 0,160 |

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio.

Richtwerte für den Einsatz von Karnasch Vollhartmetall-Fräsern für HSC/HPC-Bearbeitung
Recommended cutting data for solid carbide end mills HSC/HPC

30 6213

30 6204

| Werkstoffgruppe Material group | | 9.1 – 9.2 – 10.1 – 10.2 – 10.3 Alu, Kupfer, Messing Aluminum, copper, brass | | | | |
|-----------------------------------|-----|---|-----------|-------|-------|-------|
| d1 | l3 | min ¹ | Vf mm/min | fz mm | ae mm | ap mm |
| 0,1 | 0,1 | 60.000 | 600 | 0,005 | 0,008 | 0,004 |
| 0,1 | 0,2 | 60.000 | 600 | 0,005 | 0,005 | 0,002 |
| 0,1 | 0,3 | 60.000 | 480 | 0,004 | 0,003 | 0,002 |
| 0,1 | 0,4 | 60.000 | 240 | 0,002 | 0,002 | 0,002 |
| 0,1 | 0,5 | 60.000 | 240 | 0,002 | 0,002 | 0,002 |
| 0,2 | 0,5 | 60.000 | 2.750 | 0,023 | 0,020 | 0,060 |
| 0,2 | 1 | 60.000 | 2.750 | 0,023 | 0,012 | 0,040 |
| 0,2 | 1,5 | 60.000 | 2.160 | 0,018 | 0,008 | 0,030 |
| 0,2 | 2 | 60.000 | 1.920 | 0,016 | 0,005 | 0,020 |
| 0,3 | 1 | 60.000 | 2.750 | 0,023 | 0,020 | 0,060 |
| 0,3 | 1,5 | 60.000 | 2.400 | 0,020 | 0,015 | 0,040 |
| 0,3 | 2 | 60.000 | 2.400 | 0,020 | 0,012 | 0,035 |
| 0,3 | 2,5 | 52.000 | 1.976 | 0,019 | 0,010 | 0,028 |
| 0,3 | 3 | 48.000 | 1.700 | 0,018 | 0,008 | 0,020 |
| 0,3 | 5 | 36.000 | 600 | 0,008 | 0,005 | 0,005 |
| 0,4 | 1 | 50.000 | 3.000 | 0,030 | 0,030 | 0,090 |
| 0,4 | 2 | 48.000 | 2.900 | 0,030 | 0,025 | 0,080 |
| 0,4 | 3 | 40.000 | 2.080 | 0,026 | 0,018 | 0,050 |
| 0,4 | 4 | 38.000 | 1.800 | 0,024 | 0,010 | 0,030 |
| 0,4 | 6 | 24.000 | 400 | 0,008 | 0,005 | 0,010 |
| 0,5 | 1 | 48.000 | 2.880 | 0,030 | 0,040 | 0,100 |
| 0,5 | 2 | 45.000 | 2.700 | 0,030 | 0,035 | 0,100 |
| 0,5 | 3 | 43.000 | 2.300 | 0,027 | 0,030 | 0,090 |
| 0,5 | 4 | 43.000 | 2.300 | 0,027 | 0,020 | 0,050 |
| 0,5 | 5 | 38.000 | 1.800 | 0,024 | 0,015 | 0,045 |
| 0,5 | 6 | 35.000 | 1.400 | 0,020 | 0,010 | 0,040 |
| 0,6 | 2 | 48.000 | 3.600 | 0,038 | 0,040 | 0,120 |
| 0,6 | 3 | 45.000 | 3.420 | 0,038 | 0,030 | 0,080 |
| 0,6 | 4 | 43.000 | 3.600 | 0,038 | 0,022 | 0,065 |
| 0,6 | 5 | 40.000 | 2.400 | 0,030 | 0,018 | 0,050 |
| 0,6 | 6 | 38.000 | 2.200 | 0,030 | 0,015 | 0,040 |
| 0,6 | 8 | 38.000 | 2.200 | 0,030 | 0,015 | 0,035 |
| 0,7 | 6 | 43.000 | 2.900 | 0,034 | 0,022 | 0,070 |
| 0,7 | 10 | 38.000 | 2.300 | 0,030 | 0,015 | 0,038 |
| 0,8 | 2 | 50.000 | 4.000 | 0,040 | 0,060 | 0,118 |
| 0,8 | 4 | 48.000 | 3.600 | 0,038 | 0,050 | 0,160 |
| 0,8 | 6 | 43.000 | 2.900 | 0,034 | 0,030 | 0,090 |
| 0,8 | 8 | 38.000 | 1.150 | 0,030 | 0,020 | 0,060 |
| 0,8 | 10 | 38.000 | 1.150 | 0,030 | 0,020 | 0,050 |
| 0,9 | 6 | 43.000 | 2.900 | 0,034 | 0,030 | 0,090 |
| 0,9 | 12 | 33.000 | 2.200 | 0,034 | 0,020 | 0,060 |
| 1,0 | 2 | 45.000 | 4.500 | 0,050 | 0,100 | 0,300 |
| 1,0 | 3 | 43.000 | 3.800 | 0,045 | 0,100 | 0,300 |
| 1,0 | 4 | 40.000 | 3.200 | 0,040 | 0,050 | 0,100 |
| 1,0 | 5 | 38.000 | 3.000 | 0,040 | 0,040 | 0,100 |
| 1,0 | 6 | 38.000 | 3.040 | 0,040 | 0,040 | 0,100 |
| 1,0 | 7 | 38.000 | 3.000 | 0,040 | 0,040 | 0,100 |
| 1,0 | 8 | 38.000 | 3.040 | 0,040 | 0,025 | 0,075 |
| 1,0 | 10 | 38.000 | 3.000 | 0,040 | 0,025 | 0,075 |
| 1,0 | 12 | 35.000 | 2.450 | 0,035 | 0,025 | 0,070 |
| 1,0 | 15 | 35.000 | 2.450 | 0,035 | 0,020 | 0,065 |
| 1,0 | 18 | 30.000 | 1.920 | 0,032 | 0,015 | 0,040 |
| 1,0 | 20 | 26.000 | 1.600 | 0,032 | 0,010 | 0,025 |
| 1,0 | 25 | 22.000 | 1.100 | 0,025 | 0,010 | 0,015 |
| 1,2 | 6 | 38.000 | 3.000 | 0,040 | 0,040 | 0,120 |
| 1,2 | 8 | 34.000 | 2.700 | 0,040 | 0,040 | 0,110 |
| 1,2 | 10 | 34.000 | 2.700 | 0,040 | 0,040 | 0,090 |
| 1,2 | 12 | 34.000 | 2.700 | 0,040 | 0,030 | 0,080 |
| 1,2 | 18 | 26.000 | 1.600 | 0,032 | 0,010 | 0,025 |
| 1,2 | 25 | 22.000 | 1.100 | 0,025 | 0,010 | 0,015 |
| 1,4 | 8 | 30.000 | 2.400 | 0,040 | 0,050 | 0,160 |
| 1,4 | 16 | 28.000 | 2.000 | 0,035 | 0,030 | 0,100 |

| Werkstoffgruppe Material group | | 9.1 – 9.2 – 10.1 – 10.2 – 10.3 Alu, Kupfer, Messing Aluminum, copper, brass | | | | |
|-----------------------------------|----|---|-----------|-------|-------|-------|
| d1 | l3 | min ¹ | Vf mm/min | fz mm | ae mm | ap mm |
| 1,5 | 4 | 34.000 | 3.000 | 0,045 | 0,100 | 0,250 |
| 1,5 | 6 | 30.000 | 3.000 | 0,045 | 0,100 | 0,250 |
| 1,5 | 8 | 30.000 | 2.400 | 0,040 | 0,060 | 0,160 |
| 1,5 | 10 | 30.000 | 2.400 | 0,040 | 0,060 | 0,150 |
| 1,5 | 12 | 30.000 | 2.400 | 0,040 | 0,060 | 0,140 |
| 1,5 | 15 | 28.000 | 1.960 | 0,035 | 0,035 | 0,100 |
| 1,5 | 16 | 26.000 | 1.800 | 0,035 | 0,035 | 0,100 |
| 1,5 | 20 | 26.000 | 1.800 | 0,035 | 0,035 | 0,100 |
| 1,5 | 25 | 26.000 | 1.800 | 0,030 | 0,030 | 0,080 |
| 1,6 | 8 | 31.000 | 3.100 | 0,050 | 0,100 | 0,300 |
| 1,6 | 16 | 25.000 | 2.000 | 0,040 | 0,040 | 0,110 |
| 1,8 | 10 | 29.000 | 2.600 | 0,045 | 0,060 | 0,200 |
| 1,8 | 20 | 25.000 | 2.000 | 0,040 | 0,040 | 0,120 |
| 2,0 | 4 | 25.000 | 4.000 | 0,080 | 0,230 | 0,700 |
| 2,0 | 5 | 25.000 | 3.500 | 0,070 | 0,200 | 0,600 |
| 2,0 | 6 | 25.000 | 3.500 | 0,070 | 0,200 | 0,600 |
| 2,0 | 8 | 25.000 | 3.500 | 0,070 | 0,140 | 0,400 |
| 2,0 | 10 | 25.000 | 3.500 | 0,070 | 0,140 | 0,400 |
| 2,0 | 12 | 22.000 | 2.600 | 0,060 | 0,080 | 0,200 |
| 2,0 | 15 | 22.000 | 2.600 | 0,060 | 0,080 | 0,200 |
| 2,0 | 20 | 22.000 | 2.600 | 0,060 | 0,050 | 0,150 |
| 2,0 | 25 | 20.000 | 2.400 | 0,060 | 0,050 | 0,120 |
| 2,0 | 30 | 20.000 | 2.400 | 0,060 | 0,030 | 0,080 |
| 2,5 | 10 | 25.000 | 3.500 | 0,070 | 0,200 | 0,700 |
| 2,5 | 20 | 22.000 | 2.600 | 0,060 | 0,060 | 0,180 |
| 3,0 | 5 | 20.000 | 2.800 | 0,070 | 0,300 | 0,800 |
| 3,0 | 10 | 19.000 | 2.600 | 0,070 | 0,200 | 0,600 |
| 3,0 | 15 | 18.000 | 2.500 | 0,070 | 0,200 | 0,600 |
| 3,0 | 20 | 18.000 | 2.500 | 0,070 | 0,120 | 0,250 |
| 3,0 | 25 | 18.000 | 2.500 | 0,070 | 0,080 | 0,220 |
| 3,0 | 30 | 16.000 | 1.900 | 0,060 | 0,080 | 0,200 |
| 4,0 | 10 | 14.000 | 2.500 | 0,090 | 0,400 | 1,000 |
| 4,0 | 15 | 14.000 | 2.500 | 0,090 | 0,250 | 0,800 |
| 4,0 | 20 | 14.000 | 2.500 | 0,090 | 0,200 | 0,600 |
| 4,0 | 25 | 12.000 | 2.100 | 0,090 | 0,180 | 0,450 |
| 4,0 | 30 | 12.000 | 2.100 | 0,090 | 0,100 | 0,300 |
| 5,0 | 10 | 14.000 | 3.900 | 0,140 | 0,450 | 1,200 |
| 5,0 | 20 | 14.000 | 3.400 | 0,120 | 0,350 | 1,000 |
| 5,0 | 30 | 10.000 | 2.200 | 0,110 | 0,200 | 0,600 |
| 5,0 | 40 | 10.000 | 2.200 | 0,110 | 0,200 | 0,500 |
| 6,0 | 10 | 14.000 | 3.900 | 0,140 | 0,550 | 1,400 |
| 6,0 | 20 | 14.000 | 3.300 | 0,120 | 0,350 | 1,100 |
| 6,0 | 30 | 9.500 | 2.200 | 0,120 | 0,300 | 0,700 |
| 6,0 | 40 | 9.500 | 2.200 | 0,120 | 0,250 | 0,600 |
| 6,0 | 50 | 8.500 | 1.800 | 0,110 | 0,150 | 0,400 |

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9



Index

| Werkstoffgruppe Material group | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels < 850 N/mm ² | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat-treated steels < 35 HRC | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat-treated steels 35-45 HRC | | | | 8.1 Gehärtete Stähle / Hardened steels 45-55 HRC | | | |
|-----------------------------------|-----|--|-----------|-------|-------|---|-----------|-------|-------|--|-----------|-------|-------|--|-----------|-------|-------|
| d1 | ls | min ¹ | Vf mm/min | fz mm | ap mm | min ¹ | Vf mm/min | fz mm | ap mm | min ¹ | Vf mm/min | fz mm | ap mm | min ¹ | Vf mm/min | fz mm | ap mm |
| 0,2 | 0,5 | 45.000 | 630 | 0,007 | 0,020 | 41.000 | 574 | 0,007 | 0,018 | 38.000 | 380 | 0,005 | 0,014 | 34.000 | 306 | 0,005 | 0,010 |
| 0,2 | 1 | 45.000 | 630 | 0,007 | 0,015 | 41.000 | 574 | 0,007 | 0,014 | 38.000 | 380 | 0,005 | 0,011 | 34.000 | 306 | 0,005 | 0,008 |
| 0,3 | 1 | 40.000 | 560 | 0,007 | 0,020 | 36.000 | 504 | 0,007 | 0,018 | 34.000 | 340 | 0,005 | 0,014 | 30.000 | 270 | 0,005 | 0,010 |
| 0,3 | 2 | 36.000 | 468 | 0,007 | 0,010 | 33.000 | 429 | 0,007 | 0,009 | 31.000 | 310 | 0,005 | 0,007 | 27.000 | 243 | 0,005 | 0,005 |
| 0,3 | 3 | 36.000 | 468 | 0,007 | 0,008 | 33.000 | 429 | 0,007 | 0,007 | 31.000 | 310 | 0,005 | 0,006 | 27.000 | 243 | 0,005 | 0,004 |
| 0,4 | 2 | 32.000 | 704 | 0,011 | 0,028 | 29.000 | 580 | 0,010 | 0,025 | 27.000 | 405 | 0,008 | 0,020 | 24.000 | 336 | 0,007 | 0,014 |
| 0,4 | 3 | 29.000 | 580 | 0,010 | 0,015 | 26.000 | 520 | 0,010 | 0,014 | 25.000 | 375 | 0,008 | 0,011 | 22.000 | 308 | 0,007 | 0,008 |
| 0,4 | 4 | 29.000 | 580 | 0,010 | 0,010 | 26.000 | 520 | 0,010 | 0,009 | 25.000 | 375 | 0,008 | 0,007 | 22.000 | 308 | 0,007 | 0,005 |
| 0,5 | 2 | 32.000 | 704 | 0,011 | 0,035 | 29.000 | 638 | 0,011 | 0,032 | 27.000 | 540 | 0,010 | 0,025 | 24.000 | 336 | 0,007 | 0,018 |
| 0,5 | 3 | 29.000 | 580 | 0,010 | 0,020 | 26.000 | 520 | 0,010 | 0,018 | 25.000 | 450 | 0,009 | 0,014 | 22.000 | 308 | 0,007 | 0,010 |
| 0,5 | 4 | 29.000 | 580 | 0,010 | 0,020 | 26.000 | 520 | 0,010 | 0,018 | 25.000 | 400 | 0,008 | 0,014 | 22.000 | 308 | 0,007 | 0,010 |
| 0,6 | 2 | 32.000 | 960 | 0,015 | 0,040 | 29.000 | 870 | 0,015 | 0,036 | 27.000 | 648 | 0,012 | 0,028 | 24.000 | 480 | 0,010 | 0,020 |
| 0,6 | 3 | 29.000 | 841 | 0,015 | 0,035 | 26.000 | 728 | 0,014 | 0,032 | 25.000 | 600 | 0,012 | 0,025 | 22.000 | 440 | 0,010 | 0,018 |
| 0,6 | 4 | 29.000 | 841 | 0,015 | 0,025 | 26.000 | 728 | 0,014 | 0,023 | 25.000 | 575 | 0,012 | 0,018 | 22.000 | 440 | 0,010 | 0,013 |
| 0,6 | 6 | 29.000 | 841 | 0,015 | 0,015 | 26.000 | 728 | 0,014 | 0,014 | 25.000 | 575 | 0,012 | 0,011 | 22.000 | 418 | 0,010 | 0,008 |
| 0,8 | 2 | 32.000 | 960 | 0,015 | 0,080 | 29.000 | 870 | 0,015 | 0,072 | 27.000 | 783 | 0,015 | 0,056 | 24.000 | 672 | 0,014 | 0,040 |
| 0,8 | 4 | 32.000 | 960 | 0,015 | 0,055 | 29.000 | 870 | 0,015 | 0,050 | 27.000 | 783 | 0,015 | 0,039 | 24.000 | 672 | 0,014 | 0,028 |
| 0,8 | 5 | 29.000 | 841 | 0,015 | 0,040 | 26.000 | 780 | 0,015 | 0,036 | 25.000 | 725 | 0,015 | 0,028 | 24.000 | 672 | 0,014 | 0,020 |
| 0,8 | 6 | 29.000 | 841 | 0,015 | 0,030 | 26.000 | 728 | 0,014 | 0,027 | 25.000 | 700 | 0,014 | 0,021 | 24.000 | 648 | 0,014 | 0,015 |
| 0,8 | 8 | 29.000 | 841 | 0,015 | 0,020 | 26.000 | 728 | 0,014 | 0,018 | 25.000 | 575 | 0,012 | 0,014 | 22.000 | 440 | 0,010 | 0,010 |
| 0,8 | 10 | 26.000 | 650 | 0,013 | 0,020 | 23.000 | 575 | 0,013 | 0,018 | 21.000 | 378 | 0,009 | 0,014 | 20.000 | 340 | 0,009 | 0,010 |
| 1,0 | 3 | 29.000 | 1.450 | 0,025 | 0,085 | 26.000 | 1.300 | 0,025 | 0,077 | 25.000 | 1.175 | 0,024 | 0,060 | 23.000 | 1.035 | 0,023 | 0,043 |
| 1,0 | 4 | 29.000 | 1.450 | 0,025 | 0,070 | 26.000 | 1.300 | 0,025 | 0,063 | 25.000 | 1.100 | 0,022 | 0,049 | 23.000 | 920 | 0,020 | 0,035 |
| 1,0 | 5 | 29.000 | 1.450 | 0,025 | 0,055 | 26.000 | 1.222 | 0,024 | 0,050 | 25.000 | 1.000 | 0,020 | 0,039 | 23.000 | 874 | 0,019 | 0,028 |
| 1,0 | 6 | 26.000 | 1.170 | 0,023 | 0,040 | 24.000 | 1.080 | 0,023 | 0,036 | 22.000 | 880 | 0,020 | 0,028 | 21.000 | 735 | 0,018 | 0,020 |
| 1,0 | 7 | 26.000 | 1.170 | 0,023 | 0,040 | 24.000 | 1.080 | 0,023 | 0,036 | 22.000 | 836 | 0,019 | 0,028 | 21.000 | 714 | 0,017 | 0,020 |
| 1,0 | 8 | 26.000 | 1.170 | 0,023 | 0,040 | 24.000 | 1.080 | 0,023 | 0,036 | 22.000 | 836 | 0,019 | 0,028 | 21.000 | 630 | 0,015 | 0,020 |
| 1,0 | 10 | 26.000 | 1.170 | 0,023 | 0,025 | 24.000 | 1.080 | 0,023 | 0,023 | 22.000 | 770 | 0,018 | 0,018 | 20.000 | 600 | 0,015 | 0,013 |
| 1,0 | 12 | 23.000 | 805 | 0,018 | 0,025 | 21.000 | 735 | 0,018 | 0,023 | 20.000 | 500 | 0,013 | 0,018 | 18.000 | 450 | 0,013 | 0,013 |
| 1,0 | 15 | 23.000 | 805 | 0,018 | 0,020 | 21.000 | 735 | 0,018 | 0,018 | 20.000 | 500 | 0,013 | 0,014 | 18.000 | 450 | 0,013 | 0,010 |
| 1,0 | 20 | 21.000 | 630 | 0,015 | 0,010 | 20.000 | 500 | 0,013 | 0,009 | 18.000 | 360 | 0,010 | 0,007 | 16.000 | 320 | 0,010 | 0,005 |
| 1,2 | 6 | 26.000 | 1.300 | 0,025 | 0,085 | 23.000 | 1.150 | 0,025 | 0,077 | 22.000 | 880 | 0,020 | 0,060 | 20.000 | 600 | 0,015 | 0,043 |
| 1,2 | 8 | 23.000 | 1.035 | 0,023 | 0,050 | 21.000 | 945 | 0,023 | 0,045 | 20.000 | 800 | 0,020 | 0,035 | 18.000 | 540 | 0,015 | 0,025 |
| 1,2 | 10 | 23.000 | 1.035 | 0,023 | 0,030 | 21.000 | 945 | 0,023 | 0,027 | 20.000 | 760 | 0,019 | 0,021 | 18.000 | 540 | 0,015 | 0,015 |
| 1,2 | 12 | 23.000 | 989 | 0,022 | 0,030 | 21.000 | 903 | 0,022 | 0,027 | 20.000 | 700 | 0,018 | 0,021 | 18.000 | 540 | 0,015 | 0,015 |
| 1,4 | 8 | 21.000 | 945 | 0,023 | 0,050 | 20.000 | 1.000 | 0,025 | 0,045 | 18.000 | 630 | 0,018 | 0,035 | 16.000 | 448 | 0,014 | 0,025 |
| 1,5 | 6 | 23.000 | 1.150 | 0,025 | 0,110 | 20.000 | 1.000 | 0,025 | 0,099 | 19.000 | 798 | 0,021 | 0,077 | 17.000 | 612 | 0,018 | 0,055 |
| 1,5 | 8 | 20.000 | 960 | 0,024 | 0,080 | 18.000 | 900 | 0,025 | 0,072 | 17.000 | 714 | 0,021 | 0,056 | 15.000 | 525 | 0,018 | 0,040 |
| 1,5 | 10 | 20.000 | 860 | 0,022 | 0,060 | 18.000 | 810 | 0,023 | 0,054 | 17.000 | 714 | 0,021 | 0,042 | 15.000 | 525 | 0,018 | 0,030 |
| 1,5 | 12 | 20.000 | 860 | 0,022 | 0,050 | 18.000 | 774 | 0,022 | 0,045 | 17.000 | 714 | 0,021 | 0,035 | 15.000 | 450 | 0,015 | 0,025 |
| 1,5 | 15 | 20.000 | 860 | 0,022 | 0,040 | 18.000 | 774 | 0,022 | 0,036 | 17.000 | 646 | 0,019 | 0,028 | 15.000 | 405 | 0,014 | 0,020 |
| 1,5 | 20 | 18.000 | 720 | 0,020 | 0,040 | 16.000 | 640 | 0,020 | 0,036 | 15.500 | 387 | 0,013 | 0,028 | 13.500 | 365 | 0,014 | 0,020 |
| 1,8 | 10 | 21.000 | 945 | 0,023 | 0,060 | 18.000 | 810 | 0,023 | 0,054 | 17.000 | 646 | 0,019 | 0,042 | 15.000 | 525 | 0,018 | 0,030 |
| 1,8 | 20 | 18.000 | 774 | 0,022 | 0,040 | 16.000 | 688 | 0,022 | 0,036 | 15.500 | 511 | 0,017 | 0,028 | 14.000 | 420 | 0,015 | 0,020 |
| 2,0 | 6 | 17.000 | 1.190 | 0,035 | 0,200 | 15.000 | 1.050 | 0,035 | 0,180 | 15.000 | 750 | 0,025 | 0,140 | 13.000 | 559 | 0,022 | 0,100 |
| 2,0 | 8 | 17.000 | 1.190 | 0,035 | 0,150 | 15.000 | 1.050 | 0,035 | 0,135 | 15.000 | 750 | 0,025 | 0,105 | 13.000 | 559 | 0,022 | 0,075 |
| 2,0 | 10 | 17.000 | 1.190 | 0,035 | 0,150 | 15.000 | 1.050 | 0,035 | 0,135 | 15.000 | 750 | 0,025 | 0,105 | 13.000 | 546 | 0,021 | 0,075 |
| 2,0 | 12 | 15.000 | 900 | 0,030 | 0,100 | 14.000 | 840 | 0,030 | 0,090 | 13.000 | 585 | 0,023 | 0,070 | 12.000 | 504 | 0,021 | 0,050 |
| 2,0 | 15 | 15.000 | 900 | 0,030 | 0,080 | 14.000 | 840 | 0,030 | 0,072 | 13.000 | 585 | 0,023 | 0,056 | 12.000 | 492 | 0,021 | 0,040 |
| 2,0 | 20 | 15.000 | 870 | 0,029 | 0,050 | 14.000 | 770 | 0,028 | 0,045 | 13.000 | 585 | 0,023 | 0,035 | 11.500 | 460 | 0,020 | 0,025 |
| 2,0 | 25 | 14.000 | 700 | 0,025 | 0,050 | 12.000 | 600 | 0,025 | 0,045 | 12.000 | 420 | 0,018 | 0,035 | 10.000 | 340 | 0,017 | 0,025 |
| 2,0 | 30 | 14.000 | 700 | 0,025 | 0,030 | 12.000 | 600 | 0,025 | 0,027 | 12.000 | 420 | 0,018 | 0,021 | 10.000 | 340 | 0,017 | 0,015 |
| 2,5 | 10 | 15.000 | 1.200 | 0,040 | 0,180 | 13.000 | 1.040 | 0,040 | 0,162 | 12.000 | 720 | 0,030 | 0,126 | 11.000 | 605 | 0,028 | 0,090 |
| 2,5 | 15 | 15.000 | 1.050 | 0,035 | 0,100 | 13.000 | 910 | 0,035 | 0,090 | 12.000 | 720 | 0,030 | 0,070 | 11.000 | 605 | 0,028 | 0,050 |
| 2,5 | 20 | 13.000 | 910 | 0,035 | 0,100 | 12.000 | 840 | 0,035 | 0,090 | 11.000 | 638 | 0,029 | 0,070 | 10.000 | 540 | 0,027 | 0,050 |
| 2,5 | 25 | 12.000 | 780 | 0,033 | 0,050 | 11.000 | 715 | 0,033 | 0,045 | 10.000 | 550 | 0,028 | 0,035 | 9.000 | 459 | 0,026 | 0,025 |
| 3,0 | 10 | 13.000 | 1.170 | 0,045 | 0,300 | 12.000 | 1.080 | 0,045 | 0,270 | 11.000 | 715 | 0,033 | 0,210 | 11.000 | 594 | 0,027 | 0,150 |
| 3,0 | 15 | 13.000 | 1.105 | 0,043 | 0,150 | 12.000 | 1.020 | 0,043 | 0,135 | 11.000 | 715 | 0,033 | 0,105 | 11.000 | 594 | 0,027 | 0,075 |
| 3,0 | 20 | 12.000 | 960 | 0,040 | 0,120 | 11.000 | 880 | 0,040 | 0,108 | 10.000 | 600 | 0,030 | 0,084 | 9.500 | 513 | 0,027 | 0,060 |
| 3,0 | 25 | 12.000 | 960 | 0,040 | 0,080 | 11.000 | 880 | 0,040 | 0,072 | 10.000 | 600 | 0,030 | 0,056 | 9.500 | 513 | 0,027 | 0,040 |
| 3,0 | 30 | 12.000 | 840 | 0,035 | 0,080 | 11.000 | 770 | 0,035 | 0,072 | 10.000 | 600 | 0,030 | 0,056 | 9.500 | 513 | 0,027 | 0,040 |
| 4,0 | 10 | 10.000 | 1.900 | 0,095 | 0,400 | 9.000 | 1.710 | 0,095 | 0,360 | 8.000 | 1.360 | 0,085 | 0,280 | 7.000 | 875 | 0,063 | 0,200 |
| 4,0 | 15 | 10.000 | 1.800 | 0,090 | 0,300 | 9.000 | 1.620 | 0,090 | 0,270 | 8.000 | 1.360 | 0,085 | 0,210 | 7.000 | 875 | 0,063 | 0,150 |
| 4,0 | 20 | 9.000 | 1.530 | 0,085 | 0,300 | 8.000 | 1.360 | 0,085 | 0,270 | 7.000 | 1.190 | 0,085 | 0,210 | 6.500 | 813 | 0,063 | 0,150 |
| 4,0 | 25 | 9.000 | 1.440 | 0,080 | 0,150 | 8.000 | 1.280 | 0,080 | 0,135 | 7.000 | 1.085 | 0,078 | 0,105 | 6.500 | 813 | 0,063 | 0,075 |
| 4,0 | 30 | 9.000 | 1.440 | 0,080 | 0,150 | 8.000 | 1.280 | 0,080 | 0,135 | 7.000 | 1.0 | | | | | | |

Richtwerte für den Einsatz von Karnasch Vollhartmetall Valuetool Fräser < 55 HRC
Recommended cutting data for solid carbide Valuetool end mills < 55 HRC

Schlichten Finishing 30 8011

| Werkstoffgruppe Material group | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels < 850 N/mm ² | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat-treated steels < 35 HRC | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat-treated steels 35-45 HRC | | | | 8.1 Gehärtete Stähle / Hardened steels 45-55 HRC | | | |
|-----------------------------------|-----|--|-----------|-------|-------|---|-----------|-------|--------|--|-----------|-------|--------|--|-----------|-------|--------|
| d1 | ls | min ¹ | Vf mm/min | fz mm | ap mm | min ¹ | Vf mm/min | fz mm | ap mm | min ¹ | Vf mm/min | fz mm | ap mm | min ¹ | Vf mm/min | fz mm | ap mm |
| 0,2 | 0,5 | 45.000 | 450 | 0,005 | 0,015 | 40.500 | 405 | 0,005 | 0,0135 | 38.500 | 270 | 0,004 | 0,0105 | 34.000 | 204 | 0,003 | 0,0075 |
| 0,2 | 1 | 45.000 | 450 | 0,005 | 0,010 | 40.500 | 405 | 0,005 | 0,0090 | 38.500 | 270 | 0,004 | 0,0070 | 34.000 | 204 | 0,003 | 0,0050 |
| 0,3 | 1 | 40.000 | 400 | 0,005 | 0,020 | 36.000 | 396 | 0,006 | 0,0180 | 34.000 | 272 | 0,004 | 0,0140 | 30.000 | 240 | 0,004 | 0,0100 |
| 0,3 | 2 | 36.000 | 360 | 0,005 | 0,012 | 32.500 | 325 | 0,005 | 0,0108 | 30.500 | 244 | 0,004 | 0,0084 | 27.000 | 189 | 0,004 | 0,0060 |
| 0,3 | 3 | 36.000 | 360 | 0,005 | 0,008 | 32.500 | 325 | 0,005 | 0,0072 | 30.500 | 244 | 0,004 | 0,0056 | 27.000 | 162 | 0,003 | 0,0040 |
| 0,4 | 2 | 32.000 | 640 | 0,010 | 0,028 | 29.000 | 580 | 0,010 | 0,0252 | 27.000 | 405 | 0,008 | 0,0196 | 24.000 | 288 | 0,006 | 0,0140 |
| 0,4 | 3 | 29.000 | 435 | 0,008 | 0,015 | 26.000 | 416 | 0,008 | 0,0135 | 24.500 | 319 | 0,007 | 0,0105 | 21.500 | 237 | 0,006 | 0,0075 |
| 0,4 | 4 | 29.000 | 435 | 0,008 | 0,010 | 26.000 | 416 | 0,008 | 0,0090 | 24.500 | 319 | 0,007 | 0,0070 | 21.500 | 237 | 0,006 | 0,0050 |
| 0,5 | 2 | 32.000 | 640 | 0,010 | 0,035 | 29.000 | 580 | 0,010 | 0,0315 | 27.000 | 432 | 0,008 | 0,0245 | 24.000 | 288 | 0,006 | 0,0175 |
| 0,5 | 3 | 29.000 | 435 | 0,008 | 0,020 | 26.000 | 416 | 0,008 | 0,0180 | 24.500 | 343 | 0,007 | 0,0140 | 21.500 | 237 | 0,006 | 0,0100 |
| 0,5 | 4 | 29.000 | 435 | 0,008 | 0,020 | 26.000 | 416 | 0,008 | 0,0180 | 24.500 | 319 | 0,007 | 0,0140 | 21.500 | 237 | 0,006 | 0,0100 |
| 0,6 | 2 | 32.000 | 896 | 0,014 | 0,040 | 29.000 | 812 | 0,014 | 0,0360 | 27.000 | 540 | 0,010 | 0,0280 | 24.000 | 432 | 0,009 | 0,0200 |
| 0,6 | 3 | 29.000 | 754 | 0,013 | 0,035 | 26.000 | 676 | 0,013 | 0,0315 | 24.500 | 490 | 0,010 | 0,0245 | 21.500 | 387 | 0,009 | 0,0175 |
| 0,6 | 4 | 29.000 | 754 | 0,013 | 0,025 | 26.000 | 676 | 0,013 | 0,0225 | 24.500 | 490 | 0,010 | 0,0175 | 21.500 | 387 | 0,009 | 0,0125 |
| 0,6 | 6 | 29.000 | 667 | 0,012 | 0,015 | 26.000 | 598 | 0,012 | 0,0135 | 24.500 | 441 | 0,009 | 0,0105 | 21.500 | 344 | 0,008 | 0,0075 |
| 0,8 | 2 | 32.000 | 896 | 0,014 | 0,080 | 29.000 | 812 | 0,014 | 0,0720 | 27.500 | 633 | 0,012 | 0,0560 | 24.000 | 480 | 0,010 | 0,0400 |
| 0,8 | 4 | 32.000 | 896 | 0,014 | 0,055 | 29.000 | 812 | 0,014 | 0,0495 | 27.500 | 633 | 0,012 | 0,0385 | 24.000 | 480 | 0,010 | 0,0275 |
| 0,8 | 5 | 32.000 | 800 | 0,013 | 0,040 | 29.000 | 725 | 0,013 | 0,0360 | 27.000 | 621 | 0,012 | 0,0280 | 24.000 | 480 | 0,010 | 0,0200 |
| 0,8 | 6 | 29.000 | 667 | 0,012 | 0,030 | 26.000 | 598 | 0,012 | 0,0270 | 24.500 | 564 | 0,012 | 0,0210 | 22.000 | 440 | 0,010 | 0,0150 |
| 0,8 | 8 | 29.000 | 667 | 0,012 | 0,020 | 26.000 | 598 | 0,012 | 0,0180 | 24.500 | 441 | 0,009 | 0,0140 | 22.000 | 352 | 0,008 | 0,0100 |
| 0,8 | 10 | 26.000 | 468 | 0,009 | 0,020 | 23.000 | 414 | 0,009 | 0,0180 | 22.000 | 264 | 0,006 | 0,0140 | 19.500 | 234 | 0,006 | 0,0100 |
| 1,0 | 3 | 29.000 | 1.160 | 0,020 | 0,070 | 26.000 | 1.092 | 0,021 | 0,0630 | 24.500 | 931 | 0,019 | 0,0490 | 21.500 | 688 | 0,016 | 0,0350 |
| 1,0 | 4 | 29.000 | 1.160 | 0,020 | 0,065 | 26.000 | 1.092 | 0,021 | 0,0585 | 24.500 | 931 | 0,019 | 0,0455 | 21.500 | 688 | 0,016 | 0,0325 |
| 1,0 | 5 | 29.000 | 1.160 | 0,020 | 0,050 | 26.000 | 1.092 | 0,021 | 0,0450 | 24.500 | 931 | 0,019 | 0,0350 | 21.500 | 688 | 0,016 | 0,0250 |
| 1,0 | 6 | 26.000 | 988 | 0,019 | 0,035 | 23.500 | 917 | 0,020 | 0,0315 | 22.000 | 770 | 0,018 | 0,0245 | 19.500 | 585 | 0,015 | 0,0175 |
| 1,0 | 7 | 26.000 | 988 | 0,019 | 0,035 | 23.500 | 917 | 0,020 | 0,0315 | 22.000 | 770 | 0,018 | 0,0245 | 19.500 | 585 | 0,015 | 0,0175 |
| 1,0 | 8 | 26.000 | 988 | 0,019 | 0,035 | 23.500 | 917 | 0,020 | 0,0315 | 22.000 | 770 | 0,018 | 0,0245 | 19.500 | 585 | 0,015 | 0,0175 |
| 1,0 | 10 | 26.000 | 910 | 0,018 | 0,020 | 23.500 | 823 | 0,018 | 0,0180 | 22.000 | 660 | 0,015 | 0,0140 | 19.500 | 468 | 0,012 | 0,0100 |
| 1,0 | 12 | 23.000 | 690 | 0,015 | 0,020 | 21.000 | 630 | 0,015 | 0,0180 | 19.500 | 390 | 0,010 | 0,0140 | 17.500 | 350 | 0,010 | 0,0100 |
| 1,0 | 15 | 23.000 | 598 | 0,013 | 0,018 | 21.000 | 546 | 0,013 | 0,0162 | 19.500 | 332 | 0,009 | 0,0126 | 17.500 | 298 | 0,009 | 0,0090 |
| 1,0 | 20 | 21.000 | 504 | 0,012 | 0,008 | 19.000 | 456 | 0,012 | 0,0072 | 17.500 | 263 | 0,008 | 0,0056 | 15.500 | 217 | 0,007 | 0,0040 |
| 1,2 | 6 | 26.000 | 1.118 | 0,022 | 0,085 | 23.000 | 989 | 0,022 | 0,0765 | 22.000 | 770 | 0,018 | 0,0595 | 19.500 | 488 | 0,013 | 0,0425 |
| 1,2 | 8 | 23.000 | 874 | 0,019 | 0,048 | 21.000 | 819 | 0,020 | 0,0432 | 19.500 | 683 | 0,018 | 0,0336 | 17.500 | 438 | 0,013 | 0,0240 |
| 1,2 | 10 | 23.000 | 874 | 0,019 | 0,030 | 21.000 | 819 | 0,020 | 0,0270 | 19.500 | 683 | 0,018 | 0,0210 | 17.500 | 438 | 0,013 | 0,0150 |
| 1,2 | 12 | 23.000 | 690 | 0,015 | 0,030 | 21.000 | 630 | 0,015 | 0,0270 | 19.500 | 546 | 0,014 | 0,0210 | 17.500 | 420 | 0,012 | 0,0150 |
| 1,4 | 8 | 22.000 | 836 | 0,019 | 0,075 | 19.000 | 722 | 0,019 | 0,0675 | 18.000 | 540 | 0,015 | 0,0525 | 15.500 | 388 | 0,013 | 0,0375 |
| 1,5 | 6 | 22.500 | 968 | 0,022 | 0,110 | 20.000 | 860 | 0,022 | 0,0990 | 19.000 | 665 | 0,018 | 0,0770 | 17.000 | 510 | 0,015 | 0,0550 |
| 1,5 | 8 | 20.500 | 882 | 0,022 | 0,060 | 18.000 | 774 | 0,022 | 0,0540 | 17.000 | 595 | 0,018 | 0,0420 | 15.000 | 450 | 0,015 | 0,0300 |
| 1,5 | 10 | 20.500 | 779 | 0,019 | 0,060 | 18.000 | 702 | 0,020 | 0,0540 | 17.000 | 595 | 0,018 | 0,0420 | 15.000 | 450 | 0,015 | 0,0300 |
| 1,5 | 12 | 20.500 | 779 | 0,019 | 0,060 | 18.000 | 702 | 0,020 | 0,0540 | 17.000 | 595 | 0,018 | 0,0420 | 15.000 | 405 | 0,014 | 0,0300 |
| 1,5 | 15 | 20.500 | 718 | 0,018 | 0,038 | 18.000 | 540 | 0,015 | 0,0342 | 17.000 | 425 | 0,013 | 0,0266 | 15.000 | 345 | 0,012 | 0,0190 |
| 1,5 | 20 | 18.000 | 612 | 0,017 | 0,038 | 16.000 | 480 | 0,015 | 0,0342 | 15.500 | 310 | 0,010 | 0,0266 | 13.500 | 270 | 0,010 | 0,0190 |
| 1,8 | 10 | 20.500 | 820 | 0,020 | 0,100 | 19.000 | 760 | 0,020 | 0,0900 | 17.500 | 61 | 0,018 | 0,0700 | 15.500 | 465 | 0,015 | 0,0500 |
| 1,8 | 20 | 18.000 | 630 | 0,018 | 0,060 | 18.000 | 594 | 0,017 | 0,0540 | 17.000 | 340 | 0,010 | 0,0420 | 15.500 | 310 | 0,010 | 0,0300 |
| 2,0 | 6 | 17.000 | 952 | 0,028 | 0,200 | 15.000 | 855 | 0,029 | 0,1800 | 14.500 | 653 | 0,023 | 0,1400 | 12.500 | 500 | 0,020 | 0,1000 |
| 2,0 | 8 | 17.000 | 952 | 0,028 | 0,150 | 15.000 | 855 | 0,029 | 0,1350 | 14.500 | 653 | 0,023 | 0,1050 | 12.500 | 500 | 0,020 | 0,0750 |
| 2,0 | 10 | 17.000 | 952 | 0,028 | 0,150 | 15.000 | 855 | 0,029 | 0,1350 | 14.500 | 653 | 0,023 | 0,1050 | 12.500 | 500 | 0,020 | 0,0750 |
| 2,0 | 12 | 15.500 | 884 | 0,029 | 0,080 | 13.500 | 783 | 0,029 | 0,0720 | 13.000 | 585 | 0,023 | 0,0560 | 11.500 | 460 | 0,020 | 0,0400 |
| 2,0 | 15 | 15.500 | 775 | 0,025 | 0,080 | 13.500 | 675 | 0,025 | 0,0720 | 13.000 | 546 | 0,021 | 0,0560 | 11.500 | 437 | 0,019 | 0,0400 |
| 2,0 | 20 | 15.500 | 698 | 0,023 | 0,050 | 13.500 | 621 | 0,023 | 0,0450 | 13.000 | 481 | 0,019 | 0,0350 | 11.500 | 368 | 0,016 | 0,0250 |
| 2,0 | 25 | 13.500 | 608 | 0,023 | 0,050 | 12.000 | 540 | 0,023 | 0,0450 | 11.500 | 311 | 0,014 | 0,0350 | 10.000 | 300 | 0,015 | 0,0250 |
| 2,0 | 30 | 13.500 | 540 | 0,020 | 0,030 | 12.000 | 480 | 0,020 | 0,0270 | 11.500 | 276 | 0,012 | 0,0210 | 10.000 | 270 | 0,014 | 0,0150 |
| 2,5 | 10 | 14.500 | 1.015 | 0,035 | 0,180 | 13.000 | 910 | 0,035 | 0,1620 | 12.500 | 688 | 0,028 | 0,1260 | 11.000 | 528 | 0,024 | 0,0900 |
| 2,5 | 15 | 14.500 | 943 | 0,033 | 0,130 | 12.000 | 780 | 0,033 | 0,1170 | 12.500 | 663 | 0,027 | 0,0910 | 10.500 | 483 | 0,023 | 0,0650 |
| 2,5 | 20 | 13.000 | 780 | 0,030 | 0,100 | 12.000 | 720 | 0,030 | 0,0900 | 11.000 | 495 | 0,023 | 0,0700 | 10.000 | 460 | 0,023 | 0,0500 |
| 2,5 | 25 | 12.000 | 660 | 0,028 | 0,080 | 11.000 | 550 | 0,025 | 0,0720 | 10.000 | 400 | 0,020 | 0,0560 | 9.000 | 378 | 0,021 | 0,0400 |
| 3,0 | 10 | 13.000 | 936 | 0,036 | 0,260 | 11.500 | 828 | 0,036 | 0,2340 | 11.000 | 638 | 0,029 | 0,1820 | 9.500 | 475 | 0,025 | 0,1300 |
| 3,0 | 15 | 13.000 | 910 | 0,035 | 0,180 | 11.500 | 805 | 0,035 | 0,1620 | 11.000 | 638 | 0,029 | 0,1260 | 9.500 | 475 | 0,025 | 0,0900 |
| 3,0 | 20 | 11.500 | 782 | 0,034 | 0,120 | 10.500 | 714 | 0,034 | 0,1080 | 10.000 | 580 | 0,029 | 0,0840 | 8.500 | 425 | 0,025 | 0,0600 |
| 3,0 | 25 | 11.500 | 782 | 0,034 | 0,080 | 10.500 | 714 | 0,034 | 0,0720 | 10.000 | 580 | 0,029 | 0,0560 | 8.500 | 425 | 0,025 | 0,0400 |
| 3,0 | 30 | 11.500 | 656 | 0,029 | 0,080 | 10.500 | 609 | 0,029 | 0,0720 | 10.000 | 580 | 0,029 | 0,0560 | 8.500 | 425 | 0,025 | 0,0400 |
| 4,0 | 10 | 9.500 | 1.805 | 0,095 | 0,430 | 8.500 | 1.403 | 0,083 | 0,3870 | 8.000 | 1.224 | 0,077 | 0,3010 | 7.000 | 805 | 0,058 | 0,2150 |
| 4,0 | 15 | 9.500 | 1.710 | 0,090 | 0,300 | 8.500 | 1.377 | 0,081 | 0,2700 | 8.000 | 1.224 | 0,077 | 0,2100 | 7.000 | 805 | 0,058 | 0,1500 |
| 4,0 | 20 | 8.500 | 1.530 | 0,090 | 0,280 | 7.500 | 1.215 | 0,081 | 0,2520 | 7.000 | 1.071 | 0,077 | 0,1960 | 6.500 | 748 | 0,058 | 0,1400 |
| 4,0 | 25 | 8.500 | 1.360 | 0,080 | 0,150 | 7.500 | 1.088 | 0,073 | 0,1350 | 7.000 | 966 | 0,069 | 0,1050 | 6.500 | 748 | 0,058 | 0,0750 |
| 4,0 | 30 | 8.500 | 1.360 | 0,080 | 0,150 | 7.500 | 1.088 | 0,073 | 0,1350 | 7.000 | | | | | | | |

| Werkstoffgruppe Material group | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels < 850 N/mm ² | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat-treated steels < 35 HRC | | | | |
|-----------------------------------|-----|--|-----------|-------|-------|---------------|---|-----------|-------|--------|---------------|
| d1 | ls | min ¹ | Vf mm/min | fz mm | ap mm | ae mm | min ¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 0,2 | 0,5 | 45.000 | 360 | 0,004 | 0,020 | 0,060 - 0,100 | 45.000 | 315 | 0,004 | 0,0180 | 0,054 - 0,090 |
| 0,2 | 1 | 45.000 | 360 | 0,004 | 0,015 | 0,045 - 0,075 | 45.000 | 315 | 0,004 | 0,0135 | 0,041 - 0,068 |
| 0,3 | 1 | 45.000 | 450 | 0,005 | 0,020 | 0,060 - 0,100 | 45.000 | 450 | 0,005 | 0,0180 | 0,054 - 0,090 |
| 0,3 | 2 | 45.000 | 450 | 0,005 | 0,013 | 0,039 - 0,065 | 45.000 | 405 | 0,005 | 0,0117 | 0,035 - 0,059 |
| 0,3 | 3 | 45.000 | 450 | 0,005 | 0,009 | 0,027 - 0,045 | 45.000 | 405 | 0,005 | 0,0081 | 0,024 - 0,041 |
| 0,4 | 2 | 45.000 | 675 | 0,008 | 0,030 | 0,090 - 0,150 | 45.000 | 540 | 0,006 | 0,0270 | 0,081 - 0,135 |
| 0,4 | 3 | 40.000 | 520 | 0,007 | 0,015 | 0,045 - 0,075 | 39.000 | 390 | 0,005 | 0,0135 | 0,041 - 0,068 |
| 0,4 | 4 | 40.000 | 520 | 0,007 | 0,010 | 0,030 - 0,050 | 39.000 | 390 | 0,005 | 0,0090 | 0,027 - 0,045 |
| 0,5 | 2 | 45.000 | 1.125 | 0,013 | 0,035 | 0,105 - 0,175 | 45.000 | 1.080 | 0,012 | 0,0315 | 0,095 - 0,158 |
| 0,5 | 3 | 43.000 | 860 | 0,010 | 0,030 | 0,090 - 0,150 | 42.000 | 756 | 0,009 | 0,0270 | 0,081 - 0,135 |
| 0,5 | 4 | 35.000 | 700 | 0,010 | 0,020 | 0,060 - 0,100 | 32.000 | 576 | 0,009 | 0,0180 | 0,054 - 0,090 |
| 0,6 | 2 | 45.000 | 2.250 | 0,025 | 0,060 | 0,180 - 0,300 | 45.000 | 2.025 | 0,023 | 0,0540 | 0,162 - 0,270 |
| 0,6 | 3 | 45.000 | 1.620 | 0,018 | 0,040 | 0,120 - 0,200 | 45.000 | 1.620 | 0,018 | 0,0360 | 0,108 - 0,180 |
| 0,6 | 4 | 45.000 | 1.620 | 0,018 | 0,025 | 0,075 - 0,125 | 45.000 | 1.575 | 0,018 | 0,0225 | 0,068 - 0,113 |
| 0,6 | 6 | 43.000 | 1.204 | 0,014 | 0,015 | 0,045 - 0,075 | 42.000 | 1.134 | 0,014 | 0,0135 | 0,041 - 0,068 |
| 0,6 | 8 | 30.000 | 750 | 0,013 | 0,015 | 0,045 - 0,075 | 28.000 | 700 | 0,013 | 0,0135 | 0,041 - 0,068 |
| 0,8 | 2 | 45.000 | 2.475 | 0,028 | 0,120 | 0,360 - 0,600 | 45.000 | 2.475 | 0,028 | 0,1080 | 0,324 - 0,540 |
| 0,8 | 4 | 45.000 | 2.475 | 0,028 | 0,080 | 0,240 - 0,400 | 45.000 | 2.475 | 0,028 | 0,0720 | 0,216 - 0,360 |
| 0,8 | 5 | 45.000 | 2.250 | 0,025 | 0,060 | 0,180 - 0,300 | 45.000 | 2.250 | 0,025 | 0,0540 | 0,162 - 0,270 |
| 0,8 | 6 | 45.000 | 2.025 | 0,023 | 0,040 | 0,120 - 0,200 | 43.000 | 1.935 | 0,023 | 0,0360 | 0,108 - 0,180 |
| 0,8 | 8 | 40.000 | 1.280 | 0,016 | 0,020 | 0,060 - 0,100 | 35.000 | 1.120 | 0,016 | 0,0180 | 0,054 - 0,090 |
| 0,8 | 10 | 30.000 | 900 | 0,015 | 0,020 | 0,060 - 0,100 | 28.000 | 840 | 0,015 | 0,0180 | 0,054 - 0,090 |
| 1,0 | 3 | 45.000 | 3.375 | 0,038 | 0,200 | 0,600 - 1,000 | 45.000 | 3.375 | 0,038 | 0,1800 | 0,540 - 0,900 |
| 1,0 | 4 | 45.000 | 3.375 | 0,038 | 0,150 | 0,450 - 0,750 | 45.000 | 3.375 | 0,038 | 0,1350 | 0,405 - 0,675 |
| 1,0 | 5 | 43.000 | 3.010 | 0,035 | 0,100 | 0,300 - 0,500 | 42.000 | 2.940 | 0,035 | 0,0900 | 0,270 - 0,450 |
| 1,0 | 6 | 42.000 | 2.730 | 0,033 | 0,060 | 0,180 - 0,300 | 40.000 | 2.600 | 0,033 | 0,0540 | 0,162 - 0,270 |
| 1,0 | 7 | 38.000 | 1.710 | 0,023 | 0,060 | 0,180 - 0,300 | 34.000 | 1.530 | 0,023 | 0,0540 | 0,162 - 0,270 |
| 1,0 | 8 | 38.000 | 1.710 | 0,023 | 0,060 | 0,180 - 0,300 | 34.000 | 1.530 | 0,023 | 0,0540 | 0,162 - 0,270 |
| 1,0 | 10 | 38.000 | 1.710 | 0,023 | 0,040 | 0,120 - 0,200 | 34.000 | 1.530 | 0,023 | 0,0360 | 0,108 - 0,180 |
| 1,0 | 12 | 26.000 | 1.092 | 0,021 | 0,025 | 0,075 - 0,125 | 25.000 | 1.000 | 0,020 | 0,0225 | 0,068 - 0,113 |
| 1,0 | 15 | 26.000 | 1.092 | 0,021 | 0,018 | 0,054 - 0,090 | 25.000 | 1.000 | 0,020 | 0,0162 | 0,049 - 0,081 |
| 1,0 | 20 | 21.000 | 840 | 0,020 | 0,010 | 0,030 - 0,050 | 20.000 | 800 | 0,020 | 0,0090 | 0,027 - 0,045 |
| 1,2 | 5 | 45.000 | 3.150 | 0,035 | 0,160 | 0,480 - 0,800 | 35.000 | 2.275 | 0,033 | 0,1440 | 0,432 - 0,720 |
| 1,2 | 6 | 35.000 | 2.100 | 0,030 | 0,110 | 0,330 - 0,550 | 33.000 | 1.980 | 0,030 | 0,0990 | 0,297 - 0,495 |
| 1,2 | 8 | 35.000 | 2.100 | 0,030 | 0,060 | 0,180 - 0,300 | 33.000 | 1.980 | 0,030 | 0,0540 | 0,162 - 0,270 |
| 1,2 | 10 | 34.000 | 1.700 | 0,025 | 0,050 | 0,150 - 0,250 | 30.000 | 1.500 | 0,025 | 0,0450 | 0,135 - 0,225 |
| 1,2 | 12 | 34.000 | 1.564 | 0,023 | 0,045 | 0,135 - 0,225 | 30.000 | 1.350 | 0,023 | 0,0450 | 0,135 - 0,225 |
| 1,5 | 6 | 40.000 | 4.000 | 0,050 | 0,200 | 0,600 - 1,000 | 38.000 | 3.800 | 0,050 | 0,1800 | 0,540 - 0,900 |
| 1,5 | 8 | 32.000 | 2.560 | 0,040 | 0,100 | 0,300 - 0,500 | 30.000 | 2.100 | 0,035 | 0,0900 | 0,270 - 0,450 |
| 1,5 | 10 | 30.000 | 2.100 | 0,035 | 0,090 | 0,270 - 0,450 | 27.000 | 1.890 | 0,035 | 0,0810 | 0,243 - 0,405 |
| 1,5 | 12 | 30.000 | 1.800 | 0,030 | 0,090 | 0,270 - 0,450 | 27.000 | 1.620 | 0,030 | 0,0810 | 0,243 - 0,405 |
| 1,5 | 15 | 26.000 | 1.430 | 0,028 | 0,060 | 0,180 - 0,300 | 24.000 | 1.320 | 0,028 | 0,0540 | 0,162 - 0,270 |
| 1,5 | 20 | 22.000 | 1.100 | 0,025 | 0,040 | 0,120 - 0,200 | 20.000 | 1.100 | 0,028 | 0,0360 | 0,108 - 0,180 |
| 2,0 | 6 | 30.000 | 4.050 | 0,068 | 0,400 | 1,200 - 2,000 | 28.000 | 3.780 | 0,068 | 0,3600 | 1,080 - 1,800 |
| 2,0 | 8 | 30.000 | 4.050 | 0,068 | 0,280 | 0,840 - 1,400 | 28.000 | 3.780 | 0,068 | 0,2520 | 0,756 - 1,260 |
| 2,0 | 10 | 29.000 | 3.480 | 0,060 | 0,200 | 0,600 - 1,000 | 26.000 | 3.120 | 0,060 | 0,1800 | 0,540 - 0,900 |
| 2,0 | 12 | 26.000 | 3.120 | 0,060 | 0,120 | 0,360 - 0,600 | 24.000 | 2.880 | 0,060 | 0,1080 | 0,324 - 0,540 |
| 2,0 | 15 | 24.000 | 1.680 | 0,035 | 0,120 | 0,360 - 0,600 | 24.000 | 1.680 | 0,035 | 0,1080 | 0,324 - 0,540 |
| 2,0 | 20 | 22.000 | 1.540 | 0,035 | 0,075 | 0,225 - 0,375 | 20.000 | 1.400 | 0,035 | 0,0675 | 0,203 - 0,338 |
| 2,0 | 25 | 18.000 | 1.170 | 0,033 | 0,050 | 0,150 - 0,250 | 15.000 | 975 | 0,033 | 0,0450 | 0,135 - 0,225 |
| 2,0 | 30 | 18.000 | 1.170 | 0,033 | 0,030 | 0,090 - 0,150 | 15.000 | 975 | 0,033 | 0,0270 | 0,081 - 0,135 |
| 2,5 | 10 | 26.000 | 4.940 | 0,095 | 0,350 | 1,050 - 1,750 | 25.000 | 4.500 | 0,090 | 0,3150 | 0,945 - 1,575 |
| 2,5 | 15 | 20.000 | 2.700 | 0,068 | 0,150 | 0,450 - 0,750 | 20.000 | 2.600 | 0,065 | 0,1350 | 0,405 - 0,675 |
| 3,0 | 5 | 25.000 | 5.750 | 0,115 | 0,700 | 2,100 - 3,500 | 23.000 | 5.290 | 0,115 | 0,6300 | 1,890 - 3,150 |
| 3,0 | 10 | 24.000 | 5.280 | 0,110 | 0,400 | 1,200 - 2,000 | 22.000 | 4.840 | 0,110 | 0,3600 | 1,080 - 1,800 |
| 3,0 | 15 | 22.000 | 3.630 | 0,083 | 0,300 | 0,900 - 1,500 | 20.000 | 3.300 | 0,083 | 0,2700 | 0,810 - 1,350 |
| 3,0 | 20 | 18.000 | 2.430 | 0,068 | 0,180 | 0,540 - 0,900 | 17.000 | 2.295 | 0,068 | 0,1620 | 0,486 - 0,810 |
| 3,0 | 25 | 18.000 | 2.430 | 0,068 | 0,120 | 0,360 - 0,600 | 17.000 | 2.295 | 0,068 | 0,1080 | 0,324 - 0,540 |
| 3,0 | 30 | 16.000 | 2.160 | 0,068 | 0,120 | 0,360 - 0,600 | 16.000 | 2.160 | 0,068 | 0,1080 | 0,324 - 0,540 |
| 4,0 | 10 | 16.000 | 4.800 | 0,150 | 0,600 | 1,800 - 3,000 | 16.000 | 4.800 | 0,150 | 0,5400 | 1,620 - 2,700 |
| 4,0 | 15 | 16.000 | 4.800 | 0,150 | 0,400 | 1,200 - 2,000 | 15.000 | 4.500 | 0,150 | 0,3600 | 1,080 - 1,800 |
| 4,0 | 20 | 15.000 | 3.600 | 0,120 | 0,400 | 1,200 - 2,000 | 13.000 | 3.120 | 0,120 | 0,3600 | 1,080 - 1,800 |
| 4,0 | 25 | 13.000 | 2.795 | 0,108 | 0,250 | 0,750 - 1,250 | 12.000 | 2.580 | 0,108 | 0,2250 | 0,675 - 1,125 |
| 4,0 | 30 | 12.000 | 2.160 | 0,090 | 0,160 | 0,480 - 0,800 | 11.000 | 1.870 | 0,085 | 0,1440 | 0,432 - 0,720 |
| 5,0 | 10 | 14.000 | 4.900 | 0,175 | 0,800 | 2,400 - 4,000 | 12.000 | 4.200 | 0,175 | 0,7200 | 2,160 - 3,600 |
| 5,0 | 15 | 12.000 | 4.200 | 0,175 | 0,600 | 1,800 - 3,000 | 12.000 | 4.200 | 0,175 | 0,5400 | 1,620 - 2,700 |
| 5,0 | 20 | 12.000 | 4.200 | 0,175 | 0,500 | 1,500 - 2,500 | 11.000 | 3.850 | 0,175 | 0,4500 | 1,350 - 2,250 |
| 5,0 | 25 | 10.000 | 3.400 | 0,170 | 0,500 | 1,500 - 2,500 | 11.000 | 3.740 | 0,170 | 0,4500 | 1,350 - 2,250 |
| 5,0 | 30 | 9.000 | 2.385 | 0,133 | 0,300 | 0,900 - 1,500 | 9.000 | 2.385 | 0,133 | 0,2700 | 0,810 - 1,350 |
| 5,0 | 40 | 9.000 | 1.980 | 0,110 | 0,200 | 0,600 - 1,000 | 9.000 | 1.980 | 0,110 | 0,1800 | 0,540 - 0,900 |
| 6,0 | 10 | 12.000 | 5.400 | 0,225 | 0,800 | 2,400 - 4,000 | 12.000 | 5.400 | 0,225 | 0,7200 | 2,160 - 3,600 |
| 6,0 | 15 | 12.000 | 5.100 | 0,213 | 0,600 | 1,800 - 3,000 | 12.000 | 4.800 | 0,200 | 0,5400 | 1,620 - 2,700 |
| 6,0 | 20 | 12.000 | 4.800 | 0,200 | 0,500 | 1,500 - 2,500 | 11.000 | 4.290 | 0,195 | 0,4500 | 1,350 - 2,250 |
| 6,0 | 25 | 9.000 | 2.925 | 0,163 | 0,400 | 1,200 - 2,000 | 9.000 | 2.880 | 0,160 | 0,3600 | 1,080 - 1,800 |
| 6,0 | 30 | 9.000 | 2.610 | 0,145 | 0,400 | 1,200 - 2,000 | 9.000 | 2.610 | 0,145 | 0,3600 | 1,080 - 1,800 |
| 6,0 | 40 | 8.000 | 2.080 | 0,130 | 0,200 | 0,600 - 1,000 | 8.000 | 2.000 | 0,125 | 0,1800 | 0,540 - 0,900 |

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. Bei Fräsoperationen bei denen sich die Spannuten zusetzen können z. B. beim Rippenfräsen, sollte die Zustelltiefe ap auf 80 % des angegebenen Wertes reduziert werden. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio. If the cutting process may cause clogging such as for rib processing, the cutting depth ap should be reduced to 80 % of the stated value.

| 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat-treated steels 35-45 HRC | | | | | | 8.1 Gehärtete Stähle / Hardened steels 45-55 HRC | | | | |
|--|-----------|-------|--------|---------------|--|--|-----------|-------|--------|---------------|
| min ¹ | Vf mm/min | fz mm | ap mm | ae mm | | min ¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 45.000 | 315 | 0,004 | 0,0160 | 0,048 - 0,080 | | 45.000 | 270 | 0,003 | 0,0130 | 0,039 - 0,065 |
| 45.000 | 315 | 0,004 | 0,0120 | 0,036 - 0,060 | | 45.000 | 270 | 0,003 | 0,0098 | 0,029 - 0,049 |
| 45.000 | 405 | 0,005 | 0,0160 | 0,048 - 0,080 | | 45.000 | 360 | 0,004 | 0,0130 | 0,039 - 0,065 |
| 45.000 | 360 | 0,004 | 0,0104 | 0,031 - 0,052 | | 41.000 | 287 | 0,004 | 0,0085 | 0,025 - 0,042 |
| 45.000 | 360 | 0,004 | 0,0072 | 0,022 - 0,036 | | 41.000 | 287 | 0,004 | 0,0059 | 0,018 - 0,029 |
| 45.000 | 495 | 0,006 | 0,0240 | 0,072 - 0,120 | | 45.000 | 450 | 0,005 | 0,0195 | 0,059 - 0,098 |
| 37.000 | 370 | 0,005 | 0,0120 | 0,036 - 0,060 | | 32.000 | 288 | 0,005 | 0,0098 | 0,029 - 0,049 |
| 37.000 | 296 | 0,004 | 0,0080 | 0,024 - 0,040 | | 32.000 | 288 | 0,005 | 0,0065 | 0,020 - 0,033 |
| 44.000 | 880 | 0,010 | 0,0280 | 0,084 - 0,140 | | 39.000 | 780 | 0,010 | 0,0228 | 0,068 - 0,114 |
| 40.000 | 640 | 0,008 | 0,0240 | 0,072 - 0,120 | | 35.000 | 560 | 0,008 | 0,0195 | 0,059 - 0,098 |
| 30.000 | 480 | 0,008 | 0,0160 | 0,048 - 0,080 | | 32.000 | 512 | 0,008 | 0,0130 | 0,039 - 0,065 |
| 45.000 | 1.800 | 0,020 | 0,0480 | 0,144 - 0,240 | | 45.000 | 1.620 | 0,018 | 0,0390 | 0,117 - 0,195 |
| 45.000 | 1.350 | 0,015 | 0,0320 | 0,096 - 0,160 | | 45.000 | 1.305 | 0,015 | 0,0260 | 0,078 - 0,130 |
| 45.000 | 1.350 | 0,015 | 0,0200 | 0,060 - 0,100 | | 43.000 | 1.161 | 0,014 | 0,0163 | 0,049 - 0,081 |
| 40.000 | 920 | 0,012 | 0,0120 | 0,036 - 0,060 | | 35.000 | 770 | 0,011 | 0,0098 | 0,029 - 0,049 |
| 27.000 | 594 | 0,011 | 0,0120 | 0,036 - 0,060 | | 24.000 | 480 | 0,010 | 0,0098 | 0,029 - 0,049 |
| 45.000 | 2.250 | 0,025 | 0,0960 | 0,288 - 0,480 | | 45.000 | 2.250 | 0,025 | 0,0780 | 0,234 - 0,390 |
| 45.000 | 2.250 | 0,025 | 0,0640 | 0,192 - 0,320 | | 45.000 | 2.250 | 0,025 | 0,0520 | 0,156 - 0,260 |
| 45.000 | 2.025 | 0,023 | 0,0480 | 0,144 - 0,240 | | 43.000 | 1.935 | 0,023 | 0,0390 | 0,117 - 0,195 |
| 43.000 | 1.720 | 0,020 | 0,0320 | 0,096 - 0,160 | | 38.000 | 1.444 | 0,019 | 0,0260 | 0,078 - 0,130 |
| 35.000 | 1.050 | 0,015 | 0,0160 | 0,048 - 0,080 | | 31.000 | 837 | 0,014 | 0,0130 | 0,039 - 0,065 |
| 27.000 | 729 | 0,014 | 0,0160 | 0,048 - 0,080 | | 24.000 | 600 | 0,013 | 0,0130 | 0,039 - 0,065 |
| 45.000 | 2.925 | 0,033 | 0,1600 | 0,480 - 0,800 | | 43.000 | 2.709 | 0,032 | 0,1300 | 0,390 - 0,650 |
| 45.000 | 2.925 | 0,033 | 0,1200 | 0,360 - 0,600 | | 43.000 | 2.709 | 0,032 | 0,0975 | 0,293 - 0,488 |
| 40.000 | 2.600 | 0,033 | 0,0800 | 0,240 - 0,400 | | 43.000 | 2.580 | 0,030 | 0,0650 | 0,195 - 0,325 |
| 38.000 | 2.280 | 0,030 | 0,0480 | 0,144 - 0,240 | | 38.000 | 2.280 | 0,030 | 0,0390 | 0,117 - 0,195 |
| 33.000 | 1.320 | 0,020 | 0,0480 | 0,144 - 0,240 | | 32.000 | 1.280 | 0,020 | 0,0390 | 0,117 - 0,195 |
| 33.000 | 1.320 | 0,020 | 0,0480 | 0,144 - 0,240 | | 32.000 | 1.280 | 0,020 | 0,0390 | 0,117 - 0,195 |
| 33.000 | 1.320 | 0,020 | 0,0320 | 0,096 - 0,160 | | 32.000 | 1.280 | 0,020 | 0,0260 | 0,078 - 0,130 |
| 24.000 | 912 | 0,019 | 0,0200 | 0,060 - 0,100 | | 22.000 | 770 | 0,018 | 0,0163 | 0,049 - 0,081 |
| 24.000 | 912 | 0,019 | 0,0144 | 0,043 - 0,072 | | 22.000 | 770 | 0,018 | 0,0117 | 0,035 - 0,059 |
| 18.000 | 648 | 0,018 | 0,0080 | 0,024 - 0,040 | | 16.000 | 544 | 0,017 | 0,0065 | 0,020 - 0,033 |
| 33.000 | 2.145 | 0,033 | 0,1280 | 0,384 - 0,640 | | 32.000 | 2.080 | 0,033 | 0,1040 | 0,312 - 0,520 |
| 32.000 | 1.920 | 0,030 | 0,0880 | 0,264 - 0,440 | | 30.000 | 1.950 | 0,033 | 0,0715 | 0,215 - 0,358 |
| 32.000 | 1.920 | 0,030 | 0,0480 | 0,144 - 0,240 | | 30.000 | 1.800 | 0,030 | 0,0390 | 0,117 - 0,195 |
| 30.000 | 1.350 | 0,023 | 0,0400 | 0,120 - 0,200 | | 27.000 | 1.080 | 0,020 | 0,0325 | 0,098 - 0,163 |
| 29.000 | 1.305 | 0,023 | 0,0360 | 0,108 - 0,180 | | 26.000 | 1.040 | 0,020 | 0,0293 | 0,088 - 0,146 |
| 36.000 | 3.240 | 0,045 | 0,1600 | 0,480 - 0,800 | | 32.000 | 2.560 | 0,040 | 0,1300 | 0,390 - 0,650 |
| 28.000 | 1.820 | 0,033 | 0,0800 | 0,240 - 0,400 | | 25.000 | 1.500 | 0,030 | 0,0650 | 0,195 - 0,325 |
| 26.000 | 1.690 | 0,033 | 0,0720 | 0,216 - 0,360 | | 23.000 | 1.380 | 0,030 | 0,0585 | 0,176 - 0,293 |
| 26.000 | 1.430 | 0,028 | 0,0720 | 0,216 - 0,360 | | 23.000 | 1.150 | 0,025 | 0,0585 | 0,176 - 0,293 |
| 22.000 | 1.100 | 0,025 | 0,0480 | 0,144 - 0,240 | | 20.000 | 900 | 0,023 | 0,0390 | 0,117 - 0,195 |
| 19.000 | 950 | 0,025 | 0,0320 | 0,096 - 0,160 | | 17.000 | 765 | 0,023 | 0,0260 | 0,078 - 0,130 |
| 27.000 | 3.240 | 0,060 | 0,3200 | 0,960 - 1,600 | | 24.000 | 2.640 | 0,055 | 0,2600 | 0,780 - 1,300 |
| 27.000 | 3.240 | 0,060 | 0,2240 | 0,672 - 1,120 | | 24.000 | 2.640 | 0,055 | 0,1820 | 0,546 - 0,910 |
| 25.000 | 2.750 | 0,055 | 0,1600 | 0,480 - 0,800 | | 22.000 | 2.200 | 0,050 | 0,1300 | 0,390 - 0,650 |
| 22.000 | 2.420 | 0,055 | 0,0960 | 0,288 - 0,480 | | 20.000 | 2.000 | 0,050 | 0,0780 | 0,234 - 0,390 |
| 22.000 | 1.540 | 0,035 | 0,0960 | 0,288 - 0,480 | | 18.000 | 1.440 | 0,040 | 0,0780 | 0,234 - 0,390 |
| 19.000 | 1.235 | 0,033 | 0,0600 | 0,180 - 0,300 | | 18.000 | 1.080 | 0,030 | 0,0488 | 0,146 - 0,244 |
| 14.000 | 840 | 0,030 | 0,0400 | 0,120 - 0,200 | | 13.000 | 715 | 0,028 | 0,0325 | 0,098 - 0,163 |
| 14.000 | 840 | 0,030 | 0,0240 | 0,072 - 0,120 | | 13.000 | 715 | 0,028 | 0,0195 | 0,059 - 0,098 |
| 24.000 | 3.840 | 0,080 | 0,2800 | 0,840 - 1,400 | | 21.000 | 3.150 | 0,075 | 0,2275 | 0,683 - 1,138 |
| 18.000 | 1.980 | 0,055 | 0,1200 | 0,360 - 0,600 | | 16.000 | 1.760 | 0,055 | 0,0975 | 0,293 - 0,488 |
| 21.000 | 4.410 | 0,105 | 0,5600 | 1,680 - 2,800 | | 20.000 | 3.400 | 0,085 | 0,4550 | 1,365 - 2,275 |
| 20.000 | 4.000 | 0,100 | 0,3200 | 0,960 - 1,600 | | 18.000 | 3.060 | 0,085 | 0,2600 | 0,780 - 1,300 |
| 19.000 | 2.850 | 0,075 | 0,2400 | 0,720 - 1,200 | | 17.000 | 2.380 | 0,070 | 0,1950 | 0,585 - 0,975 |
| 16.000 | 1.920 | 0,060 | 0,1440 | 0,432 - 0,720 | | 14.000 | 1.610 | 0,058 | 0,1170 | 0,351 - 0,585 |
| 16.000 | 1.920 | 0,060 | 0,0960 | 0,288 - 0,480 | | 14.000 | 1.610 | 0,058 | 0,0780 | 0,234 - 0,390 |
| 15.000 | 1.800 | 0,060 | 0,0960 | 0,288 - 0,480 | | 13.000 | 1.482 | 0,057 | 0,0780 | 0,234 - 0,390 |
| 15.000 | 4.050 | 0,135 | 0,4800 | 1,440 - 2,400 | | 13.000 | 3.315 | 0,128 | 0,3900 | 1,170 - 1,950 |
| 15.000 | 4.050 | 0,135 | 0,3200 | 0,960 - 1,600 | | 13.000 | 3.315 | 0,128 | 0,2600 | 0,780 - 1,300 |
| 13.000 | 2.600 | 0,100 | 0,3200 | 0,960 - 1,600 | | 11.000 | 2.200 | 0,100 | 0,2600 | 0,780 - 1,300 |
| 11.000 | 2.200 | 0,100 | 0,2000 | 0,600 - 1,000 | | 10.000 | 2.000 | 0,100 | 0,1625 | 0,488 - 0,813 |
| 11.000 | 1.760 | 0,080 | 0,1280 | 0,384 - 0,640 | | 9.000 | 1.350 | 0,075 | 0,1040 | 0,312 - 0,520 |
| 11.000 | 3.300 | 0,150 | 0,6400 | 1,920 - 3,200 | | 10.000 | 2.600 | 0,130 | 0,5200 | 1,560 - 2,600 |
| 11.000 | 3.300 | 0,150 | 0,4800 | 1,440 - 2,400 | | 10.000 | 2.600 | 0,130 | 0,3900 | 1,170 - 1,950 |
| 11.000 | 3.190 | 0,145 | 0,4000 | 1,200 - 2,000 | | 10.000 | 2.600 | 0,130 | 0,3250 | 0,975 - 1,625 |
| 10.000 | 2.900 | 0,145 | 0,4000 | 1,200 - 2,000 | | 9.000 | 2.340 | 0,130 | 0,3250 | 0,975 - 1,625 |
| 9.000 | 2.520 | 0,140 | 0,2400 | 0,720 - 1,200 | | 8.000 | 2.080 | 0,130 | 0,1950 | 0,585 - 0,975 |
| 8.000 | 1.440 | 0,090 | 0,1600 | 0,480 - 0,800 | | 7.000 | 1.260 | 0,090 | 0,1300 | 0,390 - 0,650 |
| 12.000 | 4.560 | 0,190 | 0,6400 | 1,920 - 3,200 | | 11.000 | 3.850 | 0,175 | 0,5200 | 1,560 - 2,600 |
| 11.000 | 3.850 | 0,175 | 0,4800 | 1,440 - 2,400 | | 10.000 | 3.300 | 0,165 | 0,3900 | 1,170 - 1,950 |
| 11.000 | 3.740 | 0,170 | 0,4000 | 1,200 - 2,000 | | 10.000 | 3.200 | 0,160 | 0,3250 | 0,975 - 1,625 |
| 9.000 | 2.700 | 0,150 | 0,3200 | 0,960 - 1,600 | | 9.000 | 2.520 | 0,140 | 0,2600 | 0,780 - 1,300 |
| 9.000 | 2.160 | 0,120 | 0,3200 | 0,960 - 1,600 | | 8.000 | 2.080 | 0,130 | 0,2600 | 0,780 - 1,300 |
| 8.000 | 1.600 | 0,100 | 0,1600 | 0,480 - 0,800 | | 7.000 | 1.120 | 0,080 | 0,1300 | 0,390 - 0,650 |

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. Bei Fräs-Operationen bei denen sich die Spannten zusetzen können z. B. beim Rippenfräsen, sollte die Zustelltiefe ap auf 80 % des angegebenen Wertes reduziert werden. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio. If the cutting process may cause clogging such as for rib processing, the cutting depth ap should be reduced to 80 % of the stated value.



| Werkstoffgruppe Material group | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels < 850 N/mm ² | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat-treated steels < 35 HRC | | | | |
|-----------------------------------|-----|--|-------|------------------|-----------|---------------|---|-------|------------------|-----------|---------------|
| | | d1 | ls | min ¹ | Vf mm/min | fz mm | ap mm | ae mm | min ¹ | Vf mm/min | fz mm |
| 0,2 | 0,5 | 45.000 | 315 | 0,004 | 0,015 | 0,045 - 0,075 | 45.000 | 315 | 0,004 | 0,0135 | 0,041 - 0,068 |
| | 1 | 45.000 | 315 | 0,004 | 0,010 | 0,030 - 0,050 | 45.000 | 315 | 0,004 | 0,0090 | 0,027 - 0,045 |
| 0,3 | 1 | 45.000 | 450 | 0,005 | 0,015 | 0,045 - 0,075 | 45.000 | 450 | 0,005 | 0,0135 | 0,041 - 0,068 |
| | 2 | 45.000 | 405 | 0,005 | 0,010 | 0,030 - 0,050 | 45.000 | 405 | 0,005 | 0,0090 | 0,027 - 0,045 |
| 0,3 | 3 | 45.000 | 405 | 0,005 | 0,005 | 0,015 - 0,025 | 45.000 | 405 | 0,005 | 0,0045 | 0,014 - 0,023 |
| | 2 | 45.000 | 540 | 0,006 | 0,030 | 0,090 - 0,150 | 43.000 | 516 | 0,006 | 0,0270 | 0,081 - 0,135 |
| 0,4 | 3 | 43.000 | 430 | 0,005 | 0,010 | 0,030 - 0,050 | 39.000 | 429 | 0,006 | 0,0090 | 0,027 - 0,045 |
| | 4 | 43.000 | 430 | 0,005 | 0,005 | 0,015 - 0,025 | 39.000 | 429 | 0,006 | 0,0045 | 0,014 - 0,023 |
| 0,5 | 2 | 40.000 | 800 | 0,010 | 0,035 | 0,105 - 0,175 | 36.000 | 720 | 0,010 | 0,0315 | 0,095 - 0,158 |
| | 3 | 36.000 | 648 | 0,009 | 0,030 | 0,090 - 0,150 | 32.500 | 585 | 0,009 | 0,0270 | 0,081 - 0,135 |
| 0,5 | 4 | 36.000 | 648 | 0,009 | 0,020 | 0,060 - 0,100 | 32.500 | 585 | 0,009 | 0,0180 | 0,054 - 0,090 |
| | 2 | 40.000 | 1.200 | 0,015 | 0,040 | 0,120 - 0,200 | 36.000 | 1.080 | 0,015 | 0,0360 | 0,108 - 0,180 |
| 0,6 | 3 | 40.000 | 1.200 | 0,015 | 0,035 | 0,105 - 0,175 | 36.000 | 1.080 | 0,015 | 0,0315 | 0,095 - 0,158 |
| | 4 | 36.000 | 1.008 | 0,014 | 0,025 | 0,075 - 0,125 | 32.500 | 910 | 0,014 | 0,0225 | 0,068 - 0,113 |
| 0,6 | 6 | 36.000 | 972 | 0,014 | 0,015 | 0,045 - 0,075 | 32.500 | 813 | 0,013 | 0,0135 | 0,041 - 0,068 |
| | 8 | 32.000 | 800 | 0,013 | 0,008 | 0,024 - 0,040 | 29.000 | 725 | 0,013 | 0,0072 | 0,022 - 0,036 |
| 0,8 | 2 | 40.000 | 1.400 | 0,018 | 0,080 | 0,240 - 0,400 | 36.000 | 1.260 | 0,018 | 0,0720 | 0,216 - 0,360 |
| | 4 | 40.000 | 1.400 | 0,018 | 0,055 | 0,165 - 0,275 | 36.000 | 1.260 | 0,018 | 0,0495 | 0,149 - 0,248 |
| 0,8 | 5 | 36.000 | 1.152 | 0,016 | 0,045 | 0,135 - 0,225 | 32.500 | 975 | 0,015 | 0,0405 | 0,122 - 0,203 |
| | 6 | 36.000 | 1.152 | 0,016 | 0,030 | 0,090 - 0,150 | 32.500 | 975 | 0,015 | 0,0270 | 0,081 - 0,135 |
| 0,8 | 8 | 32.000 | 960 | 0,015 | 0,020 | 0,060 - 0,100 | 29.000 | 870 | 0,015 | 0,0180 | 0,054 - 0,090 |
| | 10 | 32.000 | 960 | 0,015 | 0,010 | 0,030 - 0,050 | 29.000 | 870 | 0,015 | 0,0090 | 0,027 - 0,045 |
| 1,0 | 3 | 36.000 | 1.800 | 0,025 | 0,100 | 0,300 - 0,500 | 32.500 | 1.625 | 0,025 | 0,0900 | 0,270 - 0,450 |
| | 4 | 36.000 | 1.800 | 0,025 | 0,070 | 0,210 - 0,350 | 32.500 | 1.625 | 0,025 | 0,0630 | 0,189 - 0,315 |
| 1,0 | 5 | 36.000 | 1.800 | 0,025 | 0,060 | 0,180 - 0,300 | 32.500 | 1.625 | 0,025 | 0,0540 | 0,162 - 0,270 |
| | 6 | 32.500 | 1.463 | 0,023 | 0,040 | 0,120 - 0,200 | 29.000 | 1.305 | 0,023 | 0,0360 | 0,108 - 0,180 |
| 1,0 | 7 | 32.000 | 1.440 | 0,023 | 0,040 | 0,120 - 0,200 | 29.000 | 1.305 | 0,023 | 0,0360 | 0,108 - 0,180 |
| | 8 | 32.500 | 1.463 | 0,023 | 0,040 | 0,120 - 0,200 | 29.000 | 1.305 | 0,023 | 0,0360 | 0,108 - 0,180 |
| 1,0 | 10 | 32.500 | 1.463 | 0,023 | 0,025 | 0,075 - 0,125 | 29.000 | 1.305 | 0,023 | 0,0225 | 0,068 - 0,113 |
| | 12 | 29.000 | 1.160 | 0,020 | 0,013 | 0,039 - 0,065 | 26.000 | 1.040 | 0,020 | 0,0117 | 0,035 - 0,059 |
| 1,0 | 15 | 29.000 | 1.160 | 0,020 | 0,010 | 0,030 - 0,050 | 26.000 | 1.040 | 0,020 | 0,0090 | 0,027 - 0,045 |
| | 20 | 21.500 | 860 | 0,020 | 0,005 | 0,015 - 0,025 | 19.500 | 780 | 0,020 | 0,0045 | 0,014 - 0,023 |
| 1,2 | 5 | 30.000 | 1.500 | 0,025 | 0,070 | 0,210 - 0,350 | 26.000 | 1.300 | 0,025 | 0,0630 | 0,189 - 0,315 |
| | 6 | 29.000 | 1.450 | 0,025 | 0,060 | 0,180 - 0,300 | 26.000 | 1.300 | 0,025 | 0,0540 | 0,162 - 0,270 |
| 1,2 | 8 | 29.000 | 1.450 | 0,025 | 0,040 | 0,120 - 0,200 | 26.000 | 1.300 | 0,025 | 0,0360 | 0,108 - 0,180 |
| | 10 | 29.000 | 1.450 | 0,025 | 0,035 | 0,105 - 0,175 | 26.000 | 1.170 | 0,023 | 0,0315 | 0,095 - 0,158 |
| 1,2 | 12 | 29.000 | 1.305 | 0,023 | 0,030 | 0,090 - 0,150 | 26.000 | 1.170 | 0,023 | 0,0270 | 0,081 - 0,135 |
| | 6 | 28.000 | 1.820 | 0,033 | 0,100 | 0,300 - 0,500 | 25.000 | 1.625 | 0,033 | 0,0900 | 0,270 - 0,450 |
| 1,5 | 8 | 25.000 | 1.500 | 0,030 | 0,050 | 0,150 - 0,250 | 23.000 | 1.380 | 0,030 | 0,0450 | 0,135 - 0,225 |
| | 10 | 25.000 | 1.500 | 0,030 | 0,050 | 0,150 - 0,250 | 23.000 | 1.380 | 0,030 | 0,0450 | 0,135 - 0,225 |
| 1,5 | 12 | 25.000 | 1.500 | 0,030 | 0,050 | 0,150 - 0,250 | 23.000 | 1.380 | 0,030 | 0,0450 | 0,135 - 0,225 |
| | 15 | 25.000 | 1.500 | 0,030 | 0,030 | 0,090 - 0,150 | 20.000 | 1.100 | 0,028 | 0,0270 | 0,081 - 0,135 |
| 1,5 | 20 | 22.500 | 1.238 | 0,028 | 0,020 | 0,060 - 0,100 | 20.000 | 1.100 | 0,028 | 0,0180 | 0,054 - 0,090 |
| | 6 | 21.000 | 1.890 | 0,045 | 0,200 | 0,600 - 1,000 | 19.000 | 1.710 | 0,045 | 0,1800 | 0,540 - 0,900 |
| 2,0 | 8 | 21.000 | 1.890 | 0,045 | 0,150 | 0,450 - 0,750 | 19.000 | 1.710 | 0,045 | 0,1350 | 0,405 - 0,675 |
| | 10 | 21.000 | 1.680 | 0,040 | 0,150 | 0,450 - 0,750 | 19.000 | 1.520 | 0,040 | 0,1350 | 0,405 - 0,675 |
| 2,0 | 12 | 19.000 | 1.520 | 0,040 | 0,080 | 0,240 - 0,400 | 17.000 | 1.360 | 0,040 | 0,0720 | 0,216 - 0,360 |
| | 15 | 19.000 | 1.425 | 0,038 | 0,080 | 0,240 - 0,400 | 17.000 | 1.360 | 0,040 | 0,0720 | 0,216 - 0,360 |
| 2,0 | 20 | 19.000 | 1.330 | 0,035 | 0,050 | 0,150 - 0,250 | 17.000 | 1.190 | 0,035 | 0,0450 | 0,135 - 0,225 |
| | 25 | 17.000 | 1.105 | 0,033 | 0,035 | 0,105 - 0,175 | 15.000 | 975 | 0,033 | 0,0315 | 0,095 - 0,158 |
| 2,0 | 30 | 17.000 | 1.105 | 0,033 | 0,015 | 0,045 - 0,075 | 15.000 | 975 | 0,033 | 0,0135 | 0,041 - 0,068 |
| | 10 | 19.000 | 2.280 | 0,060 | 0,170 | 0,510 - 0,850 | 17.000 | 2.040 | 0,060 | 0,1530 | 0,459 - 0,765 |
| 2,5 | 15 | 17.000 | 1.870 | 0,055 | 0,100 | 0,300 - 0,500 | 15.000 | 1.650 | 0,055 | 0,0900 | 0,270 - 0,450 |
| | 5 | 16.000 | 2.880 | 0,090 | 0,200 | 0,600 - 1,000 | 14.500 | 2.465 | 0,085 | 0,1800 | 0,540 - 0,900 |
| 3,0 | 10 | 16.000 | 2.400 | 0,075 | 0,200 | 0,600 - 1,000 | 14.500 | 2.175 | 0,075 | 0,1800 | 0,540 - 0,900 |
| | 15 | 16.000 | 2.160 | 0,068 | 0,200 | 0,600 - 1,000 | 14.500 | 1.958 | 0,068 | 0,1800 | 0,540 - 0,900 |
| 3,0 | 20 | 14.500 | 1.958 | 0,068 | 0,120 | 0,360 - 0,600 | 13.000 | 1.755 | 0,068 | 0,1080 | 0,324 - 0,540 |
| | 25 | 14.500 | 1.958 | 0,068 | 0,080 | 0,240 - 0,400 | 13.000 | 1.755 | 0,068 | 0,0720 | 0,216 - 0,360 |
| 3,0 | 30 | 14.500 | 1.885 | 0,065 | 0,080 | 0,240 - 0,400 | 13.000 | 1.755 | 0,068 | 0,0720 | 0,216 - 0,360 |
| | 10 | 11.500 | 2.300 | 0,100 | 0,400 | 1,200 - 2,000 | 10.500 | 2.100 | 0,100 | 0,3600 | 1,080 - 1,800 |
| 4,0 | 15 | 11.500 | 2.300 | 0,100 | 0,300 | 0,900 - 1,500 | 10.500 | 2.100 | 0,100 | 0,2700 | 0,810 - 1,350 |
| | 20 | 11.500 | 2.300 | 0,100 | 0,280 | 0,840 - 1,400 | 10.500 | 2.100 | 0,100 | 0,2520 | 0,756 - 1,260 |
| 4,0 | 25 | 10.500 | 1.890 | 0,090 | 0,150 | 0,450 - 0,750 | 9.500 | 1.710 | 0,090 | 0,1350 | 0,405 - 0,675 |
| | 30 | 10.500 | 1.890 | 0,090 | 0,150 | 0,450 - 0,750 | 9.500 | 1.710 | 0,090 | 0,1350 | 0,405 - 0,675 |
| 5,0 | 10 | 9.000 | 2.250 | 0,125 | 0,430 | 1,290 - 2,150 | 8.500 | 2.125 | 0,125 | 0,3870 | 1,161 - 1,935 |
| | 15 | 9.000 | 2.250 | 0,125 | 0,350 | 1,050 - 1,750 | 8.500 | 2.125 | 0,125 | 0,3150 | 0,945 - 1,575 |
| 5,0 | 20 | 9.000 | 2.160 | 0,120 | 0,350 | 1,050 - 1,750 | 8.000 | 1.920 | 0,120 | 0,3150 | 0,945 - 1,575 |
| | 25 | 9.000 | 2.160 | 0,120 | 0,350 | 1,050 - 1,750 | 8.000 | 1.920 | 0,120 | 0,3150 | 0,945 - 1,575 |
| 5,0 | 30 | 8.000 | 1.920 | 0,120 | 0,200 | 0,600 - 1,000 | 7.500 | 1.800 | 0,120 | 0,1800 | 0,540 - 0,900 |
| | 40 | 8.000 | 1.720 | 0,108 | 0,200 | 0,600 - 1,000 | 7.500 | 1.613 | 0,108 | 0,1800 | 0,540 - 0,900 |
| 6,0 | 10 | 9.000 | 2.520 | 0,140 | 0,600 | 1,800 - 3,000 | 8.500 | 2.380 | 0,140 | 0,5400 | 1,620 - 2,700 |
| | 15 | 9.000 | 2.520 | 0,140 | 0,600 | 1,800 - 3,000 | 8.000 | 2.240 | 0,140 | 0,5400 | 1,620 - 2,700 |
| 6,0 | 20 | 8.500 | 2.210 | 0,130 | 0,500 | 1,500 - 2,500 | 7.500 | 1.950 | 0,130 | 0,4500 | 1,350 - 2,250 |
| | 25 | 8.000 | 2.000 | 0,125 | 0,400 | 1,200 - 2,000 | 7.500 | 1.875 | 0,125 | 0,3600 | 1,080 - 1,800 |
| 6,0 | 30 | 8.000 | 1.920 | 0,120 | 0,400 | 1,200 - 2,000 | 7.000 | 1.680 | 0,120 | 0,3600 | 1,080 - 1,800 |
| | 40 | 8.000 | 1.760 | 0,110 | 0,200 | 0,600 - 1,000 | 6.500 | 1.430 | 0,110 | 0,1800 | 0,540 - 0,900 |

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| 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat-treated steels 35-45 HRC | | | | | | 8.1 Gehärtete Stähle / Hardened steels 45-55 HRC | | | | |
|--|-----------|-------|--------|---------------|--|--|-----------|-------|--------|---------------|
| min ¹ | Vf mm/min | fz mm | ap mm | ae mm | | min ¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 45.000 | 270 | 0,003 | 0,0120 | 0,036 - 0,060 | | 45.000 | 270 | 0,003 | 0,0098 | 0,029 - 0,049 |
| 45.000 | 270 | 0,003 | 0,0080 | 0,024 - 0,040 | | 45.000 | 270 | 0,003 | 0,0065 | 0,020 - 0,033 |
| 45.000 | 405 | 0,004 | 0,0120 | 0,036 - 0,060 | | 45.000 | 360 | 0,004 | 0,0098 | 0,029 - 0,049 |
| 45.000 | 360 | 0,004 | 0,0080 | 0,024 - 0,040 | | 41.000 | 328 | 0,004 | 0,0065 | 0,020 - 0,033 |
| 45.000 | 360 | 0,004 | 0,0040 | 0,012 - 0,020 | | 41.000 | 287 | 0,004 | 0,0033 | 0,010 - 0,016 |
| 41.000 | 410 | 0,005 | 0,0240 | 0,072 - 0,120 | | 36.000 | 360 | 0,005 | 0,0195 | 0,059 - 0,098 |
| 37.000 | 370 | 0,005 | 0,0080 | 0,024 - 0,040 | | 32.500 | 293 | 0,005 | 0,0065 | 0,020 - 0,033 |
| 37.000 | 370 | 0,005 | 0,0040 | 0,012 - 0,020 | | 32.500 | 293 | 0,005 | 0,0033 | 0,010 - 0,016 |
| 34.000 | 612 | 0,009 | 0,0280 | 0,084 - 0,140 | | 30.000 | 540 | 0,009 | 0,0228 | 0,068 - 0,114 |
| 31.000 | 465 | 0,008 | 0,0240 | 0,072 - 0,120 | | 27.000 | 432 | 0,008 | 0,0195 | 0,059 - 0,098 |
| 31.000 | 465 | 0,008 | 0,0160 | 0,048 - 0,080 | | 27.000 | 432 | 0,008 | 0,0130 | 0,039 - 0,065 |
| 34.000 | 850 | 0,013 | 0,0320 | 0,096 - 0,160 | | 30.000 | 720 | 0,012 | 0,0260 | 0,078 - 0,130 |
| 34.000 | 850 | 0,013 | 0,0280 | 0,084 - 0,140 | | 30.000 | 720 | 0,012 | 0,0228 | 0,068 - 0,114 |
| 30.500 | 763 | 0,013 | 0,0200 | 0,060 - 0,100 | | 27.000 | 594 | 0,011 | 0,0163 | 0,049 - 0,081 |
| 30.500 | 702 | 0,012 | 0,0120 | 0,036 - 0,060 | | 27.000 | 540 | 0,010 | 0,0098 | 0,029 - 0,049 |
| 27.000 | 594 | 0,011 | 0,0064 | 0,019 - 0,032 | | 24.000 | 480 | 0,010 | 0,0052 | 0,016 - 0,026 |
| 34.000 | 1.088 | 0,016 | 0,0640 | 0,192 - 0,320 | | 30.000 | 900 | 0,015 | 0,0520 | 0,156 - 0,260 |
| 34.000 | 1.088 | 0,016 | 0,0440 | 0,132 - 0,220 | | 30.000 | 900 | 0,015 | 0,0358 | 0,107 - 0,179 |
| 30.500 | 854 | 0,014 | 0,0360 | 0,108 - 0,180 | | 27.000 | 675 | 0,013 | 0,0293 | 0,088 - 0,146 |
| 30.500 | 854 | 0,014 | 0,0240 | 0,072 - 0,120 | | 27.000 | 675 | 0,013 | 0,0195 | 0,059 - 0,098 |
| 27.000 | 756 | 0,014 | 0,0160 | 0,048 - 0,080 | | 24.000 | 600 | 0,013 | 0,0130 | 0,039 - 0,065 |
| 27.000 | 729 | 0,014 | 0,0080 | 0,024 - 0,040 | | 24.000 | 600 | 0,013 | 0,0065 | 0,020 - 0,033 |
| 30.500 | 1.373 | 0,023 | 0,0800 | 0,240 - 0,400 | | 27.000 | 1.080 | 0,020 | 0,0650 | 0,195 - 0,325 |
| 30.500 | 1.373 | 0,023 | 0,0560 | 0,168 - 0,280 | | 27.000 | 1.080 | 0,020 | 0,0455 | 0,137 - 0,228 |
| 30.500 | 1.373 | 0,023 | 0,0480 | 0,144 - 0,240 | | 27.000 | 1.080 | 0,020 | 0,0390 | 0,117 - 0,195 |
| 27.500 | 1.100 | 0,020 | 0,0320 | 0,096 - 0,160 | | 24.500 | 907 | 0,019 | 0,0260 | 0,078 - 0,130 |
| 27.500 | 1.100 | 0,020 | 0,0320 | 0,096 - 0,160 | | 24.500 | 907 | 0,019 | 0,0260 | 0,078 - 0,130 |
| 27.500 | 1.100 | 0,020 | 0,0320 | 0,096 - 0,160 | | 24.500 | 907 | 0,019 | 0,0260 | 0,078 - 0,130 |
| 27.500 | 1.100 | 0,020 | 0,0200 | 0,060 - 0,100 | | 24.500 | 907 | 0,019 | 0,0163 | 0,049 - 0,081 |
| 24.500 | 931 | 0,019 | 0,0104 | 0,031 - 0,052 | | 21.500 | 753 | 0,018 | 0,0085 | 0,025 - 0,042 |
| 24.500 | 931 | 0,019 | 0,0080 | 0,024 - 0,040 | | 21.500 | 753 | 0,018 | 0,0065 | 0,020 - 0,033 |
| 18.500 | 648 | 0,018 | 0,0040 | 0,012 - 0,020 | | 16.000 | 528 | 0,017 | 0,0033 | 0,010 - 0,016 |
| 25.500 | 1.148 | 0,023 | 0,0560 | 0,168 - 0,280 | | 23.000 | 989 | 0,022 | 0,0455 | 0,137 - 0,228 |
| 24.500 | 1.103 | 0,023 | 0,0480 | 0,144 - 0,240 | | 21.500 | 925 | 0,022 | 0,0390 | 0,117 - 0,195 |
| 24.500 | 1.103 | 0,023 | 0,0320 | 0,096 - 0,160 | | 21.500 | 925 | 0,022 | 0,0260 | 0,078 - 0,130 |
| 24.500 | 1.103 | 0,023 | 0,0280 | 0,084 - 0,140 | | 21.500 | 860 | 0,020 | 0,0228 | 0,068 - 0,114 |
| 24.500 | 1.103 | 0,023 | 0,0240 | 0,072 - 0,120 | | 21.500 | 860 | 0,020 | 0,0195 | 0,059 - 0,098 |
| 24.000 | 1.440 | 0,030 | 0,0800 | 0,240 - 0,400 | | 21.000 | 1.155 | 0,028 | 0,0650 | 0,195 - 0,325 |
| 21.500 | 1.183 | 0,028 | 0,0400 | 0,120 - 0,200 | | 19.000 | 950 | 0,025 | 0,0325 | 0,098 - 0,163 |
| 21.500 | 1.183 | 0,028 | 0,0400 | 0,120 - 0,200 | | 19.000 | 912 | 0,024 | 0,0325 | 0,098 - 0,163 |
| 21.500 | 1.183 | 0,028 | 0,0400 | 0,120 - 0,200 | | 19.000 | 912 | 0,024 | 0,0325 | 0,098 - 0,163 |
| 19.000 | 950 | 0,025 | 0,0240 | 0,072 - 0,120 | | 17.000 | 765 | 0,023 | 0,0195 | 0,059 - 0,098 |
| 19.000 | 950 | 0,025 | 0,0160 | 0,048 - 0,080 | | 17.000 | 765 | 0,023 | 0,0130 | 0,039 - 0,065 |
| 18.000 | 1.440 | 0,040 | 0,1600 | 0,480 - 0,800 | | 16.000 | 1.200 | 0,038 | 0,1300 | 0,390 - 0,650 |
| 18.000 | 1.440 | 0,040 | 0,1200 | 0,360 - 0,600 | | 16.000 | 1.200 | 0,038 | 0,0975 | 0,293 - 0,488 |
| 18.000 | 1.260 | 0,035 | 0,1200 | 0,360 - 0,600 | | 16.000 | 1.088 | 0,034 | 0,0975 | 0,293 - 0,488 |
| 16.000 | 1.120 | 0,035 | 0,0640 | 0,192 - 0,320 | | 14.000 | 952 | 0,034 | 0,0520 | 0,156 - 0,260 |
| 16.000 | 1.120 | 0,035 | 0,0640 | 0,192 - 0,320 | | 14.000 | 910 | 0,033 | 0,0520 | 0,156 - 0,260 |
| 16.000 | 1.040 | 0,033 | 0,0400 | 0,120 - 0,200 | | 14.000 | 840 | 0,030 | 0,0325 | 0,098 - 0,163 |
| 14.500 | 870 | 0,030 | 0,0280 | 0,084 - 0,140 | | 12.500 | 725 | 0,029 | 0,0228 | 0,068 - 0,114 |
| 14.500 | 870 | 0,030 | 0,0120 | 0,036 - 0,060 | | 12.500 | 725 | 0,029 | 0,0098 | 0,029 - 0,049 |
| 16.000 | 1.600 | 0,050 | 0,1360 | 0,408 - 0,680 | | 14.000 | 1.386 | 0,050 | 0,1105 | 0,332 - 0,553 |
| 14.000 | 1.400 | 0,050 | 0,0800 | 0,240 - 0,400 | | 12.500 | 1.125 | 0,045 | 0,0650 | 0,195 - 0,325 |
| 14.000 | 1.960 | 0,070 | 0,1600 | 0,480 - 0,800 | | 12.000 | 1.560 | 0,065 | 0,1300 | 0,390 - 0,650 |
| 13.500 | 1.823 | 0,067 | 0,1600 | 0,480 - 0,800 | | 12.000 | 1.500 | 0,063 | 0,1300 | 0,390 - 0,650 |
| 13.500 | 1.755 | 0,065 | 0,1600 | 0,480 - 0,800 | | 12.000 | 1.500 | 0,063 | 0,1300 | 0,390 - 0,650 |
| 12.500 | 1.500 | 0,060 | 0,0960 | 0,288 - 0,480 | | 11.000 | 1.243 | 0,057 | 0,0780 | 0,234 - 0,390 |
| 12.500 | 1.500 | 0,060 | 0,0640 | 0,192 - 0,320 | | 11.000 | 1.243 | 0,057 | 0,0520 | 0,156 - 0,260 |
| 12.500 | 1.500 | 0,060 | 0,0640 | 0,192 - 0,320 | | 11.000 | 1.243 | 0,057 | 0,0520 | 0,156 - 0,260 |
| 10.000 | 1.800 | 0,090 | 0,3200 | 0,960 - 1,600 | | 8.500 | 1.445 | 0,085 | 0,2600 | 0,780 - 1,300 |
| 10.000 | 1.800 | 0,090 | 0,2400 | 0,720 - 1,200 | | 8.500 | 1.445 | 0,085 | 0,1950 | 0,585 - 0,975 |
| 10.000 | 1.800 | 0,090 | 0,2240 | 0,672 - 1,120 | | 8.500 | 1.445 | 0,085 | 0,1820 | 0,546 - 0,910 |
| 9.000 | 1.440 | 0,080 | 0,1200 | 0,360 - 0,600 | | 8.000 | 1.200 | 0,075 | 0,0975 | 0,293 - 0,488 |
| 9.000 | 1.440 | 0,080 | 0,1200 | 0,360 - 0,600 | | 7.500 | 1.125 | 0,075 | 0,0975 | 0,293 - 0,488 |
| 8.000 | 1.760 | 0,110 | 0,3440 | 1,032 - 1,720 | | 7.500 | 1.650 | 0,110 | 0,2795 | 0,839 - 1,398 |
| 8.000 | 1.600 | 0,100 | 0,2800 | 0,840 - 1,400 | | 7.500 | 1.500 | 0,100 | 0,2275 | 0,683 - 1,138 |
| 7.500 | 1.500 | 0,100 | 0,2800 | 0,840 - 1,400 | | 7.000 | 1.400 | 0,100 | 0,2275 | 0,683 - 1,138 |
| 7.500 | 1.500 | 0,100 | 0,2800 | 0,840 - 1,400 | | 6.500 | 1.300 | 0,100 | 0,2275 | 0,683 - 1,138 |
| 7.000 | 1.400 | 0,100 | 0,1600 | 0,480 - 0,800 | | 6.000 | 1.200 | 0,100 | 0,1300 | 0,390 - 0,650 |
| 7.000 | 1.260 | 0,090 | 0,1600 | 0,480 - 0,800 | | 6.000 | 1.080 | 0,090 | 0,1300 | 0,390 - 0,650 |
| 8.000 | 2.000 | 0,125 | 0,4800 | 1,440 - 2,400 | | 7.000 | 1.610 | 0,115 | 0,3900 | 1,170 - 1,950 |
| 7.500 | 1.725 | 0,115 | 0,4800 | 1,440 - 2,400 | | 6.500 | 1.365 | 0,105 | 0,3900 | 1,170 - 1,950 |
| 7.000 | 1.610 | 0,115 | 0,4000 | 1,200 - 2,000 | | 6.500 | 1.365 | 0,105 | 0,3250 | 0,975 - 1,625 |
| 7.000 | 1.540 | 0,110 | 0,3200 | 0,960 - 1,600 | | 6.000 | 1.200 | 0,100 | 0,2600 | 0,780 - 1,300 |
| 7.000 | 1.400 | 0,100 | 0,3200 | 0,960 - 1,600 | | 6.000 | 1.200 | 0,100 | 0,2600 | 0,780 - 1,300 |
| 6.000 | 1.200 | 0,100 | 0,1600 | 0,480 - 0,800 | | 5.500 | 990 | 0,090 | 0,1300 | 0,390 - 0,650 |

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. Bei Fräsoperationen bei denen sich die Spanntun zusetzen können z. B. beim Rippenfräsen, sollte die Zustelltiefe ap auf 80 % des angegebenen Wertes reduziert werden. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio. If the cutting process may cause clogging such as for rib processing, the cutting depth ap should be reduced to 80 % of the stated value.





30 6261

30 6262

Richtwerte für den Einsatz von Karnasch Vollhartmetall-Fräsern für HSC/HHC/HPC-Bearbeitung
Recommended cutting data for solid carbide end mills HSC/HHC/HPC

30 6255

30 6265

30 6256

| Werkstoffgruppe Material group | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels < 850 N/mm ² | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat-treated steels < 35 HRC (1200 N/mm ²) | | | | | | |
|-----------------------------------|-----|--|-----------|-------|-------|---|-----------|-------|-------|--|--|--|
| d1 | ls | min ¹ | Vf mm/min | fz mm | ap mm | min ¹ | Vf mm/min | fz mm | ap mm | | | |
| 0,1 | 0,2 | 50.000 | 1.000 | 0,010 | 0,015 | 45.000 | 900 | 0,010 | 0,010 | | | |
| 0,1 | 0,3 | 50.000 | 1.000 | 0,010 | 0,014 | 45.000 | 900 | 0,010 | 0,010 | | | |
| 0,1 | 0,4 | 50.000 | 1.000 | 0,010 | 0,010 | 45.000 | 900 | 0,010 | 0,008 | | | |
| 0,2 | 0,5 | 50.000 | 1.400 | 0,014 | 0,020 | 45.000 | 1.300 | 0,014 | 0,018 | | | |
| 0,2 | 1 | 50.000 | 1.400 | 0,014 | 0,014 | 45.000 | 1.300 | 0,014 | 0,013 | | | |
| 0,2 | 1,5 | 48.000 | 960 | 0,010 | 0,008 | 40.000 | 800 | 0,010 | 0,006 | | | |
| 0,2 | 2 | 42.000 | 840 | 0,010 | 0,008 | 36.000 | 720 | 0,010 | 0,006 | | | |
| 0,3 | 1 | 48.000 | 1.800 | 0,018 | 0,018 | 43.000 | 1.600 | 0,018 | 0,018 | | | |
| 0,3 | 1,5 | 45.000 | 1.620 | 0,018 | 0,018 | 38.000 | 1.064 | 0,014 | 0,015 | | | |
| 0,3 | 2 | 43.000 | 1.500 | 0,017 | 0,012 | 39.000 | 1.350 | 0,017 | 0,010 | | | |
| 0,3 | 2,5 | 41.000 | 1.312 | 0,016 | 0,010 | 34.000 | 952 | 0,014 | 0,008 | | | |
| 0,3 | 3 | 38.000 | 1.050 | 0,014 | 0,008 | 34.000 | 1.200 | 0,016 | 0,006 | | | |
| 0,3 | 5 | 32.000 | 640 | 0,010 | 0,005 | 30.000 | 500 | 0,008 | 0,003 | | | |
| 0,4 | 1 | 40.000 | 1.440 | 0,018 | 0,030 | 34.000 | 1.156 | 0,017 | 0,025 | | | |
| 0,4 | 1,5 | 40.000 | 1.440 | 0,018 | 0,028 | 34.000 | 1.156 | 0,017 | 0,024 | | | |
| 0,4 | 2 | 40.000 | 1.500 | 0,018 | 0,026 | 36.000 | 1.300 | 0,018 | 0,025 | | | |
| 0,4 | 3 | 36.000 | 1.200 | 0,016 | 0,016 | 32.000 | 1.100 | 0,016 | 0,014 | | | |
| 0,4 | 4 | 36.000 | 1.200 | 0,016 | 0,010 | 32.000 | 1.100 | 0,016 | 0,008 | | | |
| 0,4 | 5 | 36.000 | 1.200 | 0,016 | 0,008 | 30.000 | 700 | 0,012 | 0,006 | | | |
| 0,4 | 6 | 36.000 | 1.200 | 0,016 | 0,005 | 26.000 | 400 | 0,008 | 0,003 | | | |
| 0,5 | 1 | 42.000 | 2.100 | 0,025 | 0,035 | 36.000 | 1.440 | 0,020 | 0,028 | | | |
| 0,5 | 2 | 35.000 | 1.600 | 0,022 | 0,018 | 38.000 | 1.900 | 0,025 | 0,026 | | | |
| 0,5 | 3 | 35.000 | 1.600 | 0,022 | 0,018 | 31.000 | 1.400 | 0,023 | 0,018 | | | |
| 0,5 | 4 | 35.000 | 1.600 | 0,022 | 0,016 | 31.000 | 1.400 | 0,023 | 0,018 | | | |
| 0,5 | 5 | 35.000 | 1.600 | 0,022 | 0,013 | 31.000 | 1.400 | 0,023 | 0,012 | | | |
| 0,5 | 6 | 31.000 | 1.200 | 0,020 | 0,011 | 27.000 | 1.100 | 0,020 | 0,010 | | | |
| 0,6 | 2 | 35.000 | 2.000 | 0,028 | 0,022 | 38.000 | 2.300 | 0,030 | 0,030 | | | |
| 0,6 | 3 | 35.000 | 2.000 | 0,028 | 0,022 | 38.000 | 2.300 | 0,030 | 0,025 | | | |
| 0,6 | 4 | 35.000 | 2.000 | 0,028 | 0,022 | 32.000 | 1.800 | 0,028 | 0,020 | | | |
| 0,6 | 5 | 35.000 | 2.000 | 0,028 | 0,015 | 32.000 | 1.800 | 0,028 | 0,016 | | | |
| 0,6 | 6 | 35.000 | 2.000 | 0,028 | 0,015 | 32.000 | 1.800 | 0,028 | 0,014 | | | |
| 0,6 | 8 | 35.000 | 2.000 | 0,028 | 0,010 | 29.000 | 1.500 | 0,025 | 0,017 | | | |
| 0,7 | 4 | 40.000 | 1.800 | 0,023 | 0,040 | 32.000 | 1.800 | 0,028 | 0,020 | | | |
| 0,7 | 8 | 36.000 | 1.500 | 0,020 | 0,030 | 29.000 | 1.500 | 0,025 | 0,017 | | | |
| 0,8 | 2 | 40.000 | 1.800 | 0,024 | 0,045 | 36.000 | 1.700 | 0,024 | 0,055 | | | |
| 0,8 | 4 | 40.000 | 1.800 | 0,024 | 0,040 | 36.000 | 1.700 | 0,024 | 0,050 | | | |
| 0,8 | 5 | 40.000 | 1.800 | 0,024 | 0,038 | 36.000 | 1.700 | 0,024 | 0,050 | | | |
| 0,8 | 6 | 40.000 | 1.800 | 0,024 | 0,034 | 32.000 | 1.400 | 0,022 | 0,028 | | | |
| 0,8 | 7 | 40.000 | 1.800 | 0,024 | 0,032 | 32.000 | 1.400 | 0,022 | 0,028 | | | |
| 0,8 | 8 | 40.000 | 1.800 | 0,024 | 0,030 | 32.000 | 1.400 | 0,022 | 0,018 | | | |
| 0,8 | 10 | 35.000 | 1.500 | 0,022 | 0,022 | 29.000 | 1.150 | 0,020 | 0,012 | | | |
| 0,9 | 6 | 30.000 | 2.000 | 0,030 | 0,035 | 32.000 | 1.400 | 0,022 | 0,028 | | | |
| 0,9 | 12 | 28.000 | 1.600 | 0,028 | 0,025 | 26.000 | 1.000 | 0,020 | 0,020 | | | |
| 1,0 | 2 | 36.000 | 2.520 | 0,035 | 0,090 | 30.500 | 1.830 | 0,030 | 0,070 | | | |
| 1,0 | 3 | 36.000 | 2.500 | 0,035 | 0,065 | 32.000 | 2.300 | 0,035 | 0,060 | | | |
| 1,0 | 4 | 36.000 | 2.500 | 0,035 | 0,065 | 32.000 | 2.300 | 0,035 | 0,060 | | | |
| 1,0 | 5 | 32.000 | 2.100 | 0,032 | 0,040 | 29.000 | 1.900 | 0,030 | 0,035 | | | |
| 1,0 | 6 | 32.000 | 2.100 | 0,032 | 0,040 | 29.000 | 1.900 | 0,030 | 0,035 | | | |
| 1,0 | 7 | 32.000 | 2.100 | 0,032 | 0,040 | 29.000 | 1.900 | 0,030 | 0,035 | | | |
| 1,0 | 8 | 32.000 | 2.100 | 0,032 | 0,040 | 29.000 | 1.900 | 0,030 | 0,035 | | | |
| 1,0 | 9 | 32.000 | 2.100 | 0,030 | 0,025 | 29.000 | 1.900 | 0,025 | 0,022 | | | |
| 1,0 | 10 | 32.000 | 2.100 | 0,030 | 0,025 | 29.000 | 1.900 | 0,025 | 0,022 | | | |
| 1,0 | 12 | 28.000 | 1.600 | 0,028 | 0,025 | 25.000 | 1.500 | 0,028 | 0,022 | | | |
| 1,0 | 15 | 28.000 | 1.500 | 0,024 | 0,015 | 25.000 | 1.500 | 0,028 | 0,018 | | | |
| 1,0 | 20 | 22.000 | 1.000 | 0,022 | 0,010 | 19.000 | 950 | 0,025 | 0,009 | | | |
| 1,0 | 25 | 18.000 | 540 | 0,015 | 0,008 | 17.000 | 650 | 0,020 | 0,005 | | | |
| 1,0 | 30 | 18.000 | 540 | 0,015 | 0,006 | 14.000 | 400 | 0,015 | 0,003 | | | |
| 1,2 | 6 | 32.000 | 2.100 | 0,032 | 0,040 | 29.000 | 1.900 | 0,030 | 0,035 | | | |
| 1,2 | 8 | 32.000 | 2.100 | 0,032 | 0,040 | 29.000 | 1.900 | 0,030 | 0,035 | | | |
| 1,2 | 10 | 32.000 | 2.100 | 0,030 | 0,025 | 29.000 | 1.900 | 0,025 | 0,022 | | | |
| 1,2 | 12 | 28.000 | 1.600 | 0,028 | 0,025 | 25.000 | 1.500 | 0,028 | 0,022 | | | |
| 1,2 | 15 | 28.000 | 1.500 | 0,024 | 0,015 | 25.000 | 1.500 | 0,028 | 0,018 | | | |
| 1,2 | 20 | 22.000 | 1.000 | 0,022 | 0,010 | 19.000 | 950 | 0,025 | 0,009 | | | |
| 1,2 | 25 | 18.000 | 540 | 0,015 | 0,008 | 17.000 | 650 | 0,020 | 0,005 | | | |
| 1,4 | 8 | 32.000 | 2.100 | 0,032 | 0,045 | 29.000 | 1.900 | 0,030 | 0,035 | | | |
| 1,4 | 15 | 28.000 | 1.500 | 0,028 | 0,030 | 25.000 | 1.500 | 0,028 | 0,022 | | | |

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden.
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
If the rpm available is lower than recommended please reduce the feed rate to the same ratio.

Richtwerte für den Einsatz von Karnasch VHM-Fräsern für HSC/HHC/HPC-Bearbeitung
Recommended cutting data for solid carbide end mills HSC/HHC/HPC

30 6261

30 6262

30 6256

30 6255

30 6265

| Werkstoffgruppe Material group | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels < 850 N/mm ² | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat-treated steels < 35 HRC (1200 N/mm ²) | | | | | | | |
|-----------------------------------|----|--|-----------|-------|-------|---|-----------|-------|-------|--|--|--|--|
| d1 | ls | min ¹ | Vf mm/min | fz mm | ap mm | min ¹ | Vf mm/min | fz mm | ap mm | | | | |
| 1,5 | 4 | 27.500 | 1.925 | 0,035 | 0,070 | 23.500 | 1.504 | 0,032 | 0,054 | | | | |
| 1,5 | 6 | 27.000 | 1.600 | 0,030 | 0,060 | 23.000 | 1.400 | 0,030 | 0,050 | | | | |
| 1,5 | 8 | 26.000 | 1.600 | 0,030 | 0,060 | 23.000 | 1.400 | 0,030 | 0,050 | | | | |
| 1,5 | 10 | 26.000 | 1.600 | 0,030 | 0,060 | 23.000 | 1.400 | 0,030 | 0,050 | | | | |
| 1,5 | 12 | 25.000 | 1.600 | 0,030 | 0,060 | 22.000 | 1.400 | 0,030 | 0,050 | | | | |
| 1,5 | 14 | 23.500 | 1.410 | 0,030 | 0,043 | 19.000 | 874 | 0,023 | 0,030 | | | | |
| 1,5 | 15 | 22.000 | 1.200 | 0,028 | 0,037 | 20.000 | 1.100 | 0,028 | 0,034 | | | | |
| 1,5 | 16 | 22.500 | 1.305 | 0,029 | 0,036 | 19.000 | 760 | 0,020 | 0,030 | | | | |
| 1,5 | 18 | 22.500 | 1.305 | 0,029 | 0,036 | 19.000 | 760 | 0,020 | 0,030 | | | | |
| 1,5 | 20 | 22.000 | 1.200 | 0,028 | 0,037 | 20.000 | 1.100 | 0,028 | 0,034 | | | | |
| 1,5 | 25 | 20.000 | 850 | 0,022 | 0,030 | 18.000 | 900 | 0,025 | 0,020 | | | | |
| 1,5 | 30 | 18.000 | 650 | 0,018 | 0,025 | 15.000 | 600 | 0,020 | 0,015 | | | | |
| 1,6 | 8 | 26.000 | 1.600 | 0,030 | 0,060 | 23.000 | 1.400 | 0,030 | 0,050 | | | | |
| 1,6 | 15 | 22.000 | 1.200 | 0,028 | 0,037 | 20.000 | 1.100 | 0,028 | 0,034 | | | | |
| 1,8 | 10 | 26.000 | 1.600 | 0,030 | 0,060 | 23.000 | 1.400 | 0,030 | 0,050 | | | | |
| 1,8 | 20 | 22.000 | 1.200 | 0,028 | 0,035 | 20.000 | 1.100 | 0,028 | 0,034 | | | | |
| 2,0 | 4 | 21.000 | 2.940 | 0,070 | 0,200 | 17.500 | 2.555 | 0,073 | 0,150 | | | | |
| 2,0 | 6 | 21.000 | 2.800 | 0,065 | 0,200 | 19.000 | 2.500 | 0,060 | 0,180 | | | | |
| 2,0 | 8 | 21.000 | 2.800 | 0,068 | 0,140 | 19.000 | 2.500 | 0,060 | 0,120 | | | | |
| 2,0 | 10 | 20.000 | 2.400 | 0,060 | 0,100 | 17.000 | 2.000 | 0,060 | 0,070 | | | | |
| 2,0 | 12 | 19.000 | 2.300 | 0,060 | 0,080 | 17.000 | 2.000 | 0,060 | 0,070 | | | | |
| 2,0 | 15 | 19.000 | 2.300 | 0,060 | 0,080 | 17.000 | 2.000 | 0,060 | 0,070 | | | | |
| 2,0 | 20 | 19.000 | 2.300 | 0,060 | 0,050 | 17.000 | 2.000 | 0,060 | 0,040 | | | | |
| 2,0 | 25 | 17.000 | 1.800 | 0,050 | 0,025 | 15.000 | 1.600 | 0,050 | 0,020 | | | | |
| 2,0 | 30 | 17.000 | 1.800 | 0,050 | 0,016 | 15.000 | 1.600 | 0,050 | 0,015 | | | | |
| 2,5 | 10 | 20.000 | 2.400 | 0,060 | 0,100 | 17.000 | 2.000 | 0,060 | 0,070 | | | | |
| 2,5 | 15 | 19.000 | 2.300 | 0,060 | 0,080 | 17.000 | 2.000 | 0,060 | 0,070 | | | | |
| 2,5 | 20 | 19.000 | 2.300 | 0,060 | 0,050 | 17.000 | 2.000 | 0,060 | 0,040 | | | | |
| 2,5 | 25 | 17.000 | 1.800 | 0,050 | 0,025 | 15.000 | 1.600 | 0,050 | 0,020 | | | | |
| 3,0 | 5 | 16.000 | 2.100 | 0,066 | 0,300 | 14.000 | 1.900 | 0,065 | 0,250 | | | | |
| 3,0 | 10 | 16.000 | 2.100 | 0,066 | 0,210 | 14.000 | 1.900 | 0,065 | 0,250 | | | | |
| 3,0 | 15 | 16.000 | 2.100 | 0,066 | 0,120 | 14.000 | 1.900 | 0,065 | 0,100 | | | | |
| 3,0 | 20 | 14.000 | 1.700 | 0,060 | 0,120 | 13.000 | 1.600 | 0,060 | 0,100 | | | | |
| 3,0 | 25 | 14.000 | 1.700 | 0,060 | 0,100 | 13.000 | 1.600 | 0,060 | 0,080 | | | | |
| 3,0 | 30 | 14.000 | 1.700 | 0,060 | 0,080 | 13.000 | 1.600 | 0,060 | 0,070 | | | | |
| 4,0 | 10 | 12.000 | 2.400 | 0,100 | 0,300 | 11.000 | 2.100 | 0,100 | 0,310 | | | | |
| 4,0 | 15 | 12.000 | 2.400 | 0,100 | 0,250 | 11.000 | 2.100 | 0,100 | 0,310 | | | | |
| 4,0 | 20 | 11.000 | 1.900 | 0,090 | 0,200 | 11.000 | 2.100 | 0,100 | 0,200 | | | | |
| 4,0 | 25 | 11.000 | 1.900 | 0,090 | 0,150 | 9.500 | 1.700 | 0,090 | 0,140 | | | | |
| 4,0 | 30 | 9.000 | 1.600 | 0,090 | 0,100 | 7.000 | 1.300 | 0,090 | 0,080 | | | | |
| 5,0 | 10 | 9.000 | 2.300 | 0,120 | 0,400 | 10.000 | 2.400 | 0,150 | 0,400 | | | | |
| 5,0 | 15 | 9.000 | 2.300 | 0,120 | 0,380 | 10.000 | 2.400 | 0,150 | 0,350 | | | | |
| 5,0 | 20 | 9.000 | 2.300 | 0,120 | 0,350 | 8.500 | 2.100 | 0,120 | 0,300 | | | | |
| 5,0 | 30 | 9.000 | 2.300 | 0,120 | 0,200 | 8.500 | 2.100 | 0,120 | 0,300 | | | | |
| 5,0 | 40 | 8.500 | 2.000 | 0,110 | 0,120 | 7.500 | 1.700 | 0,100 | 0,120 | | | | |
| 6,0 | 10 | 9.000 | 2.300 | 0,120 | 0,400 | 9.000 | 3.200 | 0,180 | 0,400 | | | | |
| 6,0 | 15 | 9.000 | 2.300 | 0,120 | 0,400 | 9.000 | 3.200 | 0,180 | 0,350 | | | | |
| 6,0 | 20 | 8.000 | 2.400 | 0,150 | 0,300 | 7.000 | 2.100 | 0,150 | 0,300 | | | | |
| 6,0 | 30 | 8.000 | 2.200 | 0,140 | 0,250 | 7.000 | 2.100 | 0,150 | 0,300 | | | | |
| 6,0 | 40 | 7.000 | 2.000 | 0,130 | 0,240 | 6.500 | 1.700 | 0,130 | 0,200 | | | | |
| 6,0 | 50 | 5.500 | 1.500 | 0,130 | 0,160 | 5.000 | 1.300 | 0,130 | 0,140 | | | | |
| 8,0 | 30 | 7.000 | 2.100 | 0,150 | 0,280 | 6.000 | 2.160 | 0,180 | 0,350 | | | | |
| 10,0 | 40 | 6.000 | 2.160 | 0,180 | 0,300 | 5.000 | 1.800 | 0,180 | 0,380 | | | | |

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Index

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden.
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
If the rpm available is lower than recommended please reduce the feed rate to the same ratio.



30 6261 30 6262 Richtwerte für den Einsatz von Karnasch Vollhartmetall-Fräsern für HSC/HHC/HPC-Bearbeitung
Recommended cutting data for solid carbide end mills HSC/HHC/HPC

30 6255 30 6265 30 6256

| Werkstoffgruppe Material group | | 4.1 – 4.2 – 4.3 Rostfreie Stähle / Stainless steels austenitisch/ferritisch / austenitic/ferritic 35 - 45 HRC | | | | 8.1 – gehärtete Stähle / Hardened steels 45 - 55 HRC | | | | 8.2 – 8.3 gehärtete Stähle / Hardened steels 55 - 70 HRC | | | |
|-----------------------------------|-----|--|-----------|-------|-------|--|-----------|-------|-------|--|-----------|-------|-------|
| d1 | ls | min ¹ | Vf mm/min | fz mm | ap mm | min ¹ | Vf mm/min | fz mm | ap mm | min ¹ | Vf mm/min | fz mm | ap mm |
| 0,1 | 0,2 | 48.000 | 960 | 0,010 | 0,010 | 44.000 | 880 | 0,010 | 0,010 | 42.000 | 672 | 0,008 | 0,010 |
| 0,1 | 0,3 | 48.000 | 960 | 0,010 | 0,010 | 44.000 | 880 | 0,010 | 0,010 | 42.000 | 672 | 0,008 | 0,008 |
| 0,1 | 0,4 | 48.000 | 960 | 0,010 | 0,008 | 44.000 | 704 | 0,010 | 0,008 | 42.000 | 672 | 0,008 | 0,006 |
| 0,2 | 0,5 | 42.000 | 1.100 | 0,012 | 0,015 | 38.000 | 850 | 0,012 | 0,011 | 35.000 | 700 | 0,010 | 0,011 |
| 0,2 | 1 | 42.000 | 1.100 | 0,012 | 0,010 | 38.000 | 850 | 0,012 | 0,009 | 35.000 | 700 | 0,010 | 0,008 |
| 0,2 | 1,5 | 40.000 | 800 | 0,010 | 0,006 | 35.500 | 710 | 0,010 | 0,005 | 33.000 | 528 | 0,008 | 0,005 |
| 0,2 | 2 | 36.000 | 720 | 0,010 | 0,006 | 31.000 | 620 | 0,010 | 0,005 | 30.000 | 480 | 0,008 | 0,005 |
| 0,3 | 1 | 41.000 | 1.100 | 0,014 | 0,016 | 36.000 | 850 | 0,012 | 0,014 | 34.000 | 680 | 0,010 | 0,012 |
| 0,3 | 1,5 | 38.000 | 1.064 | 0,014 | 0,013 | 34.000 | 816 | 0,012 | 0,012 | 32.000 | 640 | 0,010 | 0,009 |
| 0,3 | 2 | 36.000 | 1.000 | 0,014 | 0,010 | 32.000 | 800 | 0,012 | 0,008 | 30.000 | 620 | 0,010 | 0,006 |
| 0,3 | 2,5 | 34.000 | 952 | 0,014 | 0,008 | 30.000 | 720 | 0,012 | 0,006 | 28.000 | 560 | 0,010 | 0,005 |
| 0,3 | 3 | 32.000 | 800 | 0,014 | 0,006 | 29.000 | 700 | 0,012 | 0,005 | 27.000 | 550 | 0,010 | 0,004 |
| 0,3 | 5 | 28.000 | 500 | 0,010 | 0,003 | 25.000 | 500 | 0,010 | 0,003 | 24.000 | 380 | 0,008 | 0,002 |
| 0,4 | 1 | 34.000 | 1.088 | 0,016 | 0,022 | 30.000 | 900 | 0,015 | 0,020 | 28.000 | 672 | 0,012 | 0,018 |
| 0,4 | 1,5 | 34.000 | 1.088 | 0,016 | 0,022 | 30.000 | 900 | 0,015 | 0,018 | 28.000 | 672 | 0,012 | 0,018 |
| 0,4 | 2 | 34.000 | 1.100 | 0,016 | 0,022 | 30.000 | 900 | 0,015 | 0,018 | 28.000 | 750 | 0,013 | 0,017 |
| 0,4 | 3 | 30.000 | 1.000 | 0,016 | 0,012 | 27.000 | 800 | 0,015 | 0,010 | 25.000 | 680 | 0,013 | 0,010 |
| 0,4 | 4 | 30.000 | 1.000 | 0,016 | 0,008 | 27.000 | 800 | 0,015 | 0,007 | 25.000 | 680 | 0,013 | 0,005 |
| 0,4 | 5 | 30.000 | 700 | 0,012 | 0,006 | 24.000 | 480 | 0,010 | 0,004 | 22.000 | 440 | 0,010 | 0,003 |
| 0,4 | 6 | 25.000 | 400 | 0,008 | 0,003 | 24.000 | 480 | 0,010 | 0,002 | - | - | - | - |
| 0,5 | 1 | 35.500 | 1.420 | 0,020 | 0,025 | 31.500 | 1.134 | 0,018 | 0,020 | 29.500 | 885 | 0,015 | 0,020 |
| 0,5 | 2 | 36.000 | 1.500 | 0,020 | 0,022 | 32.000 | 1.100 | 0,018 | 0,020 | 30.000 | 880 | 0,015 | 0,016 |
| 0,5 | 3 | 30.000 | 1.100 | 0,018 | 0,015 | 26.000 | 800 | 0,016 | 0,012 | 24.000 | 630 | 0,013 | 0,012 |
| 0,5 | 4 | 30.000 | 1.100 | 0,018 | 0,015 | 26.000 | 800 | 0,016 | 0,012 | 24.000 | 630 | 0,013 | 0,012 |
| 0,5 | 5 | 30.000 | 1.100 | 0,018 | 0,010 | 26.000 | 800 | 0,016 | 0,008 | 24.000 | 630 | 0,013 | 0,008 |
| 0,5 | 6 | 26.000 | 700 | 0,014 | 0,010 | 23.000 | 600 | 0,013 | 0,008 | 21.000 | 500 | 0,012 | 0,006 |
| 0,6 | 2 | 26.000 | 1.800 | 0,025 | 0,028 | 32.000 | 1.400 | 0,022 | 0,020 | 30.000 | 1.050 | 0,018 | 0,020 |
| 0,6 | 3 | 29.000 | 1.300 | 0,022 | 0,018 | 26.000 | 1.000 | 0,020 | 0,016 | 30.000 | 1.050 | 0,018 | 0,018 |
| 0,6 | 4 | 29.000 | 1.300 | 0,022 | 0,015 | 26.000 | 1.000 | 0,020 | 0,016 | 24.000 | 800 | 0,016 | 0,014 |
| 0,6 | 5 | 29.000 | 1.300 | 0,022 | 0,012 | 26.000 | 1.000 | 0,020 | 0,010 | 24.000 | 800 | 0,016 | 0,010 |
| 0,6 | 6 | 29.000 | 1.300 | 0,022 | 0,012 | 26.000 | 1.000 | 0,020 | 0,010 | 24.000 | 800 | 0,016 | 0,008 |
| 0,6 | 8 | 28.000 | 1.100 | 0,020 | 0,010 | 25.000 | 900 | 0,018 | 0,008 | 23.000 | 700 | 0,014 | 0,007 |
| 0,7 | 4 | 29.000 | 1.300 | 0,022 | 0,018 | 26.000 | 1.000 | 0,020 | 0,016 | 24.000 | 800 | 0,016 | 0,014 |
| 0,7 | 8 | 28.000 | 1.100 | 0,020 | 0,012 | 25.000 | 900 | 0,018 | 0,008 | 23.000 | 700 | 0,014 | 0,008 |
| 0,8 | 2 | 34.000 | 1.400 | 0,022 | 0,050 | 30.000 | 1.100 | 0,018 | 0,040 | 28.000 | 950 | 0,017 | 0,035 |
| 0,8 | 4 | 34.000 | 1.400 | 0,022 | 0,045 | 30.000 | 1.100 | 0,018 | 0,035 | 28.000 | 950 | 0,017 | 0,030 |
| 0,8 | 5 | 30.000 | 1.300 | 0,022 | 0,025 | 27.000 | 900 | 0,016 | 0,020 | 28.000 | 950 | 0,017 | 0,025 |
| 0,8 | 6 | 30.000 | 1.300 | 0,022 | 0,025 | 27.000 | 900 | 0,016 | 0,020 | 25.000 | 850 | 0,017 | 0,018 |
| 0,8 | 7 | 30.000 | 1.300 | 0,022 | 0,015 | 27.000 | 900 | 0,016 | 0,012 | 25.000 | 850 | 0,017 | 0,015 |
| 0,8 | 8 | 30.000 | 1.300 | 0,022 | 0,015 | 27.000 | 900 | 0,016 | 0,012 | 25.000 | 850 | 0,017 | 0,012 |
| 0,8 | 10 | 28.000 | 1.100 | 0,020 | 0,010 | 24.000 | 800 | 0,016 | 0,090 | 22.500 | 680 | 0,015 | 0,080 |
| 0,9 | 6 | 30.000 | 1.300 | 0,022 | 0,025 | 27.000 | 900 | 0,016 | 0,020 | 28.000 | 750 | 0,017 | 0,018 |
| 0,9 | 12 | 26.000 | 1.000 | 0,020 | 0,008 | 24.000 | 800 | 0,016 | 0,008 | 22.500 | 670 | 0,015 | 0,015 |
| 1,0 | 2 | 30.500 | 1.830 | 0,030 | 0,070 | 27.000 | 1.512 | 0,028 | 0,055 | 25.000 | 1.250 | 0,025 | 0,050 |
| 1,0 | 3 | 30.000 | 1.900 | 0,030 | 0,055 | 27.000 | 1.500 | 0,028 | 0,055 | 25.000 | 1.300 | 0,025 | 0,045 |
| 1,0 | 4 | 30.000 | 1.900 | 0,030 | 0,050 | 27.000 | 1.500 | 0,028 | 0,045 | 25.000 | 1.300 | 0,025 | 0,040 |
| 1,0 | 5 | 27.000 | 1.700 | 0,030 | 0,030 | 24.000 | 1.400 | 0,028 | 0,025 | 25.000 | 1.300 | 0,025 | 0,030 |
| 1,0 | 6 | 27.000 | 1.700 | 0,030 | 0,030 | 24.000 | 1.400 | 0,028 | 0,025 | 22.500 | 1.100 | 0,025 | 0,020 |
| 1,0 | 7 | 27.000 | 1.700 | 0,030 | 0,030 | 24.000 | 1.400 | 0,028 | 0,020 | 22.500 | 1.100 | 0,025 | 0,020 |
| 1,0 | 8 | 27.000 | 1.700 | 0,030 | 0,030 | 24.000 | 1.400 | 0,028 | 0,020 | 22.500 | 1.100 | 0,025 | 0,020 |
| 1,0 | 9 | 27.000 | 1.700 | 0,030 | 0,020 | 24.000 | 1.400 | 0,028 | 0,015 | 22.500 | 1.100 | 0,025 | 0,015 |
| 1,0 | 10 | 27.000 | 1.700 | 0,030 | 0,020 | 24.000 | 1.400 | 0,028 | 0,015 | 22.500 | 1.100 | 0,025 | 0,015 |
| 1,0 | 12 | 24.000 | 1.200 | 0,025 | 0,020 | 22.000 | 1.100 | 0,025 | 0,015 | 20.000 | 850 | 0,022 | 0,015 |
| 1,0 | 15 | 24.000 | 1.100 | 0,020 | 0,012 | 21.000 | 900 | 0,022 | 0,010 | 20.000 | 700 | 0,017 | 0,009 |
| 1,0 | 20 | 18.000 | 800 | 0,020 | 0,008 | 16.000 | 700 | 0,022 | 0,007 | 15.000 | 550 | 0,017 | 0,005 |
| 1,0 | 25 | 15.000 | 450 | 0,015 | 0,004 | 14.000 | 550 | 0,020 | 0,004 | - | - | - | - |
| 1,0 | 30 | 12.000 | 250 | 0,010 | 0,003 | 12.000 | 350 | 0,015 | 0,003 | - | - | - | - |
| 1,2 | 6 | 27.000 | 1.700 | 0,030 | 0,030 | 24.000 | 1.400 | 0,028 | 0,025 | 22.500 | 1.100 | 0,017 | 0,020 |
| 1,2 | 8 | 27.000 | 1.700 | 0,030 | 0,030 | 24.000 | 1.400 | 0,028 | 0,020 | 22.500 | 1.100 | 0,017 | 0,020 |
| 1,2 | 10 | 27.000 | 1.700 | 0,030 | 0,020 | 24.000 | 1.400 | 0,028 | 0,015 | 22.500 | 1.100 | 0,017 | 0,015 |
| 1,2 | 12 | 24.000 | 1.200 | 0,025 | 0,020 | 22.000 | 1.100 | 0,025 | 0,015 | 20.000 | 850 | 0,022 | 0,015 |
| 1,2 | 15 | 24.000 | 1.100 | 0,020 | 0,012 | 21.000 | 900 | 0,022 | 0,010 | 20.000 | 700 | 0,017 | 0,009 |
| 1,2 | 20 | 18.000 | 800 | 0,020 | 0,008 | 16.000 | 700 | 0,022 | 0,007 | 15.000 | 550 | 0,017 | 0,005 |
| 1,2 | 25 | 15.000 | 450 | 0,015 | 0,004 | 14.000 | 550 | 0,020 | 0,004 | - | - | - | - |
| 1,4 | 8 | 27.000 | 1.700 | 0,030 | 0,030 | 24.000 | 1.400 | 0,028 | 0,025 | 22.500 | 1.100 | 0,017 | 0,020 |
| 1,4 | 15 | 24.000 | 1.100 | 0,020 | 0,012 | 21.000 | 900 | 0,022 | 0,010 | 20.000 | 700 | 0,017 | 0,009 |

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio.

Richtwerte für den Einsatz von Karnasch VHM-Fräsern für HSC/HHC/HPC-Bearbeitung
Recommended cutting data for solid carbide end mills HSC/HHC/HPC

30 6261

30 6262

30 6256

30 6255

30 6265

| Werkstoffgruppe Material group | | 4.1 – 4.2 – 4.3 Rostfreie Stähle / Stainless steels austenitisch/ferritisch / austenitic/ferritic 35 - 45 HRC | | | | 8.1 – gehärtete Stähle / Hardened steels 45 - 55 HRC | | | | 8.2 – 8.3 gehärtete Stähle / Hardened steels 55 - 70 HRC | | | |
|-----------------------------------|----|--|-----------|-------|-------|--|-----------|-------|-------|--|-----------|-------|-------|
| d1 | ls | min ¹ | Vf mm/min | fz mm | ap mm | min ¹ | Vf mm/min | fz mm | ap mm | min ¹ | Vf mm/min | fz mm | ap mm |
| 1,5 | 4 | 23.500 | 1.457 | 0,031 | 0,050 | 20.500 | 1.230 | 0,030 | 0,040 | 19.000 | 950 | 0,025 | 0,040 |
| 1,5 | 6 | 21.000 | 1.300 | 0,030 | 0,050 | 20.000 | 1.200 | 0,030 | 0,040 | 18.500 | 900 | 0,025 | 0,040 |
| 1,5 | 8 | 21.000 | 1.300 | 0,030 | 0,045 | 19.000 | 1.000 | 0,028 | 0,035 | 17.500 | 850 | 0,024 | 0,035 |
| 1,5 | 10 | 21.000 | 1.300 | 0,030 | 0,045 | 19.000 | 1.000 | 0,028 | 0,035 | 17.500 | 850 | 0,024 | 0,032 |
| 1,5 | 12 | 21.000 | 1.300 | 0,030 | 0,045 | 19.000 | 1.000 | 0,028 | 0,035 | 17.500 | 850 | 0,024 | 0,032 |
| 1,5 | 14 | 20.000 | 1.080 | 0,027 | 0,036 | 18.000 | 936 | 0,026 | 0,028 | 16.800 | 773 | 0,023 | 0,025 |
| 1,5 | 15 | 19.000 | 900 | 0,025 | 0,030 | 17.000 | 850 | 0,025 | 0,025 | 16.000 | 700 | 0,022 | 0,022 |
| 1,5 | 16 | 19.000 | 950 | 0,025 | 0,030 | 17.000 | 850 | 0,025 | 0,025 | 16.000 | 704 | 0,022 | 0,022 |
| 1,5 | 18 | 19.000 | 950 | 0,025 | 0,030 | 17.000 | 850 | 0,025 | 0,025 | 16.000 | 704 | 0,022 | 0,020 |
| 1,5 | 20 | 19.000 | 900 | 0,025 | 0,030 | 17.000 | 850 | 0,025 | 0,025 | 16.000 | 700 | 0,022 | 0,020 |
| 1,5 | 25 | 15.000 | 450 | 0,015 | 0,025 | 15.000 | 600 | 0,020 | 0,020 | 14.000 | 500 | 0,018 | 0,015 |
| 1,5 | 30 | 15.000 | 450 | 0,015 | 0,015 | 12.000 | 350 | 0,015 | 0,010 | - | - | - | - |
| 1,6 | 8 | 21.000 | 1.300 | 0,030 | 0,050 | 19.000 | 1.200 | 0,030 | 0,040 | 17.500 | 900 | 0,025 | 0,040 |
| 1,6 | 15 | 19.000 | 900 | 0,025 | 0,030 | 17.000 | 850 | 0,025 | 0,025 | 16.000 | 700 | 0,022 | 0,022 |
| 1,8 | 10 | 21.000 | 1.300 | 0,030 | 0,045 | 19.000 | 1.000 | 0,028 | 0,035 | 17.500 | 850 | 0,024 | 0,032 |
| 1,8 | 20 | 19.000 | 900 | 0,025 | 0,030 | 17.000 | 850 | 0,025 | 0,021 | 16.000 | 700 | 0,018 | 0,020 |
| 2,0 | 4 | 17.500 | 2.100 | 0,060 | 0,160 | 15.500 | 1.550 | 0,050 | 0,130 | 14.500 | 1.450 | 0,050 | 0,120 |
| 2,0 | 6 | 18.000 | 2.400 | 0,065 | 0,140 | 16.000 | 1.700 | 0,050 | 0,120 | 15.000 | 1.400 | 0,045 | 0,100 |
| 2,0 | 8 | 18.000 | 2.400 | 0,065 | 0,110 | 16.000 | 1.700 | 0,050 | 0,090 | 15.000 | 1.400 | 0,045 | 0,080 |
| 2,0 | 10 | 16.000 | 2.000 | 0,060 | 0,060 | 16.000 | 1.700 | 0,050 | 0,050 | 15.000 | 1.400 | 0,045 | 0,060 |
| 2,0 | 12 | 16.000 | 2.000 | 0,060 | 0,060 | 14.000 | 1.500 | 0,050 | 0,050 | 13.000 | 1.200 | 0,045 | 0,040 |
| 2,0 | 15 | 16.000 | 1.900 | 0,060 | 0,060 | 14.000 | 1.500 | 0,050 | 0,050 | 13.000 | 1.200 | 0,045 | 0,040 |
| 2,0 | 20 | 16.000 | 1.900 | 0,060 | 0,040 | 14.000 | 1.500 | 0,050 | 0,030 | 13.000 | 1.200 | 0,045 | 0,030 |
| 2,0 | 25 | 14.000 | 1.500 | 0,050 | 0,020 | 13.000 | 1.250 | 0,048 | 0,016 | 11.500 | 900 | 0,040 | 0,015 |
| 2,0 | 30 | 14.000 | 1.500 | 0,050 | 0,014 | 13.000 | 1.250 | 0,048 | 0,011 | 11.500 | 900 | 0,040 | 0,010 |
| 2,5 | 10 | 16.000 | 2.000 | 0,060 | 0,060 | 16.000 | 1.700 | 0,050 | 0,120 | 12.000 | 1.200 | 0,045 | 0,045 |
| 2,5 | 15 | 16.000 | 1.900 | 0,060 | 0,060 | 14.000 | 1.500 | 0,050 | 0,050 | 12.000 | 1.200 | 0,045 | 0,040 |
| 2,5 | 20 | 16.000 | 1.900 | 0,060 | 0,040 | 14.000 | 1.500 | 0,050 | 0,030 | 12.000 | 1.200 | 0,045 | 0,035 |
| 2,5 | 25 | 14.000 | 1.500 | 0,050 | 0,020 | 13.000 | 1.250 | 0,048 | 0,016 | 11.500 | 900 | 0,040 | 0,020 |
| 3,0 | 5 | 13.000 | 1.700 | 0,065 | 0,240 | 12.000 | 1.300 | 0,055 | 0,190 | 11.000 | 1.000 | 0,045 | 0,180 |
| 3,0 | 10 | 13.000 | 1.700 | 0,065 | 0,160 | 12.000 | 1.300 | 0,055 | 0,130 | 11.000 | 1.000 | 0,045 | 0,160 |
| 3,0 | 15 | 13.000 | 1.700 | 0,065 | 0,160 | 12.000 | 1.300 | 0,055 | 0,070 | 11.000 | 1.000 | 0,045 | 0,070 |
| 3,0 | 20 | 12.000 | 1.400 | 0,060 | 0,090 | 11.000 | 1.150 | 0,054 | 0,070 | 10.000 | 950 | 0,045 | 0,070 |
| 3,0 | 25 | 12.000 | 1.400 | 0,060 | 0,060 | 11.000 | 1.150 | 0,054 | 0,050 | 10.000 | 950 | 0,045 | 0,055 |
| 3,0 | 30 | 12.000 | 1.400 | 0,060 | 0,050 | 11.000 | 1.150 | 0,054 | 0,045 | 10.000 | 950 | 0,045 | 0,045 |
| 4,0 | 10 | 10.000 | 2.000 | 0,100 | 0,250 | 9.000 | 1.400 | 0,080 | 0,200 | 8.500 | 1.100 | 0,065 | 0,200 |
| 4,0 | 15 | 10.000 | 2.000 | 0,100 | 0,250 | 9.000 | 1.400 | 0,080 | 0,200 | 8.500 | 1.100 | 0,065 | 0,120 |
| 4,0 | 20 | 9.000 | 1.600 | 0,090 | 0,120 | 8.000 | 1.150 | 0,070 | 0,100 | 7.500 | 900 | 0,060 | 0,090 |
| 4,0 | 25 | 9.000 | 1.600 | 0,090 | 0,120 | 8.000 | 1.150 | 0,070 | 0,100 | 7.500 | 900 | 0,060 | 0,090 |
| 4,0 | 30 | 6.500 | 1.200 | 0,090 | 0,080 | 6.000 | 850 | 0,070 | 0,060 | 5.500 | 700 | 0,060 | 0,050 |
| 5,0 | 10 | 8.000 | 2.000 | 0,120 | 0,300 | 7.000 | 1.400 | 0,100 | 0,250 | 6.800 | 1.100 | 0,080 | 0,250 |
| 5,0 | 15 | 8.000 | 2.000 | 0,120 | 0,250 | 7.000 | 1.400 | 0,100 | 0,200 | 6.800 | 1.100 | 0,080 | 0,220 |
| 5,0 | 20 | 8.000 | 2.000 | 0,120 | 0,250 | 7.000 | 1.400 | 0,100 | 0,200 | 6.800 | 1.100 | 0,080 | 0,200 |
| 5,0 | 30 | 7.300 | 1.500 | 0,100 | 0,100 | 6.500 | 1.150 | 0,090 | 0,080 | 6.800 | 1.100 | 0,080 | 0,100 |
| 5,0 | 40 | 7.300 | 1.500 | 0,100 | 0,080 | 6.500 | 1.150 | 0,090 | 0,070 | 6.000 | 900 | 0,075 | 0,080 |
| 6,0 | 10 | 7.000 | 2.000 | 0,150 | 0,280 | 6.000 | 1.400 | 0,120 | 0,240 | 5.500 | 1.100 | 0,10 | 0,250 |
| 6,0 | 15 | 7.000 | 2.000 | 0,150 | 0,260 | 6.000 | 1.400 | 0,120 | 0,200 | 5.500 | 1.100 | 0,10 | 0,220 |
| 6,0 | 20 | 7.000 | 2.000 | 0,150 | 0,250 | 6.000 | 1.400 | 0,120 | 0,200 | 5.500 | 1.100 | 0,10 | 0,200 |
| 6,0 | 30 | 6.000 | 1.500 | 0,120 | 0,180 | 5.500 | 1.150 | 0,100 | 0,150 | 5.000 | 900 | 0,09 | 0,140 |
| 6,0 | 40 | 4.700 | 1.200 | 0,120 | 0,120 | 4.100 | 900 | 0,100 | 0,100 | 5.000 | 900 | 0,09 | 0,100 |
| 6,0 | 50 | 4.700 | 1.200 | 0,020 | 0,080 | 4.100 | 900 | 0,100 | 0,090 | 4.000 | 700 | 0,09 | 0,080 |



Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden.
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
If the rpm available is lower than recommended please reduce the feed rate to the same ratio.

30 6264

30 6257

Richtwerte für den Einsatz von Karnasch VHM-Fräsern für HSC/HHC/HPC-Bearbeitung
Recommended cutting data for solid carbide end mills HSC/HHC/HPC

| Werkstoffgruppe Material group | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels < 850 N/mm ² | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat-treated steels < 35 HRC (1200 N/mm ²) | | | | | | | | |
|-----------------------------------|-----|--|-------|------------------|-----------|-------|---|-------|------------------|-----------|-------|-------|-------|--|--|
| | | d1 | ls | min ¹ | Vf mm/min | fz mm | ap mm | ae mm | min ¹ | Vf mm/min | fz mm | ap mm | ae mm | | |
| 0,1 | 0,2 | 50.000 | 1.000 | 0,010 | 0,100 | 0,030 | 45.000 | 900 | 0,010 | 0,010 | 0,025 | | | | |
| 0,1 | 0,3 | 50.000 | 1.000 | 0,010 | 0,100 | 0,020 | 45.000 | 900 | 0,010 | 0,009 | 0,020 | | | | |
| 0,1 | 0,4 | 50.000 | 800 | 0,008 | 0,100 | 0,011 | 45.000 | 900 | 0,010 | 0,007 | 0,010 | | | | |
| 0,2 | 0,5 | 50.000 | 2.250 | 0,023 | 0,020 | 0,060 | 45.000 | 2.000 | 0,022 | 0,018 | 0,050 | | | | |
| 0,2 | 1 | 50.000 | 2.250 | 0,023 | 0,020 | 0,040 | 45.000 | 2.000 | 0,022 | 0,012 | 0,030 | | | | |
| 0,2 | 1,5 | 50.000 | 2.300 | 0,023 | 0,020 | 0,020 | 45.000 | 1.800 | 0,020 | 0,010 | 0,025 | | | | |
| 0,3 | 1 | 50.000 | 2.250 | 0,023 | 0,020 | 0,060 | 45.000 | 2.000 | 0,022 | 0,018 | 0,050 | | | | |
| 0,3 | 1,5 | 50.000 | 2.200 | 0,022 | 0,015 | 0,045 | 45.000 | 1.800 | 0,020 | 0,015 | 0,040 | | | | |
| 0,3 | 2 | 50.000 | 2.000 | 0,020 | 0,012 | 0,035 | 45.000 | 1.800 | 0,020 | 0,010 | 0,030 | | | | |
| 0,3 | 2,5 | 50.000 | 1.900 | 0,019 | 0,010 | 0,025 | 36.000 | 1.440 | 0,020 | 0,008 | 0,025 | | | | |
| 0,3 | 3 | 40.000 | 1.400 | 0,018 | 0,008 | 0,020 | 36.000 | 1.300 | 0,018 | 0,006 | 0,020 | | | | |
| 0,3 | 5 | 30.000 | 480 | 0,008 | 0,005 | 0,005 | 30.000 | 700 | 0,012 | 0,003 | 0,010 | | | | |
| 0,4 | 1 | 40.000 | 2.400 | 0,030 | 0,030 | 0,080 | 36.000 | 2.520 | 0,035 | 0,030 | 0,070 | | | | |
| 0,4 | 1,5 | 40.000 | 2.400 | 0,030 | 0,030 | 0,080 | 36.000 | 2.160 | 0,030 | 0,025 | 0,070 | | | | |
| 0,4 | 2 | 40.000 | 2.400 | 0,030 | 0,025 | 0,080 | 36.000 | 2.100 | 0,030 | 0,025 | 0,070 | | | | |
| 0,4 | 3 | 36.000 | 2.000 | 0,026 | 0,015 | 0,045 | 32.500 | 1.700 | 0,025 | 0,014 | 0,040 | | | | |
| 0,4 | 4 | 32.000 | 1.500 | 0,024 | 0,010 | 0,030 | 29.000 | 1.400 | 0,024 | 0,008 | 0,025 | | | | |
| 0,4 | 5 | 28.000 | 850 | 0,015 | 0,008 | 0,020 | 25.000 | 1.000 | 0,010 | 0,005 | 0,015 | | | | |
| 0,4 | 6 | 20.000 | 320 | 0,008 | 0,005 | 0,010 | 20.000 | 320 | 0,008 | 0,002 | 0,010 | | | | |
| 0,5 | 1 | 40.000 | 2.400 | 0,030 | 0,030 | 0,110 | 36.000 | 2.520 | 0,035 | 0,030 | 0,090 | | | | |
| 0,5 | 2 | 40.000 | 2.400 | 0,030 | 0,030 | 0,100 | 36.000 | 2.100 | 0,030 | 0,030 | 0,090 | | | | |
| 0,5 | 3 | 36.000 | 1.900 | 0,027 | 0,030 | 0,090 | 32.500 | 1.600 | 0,025 | 0,025 | 0,080 | | | | |
| 0,5 | 4 | 36.000 | 1.900 | 0,027 | 0,020 | 0,050 | 32.500 | 1.600 | 0,025 | 0,018 | 0,050 | | | | |
| 0,5 | 5 | 32.000 | 1.500 | 0,024 | 0,015 | 0,045 | 29.000 | 1.400 | 0,024 | 0,015 | 0,045 | | | | |
| 0,5 | 6 | 32.000 | 1.500 | 0,024 | 0,012 | 0,035 | 29.000 | 1.400 | 0,024 | 0,012 | 0,035 | | | | |
| 0,6 | 2 | 40.000 | 3.000 | 0,038 | 0,040 | 0,120 | 36.000 | 2.700 | 0,038 | 0,035 | 0,110 | | | | |
| 0,6 | 3 | 36.000 | 2.400 | 0,034 | 0,022 | 0,070 | 36.000 | 2.700 | 0,038 | 0,026 | 0,080 | | | | |
| 0,6 | 4 | 36.000 | 2.400 | 0,034 | 0,022 | 0,065 | 32.500 | 2.200 | 0,034 | 0,022 | 0,060 | | | | |
| 0,6 | 5 | 32.000 | 2.000 | 0,030 | 0,015 | 0,045 | 29.000 | 1.700 | 0,030 | 0,012 | 0,050 | | | | |
| 0,6 | 6 | 32.000 | 2.000 | 0,030 | 0,015 | 0,040 | 29.000 | 1.700 | 0,030 | 0,012 | 0,030 | | | | |
| 0,6 | 8 | 32.000 | 2.000 | 0,030 | 0,015 | 0,035 | 29.000 | 1.700 | 0,030 | 0,010 | 0,025 | | | | |
| 0,7 | 4 | 36.000 | 2.400 | 0,034 | 0,022 | 0,070 | 36.000 | 2.700 | 0,038 | 0,050 | 0,120 | | | | |
| 0,7 | 8 | 32.000 | 2.000 | 0,030 | 0,015 | 0,028 | 29.000 | 1.700 | 0,030 | 0,015 | 0,050 | | | | |
| 0,8 | 2 | 40.000 | 3.000 | 0,038 | 0,080 | 0,220 | 36.000 | 2.700 | 0,038 | 0,070 | 0,200 | | | | |
| 0,8 | 4 | 40.000 | 3.000 | 0,038 | 0,050 | 0,160 | 36.000 | 2.700 | 0,038 | 0,050 | 0,150 | | | | |
| 0,8 | 5 | 40.000 | 3.000 | 0,038 | 0,040 | 0,140 | 35.000 | 2.100 | 0,034 | 0,028 | 0,080 | | | | |
| 0,8 | 6 | 36.000 | 2.400 | 0,034 | 0,030 | 0,090 | 35.000 | 2.100 | 0,034 | 0,026 | 0,070 | | | | |
| 0,8 | 7 | 32.000 | 1.900 | 0,030 | 0,020 | 0,070 | 29.000 | 1.700 | 0,030 | 0,018 | 0,050 | | | | |
| 0,8 | 8 | 32.000 | 1.900 | 0,030 | 0,020 | 0,060 | 29.000 | 1.700 | 0,030 | 0,018 | 0,045 | | | | |
| 0,8 | 10 | 32.000 | 1.900 | 0,030 | 0,020 | 0,050 | 29.000 | 1.700 | 0,030 | 0,018 | 0,045 | | | | |
| 0,9 | 6 | 36.000 | 2.400 | 0,034 | 0,030 | 0,090 | 32.500 | 2.100 | 0,034 | 0,028 | 0,090 | | | | |
| 0,9 | 12 | 28.000 | 2.000 | 0,035 | 0,020 | 0,060 | 29.000 | 1.700 | 0,029 | 0,015 | 0,040 | | | | |
| 1,0 | 2 | 36.000 | 3.240 | 0,045 | 0,110 | 0,320 | 33.000 | 2.970 | 0,045 | 0,090 | 0,260 | | | | |
| 1,0 | 3 | 36.000 | 3.200 | 0,045 | 0,100 | 0,300 | 32.500 | 2.900 | 0,045 | 0,090 | 0,260 | | | | |
| 1,0 | 4 | 36.000 | 3.200 | 0,045 | 0,070 | 0,200 | 32.500 | 2.900 | 0,045 | 0,060 | 0,180 | | | | |
| 1,0 | 5 | 32.000 | 2.600 | 0,040 | 0,040 | 0,100 | 29.000 | 2.300 | 0,040 | 0,035 | 0,100 | | | | |
| 1,0 | 6 | 32.000 | 2.600 | 0,040 | 0,040 | 0,100 | 29.000 | 2.300 | 0,040 | 0,035 | 0,100 | | | | |
| 1,0 | 7 | 32.000 | 2.600 | 0,040 | 0,040 | 0,100 | 29.000 | 2.300 | 0,040 | 0,030 | 0,090 | | | | |
| 1,0 | 8 | 32.000 | 2.600 | 0,040 | 0,030 | 0,100 | 29.000 | 2.300 | 0,040 | 0,030 | 0,090 | | | | |
| 1,0 | 9 | 32.000 | 2.600 | 0,040 | 0,025 | 0,075 | 29.000 | 2.300 | 0,040 | 0,022 | 0,060 | | | | |
| 1,0 | 10 | 32.000 | 2.600 | 0,040 | 0,025 | 0,075 | 29.000 | 2.300 | 0,040 | 0,022 | 0,060 | | | | |
| 1,0 | 12 | 29.000 | 2.000 | 0,035 | 0,025 | 0,070 | 26.000 | 1.800 | 0,036 | 0,022 | 0,060 | | | | |
| 1,0 | 15 | 29.000 | 2.000 | 0,035 | 0,020 | 0,065 | 26.000 | 1.600 | 0,032 | 0,012 | 0,040 | | | | |
| 1,0 | 20 | 21.500 | 1.400 | 0,032 | 0,010 | 0,025 | 19.500 | 1.200 | 0,032 | 0,009 | 0,020 | | | | |
| 1,0 | 25 | 18.000 | 900 | 0,025 | 0,010 | 0,015 | 19.500 | 980 | 0,025 | 0,005 | 0,015 | | | | |
| 1,0 | 30 | 15.000 | 600 | 0,020 | 0,008 | 0,010 | 19.500 | 780 | 0,020 | 0,003 | 0,010 | | | | |
| 1,2 | 5 | 32.000 | 2.600 | 0,040 | 0,040 | 0,120 | 29.000 | 2.300 | 0,040 | 0,036 | 0,100 | | | | |
| 1,2 | 6 | 32.000 | 2.600 | 0,040 | 0,040 | 0,120 | 29.000 | 2.300 | 0,040 | 0,036 | 0,100 | | | | |
| 1,2 | 8 | 28.000 | 2.300 | 0,040 | 0,040 | 0,110 | 26.000 | 2.100 | 0,040 | 0,036 | 0,100 | | | | |
| 1,2 | 10 | 28.000 | 2.300 | 0,040 | 0,040 | 0,090 | 26.000 | 2.100 | 0,040 | 0,030 | 0,090 | | | | |
| 1,2 | 12 | 28.000 | 2.300 | 0,040 | 0,030 | 0,080 | 26.000 | 2.100 | 0,040 | 0,025 | 0,080 | | | | |
| 1,2 | 15 | 28.000 | 2.000 | 0,035 | 0,025 | 0,065 | 26.000 | 1.600 | 0,032 | 0,012 | 0,040 | | | | |
| 1,2 | 20 | 21.500 | 1.400 | 0,032 | 0,010 | 0,025 | 19.500 | 1.200 | 0,032 | 0,005 | 0,020 | | | | |
| 1,2 | 25 | 18.000 | 900 | 0,025 | 0,010 | 0,015 | 19.500 | 980 | 0,025 | 0,005 | 0,015 | | | | |
| 1,4 | 8 | 25.000 | 2.000 | 0,040 | 0,050 | 0,160 | 23.000 | 1.800 | 0,040 | 0,050 | 0,140 | | | | |
| 1,4 | 15 | 23.000 | 1.600 | 0,035 | 0,030 | 0,100 | 20.000 | 1.400 | 0,035 | 0,030 | 0,080 | | | | |

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden.
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
If the rpm available is lower than recommended please reduce the feed rate to the same ratio.

Richtwerte für den Einsatz von Karnasch VHM-Fräsern für HSC/HHC/HPC-Bearbeitung
Recommended cutting data for solid carbide end mills HSC/HHC/HPC

30 6264

30 6257

| Werkstoffgruppe Material group | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels < 850 N/mm ² | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat-treated steels < 35 HRC (1200 N/mm ²) | | | | | | | | | |
|-----------------------------------|----|--|----------------|------------------|-----------|-------|---|-------|------------------|-----------|-------|-------|-------|--|--|--|
| | | d1 | l _s | min ¹ | Vf mm/min | fz mm | ap mm | ae mm | min ¹ | Vf mm/min | fz mm | ap mm | ae mm | | | |
| 1,5 | 4 | 29.000 | 2.900 | 0,050 | 0,120 | 0,300 | 28.000 | 2.800 | 0,050 | 0,090 | 0,240 | | | | | |
| 1,5 | 6 | 28.000 | 2.500 | 0,045 | 0,100 | 0,250 | 25.000 | 2.200 | 0,045 | 0,080 | 0,240 | | | | | |
| 1,5 | 8 | 25.000 | 2.000 | 0,040 | 0,060 | 0,160 | 23.000 | 1.800 | 0,040 | 0,050 | 0,150 | | | | | |
| 1,5 | 10 | 25.000 | 2.000 | 0,040 | 0,060 | 0,150 | 23.000 | 1.800 | 0,040 | 0,050 | 0,150 | | | | | |
| 1,5 | 12 | 25.000 | 2.000 | 0,040 | 0,050 | 0,140 | 23.000 | 1.800 | 0,040 | 0,050 | 0,120 | | | | | |
| 1,5 | 14 | 23.000 | 1.610 | 0,035 | 0,035 | 0,100 | 20.000 | 1.440 | 0,036 | 0,040 | 0,100 | | | | | |
| 1,5 | 15 | 22.000 | 1.600 | 0,035 | 0,035 | 0,100 | 20.000 | 1.450 | 0,035 | 0,030 | 0,100 | | | | | |
| 1,5 | 16 | 22.000 | 1.540 | 0,035 | 0,035 | 0,100 | 20.000 | 1.400 | 0,035 | 0,030 | 0,100 | | | | | |
| 1,5 | 18 | 22.000 | 1.540 | 0,035 | 0,035 | 0,100 | 20.000 | 1.400 | 0,035 | 0,030 | 0,100 | | | | | |
| 1,5 | 20 | 22.000 | 1.600 | 0,035 | 0,035 | 0,100 | 20.000 | 1.450 | 0,035 | 0,030 | 0,100 | | | | | |
| 1,5 | 25 | 22.000 | 1.600 | 0,030 | 0,030 | 0,080 | 18.000 | 1.100 | 0,030 | 0,020 | 0,070 | | | | | |
| 1,5 | 30 | 20.000 | 1.000 | 0,025 | 0,030 | 0,060 | 15.000 | 600 | 0,020 | 0,010 | 0,040 | | | | | |
| 1,6 | 8 | 26.000 | 2.600 | 0,050 | 0,100 | 0,300 | 23.000 | 2.300 | 0,050 | 0,090 | 0,280 | | | | | |
| 1,6 | 15 | 21.000 | 1.600 | 0,040 | 0,040 | 0,110 | 19.000 | 1.500 | 0,040 | 0,030 | 0,090 | | | | | |
| 1,8 | 10 | 24.000 | 2.100 | 0,045 | 0,060 | 0,200 | 23.000 | 2.300 | 0,050 | 0,060 | 0,160 | | | | | |
| 1,8 | 20 | 21.000 | 1.600 | 0,040 | 0,040 | 0,120 | 19.000 | 1.500 | 0,040 | 0,040 | 0,110 | | | | | |
| 2,0 | 6 | 21.000 | 3.100 | 0,070 | 0,200 | 0,600 | 19.000 | 2.800 | 0,075 | 0,180 | 0,500 | | | | | |
| 2,0 | 8 | 21.000 | 3.100 | 0,070 | 0,140 | 0,400 | 19.000 | 2.800 | 0,075 | 0,120 | 0,350 | | | | | |
| 2,0 | 10 | 21.000 | 3.100 | 0,070 | 0,140 | 0,400 | 19.000 | 2.800 | 0,075 | 0,120 | 0,350 | | | | | |
| 2,0 | 12 | 19.000 | 2.300 | 0,060 | 0,080 | 0,200 | 17.000 | 2.300 | 0,068 | 0,070 | 0,200 | | | | | |
| 2,0 | 15 | 19.000 | 2.300 | 0,060 | 0,080 | 0,200 | 17.000 | 2.300 | 0,068 | 0,070 | 0,200 | | | | | |
| 2,0 | 20 | 19.000 | 2.300 | 0,060 | 0,050 | 0,150 | 17.000 | 2.300 | 0,068 | 0,040 | 0,110 | | | | | |
| 2,0 | 25 | 17.000 | 2.000 | 0,060 | 0,050 | 0,120 | 15.000 | 1.800 | 0,060 | 0,040 | 0,110 | | | | | |
| 2,0 | 30 | 17.000 | 2.000 | 0,060 | 0,030 | 0,080 | 15.000 | 1.800 | 0,060 | 0,020 | 0,080 | | | | | |
| 2,5 | 10 | 21.000 | 3.100 | 0,070 | 0,200 | 0,700 | 19.000 | 2.800 | 0,075 | 0,200 | 0,180 | | | | | |
| 2,5 | 15 | 19.000 | 2.300 | 0,060 | 0,080 | 0,250 | 17.000 | 2.300 | 0,070 | 0,080 | 0,180 | | | | | |
| 2,5 | 20 | 19.000 | 2.300 | 0,060 | 0,060 | 0,180 | 17.000 | 2.300 | 0,070 | 0,040 | 0,120 | | | | | |
| 2,5 | 25 | 17.000 | 2.000 | 0,060 | 0,050 | 0,140 | 15.000 | 1.800 | 0,060 | 0,040 | 0,110 | | | | | |
| 3,0 | 5 | 17.000 | 2.500 | 0,075 | 0,300 | 0,800 | 15.000 | 2.100 | 0,070 | 0,250 | 0,800 | | | | | |
| 3,0 | 10 | 16.000 | 2.400 | 0,075 | 0,200 | 0,600 | 15.000 | 2.100 | 0,070 | 0,180 | 0,550 | | | | | |
| 3,0 | 15 | 14.500 | 2.000 | 0,070 | 0,200 | 0,600 | 13.000 | 1.550 | 0,060 | 0,180 | 0,550 | | | | | |
| 3,0 | 20 | 14.500 | 2.000 | 0,070 | 0,120 | 0,250 | 13.000 | 1.550 | 0,060 | 0,150 | 0,500 | | | | | |
| 3,0 | 25 | 14.500 | 2.000 | 0,070 | 0,080 | 0,220 | 13.000 | 1.550 | 0,060 | 0,070 | 0,200 | | | | | |
| 3,0 | 30 | 13.000 | 1.500 | 0,060 | 0,080 | 0,200 | 11.500 | 1.300 | 0,060 | 0,070 | 0,200 | | | | | |
| 4,0 | 10 | 11.500 | 2.200 | 0,095 | 0,400 | 1,000 | 10.500 | 2.000 | 0,100 | 0,350 | 1,000 | | | | | |
| 4,0 | 15 | 11.500 | 2.200 | 0,095 | 0,250 | 0,800 | 10.500 | 2.000 | 0,100 | 0,250 | 0,750 | | | | | |
| 4,0 | 20 | 11.500 | 2.200 | 0,090 | 0,200 | 0,600 | 10.500 | 2.000 | 0,100 | 0,200 | 0,650 | | | | | |
| 4,0 | 25 | 10.000 | 1.800 | 0,090 | 0,150 | 0,450 | 9.500 | 1.600 | 0,090 | 0,150 | 0,400 | | | | | |
| 4,0 | 30 | 10.000 | 1.800 | 0,090 | 0,100 | 0,300 | 9.500 | 1.600 | 0,090 | 0,090 | 0,250 | | | | | |
| 5,0 | 10 | 12.000 | 3.300 | 0,140 | 0,450 | 1,200 | 9.000 | 2.500 | 0,140 | 0,450 | 1,100 | | | | | |
| 5,0 | 15 | 12.000 | 2.800 | 0,120 | 0,350 | 1,100 | 9.000 | 2.500 | 0,140 | 0,380 | 1,000 | | | | | |
| 5,0 | 20 | 12.000 | 2.600 | 0,120 | 0,350 | 1,000 | 9.000 | 2.500 | 0,140 | 0,350 | 0,950 | | | | | |
| 5,0 | 25 | 9.000 | 2.200 | 0,120 | 0,350 | 0,800 | 8.100 | 2.000 | 0,125 | 0,310 | 0,900 | | | | | |
| 5,0 | 30 | 8.000 | 1.800 | 0,110 | 0,200 | 0,600 | 8.100 | 2.000 | 0,125 | 0,200 | 0,700 | | | | | |
| 5,0 | 40 | 8.000 | 1.800 | 0,110 | 0,200 | 0,500 | 7.300 | 1.600 | 0,110 | 0,150 | 0,500 | | | | | |
| 6,0 | 10 | 12.000 | 3.300 | 0,140 | 0,550 | 1,400 | 9.000 | 2.500 | 0,140 | 0,450 | 1,200 | | | | | |
| 6,0 | 15 | 12.000 | 2.800 | 0,120 | 0,400 | 1,200 | 9.000 | 2.500 | 0,140 | 0,400 | 1,100 | | | | | |
| 6,0 | 20 | 12.000 | 2.600 | 0,120 | 0,350 | 1,100 | 9.000 | 2.500 | 0,140 | 0,400 | 1,100 | | | | | |
| 6,0 | 25 | 9.000 | 2.200 | 0,120 | 0,300 | 0,800 | 9.000 | 2.500 | 0,140 | 0,380 | 1,000 | | | | | |
| 6,0 | 30 | 8.000 | 2.000 | 0,125 | 0,400 | 0,700 | 7.200 | 1.700 | 0,120 | 0,370 | 1,000 | | | | | |
| 6,0 | 40 | 8.000 | 2.000 | 0,125 | 0,250 | 0,600 | 7.200 | 1.700 | 0,120 | 0,200 | 0,600 | | | | | |
| 6,0 | 50 | 7.200 | 1.600 | 0,110 | 0,150 | 0,400 | 6.500 | 1.400 | 0,110 | 0,120 | 0,400 | | | | | |



Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden.
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
If the rpm available is lower than recommended please reduce the feed rate to the same ratio.

30 6264

30 6257

Richtwerte für den Einsatz von Karnasch VHM-Fräsern für HSC/HHC/HPC-Bearbeitung
Recommended cutting data for solid carbide end mills HSC/HHC/HPC

| Werkstoffgruppe Material group | d1 | l3 | 4.1 - 4.2 - 4.3 Rostfreie Stähle / Stainless steels austenitisch/ferritisch / austenitic/ferritic 35 - 45 HRC | | | | | 8.1 - gehärtete Stähle / Hardened steels 45 - 55 HRC | | | | | 8.2 - 8.3 gehärtete Stähle / Hardened steels 55 - 70 HRC | | | | |
|-----------------------------------|-----|--------|--|-----------|-------|-------|--------|--|-----------|-------|-------|--------|--|-----------|-------|-------|-------|
| | | | min ¹ | Vf mm/min | fz mm | ap mm | ae mm | min ¹ | Vf mm/min | fz mm | ap mm | ae mm | min ¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 0,1 | 0,2 | 45.000 | 900 | 0,010 | 0,010 | 0,030 | 40.000 | 720 | 0,009 | 0,008 | 0,015 | 40.000 | 640 | 0,008 | 0,008 | 0,013 | |
| | | 45.000 | 900 | 0,010 | 0,008 | 0,020 | 40.000 | 720 | 0,009 | 0,006 | 0,013 | 40.000 | 640 | 0,008 | 0,006 | 0,011 | |
| | | 45.000 | 900 | 0,010 | 0,005 | 0,010 | 40.000 | 720 | 0,009 | 0,004 | 0,010 | 40.000 | 640 | 0,008 | 0,004 | 0,008 | |
| 0,2 | 0,5 | 43.000 | 1.700 | 0,020 | 0,015 | 0,045 | 38.000 | 1.350 | 0,018 | 0,012 | 0,030 | 38.000 | 1.350 | 0,018 | 0,012 | 0,035 | |
| | | 43.000 | 1.700 | 0,020 | 0,010 | 0,030 | 38.000 | 1.350 | 0,018 | 0,008 | 0,025 | 38.000 | 1.350 | 0,018 | 0,008 | 0,025 | |
| | | 43.000 | 1.720 | 0,020 | 0,008 | 0,020 | 38.000 | 1.368 | 0,018 | 0,006 | 0,020 | 38.000 | 1.368 | 0,018 | 0,006 | 0,020 | |
| 0,3 | 1 | 43.000 | 1.700 | 0,020 | 0,015 | 0,040 | 38.000 | 1.350 | 0,018 | 0,014 | 0,040 | 37.500 | 1.350 | 0,018 | 0,012 | 0,040 | |
| | | 43.000 | 1.720 | 0,020 | 0,012 | 0,030 | 38.000 | 1.368 | 0,018 | 0,010 | 0,030 | 37.500 | 1.350 | 0,018 | 0,010 | 0,030 | |
| | | 43.000 | 1.700 | 0,020 | 0,010 | 0,025 | 38.000 | 1.350 | 0,018 | 0,008 | 0,020 | 37.500 | 1.350 | 0,018 | 0,008 | 0,020 | |
| 0,3 | 2,5 | 38.000 | 1.520 | 0,020 | 0,009 | 0,020 | 34.000 | 1.156 | 0,017 | 0,006 | 0,015 | 30.000 | 960 | 0,016 | 0,006 | 0,016 | |
| | | 34.000 | 1.050 | 0,016 | 0,006 | 0,018 | 30.000 | 950 | 0,016 | 0,005 | 0,015 | 30.000 | 950 | 0,016 | 0,005 | 0,015 | |
| | | 30.000 | 480 | 0,008 | 0,003 | 0,008 | 30.000 | 950 | 0,016 | 0,002 | 0,006 | - | - | - | - | - | |
| 0,4 | 1,5 | 35.000 | 1.890 | 0,027 | 0,025 | 0,060 | 32.000 | 1.536 | 0,024 | 0,020 | 0,050 | 32.000 | 1.536 | 0,024 | 0,020 | 0,050 | |
| | | 35.000 | 1.890 | 0,027 | 0,025 | 0,060 | 32.000 | 1.536 | 0,024 | 0,020 | 0,050 | 32.000 | 1.536 | 0,024 | 0,020 | 0,050 | |
| | | 34.000 | 1.800 | 0,027 | 0,020 | 0,060 | 30.000 | 1.450 | 0,024 | 0,018 | 0,050 | 30.000 | 1.450 | 0,024 | 0,018 | 0,050 | |
| 0,4 | 3 | 30.500 | 1.650 | 0,027 | 0,012 | 0,035 | 27.000 | 1.300 | 0,024 | 0,010 | 0,030 | 27.000 | 1.300 | 0,024 | 0,010 | 0,025 | |
| | | 27.000 | 1.150 | 0,021 | 0,008 | 0,022 | 24.000 | 1.000 | 0,020 | 0,006 | 0,020 | 24.000 | 1.000 | 0,020 | 0,006 | 0,020 | |
| | | 24.000 | 480 | 0,010 | 0,004 | 0,012 | 20.000 | 480 | 0,012 | 0,004 | 0,010 | - | - | - | - | - | |
| 0,4 | 5 | 24.000 | 480 | 0,010 | 0,004 | 0,008 | 20.000 | 480 | 0,012 | 0,002 | 0,006 | - | - | - | - | - | |
| | | 24.000 | 480 | 0,010 | 0,004 | 0,008 | 20.000 | 480 | 0,012 | 0,002 | 0,006 | - | - | - | - | - | |
| | | 24.000 | 480 | 0,010 | 0,004 | 0,008 | 20.000 | 480 | 0,012 | 0,002 | 0,006 | - | - | - | - | - | |
| 0,5 | 1 | 35.000 | 1.890 | 0,027 | 0,028 | 0,080 | 32.000 | 1.536 | 0,024 | 0,020 | 0,060 | 32.000 | 1.536 | 0,024 | 0,020 | 0,060 | |
| | | 34.000 | 1.800 | 0,027 | 0,026 | 0,080 | 30.000 | 1.450 | 0,024 | 0,020 | 0,060 | 30.000 | 1.450 | 0,024 | 0,020 | 0,060 | |
| | | 30.500 | 1.600 | 0,026 | 0,022 | 0,070 | 27.000 | 1.300 | 0,024 | 0,020 | 0,050 | 27.000 | 1.300 | 0,024 | 0,020 | 0,045 | |
| 0,5 | 4 | 30.500 | 1.600 | 0,026 | 0,015 | 0,045 | 27.000 | 1.300 | 0,024 | 0,012 | 0,035 | 27.000 | 1.300 | 0,024 | 0,010 | 0,030 | |
| | | 27.000 | 1.150 | 0,021 | 0,012 | 0,040 | 24.000 | 1.000 | 0,020 | 0,010 | 0,030 | 24.000 | 1.000 | 0,020 | 0,010 | 0,025 | |
| | | 27.000 | 1.150 | 0,021 | 0,010 | 0,030 | 24.000 | 1.000 | 0,020 | 0,006 | 0,020 | 24.000 | 1.000 | 0,020 | 0,008 | 0,020 | |
| 0,6 | 2 | 34.000 | 2.300 | 0,034 | 0,032 | 0,090 | 30.000 | 1.800 | 0,030 | 0,025 | 0,080 | 28.000 | 1.450 | 0,025 | 0,025 | 0,060 | |
| | | 34.000 | 2.300 | 0,034 | 0,025 | 0,065 | 30.000 | 1.800 | 0,030 | 0,020 | 0,060 | 28.000 | 1.450 | 0,025 | 0,018 | 0,050 | |
| | | 30.500 | 2.000 | 0,033 | 0,018 | 0,050 | 27.000 | 1.600 | 0,030 | 0,015 | 0,040 | 25.000 | 1.300 | 0,025 | 0,014 | 0,040 | |
| 0,6 | 5 | 27.000 | 1.400 | 0,026 | 0,012 | 0,035 | 27.000 | 1.600 | 0,030 | 0,011 | 0,030 | 25.000 | 1.300 | 0,025 | 0,010 | 0,030 | |
| | | 27.000 | 1.400 | 0,026 | 0,012 | 0,035 | 24.000 | 1.200 | 0,025 | 0,010 | 0,025 | 22.500 | 1.000 | 0,022 | 0,008 | 0,030 | |
| | | 27.000 | 1.400 | 0,026 | 0,010 | 0,030 | 24.000 | 1.200 | 0,025 | 0,010 | 0,020 | 22.500 | 1.000 | 0,022 | 0,006 | 0,020 | |
| 0,7 | 4 | 30.500 | 2.000 | 0,033 | 0,018 | 0,050 | 27.000 | 1.600 | 0,030 | 0,015 | 0,040 | 25.000 | 1.300 | 0,025 | 0,014 | 0,040 | |
| | | 27.000 | 1.400 | 0,026 | 0,010 | 0,035 | 24.000 | 1.200 | 0,025 | 0,010 | 0,020 | 22.500 | 1.000 | 0,022 | 0,007 | 0,020 | |
| | | 34.000 | 2.300 | 0,034 | 0,060 | 0,180 | 30.000 | 1.800 | 0,030 | 0,050 | 0,140 | 28.000 | 1.460 | 0,025 | 0,045 | 0,120 | |
| 0,8 | 2 | 34.000 | 2.300 | 0,034 | 0,040 | 0,130 | 30.000 | 1.800 | 0,030 | 0,035 | 0,100 | 28.000 | 1.460 | 0,025 | 0,030 | 0,100 | |
| | | 34.000 | 2.300 | 0,034 | 0,030 | 0,100 | 30.000 | 1.800 | 0,030 | 0,025 | 0,080 | 28.000 | 1.460 | 0,025 | 0,020 | 0,070 | |
| | | 30.500 | 2.050 | 0,034 | 0,025 | 0,070 | 27.000 | 1.600 | 0,030 | 0,020 | 0,050 | 25.000 | 1.250 | 0,025 | 0,018 | 0,050 | |
| 0,8 | 7 | 30.500 | 2.050 | 0,034 | 0,018 | 0,060 | 27.000 | 1.600 | 0,030 | 0,015 | 0,040 | 25.000 | 1.250 | 0,025 | 0,018 | 0,050 | |
| | | 27.000 | 1.400 | 0,025 | 0,015 | 0,040 | 24.000 | 1.250 | 0,025 | 0,010 | 0,030 | 22.500 | 1.000 | 0,022 | 0,010 | 0,030 | |
| | | 27.000 | 1.400 | 0,025 | 0,014 | 0,040 | 24.000 | 1.250 | 0,025 | 0,010 | 0,025 | 22.500 | 1.000 | 0,022 | 0,010 | 0,025 | |
| 0,8 | 10 | 27.000 | 1.400 | 0,025 | 0,014 | 0,040 | 24.000 | 1.250 | 0,025 | 0,010 | 0,025 | 22.500 | 1.000 | 0,022 | 0,010 | 0,025 | |
| | | 30.500 | 2.050 | 0,034 | 0,025 | 0,070 | 27.000 | 1.600 | 0,030 | 0,020 | 0,050 | 25.000 | 1.250 | 0,025 | 0,018 | 0,050 | |
| | | 27.000 | 1.400 | 0,025 | 0,012 | 0,040 | 24.000 | 1.250 | 0,025 | 0,010 | 0,020 | 22.500 | 1.000 | 0,022 | 0,010 | 0,020 | |
| 0,9 | 6 | 30.500 | 2.440 | 0,040 | 0,090 | 0,25 | 27.000 | 1.890 | 0,035 | 0,070 | 0,20 | 25.000 | 1.600 | 0,032 | 0,060 | 0,18 | |
| | | 30.500 | 2.400 | 0,040 | 0,080 | 0,220 | 27.000 | 1.950 | 0,035 | 0,060 | 0,18 | 25.000 | 1.600 | 0,032 | 0,050 | 0,150 | |
| | | 30.500 | 2.400 | 0,040 | 0,050 | 0,160 | 27.000 | 1.950 | 0,035 | 0,040 | 0,12 | 25.000 | 1.600 | 0,032 | 0,040 | 0,120 | |
| 1,0 | 5 | 30.500 | 2.400 | 0,040 | 0,040 | 0,100 | 27.000 | 1.950 | 0,035 | 0,025 | 0,08 | 25.000 | 1.600 | 0,032 | 0,030 | 0,080 | |
| | | 27.500 | 2.200 | 0,040 | 0,030 | 0,080 | 24.000 | 1.750 | 0,035 | 0,025 | 0,070 | 23.000 | 1.400 | 0,030 | 0,020 | 0,060 | |
| | | 27.500 | 2.200 | 0,040 | 0,030 | 0,080 | 24.000 | 1.750 | 0,035 | 0,025 | 0,070 | 23.000 | 1.400 | 0,030 | 0,020 | 0,050 | |
| 1,0 | 9 | 27.500 | 2.200 | 0,040 | 0,020 | 0,060 | 24.000 | 1.750 | 0,035 | 0,020 | 0,060 | 23.000 | 1.400 | 0,030 | 0,020 | 0,045 | |
| | | 27.500 | 2.200 | 0,040 | 0,020 | 0,050 | 24.000 | 1.750 | 0,035 | 0,015 | 0,045 | 23.000 | 1.400 | 0,030 | 0,015 | 0,040 | |
| | | 24.500 | 1.500 | 0,032 | 0,020 | 0,050 | 21.500 | 1.350 | 0,032 | 0,015 | 0,040 | 20.000 | 1.000 | 0,025 | 0,015 | 0,040 | |
| 1,0 | 15 | 24.500 | 1.400 | 0,028 | 0,012 | 0,030 | 21.500 | 1.150 | 0,027 | 0,010 | 0,025 | 20.000 | 900 | 0,022 | 0,009 | 0,025 | |
| | | 18.000 | 1.000 | 0,028 | 0,008 | 0,020 | 16.000 | 800 | 0,025 | 0,006 | 0,018 | 15.000 | 700 | 0,022 | 0,006 | 0,015 | |
| | | 18.000 | 1.000 | 0,028 | 0,004 | 0,010 | 16.000 | 800 | 0,025 | 0,004 | 0,012 | - | - | - | - | - | |
| 1,0 | 30 | 18.000 | 1.000 | 0,028 | 0,003 | 0,006 | 16.000 | 800 | 0,025 | 0,002 | 0,006 | - | - | - | - | - | |
| | | 26.000 | 2.600 | 0,050 | 0,040 | 0,140 | 21.500 | 1.500 | 0,035 | 0,025 | 0,070 | 20.000 | 1.300 | 0,032 | 0,020 | 0,080 | |
| | | 26.000 | 2.600 | 0,050 | 0,030 | 0,100 | 21.500 | 1.500 | 0,035 | 0,025 | 0,070 | 20.000 | 1.300 | 0,032 | 0,020 | 0,080 | |
| 1,2 | 8 | 24.500 | 2.000 | 0,040 | 0,030 | 0,090 | 21.500 | 1.500 | 0,035 | 0,025 | 0,070 | 20.000 | 1.250 | 0,032 | 0,020 | 0,070 | |
| | | 24.500 | 2.000 | 0,040 | 0,025 | 0,080 | 21.500 | 1.500 | 0,035 | 0,020 | 0,060 | 20.000 | 1.250 | 0,032 | 0,015 | 0,060 | |
| | | 24.500 | 2.000 | 0,040 | 0,022 | 0,070 | 21.500 | 1.500 | 0,035 | 0,020 | 0,050 | 20.000 | 1.250 | 0,032 | 0,015 | 0,050 | |
| 1,2 | 15 | 19.000 | 1.100 | 0,030 | 0,020 | 0,060 | 18.000 | 720 | 0,020 | 0,015 | 0,030 | 16.000 | 850 | 0,027 | 0,020 | 0,060 | |
| | | 19.000 | 1.100 | 0,030 | 0,010 | 0,040 | 18.000 | 720 | 0,020 | 0,010 | 0,015 | 16.000 | 850 | 0,027 | 0,020 | 0,060 | |
| | | 19.000 | 1.100 | 0,030 | 0,005 | 0,020 | - | - | - | - | - | - | - | - | - | - | |
| 1,4 | 8 | 24.500 | 2.000 | 0,040 | 0,004 | 0,110 | 19.000 | 1.350 | 0,035 | 0,032 | 0,100 | 17.500 | 1.100 | 0,032 | 0,030 | 0,080 | |
| | | 19.000 | 1.100 | 0,030 | 0,020 | 0,080 | 17.000 | 1.050 | 0,032 | 0,020 | 0,060 | 16.000 | 850 | 0,026 | 0,020 | 0,050 | |

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden.
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
If the rpm available is lower than recommended please reduce the feed rate to the same ratio.

Richtwerte für den Einsatz von Karnasch VHM-Fräsern für HSC/HHC/HPC-Bearbeitung
Recommended cutting data for solid carbide end mills HSC/HHC/HPC

30 6264

30 6257

| Werkstoff- gruppe Material group | d1 | S | 4.1 – 4.2 – 4.3 Rostfreie Stähle / Stainless steels austenitisch/ferritisch / austenitic/ferritic 35 - 45 HRC | | | | | 8.1 – gehärtete Stähle / Hardened steels 45 - 55 HRC | | | | | 8.2 – 8.3 gehärtete Stähle / Hardened steels 55 - 70 HRC | | | | |
|--|----|---|--|-----------|-------|-------|-------|--|-----------|-------|-------|-------|--|-----------|-------|-------|-------|
| | | | min ¹ | Vf mm/min | fz mm | ap mm | ae mm | min ¹ | Vf mm/min | fz mm | ap mm | ae mm | min ¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 1,5 | 4 | | 25.000 | 2.000 | 0,040 | 0,100 | 0,250 | 22.000 | 1.540 | 0,035 | 0,070 | 0,200 | 18.000 | 936 | 0,026 | 0,045 | 0,090 |
| 1,5 | 6 | | 24.000 | 1.900 | 0,040 | 0,080 | 0,200 | 21.000 | 1.500 | 0,035 | 0,060 | 0,170 | 17.500 | 1.100 | 0,026 | 0,040 | 0,080 |
| 1,5 | 8 | | 21.500 | 1.700 | 0,040 | 0,040 | 0,120 | 19.000 | 1.350 | 0,035 | 0,040 | 0,100 | 17.500 | 1.100 | 0,026 | 0,030 | 0,070 |
| 1,5 | 10 | | 21.500 | 1.700 | 0,040 | 0,040 | 0,100 | 19.000 | 1.350 | 0,035 | 0,040 | 0,100 | 17.500 | 1.100 | 0,026 | 0,030 | 0,070 |
| 1,5 | 12 | | 21.500 | 1.700 | 0,040 | 0,030 | 0,100 | 19.000 | 1.350 | 0,035 | 0,040 | 0,100 | 17.500 | 1.100 | 0,026 | 0,030 | 0,070 |
| 1,5 | 14 | | 19.000 | 1.216 | 0,032 | 0,030 | 0,090 | 17.000 | 1.088 | 0,032 | 0,025 | 0,080 | 16.000 | 832 | 0,026 | 0,025 | 0,055 |
| 1,5 | 15 | | 19.000 | 1.200 | 0,032 | 0,030 | 0,080 | 17.000 | 1.050 | 0,032 | 0,020 | 0,070 | 15.500 | 800 | 0,026 | 0,020 | 0,050 |
| 1,5 | 16 | | 19.000 | 1.216 | 0,032 | 0,030 | 0,080 | 17.000 | 1.088 | 0,032 | 0,020 | 0,070 | 15.500 | 806 | 0,026 | 0,020 | 0,050 |
| 1,5 | 18 | | 19.000 | 1.216 | 0,032 | 0,030 | 0,070 | 17.000 | 1.088 | 0,032 | 0,020 | 0,070 | 15.500 | 806 | 0,026 | 0,015 | 0,040 |
| 1,5 | 20 | | 19.000 | 1.200 | 0,032 | 0,030 | 0,070 | 17.000 | 1.050 | 0,032 | 0,020 | 0,070 | 15.500 | 800 | 0,026 | 0,015 | 0,040 |
| 1,5 | 25 | | 19.000 | 1.200 | 0,032 | 0,020 | 0,060 | - | - | - | - | - | - | - | - | - | - |
| 1,5 | 30 | | 19.000 | 1.200 | 0,032 | 0,020 | 0,050 | - | - | - | - | - | - | - | - | - | - |
| 1,6 | 8 | | 22.000 | 2.000 | 0,045 | 0,080 | 0,250 | 19.500 | 1.550 | 0,040 | 0,060 | 0,200 | 18.000 | 1.250 | 0,035 | 0,060 | 0,160 |
| 1,6 | 15 | | 18.000 | 1.200 | 0,033 | 0,030 | 0,080 | 15.500 | 1.100 | 0,035 | 0,020 | 0,060 | 14.500 | 850 | 0,024 | 0,060 | 0,070 |
| 1,8 | 10 | | 20.000 | 1.800 | 0,045 | 0,050 | 0,150 | 17.500 | 1.400 | 0,040 | 0,040 | 0,120 | 16.000 | 1.150 | 0,030 | 0,040 | 0,110 |
| 1,8 | 20 | | 18.000 | 1.200 | 0,035 | 0,030 | 0,100 | 15.500 | 1.100 | 0,035 | 0,025 | 0,080 | 14.500 | 850 | 0,030 | 0,025 | 0,070 |
| 2,0 | 6 | | 18.000 | 2.600 | 0,072 | 0,150 | 0,450 | 16.000 | 1.900 | 0,060 | 0,120 | 0,350 | 14.500 | 1.500 | 0,050 | 0,100 | 0,300 |
| 2,0 | 8 | | 18.000 | 2.600 | 0,072 | 0,100 | 0,300 | 16.000 | 1.900 | 0,060 | 0,080 | 0,250 | 14.500 | 1.500 | 0,050 | 0,080 | 0,250 |
| 2,0 | 10 | | 18.000 | 2.600 | 0,072 | 0,100 | 0,300 | 16.000 | 1.900 | 0,060 | 0,080 | 0,250 | 14.500 | 1.500 | 0,050 | 0,070 | 0,240 |
| 2,0 | 12 | | 16.000 | 2.100 | 0,065 | 0,060 | 0,180 | 14.000 | 1.700 | 0,060 | 0,050 | 0,140 | 13.000 | 1.300 | 0,050 | 0,040 | 0,140 |
| 2,0 | 15 | | 16.000 | 2.100 | 0,065 | 0,050 | 0,150 | 14.000 | 1.700 | 0,060 | 0,050 | 0,140 | 13.000 | 1.300 | 0,050 | 0,040 | 0,140 |
| 2,0 | 20 | | 16.000 | 2.100 | 0,065 | 0,040 | 0,120 | 14.000 | 1.700 | 0,060 | 0,030 | 0,080 | 13.000 | 1.300 | 0,050 | 0,030 | 0,080 |
| 2,0 | 25 | | 14.000 | 1.400 | 0,050 | 0,040 | 0,120 | 12.500 | 1.300 | 0,050 | 0,030 | 0,080 | 11.500 | 1.050 | 0,045 | 0,030 | 0,070 |
| 2,0 | 30 | | 14.000 | 1.400 | 0,050 | 0,020 | 0,070 | 12.500 | 1.300 | 0,050 | 0,020 | 0,050 | 11.500 | 1.050 | 0,045 | 0,016 | 0,050 |
| 2,5 | 10 | | 18.000 | 2.600 | 0,072 | 0,150 | 0,500 | 16.000 | 1.900 | 0,060 | 0,050 | 0,150 | 14.500 | 1.500 | 0,050 | 0,080 | 0,260 |
| 2,5 | 15 | | 16.000 | 2.100 | 0,065 | 0,060 | 0,200 | 14.000 | 1.700 | 0,060 | 0,050 | 0,140 | 13.000 | 1.300 | 0,050 | 0,040 | 0,120 |
| 2,5 | 20 | | 16.000 | 2.100 | 0,065 | 0,050 | 0,180 | 14.000 | 1.700 | 0,060 | 0,030 | 0,090 | 13.000 | 1.300 | 0,050 | 0,030 | 0,100 |
| 2,5 | 25 | | 14.000 | 1.400 | 0,050 | 0,050 | 0,160 | 12.500 | 1.300 | 0,050 | 0,030 | 0,085 | 11.500 | 1.050 | 0,045 | 0,030 | 0,080 |
| 3,0 | 5 | | 13.500 | 1.800 | 0,068 | 0,220 | 0,700 | 12.000 | 1.450 | 0,060 | 0,180 | 0,500 | 11.000 | 1.150 | 0,052 | 0,125 | 0,310 |
| 3,0 | 10 | | 13.500 | 1.800 | 0,068 | 0,160 | 0,500 | 12.000 | 1.450 | 0,060 | 0,120 | 0,400 | 11.000 | 1.150 | 0,052 | 0,120 | 0,300 |
| 3,0 | 15 | | 12.000 | 1.500 | 0,060 | 0,160 | 0,450 | 11.000 | 1.300 | 0,060 | 0,120 | 0,400 | 10.000 | 1.050 | 0,052 | 0,120 | 0,300 |
| 3,0 | 20 | | 12.000 | 1.500 | 0,060 | 0,120 | 0,400 | 11.000 | 1.300 | 0,060 | 0,050 | 0,120 | 10.000 | 1.050 | 0,052 | 0,060 | 0,200 |
| 3,0 | 25 | | 12.000 | 1.500 | 0,060 | 0,060 | 0,200 | 11.000 | 1.300 | 0,060 | 0,050 | 0,120 | 10.000 | 1.050 | 0,052 | 0,045 | 0,120 |
| 3,0 | 30 | | 11.000 | 1.100 | 0,050 | 0,050 | 0,180 | 9.500 | 1.000 | 0,050 | 0,050 | 0,120 | 9.000 | 800 | 0,045 | 0,045 | 0,100 |
| 4,0 | 10 | | 10.000 | 1.700 | 0,090 | 0,300 | 0,900 | 8.500 | 1.400 | 0,080 | 0,250 | 0,700 | 8.000 | 1.100 | 0,070 | 0,022 | 0,600 |
| 4,0 | 15 | | 10.000 | 1.600 | 0,080 | 0,200 | 0,600 | 8.500 | 1.400 | 0,080 | 0,150 | 0,500 | 8.000 | 1.100 | 0,070 | 0,016 | 0,500 |
| 4,0 | 20 | | 10.000 | 1.600 | 0,080 | 0,150 | 0,450 | 7.500 | 1.200 | 0,080 | 0,120 | 0,350 | 8.000 | 1.100 | 0,070 | 0,012 | 0,300 |
| 4,0 | 25 | | 9.000 | 1.600 | 0,090 | 0,120 | 0,350 | 7.500 | 1.200 | 0,080 | 0,100 | 0,280 | 7.000 | 1.000 | 0,070 | 0,009 | 0,250 |
| 4,0 | 30 | | 9.000 | 1.600 | 0,090 | 0,080 | 0,200 | 7.500 | 1.200 | 0,080 | 0,060 | 0,150 | 7.000 | 1.000 | 0,070 | 0,008 | 0,180 |
| 5,0 | 10 | | 8.500 | 2.500 | 0,150 | 0,350 | 1,000 | 7.500 | 1.200 | 0,080 | 0,280 | 0,750 | 6.300 | 1.000 | 0,080 | 0,350 | 0,800 |
| 5,0 | 15 | | 8.500 | 2.500 | 0,150 | 0,300 | 0,900 | 7.500 | 1.200 | 0,080 | 0,200 | 0,600 | 6.300 | 1.000 | 0,080 | 0,300 | 0,700 |
| 5,0 | 20 | | 8.500 | 2.500 | 0,150 | 0,300 | 0,900 | 7.500 | 1.200 | 0,080 | 0,200 | 0,600 | 6.300 | 1.000 | 0,080 | 0,250 | 0,600 |
| 5,0 | 25 | | 7.500 | 1.800 | 0,120 | 0,250 | 0,800 | 6.500 | 1.300 | 0,100 | 0,200 | 0,600 | 6.300 | 1.000 | 0,080 | 0,200 | 0,600 |
| 5,0 | 30 | | 7.500 | 1.800 | 0,120 | 0,200 | 0,600 | 6.500 | 1.300 | 0,100 | 0,150 | 0,450 | 6.300 | 1.000 | 0,080 | 0,150 | 0,400 |
| 5,0 | 40 | | 7.000 | 1.500 | 0,110 | 0,150 | 0,400 | 6.000 | 1.200 | 0,100 | 0,120 | 0,350 | 5.500 | 1.000 | 0,080 | 0,100 | 0,350 |
| 6,0 | 10 | | 7.000 | 2.250 | 0,160 | 0,450 | 1,250 | 6.000 | 1.200 | 0,100 | 0,300 | 0,800 | 6.200 | 1.000 | 0,080 | 0,400 | 0,900 |
| 6,0 | 15 | | 7.000 | 2.250 | 0,160 | 0,400 | 1,100 | 6.000 | 1.200 | 0,100 | 0,300 | 0,800 | 6.200 | 1.000 | 0,080 | 0,400 | 0,900 |
| 6,0 | 20 | | 7.000 | 2.250 | 0,160 | 0,350 | 1,100 | 6.000 | 1.200 | 0,100 | 0,300 | 0,750 | 6.200 | 1.000 | 0,080 | 0,300 | 0,800 |
| 6,0 | 25 | | 7.000 | 2.250 | 0,160 | 0,300 | 1,000 | 6.000 | 1.200 | 0,100 | 0,300 | 0,750 | 6.200 | 1.000 | 0,080 | 0,250 | 0,700 |
| 6,0 | 30 | | 7.000 | 1.700 | 0,125 | 0,300 | 1,000 | 6.000 | 1.200 | 0,100 | 0,250 | 0,700 | 5.500 | 1.000 | 0,080 | 0,250 | 0,700 |
| 6,0 | 40 | | 7.000 | 1.700 | 0,125 | 0,150 | 0,600 | 6.000 | 1.200 | 0,100 | 0,150 | 0,400 | 5.500 | 1.000 | 0,080 | 0,100 | 0,350 |
| 6,0 | 50 | | 6.100 | 1.350 | 0,110 | 0,110 | 0,320 | 5.400 | 1.050 | 0,100 | 0,080 | 0,200 | 5.000 | 1.000 | 0,080 | 0,080 | 0,250 |



Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden.
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
If the rpm available is lower than recommended please reduce the feed rate to the same ratio.

| Werkstoffgruppe Material group | | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels < 850 N/mm² | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat-treated steels < 35 HRC (1200 N/mm²) | | | | |
|-----------------------------------|------|----------------|--|-----------|-------|-------|-------|--|-----------|-------|-------|-------|
| d1 | r | l ₃ | min ^l | Vf mm/min | fz mm | ap mm | ae mm | min ^l | Vf mm/min | fz mm | ap mm | ae mm |
| 1,0 | 0,05 | 4 | 32.000 | 2.304 | 0,018 | 0,011 | 0,032 | 27.000 | 1.620 | 0,015 | 0,010 | 0,020 |
| 1,0 | 0,05 | 6 | 26.000 | 1.664 | 0,016 | 0,010 | 0,028 | 22.000 | 1.232 | 0,014 | 0,007 | 0,020 |
| 1,0 | 0,05 | 8 | 23.000 | 1.472 | 0,016 | 0,007 | 0,020 | 20.000 | 1.120 | 0,014 | 0,005 | 0,018 |
| 1,0 | 0,05 | 10 | 20.000 | 1.280 | 0,016 | 0,006 | 0,015 | 17.000 | 952 | 0,014 | 0,004 | 0,010 |
| 1,0 | 0,05 | 12 | 18.000 | 1.080 | 0,015 | 0,005 | 0,010 | 16.000 | 768 | 0,012 | 0,003 | 0,009 |
| 1,0 | 0,05 | 16 | 18.000 | 936 | 0,013 | 0,004 | 0,010 | 15.000 | 600 | 0,010 | 0,002 | 0,006 |
| 1,0 | 0,05 | 20 | 14.000 | 728 | 0,013 | 0,003 | 0,007 | 12.000 | 480 | 0,010 | 0,002 | 0,005 |
| 1,0 | 0,1 | 4 | 32.000 | 2.304 | 0,018 | 0,017 | 0,050 | 27.000 | 1.620 | 0,015 | 0,012 | 0,030 |
| 1,0 | 0,1 | 6 | 26.000 | 1.664 | 0,016 | 0,015 | 0,040 | 22.000 | 1.232 | 0,014 | 0,012 | 0,030 |
| 1,0 | 0,1 | 8 | 23.000 | 1.472 | 0,016 | 0,012 | 0,032 | 20.000 | 1.120 | 0,014 | 0,008 | 0,028 |
| 1,0 | 0,1 | 10 | 20.000 | 1.280 | 0,016 | 0,010 | 0,025 | 17.000 | 952 | 0,014 | 0,007 | 0,018 |
| 1,0 | 0,1 | 12 | 18.000 | 1.080 | 0,015 | 0,008 | 0,024 | 16.000 | 768 | 0,012 | 0,006 | 0,016 |
| 1,0 | 0,1 | 16 | 18.000 | 936 | 0,013 | 0,006 | 0,017 | 15.000 | 600 | 0,010 | 0,005 | 0,012 |
| 1,0 | 0,1 | 20 | 14.000 | 728 | 0,013 | 0,004 | 0,011 | 12.000 | 480 | 0,010 | 0,003 | 0,008 |
| 1,5 | 0,1 | 4 | 24.000 | 1.920 | 0,020 | 0,024 | 0,070 | 21.000 | 1.512 | 0,018 | 0,018 | 0,050 |
| 1,5 | 0,1 | 8 | 22.000 | 1.760 | 0,020 | 0,020 | 0,050 | 19.000 | 1.216 | 0,016 | 0,014 | 0,035 |
| 1,5 | 0,1 | 12 | 18.000 | 1.440 | 0,020 | 0,015 | 0,040 | 16.000 | 1.024 | 0,016 | 0,013 | 0,030 |
| 1,5 | 0,1 | 15 | 14.000 | 1.008 | 0,018 | 0,012 | 0,035 | 12.000 | 672 | 0,014 | 0,010 | 0,025 |
| 1,5 | 0,1 | 20 | 14.000 | 896 | 0,016 | 0,010 | 0,025 | 12.000 | 768 | 0,016 | 0,007 | 0,020 |
| 2,0 | 0,05 | 4 | 21.000 | 2.520 | 0,030 | 0,032 | 0,100 | 18.000 | 2.160 | 0,030 | 0,025 | 0,070 |
| 2,0 | 0,05 | 8 | 19.000 | 2.280 | 0,030 | 0,023 | 0,065 | 17.000 | 2.040 | 0,030 | 0,020 | 0,050 |
| 2,0 | 0,05 | 12 | 16.000 | 1.792 | 0,028 | 0,018 | 0,050 | 14.000 | 1.680 | 0,030 | 0,015 | 0,035 |
| 2,0 | 0,05 | 16 | 14.000 | 1.568 | 0,028 | 0,013 | 0,040 | 12.000 | 1.440 | 0,030 | 0,010 | 0,025 |
| 2,0 | 0,05 | 20 | 12.000 | 1.344 | 0,028 | 0,010 | 0,025 | 11.000 | 1.320 | 0,030 | 0,008 | 0,016 |
| 2,0 | 0,1 | 4 | 21.000 | 2.520 | 0,030 | 0,040 | 0,110 | 18.000 | 2.160 | 0,030 | 0,030 | 0,080 |
| 2,0 | 0,1 | 8 | 19.000 | 2.280 | 0,030 | 0,034 | 0,095 | 17.000 | 2.040 | 0,030 | 0,026 | 0,060 |
| 2,0 | 0,1 | 12 | 16.000 | 1.792 | 0,028 | 0,034 | 0,095 | 14.000 | 1.680 | 0,030 | 0,030 | 0,060 |
| 2,0 | 0,1 | 16 | 14.000 | 1.568 | 0,028 | 0,020 | 0,055 | 12.000 | 1.440 | 0,030 | 0,016 | 0,040 |
| 2,0 | 0,1 | 20 | 12.000 | 1.344 | 0,028 | 0,016 | 0,045 | 11.000 | 1.232 | 0,028 | 0,012 | 0,030 |
| 2,0 | 0,2 | 4 | 21.000 | 1.260 | 0,030 | 0,050 | 0,120 | 18.000 | 1.080 | 0,030 | 0,035 | 0,090 |
| 2,0 | 0,2 | 8 | 19.000 | 1.140 | 0,030 | 0,044 | 0,100 | 17.000 | 1.020 | 0,030 | 0,030 | 0,070 |
| 2,0 | 0,2 | 12 | 16.000 | 896 | 0,028 | 0,044 | 0,100 | 14.000 | 840 | 0,030 | 0,035 | 0,070 |
| 2,0 | 0,2 | 16 | 14.000 | 784 | 0,028 | 0,030 | 0,060 | 12.000 | 720 | 0,030 | 0,020 | 0,050 |
| 2,0 | 0,2 | 20 | 12.000 | 672 | 0,028 | 0,025 | 0,050 | 11.000 | 660 | 0,030 | 0,015 | 0,040 |
| 2,5 | 0,1 | 8 | 19.000 | 2.660 | 0,035 | 0,045 | 0,013 | 17.000 | 2.380 | 0,035 | 0,035 | 0,090 |
| 2,5 | 0,1 | 16 | 14.000 | 1.680 | 0,030 | 0,035 | 0,010 | 12.000 | 1.440 | 0,030 | 0,030 | 0,065 |
| 2,5 | 0,1 | 20 | 12.000 | 1.440 | 0,030 | 0,023 | 0,006 | 11.000 | 1.320 | 0,030 | 0,030 | 0,050 |
| 2,5 | 0,2 | 8 | 19.000 | 2.660 | 0,035 | 0,080 | 0,200 | 14.000 | 1.960 | 0,035 | 0,060 | 0,130 |
| 2,5 | 0,2 | 16 | 15.000 | 1.800 | 0,030 | 0,043 | 0,130 | 13.000 | 1.560 | 0,030 | 0,035 | 0,080 |
| 2,5 | 0,2 | 20 | 12.000 | 1.440 | 0,030 | 0,040 | 0,110 | 11.000 | 1.320 | 0,030 | 0,032 | 0,080 |
| 3,0 | 0,2 | 8 | 15.000 | 2.400 | 0,040 | 0,088 | 0,250 | 13.000 | 2.080 | 0,040 | 0,070 | 0,150 |
| 3,0 | 0,2 | 12 | 15.000 | 2.400 | 0,040 | 0,068 | 0,200 | 13.000 | 2.080 | 0,040 | 0,050 | 0,120 |
| 3,0 | 0,2 | 16 | 15.000 | 2.400 | 0,040 | 0,050 | 0,130 | 13.000 | 2.080 | 0,040 | 0,040 | 0,100 |
| 3,0 | 0,2 | 20 | 12.000 | 1.920 | 0,040 | 0,050 | 0,130 | 10.000 | 1.600 | 0,040 | 0,040 | 0,090 |
| 3,0 | 0,2 | 25 | 12.000 | 1.920 | 0,040 | 0,043 | 0,120 | 10.000 | 1.600 | 0,040 | 0,035 | 0,080 |
| 3,0 | 0,2 | 30 | 10.000 | 2.000 | 0,050 | 0,040 | 0,100 | 8.000 | 1.600 | 0,050 | 0,030 | 0,070 |
| 3,0 | 0,3 | 8 | 15.000 | 1.200 | 0,040 | 0,090 | 0,260 | 13.000 | 1.040 | 0,040 | 0,080 | 0,160 |
| 3,0 | 0,3 | 12 | 15.000 | 1.200 | 0,040 | 0,070 | 0,220 | 13.000 | 1.040 | 0,040 | 0,055 | 0,130 |
| 3,0 | 0,3 | 16 | 15.000 | 1.200 | 0,040 | 0,055 | 0,150 | 13.000 | 1.040 | 0,040 | 0,045 | 0,110 |
| 3,0 | 0,3 | 20 | 12.000 | 960 | 0,040 | 0,055 | 0,150 | 10.000 | 800 | 0,040 | 0,045 | 0,100 |
| 3,0 | 0,3 | 25 | 12.000 | 960 | 0,040 | 0,045 | 0,140 | 10.000 | 800 | 0,040 | 0,040 | 0,090 |
| 3,0 | 0,3 | 30 | 10.000 | 1.000 | 0,050 | 0,043 | 0,110 | 8.000 | 800 | 0,050 | 0,035 | 0,080 |
| 3,0 | 0,5 | 8 | 15.000 | 1.200 | 0,040 | 0,100 | 0,280 | 13.000 | 1.040 | 0,040 | 0,090 | 0,180 |
| 3,0 | 0,5 | 12 | 15.000 | 1.200 | 0,040 | 0,080 | 0,240 | 13.000 | 1.040 | 0,040 | 0,065 | 0,150 |
| 3,0 | 0,5 | 16 | 15.000 | 1.200 | 0,040 | 0,060 | 0,165 | 13.000 | 1.040 | 0,040 | 0,055 | 0,130 |
| 3,0 | 0,5 | 20 | 12.000 | 960 | 0,040 | 0,060 | 0,165 | 10.000 | 800 | 0,040 | 0,055 | 0,120 |
| 3,0 | 0,5 | 25 | 12.000 | 960 | 0,040 | 0,050 | 0,150 | 10.000 | 800 | 0,040 | 0,045 | 0,100 |
| 3,0 | 0,5 | 30 | 10.000 | 1.000 | 0,050 | 0,048 | 0,120 | 8.000 | 800 | 0,050 | 0,040 | 0,090 |
| 4,0 | 0,2 | 12 | 11.000 | 3.080 | 0,070 | 0,126 | 0,350 | 9.000 | 2.160 | 0,060 | 0,100 | 0,220 |
| 4,0 | 0,2 | 20 | 11.000 | 3.080 | 0,070 | 0,090 | 0,260 | 9.000 | 2.160 | 0,060 | 0,080 | 0,180 |
| 4,0 | 0,2 | 30 | 10.000 | 2.800 | 0,070 | 0,080 | 0,210 | 8.000 | 1.920 | 0,060 | 0,060 | 0,150 |
| 4,0 | 0,2 | 40 | 10.000 | 2.800 | 0,070 | 0,060 | 0,160 | 8.000 | 1.920 | 0,060 | 0,045 | 0,110 |
| 4,0 | 0,5 | 12 | 11.000 | 1.540 | 0,070 | 0,140 | 0,380 | 9.000 | 1.080 | 0,060 | 0,120 | 0,240 |
| 4,0 | 0,5 | 20 | 11.000 | 1.540 | 0,070 | 0,100 | 0,290 | 9.000 | 1.080 | 0,060 | 0,090 | 0,200 |
| 4,0 | 0,5 | 30 | 10.000 | 1.400 | 0,070 | 0,090 | 0,240 | 8.000 | 960 | 0,060 | 0,070 | 0,180 |
| 4,0 | 0,5 | 40 | 10.000 | 1.400 | 0,070 | 0,070 | 0,190 | 8.000 | 960 | 0,060 | 0,055 | 0,150 |

Hinweis:

Bei gleichen Schnittwerten der zylindrischen [30 6267] und der konischen [30 6268] Ausführung sind durch die erhöhte Stabilität des konischen Halses die Qualität der Oberflächen besser sowie eine höhere Lebensdauer erzielbar. Die erhöhte Stabilität des konischen Halses ermöglicht entweder eine Erhöhung des fz-Wertes um max. 20% oder eine Erhöhung des ap-Wertes um max. 10%. Bei der HSC-Bearbeitung können die Drehzahlen bis zu 400% erhöht werden. Dabei sollte der ae-Wert im unteren Bereich liegen.

Please note:

By using the same cutting data for the cylindrical neck [30 6267] and the conical neck [30 6268] you will achieve a better surface and the tool life will improved due to the more stable tool. Due to the more stable neck of the conical tool you can increase the feet per tooth by max. 20% or increase ap max. 10%. You can increase the speed up to 400% in HSC machining. The radial cutting depth ae should be in a lower range.

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio.

Richtwerte für den Einsatz von VHM-Gesenkfräser mit Eckenradius
Recommended cutting data for solid carbide end mills with corner radius

HPC Schlichten Finishing 30 6267 30 6268
30 6269

| 4.1 - 4.2 - 4.3 Rostfreie Stähle / Stainless steels austenitisch / ferritisch - austenitic / ferritic 35 - 45 HRC | | | | | 8.1 Gehärtete Stähle / Hardened steels 45 - 55 HRC | | | | | 8.2 - 8.3 Gehärtete Stähle / Hardened steels 55 - 70 HRC | | | | |
|--|-----------|-------|-------|-------|--|-----------|-------|-------|-------|--|-----------|-------|-------|-------|
| min ¹ | Vf mm/min | fz mm | ap mm | ae mm | min ¹ | Vf mm/min | fz mm | ap mm | ae mm | min ¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 29.000 | 2.088 | 0,018 | 0,010 | 0,028 | 25.000 | 1.500 | 0,015 | 0,006 | 0,020 | 23.000 | 1.196 | 0,013 | 0,006 | 0,016 |
| 23.000 | 1.380 | 0,015 | 0,008 | 0,020 | 20.000 | 1.200 | 0,015 | 0,060 | 0,015 | 19.000 | 988 | 0,013 | 0,006 | 0,013 |
| 21.000 | 1.260 | 0,015 | 0,006 | 0,018 | 18.000 | 1.080 | 0,015 | 0,005 | 0,012 | 17.000 | 884 | 0,013 | 0,004 | 0,010 |
| 18.000 | 1.080 | 0,015 | 0,004 | 0,012 | 16.000 | 960 | 0,015 | 0,004 | 0,009 | 15.000 | 780 | 0,013 | 0,003 | 0,008 |
| 16.000 | 960 | 0,015 | 0,004 | 0,010 | 14.000 | 872 | 0,012 | 0,003 | 0,008 | 13.000 | 520 | 0,010 | 0,002 | 0,007 |
| 16.000 | 832 | 0,013 | 0,003 | 0,008 | 14.000 | 560 | 0,010 | 0,003 | 0,006 | 13.000 | 416 | 0,008 | 0,002 | 0,005 |
| 12.000 | 624 | 0,013 | 0,003 | 0,006 | 11.000 | 440 | 0,010 | 0,002 | 0,005 | 10.000 | 320 | 0,008 | 0,002 | 0,004 |
| 29.000 | 2.088 | 0,018 | 0,015 | 0,040 | 25.000 | 1.500 | 0,015 | 0,011 | 0,026 | 23.000 | 1.196 | 0,013 | 0,010 | 0,026 |
| 23.000 | 1.380 | 0,015 | 0,012 | 0,038 | 20.000 | 1.200 | 0,015 | 0,010 | 0,022 | 19.000 | 988 | 0,013 | 0,010 | 0,021 |
| 21.000 | 1.260 | 0,015 | 0,010 | 0,030 | 18.000 | 1.080 | 0,015 | 0,008 | 0,018 | 17.000 | 884 | 0,013 | 0,007 | 0,019 |
| 18.000 | 1.080 | 0,015 | 0,008 | 0,021 | 16.000 | 960 | 0,015 | 0,006 | 0,016 | 15.000 | 780 | 0,013 | 0,005 | 0,014 |
| 16.000 | 832 | 0,013 | 0,007 | 0,019 | 14.000 | 560 | 0,010 | 0,005 | 0,012 | 13.000 | 520 | 0,010 | 0,004 | 0,012 |
| 16.000 | 832 | 0,013 | 0,005 | 0,015 | 14.000 | 560 | 0,010 | 0,004 | 0,010 | 13.000 | 416 | 0,008 | 0,003 | 0,010 |
| 12.000 | 624 | 0,013 | 0,005 | 0,011 | 11.000 | 440 | 0,010 | 0,003 | 0,008 | 10.000 | 320 | 0,008 | 0,003 | 0,006 |
| 22.000 | 1.760 | 0,020 | 0,020 | 0,060 | 19.000 | 1.140 | 0,015 | 0,015 | 0,040 | 18.000 | 1.080 | 0,015 | 0,014 | 0,035 |
| 20.000 | 1.600 | 0,020 | 0,018 | 0,045 | 17.000 | 1.020 | 0,015 | 0,012 | 0,028 | 16.000 | 896 | 0,014 | 0,011 | 0,030 |
| 16.000 | 1.280 | 0,020 | 0,014 | 0,038 | 14.000 | 840 | 0,015 | 0,010 | 0,025 | 13.000 | 728 | 0,014 | 0,010 | 0,025 |
| 13.000 | 884 | 0,017 | 0,012 | 0,030 | 11.000 | 660 | 0,015 | 0,008 | 0,016 | 10.000 | 520 | 0,013 | 0,007 | 0,020 |
| 13.000 | 780 | 0,015 | 0,008 | 0,020 | 11.000 | 660 | 0,015 | 0,006 | 0,014 | 10.000 | 480 | 0,012 | 0,005 | 0,015 |
| 19.000 | 2.280 | 0,030 | 0,030 | 0,085 | 16.000 | 1.600 | 0,025 | 0,020 | 0,050 | 15.000 | 1.500 | 0,025 | 0,020 | 0,050 |
| 17.000 | 2.040 | 0,030 | 0,021 | 0,060 | 15.000 | 1.500 | 0,025 | 0,015 | 0,035 | 14.000 | 1.400 | 0,025 | 0,014 | 0,036 |
| 14.000 | 1.680 | 0,030 | 0,016 | 0,048 | 12.000 | 1.200 | 0,025 | 0,012 | 0,026 | 11.000 | 1.100 | 0,025 | 0,011 | 0,030 |
| 13.000 | 1.560 | 0,030 | 0,014 | 0,035 | 11.000 | 1.100 | 0,025 | 0,010 | 0,020 | 10.000 | 1.000 | 0,025 | 0,008 | 0,020 |
| 11.000 | 1.320 | 0,030 | 0,008 | 0,024 | 10.000 | 1.000 | 0,025 | 0,006 | 0,016 | 9.000 | 900 | 0,025 | 0,005 | 0,015 |
| 19.000 | 2.280 | 0,030 | 0,036 | 0,100 | 16.000 | 1.600 | 0,025 | 0,025 | 0,080 | 15.000 | 1.500 | 0,025 | 0,024 | 0,060 |
| 17.000 | 2.040 | 0,030 | 0,030 | 0,090 | 15.000 | 1.500 | 0,025 | 0,021 | 0,060 | 14.000 | 1.400 | 0,025 | 0,021 | 0,055 |
| 14.000 | 1.680 | 0,030 | 0,030 | 0,090 | 12.000 | 1.200 | 0,025 | 0,020 | 0,060 | 11.000 | 1.100 | 0,025 | 0,020 | 0,055 |
| 13.000 | 1.560 | 0,030 | 0,020 | 0,058 | 11.000 | 1.100 | 0,025 | 0,015 | 0,032 | 10.000 | 1.000 | 0,025 | 0,013 | 0,035 |
| 11.000 | 1.320 | 0,030 | 0,015 | 0,040 | 10.000 | 1.000 | 0,025 | 0,012 | 0,025 | 9.000 | 900 | 0,025 | 0,010 | 0,026 |
| 19.000 | 1.140 | 0,030 | 0,042 | 0,110 | 16.000 | 800 | 0,025 | 0,030 | 0,100 | 15.000 | 750 | 0,025 | 0,028 | 0,070 |
| 17.000 | 1.020 | 0,030 | 0,035 | 0,100 | 15.000 | 750 | 0,025 | 0,025 | 0,080 | 14.000 | 700 | 0,025 | 0,025 | 0,065 |
| 14.000 | 840 | 0,030 | 0,035 | 0,100 | 12.000 | 600 | 0,025 | 0,025 | 0,080 | 11.000 | 550 | 0,025 | 0,024 | 0,055 |
| 13.000 | 780 | 0,030 | 0,025 | 0,070 | 11.000 | 550 | 0,025 | 0,020 | 0,042 | 10.000 | 500 | 0,025 | 0,018 | 0,040 |
| 11.000 | 660 | 0,030 | 0,020 | 0,050 | 10.000 | 500 | 0,025 | 0,016 | 0,032 | 9.000 | 450 | 0,025 | 0,015 | 0,032 |
| 17.000 | 2.380 | 0,035 | 0,040 | 0,115 | 15.000 | 1.500 | 0,025 | 0,030 | 0,080 | 14.000 | 1.400 | 0,025 | 0,026 | 0,070 |
| 13.000 | 1.560 | 0,030 | 0,031 | 0,090 | 13.000 | 1.300 | 0,025 | 0,023 | 0,060 | 11.000 | 1.100 | 0,025 | 0,021 | 0,055 |
| 11.000 | 1.320 | 0,030 | 0,021 | 0,060 | 11.000 | 1.100 | 0,025 | 0,015 | 0,036 | 9.000 | 900 | 0,025 | 0,014 | 0,035 |
| 15.000 | 2.100 | 0,035 | 0,070 | 0,200 | 13.000 | 1.300 | 0,025 | 0,050 | 0,130 | 12.000 | 1.200 | 0,025 | 0,046 | 0,120 |
| 13.000 | 1.560 | 0,030 | 0,040 | 0,100 | 11.000 | 1.100 | 0,025 | 0,030 | 0,065 | 11.000 | 1.100 | 0,025 | 0,026 | 0,070 |
| 11.000 | 1.320 | 0,030 | 0,036 | 0,090 | 9.000 | 900 | 0,025 | 0,025 | 0,060 | 9.000 | 900 | 0,025 | 0,024 | 0,065 |
| 13.000 | 2.080 | 0,040 | 0,080 | 0,230 | 11.000 | 1.320 | 0,030 | 0,056 | 0,150 | 11.000 | 1.320 | 0,030 | 0,052 | 0,140 |
| 13.000 | 2.080 | 0,040 | 0,061 | 0,160 | 11.000 | 1.320 | 0,030 | 0,045 | 0,120 | 11.000 | 1.320 | 0,030 | 0,040 | 0,110 |
| 13.000 | 2.080 | 0,040 | 0,043 | 0,125 | 11.000 | 1.320 | 0,030 | 0,030 | 0,080 | 11.000 | 1.320 | 0,030 | 0,030 | 0,075 |
| 11.000 | 1.760 | 0,040 | 0,043 | 0,125 | 9.000 | 1.260 | 0,035 | 0,030 | 0,080 | 9.000 | 1.080 | 0,030 | 0,030 | 0,075 |
| 11.000 | 1.760 | 0,040 | 0,040 | 0,115 | 9.000 | 1.260 | 0,035 | 0,026 | 0,075 | 9.000 | 1.080 | 0,030 | 0,026 | 0,070 |
| 9.000 | 1.800 | 0,050 | 0,034 | 0,100 | 7.000 | 1.260 | 0,045 | 0,026 | 0,070 | 7.000 | 1.120 | 0,040 | 0,022 | 0,060 |
| 13.000 | 1.040 | 0,040 | 0,090 | 0,250 | 11.000 | 660 | 0,030 | 0,060 | 0,160 | 11.000 | 660 | 0,030 | 0,055 | 0,150 |
| 13.000 | 1.040 | 0,040 | 0,065 | 0,180 | 11.000 | 660 | 0,030 | 0,050 | 0,130 | 11.000 | 660 | 0,030 | 0,043 | 0,120 |
| 13.000 | 1.040 | 0,040 | 0,045 | 0,140 | 11.000 | 660 | 0,030 | 0,035 | 0,090 | 11.000 | 660 | 0,030 | 0,033 | 0,085 |
| 11.000 | 880 | 0,040 | 0,045 | 0,140 | 9.000 | 630 | 0,035 | 0,035 | 0,090 | 9.000 | 540 | 0,030 | 0,033 | 0,085 |
| 11.000 | 880 | 0,040 | 0,045 | 0,130 | 9.000 | 630 | 0,035 | 0,030 | 0,085 | 9.000 | 540 | 0,030 | 0,028 | 0,075 |
| 9.000 | 900 | 0,050 | 0,036 | 0,110 | 7.000 | 630 | 0,045 | 0,030 | 0,080 | 7.000 | 560 | 0,040 | 0,025 | 0,065 |
| 13.000 | 1.040 | 0,040 | 0,100 | 0,270 | 11.000 | 660 | 0,030 | 0,070 | 0,170 | 11.000 | 660 | 0,030 | 0,060 | 0,160 |
| 13.000 | 1.040 | 0,040 | 0,075 | 0,200 | 11.000 | 660 | 0,030 | 0,060 | 0,140 | 11.000 | 660 | 0,030 | 0,050 | 0,130 |
| 13.000 | 1.040 | 0,040 | 0,055 | 0,160 | 11.000 | 660 | 0,030 | 0,045 | 0,100 | 11.000 | 660 | 0,030 | 0,040 | 0,095 |
| 11.000 | 880 | 0,040 | 0,055 | 0,160 | 9.000 | 630 | 0,035 | 0,045 | 0,100 | 9.000 | 540 | 0,030 | 0,040 | 0,095 |
| 11.000 | 880 | 0,040 | 0,055 | 0,150 | 9.000 | 630 | 0,035 | 0,040 | 0,095 | 9.000 | 540 | 0,030 | 0,030 | 0,080 |
| 9.000 | 900 | 0,050 | 0,042 | 0,120 | 7.000 | 630 | 0,045 | 0,040 | 0,090 | 7.000 | 560 | 0,040 | 0,028 | 0,070 |
| 10.000 | 2.800 | 0,070 | 0,115 | 0,330 | 8.000 | 1.920 | 0,060 | 0,083 | 0,230 | 8.000 | 1.600 | 0,050 | 0,075 | 0,200 |
| 10.000 | 2.800 | 0,070 | 0,090 | 0,250 | 8.000 | 1.920 | 0,060 | 0,063 | 0,170 | 8.000 | 1.600 | 0,050 | 0,060 | 0,160 |
| 9.000 | 2.160 | 0,060 | 0,070 | 0,200 | 7.000 | 1.540 | 0,055 | 0,050 | 0,130 | 7.000 | 1.400 | 0,050 | 0,045 | 0,120 |
| 9.000 | 2.160 | 0,060 | 0,052 | 0,150 | 7.000 | 1.540 | 0,055 | 0,036 | 0,100 | 7.000 | 1.400 | 0,050 | 0,034 | 0,100 |
| 10.000 | 1.400 | 0,070 | 0,130 | 0,350 | 8.000 | 960 | 0,060 | 0,100 | 0,250 | 8.000 | 800 | 0,050 | 0,085 | 0,230 |
| 10.000 | 1.400 | 0,070 | 0,100 | 0,280 | 8.000 | 960 | 0,060 | 0,080 | 0,190 | 8.000 | 800 | 0,050 | 0,070 | 0,180 |
| 9.000 | 1.080 | 0,060 | 0,080 | 0,230 | 7.000 | 770 | 0,055 | 0,060 | 0,150 | 7.000 | 700 | 0,050 | 0,050 | 0,150 |
| 9.000 | 1.080 | 0,060 | 0,060 | 0,180 | 7.000 | 770 | 0,055 | 0,045 | 0,120 | 7.000 | 700 | 0,050 | 0,040 | 0,130 |

Hinweis:

Bei gleichen Schnittwerten der zylindrischen [30 6267] und der konischen [30 6268] Ausführung sind durch die erhöhte Stabilität des konischen Halses die Qualität der Oberflächen besser sowie eine höhere Lebensdauer erzielbar. Die erhöhte Stabilität des konischen Halses ermöglicht entweder eine Erhöhung des fz-Wertes um max. 20% oder eine Erhöhung des ap-Wertes um max. 10%. Bei der HSC-Bearbeitung können die Drehzahlen bis zu 400% erhöht werden. Dabei sollte der ae-Wert im unteren Bereich liegen.

Please note:

By using the same cutting data for the cylindrical neck [30 6267] and the conical neck [30 6268] you will achieve a better surface and the tool life will improved due to the more stable tool. Due to the more stable neck of the conical tool you can increase the feed per tooth by max. 20% or increase ap max. 10%. You can increase the speed up to 400% in HSC machining. The radial cutting depth ae should be in a lower range.

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden.
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
If the rpm available is lower than recommended please reduce the feed rate to the same ratio.



| Werkstoffgruppe Material group | | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels < 850 N/mm ² | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat-treated steels < 35 HRC (1200 N/mm ²) | | | | |
|-----------------------------------|------|----------------|--|-----------|-------|-------|---------------|---|-----------|-------|-------|---------------|
| d1 | r | l ₃ | min ¹ | Vf mm/min | fz mm | ap mm | ae mm | min ¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 1,0 | 0,05 | 4 | 37.000 | 3.700 | 0,025 | 0,047 | 0,150 - 0,600 | 31.000 | 3.100 | 0,025 | 0,038 | 0,120 - 0,600 |
| 1,0 | 0,05 | 6 | 33.000 | 3.300 | 0,025 | 0,026 | 0,085 - 0,600 | 28.000 | 2.800 | 0,025 | 0,020 | 0,070 - 0,600 |
| 1,0 | 0,05 | 8 | 33.000 | 3.300 | 0,025 | 0,026 | 0,085 - 0,600 | 28.000 | 2.800 | 0,025 | 0,020 | 0,070 - 0,600 |
| 1,0 | 0,05 | 10 | 33.000 | 3.300 | 0,025 | 0,016 | 0,055 - 0,600 | 28.000 | 2.800 | 0,025 | 0,012 | 0,050 - 0,600 |
| 1,0 | 0,05 | 12 | 29.000 | 2.552 | 0,022 | 0,016 | 0,055 - 0,600 | 25.000 | 2.000 | 0,020 | 0,012 | 0,050 - 0,600 |
| 1,0 | 0,05 | 16 | 29.000 | 2.320 | 0,020 | 0,010 | 0,035 - 0,600 | 25.000 | 2.000 | 0,020 | 0,008 | 0,030 - 0,600 |
| 1,0 | 0,05 | 20 | 22.000 | 1.760 | 0,020 | 0,005 | 0,024 - 0,600 | 19.000 | 1.520 | 0,020 | 0,005 | 0,020 - 0,600 |
| 1,0 | 0,1 | 4 | 37.000 | 4.440 | 0,030 | 0,068 | 0,215 - 0,600 | 31.000 | 3.348 | 0,027 | 0,055 | 0,180 - 0,600 |
| 1,0 | 0,1 | 6 | 33.000 | 3.300 | 0,025 | 0,038 | 0,125 - 0,600 | 28.000 | 3.024 | 0,027 | 0,030 | 0,100 - 0,600 |
| 1,0 | 0,1 | 8 | 33.000 | 3.300 | 0,025 | 0,038 | 0,125 - 0,600 | 28.000 | 3.024 | 0,027 | 0,030 | 0,100 - 0,600 |
| 1,0 | 0,1 | 10 | 33.000 | 3.300 | 0,025 | 0,023 | 0,080 - 0,600 | 28.000 | 3.024 | 0,027 | 0,020 | 0,070 - 0,600 |
| 1,0 | 0,1 | 12 | 29.000 | 2.900 | 0,025 | 0,023 | 0,080 - 0,600 | 25.000 | 2.000 | 0,020 | 0,020 | 0,060 - 0,600 |
| 1,0 | 0,1 | 16 | 29.000 | 2.552 | 0,022 | 0,013 | 0,050 - 0,600 | 25.000 | 2.000 | 0,020 | 0,010 | 0,040 - 0,600 |
| 1,0 | 0,1 | 20 | 22.000 | 1.936 | 0,022 | 0,008 | 0,030 - 0,600 | 19.000 | 1.520 | 0,020 | 0,007 | 0,030 - 0,600 |
| 1,5 | 0,1 | 4 | 28.000 | 3.360 | 0,030 | 0,068 | 0,220 - 0,800 | 24.000 | 2.880 | 0,030 | 0,055 | 0,170 - 0,800 |
| 1,5 | 0,1 | 8 | 26.000 | 2.600 | 0,025 | 0,058 | 0,180 - 0,800 | 22.000 | 2.200 | 0,025 | 0,045 | 0,150 - 0,800 |
| 1,5 | 0,1 | 12 | 26.000 | 2.600 | 0,025 | 0,058 | 0,180 - 0,800 | 22.000 | 2.200 | 0,025 | 0,045 | 0,150 - 0,800 |
| 1,5 | 0,1 | 15 | 23.000 | 2.300 | 0,025 | 0,035 | 0,118 - 0,800 | 20.000 | 1.600 | 0,020 | 0,030 | 0,100 - 0,800 |
| 1,5 | 0,1 | 20 | 23.000 | 2.300 | 0,025 | 0,035 | 0,118 - 0,800 | 20.000 | 1.600 | 0,020 | 0,030 | 0,100 - 0,800 |
| 2,0 | 0,05 | 4 | 22.000 | 4.400 | 0,050 | 0,138 | 0,430 - 1,100 | 18.000 | 3.600 | 0,050 | 0,110 | 0,350 - 1,100 |
| 2,0 | 0,05 | 8 | 22.000 | 4.400 | 0,050 | 0,095 | 0,310 - 1,100 | 18.000 | 3.600 | 0,050 | 0,080 | 0,250 - 1,100 |
| 2,0 | 0,05 | 12 | 20.000 | 3.600 | 0,045 | 0,054 | 0,170 - 1,100 | 17.000 | 2.720 | 0,040 | 0,045 | 0,140 - 1,100 |
| 2,0 | 0,05 | 16 | 20.000 | 3.600 | 0,045 | 0,054 | 0,170 - 1,100 | 17.000 | 2.720 | 0,040 | 0,042 | 0,140 - 1,100 |
| 2,0 | 0,05 | 20 | 20.000 | 3.600 | 0,045 | 0,030 | 0,110 - 1,100 | 17.000 | 2.720 | 0,040 | 0,025 | 0,090 - 1,100 |
| 2,0 | 0,1 | 4 | 22.000 | 4.840 | 0,055 | 0,200 | 0,620 - 1,100 | 18.000 | 3.600 | 0,050 | 0,160 | 0,500 - 1,100 |
| 2,0 | 0,1 | 8 | 22.000 | 4.840 | 0,055 | 0,138 | 0,430 - 1,100 | 18.000 | 3.600 | 0,050 | 0,110 | 0,340 - 1,100 |
| 2,0 | 0,1 | 12 | 20.000 | 4.000 | 0,050 | 0,077 | 0,250 - 1,100 | 17.000 | 3.400 | 0,050 | 0,060 | 0,200 - 1,100 |
| 2,0 | 0,1 | 16 | 20.000 | 4.000 | 0,050 | 0,077 | 0,250 - 1,100 | 17.000 | 3.400 | 0,050 | 0,060 | 0,200 - 1,100 |
| 2,0 | 0,1 | 20 | 20.000 | 4.000 | 0,050 | 0,047 | 0,160 - 1,100 | 17.000 | 3.400 | 0,050 | 0,040 | 0,120 - 1,100 |
| 2,0 | 0,2 | 4 | 22.000 | 2.640 | 0,060 | 0,240 | 0,700 - 1,200 | 18.000 | 1.980 | 0,055 | 0,190 | 0,600 - 1,200 |
| 2,0 | 0,2 | 8 | 22.000 | 2.640 | 0,060 | 0,160 | 0,500 - 1,200 | 18.000 | 1.980 | 0,055 | 0,140 | 0,400 - 1,200 |
| 2,0 | 0,2 | 12 | 20.000 | 2.200 | 0,055 | 0,100 | 0,280 - 1,200 | 17.000 | 1.870 | 0,055 | 0,080 | 0,250 - 1,200 |
| 2,0 | 0,2 | 16 | 20.000 | 2.200 | 0,055 | 0,100 | 0,280 - 1,200 | 17.000 | 1.870 | 0,055 | 0,080 | 0,250 - 1,200 |
| 2,0 | 0,2 | 20 | 20.000 | 2.200 | 0,055 | 0,060 | 0,180 - 1,200 | 17.000 | 1.870 | 0,055 | 0,060 | 0,150 - 1,200 |
| 2,5 | 0,1 | 8 | 19.000 | 3.800 | 0,050 | 0,175 | 0,550 - 1,400 | 16.000 | 3.200 | 0,050 | 0,140 | 0,440 - 1,400 |
| 2,5 | 0,1 | 16 | 18.000 | 2.880 | 0,040 | 0,075 | 0,250 - 1,400 | 15.000 | 2.400 | 0,040 | 0,060 | 0,200 - 1,400 |
| 2,5 | 0,1 | 20 | 17.000 | 3.060 | 0,045 | 0,060 | 0,200 - 1,400 | 15.000 | 2.400 | 0,040 | 0,050 | 0,170 - 1,400 |
| 2,5 | 0,2 | 8 | 19.000 | 4.180 | 0,055 | 0,220 | 0,670 - 1,400 | 16.000 | 3.200 | 0,050 | 0,175 | 0,540 - 1,400 |
| 2,5 | 0,2 | 16 | 18.000 | 3.240 | 0,045 | 0,100 | 0,300 - 1,400 | 15.000 | 2.700 | 0,045 | 0,075 | 0,250 - 1,400 |
| 2,5 | 0,2 | 20 | 17.000 | 3.400 | 0,050 | 0,075 | 0,250 - 1,400 | 15.000 | 3.000 | 0,050 | 0,060 | 0,200 - 1,400 |
| 3,0 | 0,2 | 8 | 17.000 | 3.740 | 0,055 | 0,295 | 0,920 - 1,600 | 14.000 | 3.080 | 0,055 | 0,235 | 0,750 - 1,600 |
| 3,0 | 0,2 | 12 | 17.000 | 3.740 | 0,055 | 0,200 | 0,640 - 1,600 | 14.000 | 3.080 | 0,055 | 0,165 | 0,520 - 1,600 |
| 3,0 | 0,2 | 16 | 17.000 | 3.400 | 0,050 | 0,115 | 0,370 - 1,600 | 14.000 | 3.080 | 0,055 | 0,094 | 0,300 - 1,600 |
| 3,0 | 0,2 | 20 | 15.000 | 3.000 | 0,050 | 0,115 | 0,370 - 1,600 | 13.000 | 2.600 | 0,050 | 0,094 | 0,300 - 1,600 |
| 3,0 | 0,2 | 25 | 15.000 | 3.000 | 0,050 | 0,090 | 0,320 - 1,600 | 13.000 | 2.600 | 0,050 | 0,075 | 0,250 - 1,600 |
| 3,0 | 0,2 | 30 | 15.000 | 3.000 | 0,050 | 0,075 | 0,250 - 1,600 | 13.000 | 2.600 | 0,050 | 0,060 | 0,200 - 1,600 |
| 3,0 | 0,3 | 8 | 17.000 | 1.870 | 0,055 | 0,310 | 1,000 - 1,800 | 14.000 | 1.540 | 0,055 | 0,245 | 0,780 - 1,800 |
| 3,0 | 0,3 | 12 | 17.000 | 1.870 | 0,055 | 0,220 | 0,700 - 1,800 | 14.000 | 1.540 | 0,055 | 0,175 | 0,540 - 1,800 |
| 3,0 | 0,3 | 16 | 17.000 | 1.700 | 0,050 | 0,125 | 0,400 - 1,800 | 14.000 | 1.540 | 0,055 | 0,100 | 0,320 - 1,800 |
| 3,0 | 0,3 | 20 | 15.000 | 1.500 | 0,050 | 0,125 | 0,400 - 1,800 | 13.000 | 1.300 | 0,050 | 0,100 | 0,320 - 1,800 |
| 3,0 | 0,3 | 25 | 15.000 | 1.500 | 0,050 | 0,100 | 0,350 - 1,800 | 13.000 | 1.300 | 0,050 | 0,085 | 0,270 - 1,800 |
| 3,0 | 0,3 | 30 | 15.000 | 1.500 | 0,050 | 0,085 | 0,280 - 1,800 | 13.000 | 1.300 | 0,050 | 0,070 | 0,220 - 1,800 |
| 3,0 | 0,5 | 8 | 17.000 | 1.870 | 0,055 | 0,330 | 1,100 - 1,800 | 14.000 | 1.540 | 0,055 | 0,255 | 0,800 - 1,800 |
| 3,0 | 0,5 | 12 | 17.000 | 1.870 | 0,055 | 0,240 | 0,730 - 1,800 | 14.000 | 1.540 | 0,055 | 0,185 | 0,560 - 1,800 |
| 3,0 | 0,5 | 16 | 17.000 | 1.700 | 0,050 | 0,135 | 0,420 - 1,800 | 14.000 | 1.540 | 0,055 | 0,110 | 0,340 - 1,800 |
| 3,0 | 0,5 | 20 | 15.000 | 1.500 | 0,050 | 0,135 | 0,420 - 1,800 | 13.000 | 1.300 | 0,050 | 0,110 | 0,340 - 1,800 |
| 3,0 | 0,5 | 25 | 15.000 | 1.500 | 0,050 | 0,110 | 0,370 - 1,800 | 13.000 | 1.300 | 0,050 | 0,095 | 0,290 - 1,800 |
| 3,0 | 0,5 | 30 | 15.000 | 1.500 | 0,050 | 0,095 | 0,290 - 1,800 | 13.000 | 1.300 | 0,050 | 0,080 | 0,240 - 1,800 |
| 4,0 | 0,2 | 12 | 13.000 | 4.160 | 0,080 | 0,340 | 1,080 - 2,000 | 11.000 | 3.520 | 0,080 | 0,280 | 0,860 - 2,000 |
| 4,0 | 0,2 | 20 | 11.000 | 3.080 | 0,070 | 0,170 | 0,550 - 2,000 | 10.000 | 2.800 | 0,070 | 0,142 | 0,450 - 2,000 |
| 4,0 | 0,2 | 30 | 8.000 | 2.240 | 0,070 | 0,120 | 0,400 - 2,000 | 7.000 | 1.960 | 0,070 | 0,100 | 0,330 - 2,000 |
| 4,0 | 0,2 | 40 | 7.000 | 1.960 | 0,070 | 0,090 | 0,320 - 2,000 | 7.000 | 1.960 | 0,070 | 0,075 | 0,250 - 2,000 |
| 4,0 | 0,5 | 12 | 13.000 | 2.080 | 0,080 | 0,360 | 1,150 - 2,200 | 11.000 | 1.760 | 0,080 | 0,300 | 0,900 - 2,200 |
| 4,0 | 0,5 | 20 | 11.000 | 1.540 | 0,070 | 0,190 | 0,600 - 2,200 | 10.000 | 1.400 | 0,070 | 0,155 | 0,480 - 2,200 |
| 4,0 | 0,5 | 30 | 8.000 | 1.120 | 0,070 | 0,130 | 0,430 - 2,200 | 7.000 | 980 | 0,070 | 0,110 | 0,350 - 2,200 |
| 4,0 | 0,5 | 40 | 7.000 | 980 | 0,070 | 0,100 | 0,350 - 2,200 | 7.000 | 980 | 0,070 | 0,085 | 0,270 - 2,200 |

Hinweis:

Bei gleichen Schnittwerten der zylindrischen [30 6267] und der konischen [30 6268] Ausführung sind durch die erhöhte Stabilität des konischen Halses die Qualität der Oberflächen besser sowie eine höhere Lebensdauer erzielbar. Die erhöhte Stabilität des konischen Halses ermöglicht entweder eine Erhöhung des fz-Wertes um max. 20% oder eine Erhöhung des ap-Wertes um max. 10%. Bei der HSC-Bearbeitung können die Drehzahlen bis zu 400% erhöht werden. Dabei sollte der ae-Wert im unteren Bereich liegen.

Please note:

By using the same cutting data for the cylindrical neck [30 6267] and the conical neck [30 6268] you will achieve a better surface and the tool life will improved due to the more stable tool. Due to the more stable neck of the conical tool you can increase the feed per tooth by max. 20% or increase ap max. 10%. You can increase the speed up to 400% in HSC machining. The radial cutting depth ae should be in a lower range.

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio.

Richtwerte für den Einsatz von VHM-Gesenkräuser mit Eckenradius
Recommended cutting data for solid carbide end mills with corner radius

HPC Schruppen / Roughing 30 6267 30 6268
30 6269

| 4.1 - 4.2 - 4.3 Rostfreie Stähle / Stainless steels austenitisch / ferritisch - austenitic / ferritic 35 - 45 HRC | | | | | 8.1 Gehärtete Stähle / Hardened steels 45 - 55 HRC | | | | | 8.2 - 8.3 Gehärtete Stähle / Hardened steels 55 - 70 HRC | | | | |
|--|-----------|-------|-------|---------------|--|-----------|-------|-------|---------------|--|-----------|-------|-------|---------------|
| min ¹ | Vf mm/min | fz mm | ap mm | ae mm | min ¹ | Vf mm/min | fz mm | ap mm | ae mm | min ¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 33.000 | 3.300 | 0,025 | 0,042 | 0,135 - 0,600 | 28.000 | 2.240 | 0,020 | 0,030 | 0,100 - 0,600 | 26.000 | 2.080 | 0,020 | 0,030 | 0,090 - 0,600 |
| 30.000 | 3.000 | 0,025 | 0,023 | 0,080 - 0,600 | 25.000 | 2.000 | 0,020 | 0,016 | 0,060 - 0,600 | 23.000 | 1.840 | 0,020 | 0,015 | 0,050 - 0,600 |
| 30.000 | 3.000 | 0,025 | 0,023 | 0,080 - 0,600 | 25.000 | 2.000 | 0,020 | 0,016 | 0,060 - 0,600 | 23.000 | 1.840 | 0,020 | 0,015 | 0,050 - 0,600 |
| 30.000 | 3.000 | 0,025 | 0,014 | 0,050 - 0,600 | 25.000 | 2.000 | 0,020 | 0,010 | 0,040 - 0,600 | 23.000 | 1.840 | 0,020 | 0,010 | 0,040 - 0,600 |
| 26.000 | 2.080 | 0,020 | 0,014 | 0,050 - 0,600 | 22.000 | 2.640 | 0,030 | 0,010 | 0,040 - 0,600 | 21.000 | 1.260 | 0,015 | 0,010 | 0,035 - 0,600 |
| 26.000 | 2.080 | 0,020 | 0,008 | 0,032 - 0,600 | 22.000 | 2.200 | 0,025 | 0,007 | 0,020 - 0,600 | 21.000 | 1.260 | 0,015 | 0,006 | 0,020 - 0,600 |
| 20.000 | 1.600 | 0,020 | 0,005 | 0,020 - 0,600 | 17.000 | 1.224 | 0,018 | 0,006 | 0,020 - 0,600 | 16.000 | 960 | 0,015 | 0,004 | 0,015 - 0,600 |
| 33.000 | 3.960 | 0,030 | 0,060 | 0,190 - 0,600 | 28.000 | 2.800 | 0,025 | 0,045 | 0,150 - 0,600 | 26.000 | 2.080 | 0,020 | 0,040 | 0,140 - 0,600 |
| 30.000 | 3.000 | 0,025 | 0,035 | 0,110 - 0,600 | 25.000 | 2.500 | 0,025 | 0,025 | 0,080 - 0,600 | 23.000 | 1.840 | 0,020 | 0,022 | 0,080 - 0,600 |
| 30.000 | 3.000 | 0,025 | 0,035 | 0,110 - 0,600 | 25.000 | 2.500 | 0,025 | 0,025 | 0,080 - 0,600 | 23.000 | 1.840 | 0,020 | 0,022 | 0,080 - 0,600 |
| 30.000 | 3.000 | 0,025 | 0,020 | 0,070 - 0,600 | 22.000 | 2.200 | 0,025 | 0,015 | 0,050 - 0,600 | 23.000 | 1.840 | 0,020 | 0,012 | 0,050 - 0,600 |
| 26.000 | 2.600 | 0,025 | 0,020 | 0,070 - 0,600 | 22.000 | 1.760 | 0,020 | 0,015 | 0,050 - 0,600 | 21.000 | 1.512 | 0,018 | 0,013 | 0,050 - 0,600 |
| 26.000 | 2.080 | 0,020 | 0,012 | 0,045 - 0,600 | 22.000 | 1.584 | 0,018 | 0,008 | 0,030 - 0,600 | 21.000 | 1.260 | 0,015 | 0,008 | 0,030 - 0,600 |
| 20.000 | 1.600 | 0,020 | 0,008 | 0,030 - 0,600 | 17.000 | 1.224 | 0,018 | 0,006 | 0,023 - 0,600 | 16.000 | 960 | 0,015 | 0,005 | 0,020 - 0,600 |
| 25.000 | 3.000 | 0,030 | 0,060 | 0,190 - 0,800 | 21.000 | 2.100 | 0,025 | 0,045 | 0,150 - 0,800 | 20.000 | 1.600 | 0,020 | 0,040 | 0,140 - 0,800 |
| 23.000 | 2.300 | 0,025 | 0,051 | 0,168 - 0,800 | 20.000 | 2.000 | 0,025 | 0,040 | 0,130 - 0,800 | 18.000 | 1.440 | 0,020 | 0,035 | 0,110 - 0,800 |
| 23.000 | 2.300 | 0,025 | 0,053 | 0,168 - 0,800 | 20.000 | 2.000 | 0,025 | 0,040 | 0,130 - 0,800 | 18.000 | 1.440 | 0,020 | 0,035 | 0,110 - 0,800 |
| 21.000 | 2.016 | 0,024 | 0,031 | 0,110 - 0,800 | 18.000 | 1.440 | 0,020 | 0,023 | 0,080 - 0,800 | 16.000 | 1.152 | 0,018 | 0,020 | 0,070 - 0,800 |
| 21.000 | 2.016 | 0,024 | 0,031 | 0,110 - 0,800 | 18.000 | 1.440 | 0,020 | 0,022 | 0,080 - 0,800 | 16.000 | 1.152 | 0,018 | 0,020 | 0,070 - 0,800 |
| 20.000 | 4.000 | 0,050 | 0,125 | 0,390 - 1,100 | 16.000 | 2.560 | 0,040 | 0,090 | 0,290 - 1,100 | 15.000 | 2.100 | 0,035 | 0,080 | 0,270 - 1,100 |
| 20.000 | 4.000 | 0,050 | 0,090 | 0,280 - 1,100 | 16.000 | 2.560 | 0,040 | 0,062 | 0,200 - 1,100 | 15.000 | 2.100 | 0,035 | 0,057 | 0,190 - 1,100 |
| 18.000 | 3.240 | 0,045 | 0,048 | 0,160 - 1,100 | 15.000 | 2.400 | 0,040 | 0,034 | 0,120 - 1,100 | 14.000 | 1.960 | 0,035 | 0,030 | 0,110 - 1,100 |
| 18.000 | 3.240 | 0,045 | 0,050 | 0,160 - 1,100 | 15.000 | 2.400 | 0,040 | 0,034 | 0,120 - 1,100 | 14.000 | 1.960 | 0,035 | 0,030 | 0,110 - 1,100 |
| 18.000 | 3.240 | 0,045 | 0,030 | 0,100 - 1,100 | 15.000 | 2.400 | 0,040 | 0,025 | 0,090 - 1,100 | 14.000 | 1.960 | 0,035 | 0,020 | 0,070 - 1,100 |
| 20.000 | 4.000 | 0,050 | 0,180 | 0,550 - 1,100 | 16.000 | 2.880 | 0,045 | 0,130 | 0,400 - 1,100 | 15.000 | 2.100 | 0,035 | 0,120 | 0,380 - 1,100 |
| 20.000 | 4.400 | 0,055 | 0,125 | 0,380 - 1,100 | 16.000 | 2.560 | 0,040 | 0,090 | 0,290 - 1,100 | 15.000 | 2.100 | 0,035 | 0,080 | 0,270 - 1,100 |
| 18.000 | 3.600 | 0,050 | 0,070 | 0,230 - 1,100 | 15.000 | 2.400 | 0,040 | 0,050 | 0,170 - 1,100 | 14.000 | 2.128 | 0,038 | 0,045 | 0,150 - 1,100 |
| 18.000 | 3.600 | 0,050 | 0,070 | 0,230 - 1,100 | 15.000 | 2.400 | 0,040 | 0,050 | 0,160 - 1,100 | 14.000 | 2.128 | 0,038 | 0,045 | 0,150 - 1,100 |
| 18.000 | 3.600 | 0,050 | 0,040 | 0,145 - 1,100 | 15.000 | 2.400 | 0,040 | 0,030 | 0,100 - 1,100 | 14.000 | 2.128 | 0,038 | 0,030 | 0,090 - 1,100 |
| 20.000 | 2.000 | 0,050 | 0,200 | 0,600 - 1,200 | 16.000 | 1.600 | 0,050 | 0,150 | 0,500 - 1,200 | 15.000 | 1.050 | 0,035 | 0,140 | 0,420 - 1,200 |
| 20.000 | 2.000 | 0,050 | 0,140 | 0,430 - 1,200 | 16.000 | 1.440 | 0,045 | 0,110 | 0,320 - 1,200 | 15.000 | 1.050 | 0,035 | 0,100 | 0,300 - 1,200 |
| 18.000 | 1.800 | 0,050 | 0,080 | 0,260 - 1,200 | 15.000 | 1.350 | 0,045 | 0,060 | 0,190 - 1,200 | 14.000 | 1.120 | 0,040 | 0,055 | 0,170 - 1,200 |
| 18.000 | 1.800 | 0,050 | 0,080 | 0,260 - 1,200 | 15.000 | 1.350 | 0,045 | 0,060 | 0,180 - 1,200 | 14.000 | 1.120 | 0,040 | 0,055 | 0,170 - 1,200 |
| 18.000 | 1.800 | 0,050 | 0,055 | 0,160 - 1,200 | 15.000 | 1.350 | 0,045 | 0,040 | 0,120 - 1,200 | 14.000 | 1.120 | 0,040 | 0,040 | 0,110 - 1,200 |
| 17.000 | 3.400 | 0,050 | 0,160 | 0,500 - 1,400 | 14.000 | 2.240 | 0,040 | 0,115 | 0,370 - 1,400 | 13.000 | 1.820 | 0,035 | 0,105 | 0,340 - 1,400 |
| 17.000 | 2.720 | 0,040 | 0,070 | 0,230 - 1,400 | 14.000 | 1.960 | 0,035 | 0,050 | 0,170 - 1,400 | 13.000 | 1.560 | 0,030 | 0,045 | 0,150 - 1,400 |
| 16.000 | 2.560 | 0,040 | 0,055 | 0,180 - 1,400 | 13.000 | 2.080 | 0,040 | 0,040 | 0,140 - 1,400 | 12.000 | 1.680 | 0,035 | 0,035 | 0,120 - 1,400 |
| 17.000 | 3.740 | 0,055 | 0,195 | 0,600 - 1,400 | 14.000 | 2.240 | 0,040 | 0,145 | 0,440 - 1,400 | 13.000 | 1.820 | 0,035 | 0,130 | 0,400 - 1,400 |
| 16.000 | 2.880 | 0,045 | 0,090 | 0,280 - 1,400 | 14.000 | 2.240 | 0,040 | 0,060 | 0,200 - 1,400 | 13.000 | 1.820 | 0,035 | 0,060 | 0,190 - 1,400 |
| 15.000 | 3.000 | 0,050 | 0,070 | 0,220 - 1,400 | 13.000 | 2.080 | 0,040 | 0,050 | 0,170 - 1,400 | 12.000 | 1.824 | 0,038 | 0,045 | 0,150 - 1,400 |
| 15.000 | 3.300 | 0,055 | 0,265 | 0,840 - 1,600 | 12.000 | 2.064 | 0,043 | 0,200 | 0,600 - 1,600 | 12.000 | 1.920 | 0,040 | 0,180 | 0,550 - 1,600 |
| 15.000 | 3.300 | 0,055 | 0,185 | 0,580 - 1,600 | 12.000 | 2.064 | 0,043 | 0,135 | 0,430 - 1,600 | 12.000 | 1.920 | 0,040 | 0,125 | 0,380 - 1,600 |
| 15.000 | 3.300 | 0,055 | 0,105 | 0,340 - 1,600 | 12.000 | 2.064 | 0,043 | 0,075 | 0,250 - 1,600 | 12.000 | 1.920 | 0,040 | 0,070 | 0,230 - 1,600 |
| 14.000 | 2.800 | 0,050 | 0,105 | 0,330 - 1,600 | 11.000 | 1.892 | 0,043 | 0,075 | 0,250 - 1,600 | 11.000 | 1.760 | 0,040 | 0,070 | 0,230 - 1,600 |
| 14.000 | 2.800 | 0,050 | 0,085 | 0,300 - 1,600 | 11.000 | 1.892 | 0,043 | 0,063 | 0,200 - 1,600 | 11.000 | 1.760 | 0,040 | 0,060 | 0,190 - 1,600 |
| 14.000 | 2.800 | 0,050 | 0,070 | 0,220 - 1,600 | 11.000 | 1.892 | 0,043 | 0,050 | 0,170 - 1,600 | 11.000 | 1.760 | 0,040 | 0,045 | 0,150 - 1,600 |
| 15.000 | 1.650 | 0,055 | 0,280 | 0,900 - 1,800 | 12.000 | 1.032 | 0,043 | 0,210 | 0,630 - 1,800 | 12.000 | 960 | 0,040 | 0,200 | 0,570 - 1,800 |
| 15.000 | 1.650 | 0,055 | 0,200 | 0,600 - 1,800 | 12.000 | 1.032 | 0,043 | 0,145 | 0,450 - 1,800 | 12.000 | 960 | 0,040 | 0,140 | 0,400 - 1,800 |
| 15.000 | 1.650 | 0,055 | 0,115 | 0,360 - 1,800 | 12.000 | 1.032 | 0,043 | 0,085 | 0,260 - 1,800 | 12.000 | 960 | 0,040 | 0,080 | 0,250 - 1,800 |
| 14.000 | 1.400 | 0,050 | 0,115 | 0,350 - 1,800 | 11.000 | 946 | 0,043 | 0,085 | 0,260 - 1,800 | 11.000 | 880 | 0,040 | 0,080 | 0,250 - 1,800 |
| 14.000 | 1.400 | 0,050 | 0,095 | 0,330 - 1,800 | 11.000 | 946 | 0,043 | 0,070 | 0,210 - 1,800 | 11.000 | 880 | 0,040 | 0,070 | 0,200 - 1,800 |
| 14.000 | 1.400 | 0,050 | 0,080 | 0,230 - 1,800 | 11.000 | 946 | 0,043 | 0,055 | 0,180 - 1,800 | 11.000 | 880 | 0,040 | 0,055 | 0,160 - 1,800 |
| 15.000 | 1.650 | 0,055 | 0,300 | 1,000 - 1,800 | 12.000 | 1.032 | 0,043 | 0,230 | 0,650 - 1,800 | 12.000 | 960 | 0,040 | 0,210 | 0,580 - 1,800 |
| 15.000 | 1.650 | 0,055 | 0,220 | 0,650 - 1,800 | 12.000 | 1.032 | 0,043 | 0,160 | 0,470 - 1,800 | 12.000 | 960 | 0,040 | 0,150 | 0,410 - 1,800 |
| 15.000 | 1.650 | 0,055 | 0,125 | 0,380 - 1,800 | 12.000 | 1.032 | 0,043 | 0,095 | 0,280 - 1,800 | 12.000 | 960 | 0,040 | 0,090 | 0,260 - 1,800 |
| 14.000 | 1.400 | 0,050 | 0,125 | 0,380 - 1,800 | 11.000 | 946 | 0,043 | 0,095 | 0,280 - 1,800 | 11.000 | 880 | 0,040 | 0,090 | 0,260 - 1,800 |
| 14.000 | 1.400 | 0,050 | 0,100 | 0,350 - 1,800 | 11.000 | 946 | 0,043 | 0,080 | 0,230 - 1,800 | 11.000 | 880 | 0,040 | 0,080 | 0,210 - 1,800 |
| 14.000 | 1.400 | 0,050 | 0,090 | 0,250 - 1,800 | 11.000 | 946 | 0,043 | 0,065 | 0,190 - 1,800 | 11.000 | 880 | 0,040 | 0,060 | 0,170 - 1,800 |
| 11.000 | 3.520 | 0,080 | 0,310 | 0,980 - 2,000 | 9.000 | 2.160 | 0,060 | 0,225 | 0,700 - 2,000 | 9.000 | 1.980 | 0,055 | 0,200 | 0,650 - 2,000 |
| 10.000 | 2.800 | 0,070 | 0,160 | 0,500 - 2,000 | 9.000 | 1.980 | 0,055 | 0,115 | 0,360 - 2,000 | 8.000 | 1.600 | 0,050 | 0,105 | 0,330 - 2,000 |
| 8.000 | 2.240 | 0,070 | 0,115 | 0,360 - 2,000 | 6.000 | 1.320 | 0,055 | 0,080 | 0,270 - 2,000 | 6.000 | 1.200 | 0,050 | 0,075 | 0,240 - 2,000 |
| 7.000 | 1.960 | 0,070 | 0,085 | 0,280 - 2,000 | 5.000 | 1.100 | 0,055 | 0,060 | 0,200 - 2,000 | 5.000 | 1.000 | 0,050 | 0,060 | 0,190 - 2,000 |
| 11.000 | 1.760 | 0,080 | 0,330 | 1,000 - 2,200 | 9.000 | 1.080 | 0,060 | 0,240 | 0,730 - 2,200 | 9.000 | 990 | 0,055 | 0,230 | 0,680 - 2,200 |
| 10.000 | 1.400 | 0,070 | 0,180 | 0,550 - 2,200 | 9.000 | 990 | 0,055 | 0,130 | 0,380 - 2,200 | 8.000 | 800 | 0,050 | 0,120 | 0,350 - 2,200 |
| 8.000 | 1.120 | 0,070 | 0,125 | 0,380 - 2,200 | 6.000 | 660 | 0,055 | 0,090 | 0,280 - 2,200 | 6.000 | 600 | 0,050 | 0,085 | 0,250 - 2,200 |
| 7.000 | 980 | 0,070 | 0,095 | 0,290 - 2,200 | 5.000 | 550 | 0,055 | 0,070 | 0,210 - 2,200 | 5.000 | 500 | 0,050 | 0,070 | 0,200 - 2,200 |

Hinweis:
Bei gleichen Schnittwerten der zylindrischen [30 6267] und der konischen [30 6268] Ausführung sind durch die erhöhte Stabilität des konischen Halses die Qualität der Oberflächen besser sowie eine höhere Lebensdauer erzielbar. Die erhöhte Stabilität des konischen Halses ermöglicht entweder eine Erhöhung des fz-Wertes um max. 20%

| Werkstoffgruppe Material group | Werkstoff HRC N/mm ² Material HRC N/mm ² | 0,2 × 0,05 rp × 2 | 0,2 × 0,05 rp × 3 | 0,4 × 0,05 rp × 4 | 0,4 × 0,05 rp × 5 | 0,4 × 0,05 rp × 6 | 0,5 × 0,05 rp × 5 | 0,5 × 0,05 rp × 8 | 0,5 × 0,05 rp × 10 |
|-----------------------------------|---|--------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| 3.1-3.2 | Werkstähle < 35 HRC (1140 N/mm ²) Tool steels < 35 HRC (1140 N/mm ²) | ap = 0,005 | 0,004 | 0,006 | 0,006 | 0,004 | 0,010 | 0,006 | 0,005 |
| | | n = 45.000 | 40.000 | 36.000 | 32.000 | 28.000 | 34.000 | 27.000 | 20.000 |
| | | fz = 0,015 Vf = 1.200 | 0,010 800 | 0,018 1.200 | 0,016 1.000 | 0,012 800 | 0,02 1.500 | 0,015 1.000 | 0,014 700 |
| 4.1-4.2-4.3 | Werkstähle < 45 HRC (1460 N/mm ²) Tool steels < 45 HRC (1460 N/mm ²) | ap = 0,005 | 0,004 | 0,005 | 0,005 | 0,003 | 0,010 | 0,005 | 0,004 |
| | | n = 42.000 | 38.000 | 33.000 | 30.000 | 26.000 | 32.000 | 25.000 | 19.000 |
| | | fz = 0,014 Vf = 1.100 | 0,008 700 | 0,016 1.200 | 0,015 900 | 0,010 700 | 0,018 1.200 | 0,012 700 | 0,012 500 |
| 8.1 | Gehärtete Stähle < 55 HRC (1930 N/mm ²) Hardened steels < 55 HRC (1930 N/mm ²) | ap = 0,005 | 0,003 | 0,004 | 0,004 | 0,003 | 0,007 | 0,004 | 0,003 |
| | | n = 37.000 | 36.000 | 30.000 | 27.000 | 25.000 | 28.000 | 22.000 | 17.000 |
| | | fz = 0,012 Vf = 1.000 | 0,007 600 | 0,015 1.000 | 0,014 800 | 0,008 600 | 0,015 900 | 0,010 500 | 0,010 400 |
| 8.2-8.3 | Gehärtete Stähle < 72 HRC Hardened steels < 72 HRC | ap = 0,003 | 0,002 | 0,003 | 0,003 | 0,002 | 0,006 | 0,003 | 0,0025 |
| | | n = 35.000 | 34.000 | 27.000 | 24.000 | 22.000 | 26.000 | 20.000 | 15.000 |
| | | fz = 0,010 Vf = 800 | 0,006 500 | 0,013 700 | 0,012 600 | 0,001 400 | 0,012 600 | 0,008 400 | 0,008 300 |

| Werkstoffgruppe Material group | Werkstoff HRC N/mm ² Material HRC N/mm ² | 0,6 × 0,06 rp × 6 | 0,6 × 0,06 rp × 8 | 0,6 × 0,06 rp × 10 | 0,6 × 0,06 rp × 12 | 0,6 × 0,06 rp × 15 | 0,8 × 0,08 rp × 6 | 0,8 × 0,08 rp × 12 | 0,8 × 0,08 rp × 16 |
|-----------------------------------|---|--------------------------|-------------------|--------------------|--------------------|--------------------|-------------------|--------------------|--------------------|
| 3.1-3.2 | Werkstähle < 35 HRC (1140 N/mm ²) Tool steels < 35 HRC (1140 N/mm ²) | ap = 0,036 | 0,030 | 0,020 | 0,008 | 0,004 | 0,04 | 0,016 | 0,008 |
| | | n = 30.000 | 26.000 | 24.000 | 22.000 | 18.000 | 36.000 | 31.000 | 27.000 |
| | | fz = 0,026 Vf = 1.400 | 0,018 1.400 | 0,015 1.200 | 0,025 1.100 | 0,024 900 | 0,022 1.600 | 0,020 1.400 | 0,015 1.100 |
| 4.1-4.2-4.3 | Werkstähle < 45 HRC (1460 N/mm ²) Tool steels < 45 HRC (1460 N/mm ²) | ap = 0,035 | 0,010 | 0,008 | 0,007 | 0,004 | 0,032 | 0,014 | 0,006 |
| | | n = 28.000 | 25.000 | 23.000 | 21.000 | 17.000 | 33.000 | 30.000 | 26.000 |
| | | fz = 0,022 Vf = 1.200 | 0,022 1.100 | 0,020 1.000 | 0,020 900 | 0,020 700 | 0,020 1.500 | 0,018 1.100 | 0,012 900 |
| 8.1 | Gehärtete Stähle < 55 HRC (1930 N/mm ²) Hardened steels < 55 HRC (1930 N/mm ²) | ap = 0,028 | 0,020 | 0,010 | 0,006 | 0,003 | 0,028 | 0,012 | 0,005 |
| | | n = 27.000 | 24.000 | 21.000 | 19.000 | 15.000 | 30.000 | 26.000 | 23.000 |
| | | fz = 0,020 Vf = 1.100 | 0,016 1.000 | 0,015 900 | 0,018 700 | 0,018 500 | 0,018 1.200 | 0,016 1.100 | 0,010 900 |
| 8.2-8.3 | Gehärtete Stähle < 72 HRC Hardened steels < 72 HRC | ap = 0,025 | 0,015 | 0,010 | 0,005 | 0,003 | 0,025 | 0,010 | 0,004 |
| | | n = 27.000 | 23.000 | 20.000 | 17.000 | 14.000 | 27.000 | 24.000 | 21.000 |
| | | fz = 0,016 Vf = 900 | 0,015 700 | 0,015 600 | 0,015 500 | 0,015 400 | 0,015 1.000 | 0,014 800 | 0,009 600 |

| Werkstoffgruppe Material group | Werkstoff HRC N/mm ² Material HRC N/mm ² | 1,0 × 0,1 rp × 8 | 1,0 × 0,1 rp × 10 | 1,0 × 0,1 rp × 15 | 1,0 × 0,1 rp × 20 | 1,0 × 0,1 rp × 25 | 1,0 × 0,1 rp × 30 | 1,5 × 0,15 rp × 15 | 1,5 × 0,15 rp × 25 | 1,5 × 0,15 rp × 30 |
|-----------------------------------|---|--------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|--------------------|--------------------|
| 3.1-3.2 | Werkstähle < 35 HRC (1140 N/mm ²) Tool steels < 35 HRC (1140 N/mm ²) | ap = 0,035 | 0,032 | 0,025 | 0,018 | 0,015 | 0,012 | 0,04 | 0,028 | 0,025 |
| | | n = 32.000 | 32.000 | 28.000 | 22.000 | 17.000 | 17.000 | 22.000 | 16.000 | 14.000 |
| | | fz = 0,032 Vf = 2.100 | 0,030 2.000 | 0,028 1.800 | 0,026 1.200 | 0,025 1.000 | 0,025 1.000 | 0,03 1.400 | 0,03 1.000 | 0,03 800 |
| 4.1-4.2-4.3 | Werkstähle < 45 HRC (1460 N/mm ²) Tool steels < 45 HRC (1460 N/mm ²) | ap = 0,030 | 0,028 | 0,022 | 0,016 | 0,014 | 0,012 | 0,035 | 0,025 | 0,020 |
| | | n = 30.000 | 30.000 | 26.000 | 20.000 | 16.000 | 16.000 | 21.000 | 15.000 | 13.000 |
| | | fz = 0,032 Vf = 2.000 | 0,032 1.900 | 0,026 1.600 | 0,024 1.100 | 0,023 900 | 0,022 800 | 0,028 1.200 | 0,025 800 | 0,025 700 |
| 8.1 | Gehärtete Stähle < 55 HRC (1930 N/mm ²) Hardened steels < 55 HRC (1930 N/mm ²) | ap = 0,025 | 0,022 | 0,018 | 0,012 | 0,010 | 0,011 | 0,028 | 0,018 | 0,016 |
| | | n = 25.000 | 26.000 | 23.000 | 17.000 | 15.000 | 14.000 | 18.000 | 14.000 | 12.000 |
| | | fz = 0,030 Vf = 1.600 | 0,030 1.700 | 0,025 1.400 | 0,022 900 | 0,021 700 | 0,021 600 | 0,026 1.100 | 0,024 700 | 0,022 600 |
| 8.2-8.3 | Gehärtete Stähle < 72 HRC Hardened steels < 72 HRC | ap = 0,022 | 0,020 | 0,016 | 0,010 | 0,009 | 0,010 | 0,025 | 0,016 | 0,014 |
| | | n = 25.000 | 24.000 | 22.000 | 16.000 | 14.000 | 13.000 | 17.000 | 13.000 | 11.000 |
| | | fz = 0,026 Vf = 1.200 | 0,028 1.500 | 0,24 1.200 | 0,020 700 | 0,020 600 | 0,020 500 | 0,024 900 | 0,022 600 | 0,02 400 |

| Werkstoffgruppe Material group | Werkstoff HRC N/mm ² Material HRC N/mm ² | 2,0 × 0,2 rp × 20 | 2,0 × 0,2 rp × 25 | 2,0 × 0,2 rp × 30 | 2,0 × 0,2 rp × 40 | 2,0 × 0,2 rp × 50 | 3,0 × 0,3 rp × 30 | 3,0 × 0,3 rp × 40 | 3,0 × 0,3 rp × 50 | 3,0 × 0,3 rp × 60 |
|-----------------------------------|---|-------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| 3.1-3.2 | Werkstähle < 35 HRC (1140 N/mm ²) Tool steels < 35 HRC (1140 N/mm ²) | ap = 0,045 | 0,045 | 0,04 | 0,030 | 0,015 | 0,065 | 0,06 | 0,045 | 0,025 |
| | | n = 17.000 | 16.000 | 15.000 | 11.000 | 9.000 | 13.000 | 12.000 | 9.000 | 7.000 |
| | | fz = 0,07 Vf = 2.200 | 0,06 2.100 | 0,06 1.900 | 0,05 1.200 | 0,05 1.000 | 0,065 1.500 | 0,06 1.400 | 0,05 900 | 0,05 800 |
| 4.1-4.2-4.3 | Werkstähle < 45 HRC (1460 N/mm ²) Tool steels < 45 HRC (1460 N/mm ²) | ap = 0,040 | 0,038 | 0,035 | 0,028 | 0,014 | 0,06 | 0,05 | 0,04 | 0,02 |
| | | n = 18.000 | 16.000 | 14.000 | 10.000 | 9.000 | 12.000 | 11.000 | 8.000 | 6.000 |
| | | fz = 0,06 Vf = 1.800 | 0,05 1.700 | 0,05 1.600 | 0,045 1.100 | 0,045 900 | 0,055 1.300 | 0,05 1.200 | 0,045 800 | 0,045 700 |
| 8.1 | Gehärtete Stähle < 55 HRC (1930 N/mm ²) Hardened steels < 55 HRC (1930 N/mm ²) | ap = 0,032 | 0,030 | 0,028 | 0,022 | 0,010 | 0,05 | 0,045 | 0,03 | 0,02 |
| | | n = 14.000 | 13.000 | 12.000 | 9.000 | 8.000 | 12.000 | 10.000 | 7.000 | 6.000 |
| | | fz = 0,06 Vf = 1.600 | 0,05 1.500 | 0,05 1.400 | 0,04 900 | 0,04 800 | 0,05 1.100 | 0,045 1.000 | 0,04 700 | 0,04 600 |
| 8.2-8.3 | Gehärtete Stähle < 72 HRC Hardened steels < 72 HRC | ap = 0,030 | 0,028 | 0,025 | 0,020 | 0,008 | 0,045 | 0,040 | 0,025 | 0,016 |
| | | n = 13.000 | 12.000 | 11.000 | 8.000 | 7.000 | 11.000 | 9.000 | 6.000 | 5.500 |
| | | fz = 0,05 Vf = 1.300 | 0,045 1.200 | 0,04 1.100 | 0,038 800 | 0,035 600 | 0,045 900 | 0,04 800 | 0,035 500 | 0,035 450 |

Modifizierung der Schnittdaten für Kupfer
Modification of the cutting conditions for copper $n = + 25 \% / fz = + 25 \%$

Sind die Ihnen zur Verfügung stehenden Drehzahlen geringer als in dieser Tabelle vorgegebenen ist der Vorschub im gleichen Verhältnis zu reduzieren.
If the rpm available in lower than recommended, reduce the feed rate to the same ratio.



Empfohlene Schnittdaten für Karnasch Micro-Schaftfräser
Recommended cutting data for Karnasch solid carbide micro end mills

30 6266

| Werkstoffgruppe Material group | Werkstoff HRC N/mm ² Material HRC N/mm ² | 0,2 × 1,0 | | 0,2 × 1,5 | | 0,2 × 2,0 | | 0,2 × 3,0 | | 0,4 × 2 | | 0,4 × 3 | | 0,4 × 4 | | 0,4 × 5 | | 0,4 × 6 | | 0,5 × 2 | | 0,5 × 4 | | 0,6 × 6 | | 0,6 × 8 | | 0,6 × 10 | | 0,6 × 12 | | 0,6 × 15 | |
|-----------------------------------|---|-----------|--------|-----------|--------|-----------|--------|-----------|--------|----------|--------|----------|--------|---------|--------|----------|-------|----------|----|----------|----|----------|----|----------|----|----------|----|----------|----|----------|----|----------|----|
| | | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae |
| 3.1-3.2 | Werkstähle < 35 HRC (1140 N/mm ²) | 0,015 | 0,008 | 0,005 | 0,004 | 0,030 | 0,018 | 0,008 | 0,006 | 0,005 | 0,040 | 0,035 | 0,018 | 0,017 | 0,014 | 0,009 | 0,004 | | | | | | | | | | | | | | | | |
| | Tool steels < 35 HRC (1140 N/mm ²) | 0,045 | 0,023 | 0,018 | 0,010 | 0,090 | 0,050 | 0,022 | 0,018 | 0,016 | 0,12 | 0,01 | 0,05 | 0,05 | 0,04 | 0,025 | 0,015 | | | | | | | | | | | | | | | | |
| | n= 42.000 | 44.000 | 44.000 | 39.000 | 39.000 | 35.000 | 35.000 | 32.000 | 30.000 | 39.000 | 36.000 | 32.000 | 32.000 | 30.000 | 24.000 | 20.000 | | | | | | | | | | | | | | | | | |
| | fz= 0,022 | 0,020 | 0,020 | 0,020 | 0,030 | 0,030 | 0,028 | 0,027 | 0,025 | 0,030 | 0,028 | 0,028 | 0,025 | 0,024 | 0,024 | 0,022 | 0,020 | | | | | | | | | | | | | | | | |
| Vf= 2.200 | 1.900 | 1.900 | 1.700 | 2.600 | 2.100 | 2.000 | 1.800 | 1.600 | 2.700 | 2.200 | 2.000 | 1.800 | 1.600 | 1.400 | 1.200 | 1.000 | | | | | | | | | | | | | | | | | |
| 4.1-4.2-4.3 | Werkstähle < 45 HRC (1460 N/mm ²) | 0,012 | 0,006 | 0,005 | 0,003 | 0,027 | 0,016 | 0,006 | 0,005 | 0,004 | 0,035 | 0,030 | 0,015 | 0,015 | 0,012 | 0,008 | 0,004 | | | | | | | | | | | | | | | | |
| | Tool steels < 45 HRC (1460 N/mm ²) | 0,040 | 0,020 | 0,016 | 0,010 | 0,080 | 0,045 | 0,020 | 0,016 | 0,014 | 0,10 | 0,09 | 0,05 | 0,05 | 0,03 | 0,023 | 0,012 | | | | | | | | | | | | | | | | |
| | n= 42.000 | 40.000 | 42.000 | 37.000 | 37.000 | 33.000 | 33.000 | 29.000 | 27.000 | 38.000 | 34.000 | 33.000 | 30.000 | 30.000 | 22.000 | 19.000 | | | | | | | | | | | | | | | | | |
| | fz= 0,020 | 0,020 | 0,017 | 0,018 | 0,030 | 0,030 | 0,024 | 0,024 | 0,022 | 0,025 | 0,022 | 0,022 | 0,022 | 0,022 | 0,021 | 0,022 | 0,020 | | | | | | | | | | | | | | | | |
| Vf= 1.800 | 1.700 | 1.500 | 1.400 | 2.200 | 2.000 | 1.700 | 1.500 | 1.300 | 1.800 | 2.000 | 1.700 | 1.600 | 1.400 | 1.000 | 900 | | | | | | | | | | | | | | | | | | |
| 8.1 | Gehärtete Stähle < 55 HRC (1930 N/mm ²) | 0,10 | 0,005 | 0,005 | 0,003 | 0,022 | 0,012 | 0,006 | 0,004 | 0,003 | 0,030 | 0,026 | 0,012 | 0,012 | 0,010 | 0,007 | 0,003 | | | | | | | | | | | | | | | | |
| | Hardened steels < 55 HRC (1930 N/mm ²) | 0,30 | 0,015 | 0,012 | 0,007 | 0,065 | 0,038 | 0,013 | 0,010 | 0,010 | 0,09 | 0,08 | 0,04 | 0,035 | 0,024 | 0,020 | 0,011 | | | | | | | | | | | | | | | | |
| | n= 37.000 | 37.000 | 37.000 | 32.000 | 33.000 | 30.000 | 30.000 | 26.000 | 24.000 | 34.000 | 30.000 | 29.000 | 27.000 | 26.000 | 20.000 | 17.000 | | | | | | | | | | | | | | | | | |
| | fz= 0,020 | 0,018 | 0,016 | 0,018 | 0,025 | 0,025 | 0,023 | 0,023 | 0,021 | 0,024 | 0,024 | 0,023 | 0,023 | 0,022 | 0,022 | 0,020 | 0,020 | | | | | | | | | | | | | | | | |
| Vf= 1.400 | 1.400 | 1.400 | 1.200 | 1.700 | 1.500 | 1.500 | 1.300 | 1.200 | 1.400 | 1.600 | 1.500 | 1.300 | 1.100 | 900 | 700 | | | | | | | | | | | | | | | | | | |
| 8.2-8.3 | Gehärtete Stähle < 72 HRC Hardened steels < 72 HRC | 0,09 | 0,004 | 0,003 | 0,002 | 0,020 | 0,012 | 0,005 | 0,004 | 0,003 | 0,028 | 0,025 | 0,011 | 0,012 | 0,009 | 0,005 | 0,003 | | | | | | | | | | | | | | | | |
| | n= 34.000 | 34.000 | 34.000 | 30.000 | 30.000 | 27.000 | 27.000 | 24.000 | 22.000 | 31.000 | 28.000 | 27.000 | 25.000 | 25.000 | 18.000 | 16.000 | | | | | | | | | | | | | | | | | |
| | fz= 0,015 | 0,015 | 0,014 | 0,015 | 0,022 | 0,022 | 0,020 | 0,020 | 0,018 | 0,020 | 0,022 | 0,02 | 0,02 | 0,017 | 0,016 | 0,015 | | | | | | | | | | | | | | | | | |
| | Vf= 1.200 | 1.100 | 1.000 | 900 | 1.400 | 1.200 | 1.200 | 1.000 | 1.000 | 1.000 | 1.200 | 1.200 | 1.000 | 800 | 600 | 500 | | | | | | | | | | | | | | | | | |
| Werkstoffgruppe Material group | Werkstoff HRC N/mm ² Material HRC N/mm ² | 0,8 × 4 | | 0,8 × 6 | | 0,8 × 8 | | 0,8 × 12 | | 0,8 × 16 | | 1,0 × 6 | | 1,0 × 8 | | 1,0 × 10 | | 1,0 × 15 | | 1,0 × 20 | | 1,0 × 25 | | 1,0 × 30 | | 1,0 × 35 | | | | | | | |
| | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | |
| 3.1-3.2 | Werkstähle < 35 HRC (1140 N/mm ²) | 0,050 | 0,040 | 0,02 | 0,016 | 0,015 | 0,05 | 0,05 | 0,03 | 0,025 | 0,018 | 0,015 | 0,014 | 0,008 | | | | | | | | | | | | | | | | | | | |
| | Tool steels < 35 HRC (1140 N/mm ²) | 0,15 | 0,12 | 0,07 | 0,05 | 0,045 | 0,14 | 0,14 | 0,09 | 0,07 | 0,05 | 0,045 | 0,04 | 0,025 | | | | | | | | | | | | | | | | | | | |
| | n= 40.000 | 36.000 | 36.000 | 32.000 | 24.000 | 33.000 | 33.000 | 32.000 | 28.000 | 22.000 | 18.000 | 17.000 | 17.000 | | | | | | | | | | | | | | | | | | | | |
| | fz= 0,039 | 0,035 | 0,032 | 0,030 | 0,028 | 0,04 | 0,04 | 0,04 | 0,04 | 0,035 | 0,033 | 0,03 | 0,03 | | | | | | | | | | | | | | | | | | | | |
| Vf= 3.000 | 2.600 | 2.500 | 2.200 | 1.400 | 2.700 | 2.700 | 2.500 | 1.600 | 1.300 | 1.300 | 1.300 | | | | | | | | | | | | | | | | | | | | | | |
| 4.1-4.2-4.3 | Werkstähle < 45 HRC (1460 N/mm ²) | 0,045 | 0,035 | 0,020 | 0,015 | 0,013 | 0,04 | 0,04 | 0,025 | 0,02 | 0,015 | 0,014 | 0,014 | 0,008 | | | | | | | | | | | | | | | | | | | |
| | Tool steels < 45 HRC (1460 N/mm ²) | 0,14 | 0,10 | 0,05 | 0,045 | 0,04 | 0,12 | 0,12 | 0,08 | 0,06 | 0,04 | 0,04 | 0,02 | | | | | | | | | | | | | | | | | | | | |
| | n= 37.000 | 33.000 | 33.000 | 30.000 | 23.000 | 30.000 | 30.000 | 30.000 | 27.000 | 21.000 | 17.000 | 17.000 | 17.000 | | | | | | | | | | | | | | | | | | | | |
| | fz= 0,035 | 0,035 | 0,03 | 0,028 | 0,025 | 0,04 | 0,04 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | 0,03 | | | | | | | | | | | | | | | | | | | | |
| Vf= 2.600 | 2.400 | 2.200 | 1.800 | 1.200 | 2.500 | 2.500 | 2.200 | 2.000 | 1.400 | 1.200 | 1.200 | 1.200 | | | | | | | | | | | | | | | | | | | | | |
| 8.1 | Gehärtete Stähle < 55 HRC (1930 N/mm ²) | 0,040 | 0,028 | 0,015 | 0,012 | 0,010 | 0,03 | 0,03 | 0,02 | 0,016 | 0,012 | 0,010 | 0,010 | 0,006 | | | | | | | | | | | | | | | | | | | |
| | Hardened steels < 55 HRC (1930 N/mm ²) | 0,12 | 0,08 | 0,05 | 0,040 | 0,03 | 0,01 | 0,01 | 0,06 | 0,05 | 0,04 | 0,03 | 0,03 | 0,02 | | | | | | | | | | | | | | | | | | | |
| | n= 33.000 | 30.000 | 30.000 | 26.000 | 20.000 | 27.000 | 27.000 | 27.000 | 24.000 | 18.000 | 15.000 | 15.000 | 15.000 | | | | | | | | | | | | | | | | | | | | |
| | fz= 0,030 | 0,03 | 0,028 | 0,026 | 0,025 | 0,035 | 0,035 | 0,035 | 0,033 | 0,03 | 0,03 | 0,03 | 0,03 | | | | | | | | | | | | | | | | | | | | |
| Vf= 2.100 | 2.000 | 1.800 | 1.700 | 1.000 | 2.000 | 2.000 | 2.000 | 1.800 | 1.200 | 900 | 900 | 900 | | | | | | | | | | | | | | | | | | | | | |
| 8.2-8.3 | Gehärtete Stähle < 72 HRC Hardened steels < 72 HRC | 0,035 | 0,020 | 0,015 | 0,011 | 0,010 | 0,03 | 0,03 | 0,02 | 0,016 | 0,012 | 0,009 | 0,009 | 0,005 | | | | | | | | | | | | | | | | | | | |
| | n= 30.000 | 27.000 | 27.000 | 25.000 | 19.000 | 25.000 | 25.000 | 25.000 | 22.000 | 17.000 | 14.000 | 14.000 | 14.000 | | | | | | | | | | | | | | | | | | | | |
| | fz= 0,028 | 0,024 | 0,022 | 0,024 | 0,020 | 0,030 | 0,030 | 0,030 | 0,03 | 0,03 | 0,025 | 0,025 | 0,025 | | | | | | | | | | | | | | | | | | | | |
| | Vf= 1.700 | 1.500 | 1.400 | 1.200 | 800 | 1.600 | 1.600 | 1.600 | 1.600 | 1.400 | 900 | 700 | 700 | | | | | | | | | | | | | | | | | | | | |
| Werkstoffgruppe Material group | Werkstoff HRC N/mm ² Material HRC N/mm ² | 1,5 × 8 | | 1,5 × 10 | | 1,5 × 12 | | 1,5 × 15 | | 1,5 × 20 | | 1,5 × 30 | | 2,0 × 8 | | 2,0 × 12 | | 2,0 × 16 | | 2,0 × 20 | | 2,0 × 25 | | 2,0 × 30 | | 2,0 × 35 | | 2,0 × 40 | | 2,0 × 50 | | | |
| | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | ap | ae | |
| 3.1-3.2 | Werkstähle < 35 HRC (1140 N/mm ²) | 0,060 | 0,060 | 0,060 | 0,040 | 0,035 | 0,025 | 0,12 | 0,08 | 0,08 | 0,06 | 0,06 | 0,04 | 0,04 | 0,03 | 0,015 | | | | | | | | | | | | | | | | | |
| | Tool steels < 35 HRC (1140 N/mm ²) | 0,18 | 0,18 | 0,18 | 0,12 | 0,10 | 0,070 | 0,40 | 0,22 | 0,21 | 0,18 | 0,18 | 0,12 | 0,09 | 0,04 | 0,04 | | | | | | | | | | | | | | | | | |
| | n= 25.000 | 25.000 | 25.000 | 25.000 | 22.000 | 22.000 | 21.000 | 19.000 | 19.000 | 18.000 | 16.000 | 16.000 | 13.000 | 13.000 | 10.000 | | | | | | | | | | | | | | | | | | |
| | fz= 0,045 | 0,045 | 0,045 | 0,040 | 0,040 | 0,040 | 0,08 | 0,07 | 0,07 | 0,06 | 0,06 | 0,06 | 0,06 | 0,06 | 0,05 | 0,05 | | | | | | | | | | | | | | | | | |
| Vf= 2.000 | 2.200 | 2.200 | 2.100 | 1.900 | 1.900 | 3.200 | 2.700 | 2.600 | 2.500 | 2.200 | 2.200 | 2.200 | 1.500 | 1.500 | 1.300 | | | | | | | | | | | | | | | | | | |
| 4.1-4.2-4.3 | Werkstähle < 45 HRC (1460 N/mm ²) | 0,055 | 0,055 | 0,055 | 0,035 | 0,030 | 0,020 | 0,12 | 0,07 | 0,07 | 0,05 | 0,05 | 0,03 | 0,03 | 0,025 | 0,12 | | | | | | | | | | | | | | | | | |
| | Tool steels < 45 HRC (1460 N/mm ²) | 0,16 | 0,15 | 0,14 | 0,10 | 0,09 | 0,06 | 0,35 | 0,2 | 0,18 | 0,15 | 0,15 | 0,10 | 0,08 | 0,04 | 0,04 | | | | | | | | | | | | | | | | | |
| | n= 24.000 | 24.000 | 24.000 | 24.000 | 21.000 | 21.000 | 20.000 | 18.000 | 18.000 | 17.000 | 16.000 | 15.000 | 12.000 | 12.000 | 10.000 | | | | | | | | | | | | | | | | | | |
| | fz= 0,040 | 0,040 | 0,040 | 0,035 | 0,034 | 0,032 | 0,07 | 0,06 | 0,06 | 0,06 | 0,05 | 0,05 | 0,04 | 0,04 | 0,04 | 0,04 | | | | | | | | | | | | | | | | | |
| Vf= 2.000 | 2.000 | 2.000 | 1.700 | 1.500 | 1.500 | 2.800 | 2.500 | 2.400 | 2.200 | 1.900 | 1.800 | 1.300 | 1.300 | 1.100 | 1.100 | | | | | | | | | | | | | | | | | | |
| 8.1 | Gehärtete Stähle < 55 HRC (1930 N/mm ²) | 0,045 | 0,045 | 0,045 | 0,028 | 0,025 | 0,017 | 0,09 | 0,05 | 0,04 | | | | | | | | | | | | | | | | | | | | | | | |



| Werkstoff Material | Guss cast iron <150 HB | | | | | Guss cast iron 150-200 HB | | | | | Guss cast iron <200-250 HB | | | | | Guss cast iron <250-300 HB | | | | | Rostfreier Stahl stainless steels <800 N/mm² | | | | |
|-----------------------|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|
| | unlegierter Stahl carbon steels <850 N/mm² | | | | | Vergütungsstahl heat treatable steels <1200 N/mm² | | | | | Werkzeugstahl tool steels 800-1350 N/mm² | | | | | Werkzeugstahl tool steels 1350-1620 N/mm² | | | | | | | | | |

**Schnittwerte: Nuten / Schruppen / ~ ap= 50-150 % - ae= 100 %
Cutting data: Slot milling / Roughing / ~ ap= 50-150 % - ae= 100 %**

| Werkstoffgruppe Material group | | | 1.1-1.5 | | | | | 2.1-2.6 | | | | | 3.1 | | | | | 3.2 | | | | | 4.1/4.2 | | | | |
|-----------------------------------|----|---|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|
| d | l2 | Z | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min |
| 0,4 | 3 | 2 | 0,400 | 0,200 | 65 | 0,007 | 1.117 | 0,400 | 0,200 | 50 | 0,006 | 716 | 0,400 | 0,160 | 43 | 0,005 | 487 | 0,400 | 0,100 | 38 | 0,004 | 376 | 0,400 | 0,100 | 35 | 0,004 | 326 |
| 0,6 | 3 | 2 | 0,600 | 0,300 | 65 | 0,007 | 745 | 0,600 | 0,300 | 50 | 0,006 | 477 | 0,600 | 0,240 | 43 | 0,005 | 325 | 0,600 | 0,150 | 38 | 0,004 | 251 | 0,600 | 0,150 | 35 | 0,004 | 217 |
| 0,8 | 3 | 2 | 0,800 | 0,400 | 65 | 0,007 | 559 | 0,800 | 0,400 | 50 | 0,006 | 358 | 0,800 | 0,320 | 43 | 0,005 | 244 | 0,800 | 0,200 | 38 | 0,004 | 188 | 0,800 | 0,200 | 35 | 0,004 | 163 |
| 1,0 | 5 | 2 | 1,000 | 0,500 | 65 | 0,007 | 447 | 1,000 | 0,500 | 50 | 0,006 | 286 | 1,000 | 0,400 | 43 | 0,005 | 195 | 1,000 | 0,250 | 38 | 0,004 | 150 | 1,000 | 0,250 | 35 | 0,004 | 130 |
| 1,5 | 5 | 2 | 1,500 | 0,750 | 65 | 0,007 | 298 | 1,500 | 0,750 | 50 | 0,006 | 191 | 1,500 | 0,600 | 43 | 0,005 | 130 | 1,500 | 0,380 | 38 | 0,004 | 100 | 1,500 | 0,380 | 35 | 0,004 | 87 |

| Werkstoff Material | Guss cast iron <150 HB | | | | | Guss cast iron 150-200 HB | | | | | Guss cast iron <200-250 HB | | | | | Guss cast iron <250-300 HB | | | | | Rostfreier Stahl stainless steels <800 N/mm² | | | | |
|-----------------------|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|
| | unlegierter Stahl carbon steels <850 N/mm² | | | | | Vergütungsstahl heat treatable steels <1200 N/mm² | | | | | Werkzeugstahl tool steels 800-1350 N/mm² | | | | | Werkzeugstahl tool steels 1350-1620 N/mm² | | | | | | | | | |

**Schnittwerte: Konturfräsen / Schruppen / ~ ap= 100-150 % - ae= 25-50 %
Cutting data: Contour milling / Roughing / ~ ap= 100-150 % - ae= 25-50 %**

| Werkstoffgruppe Material group | | | 1.1-1.5 | | | | | 2.1-2.6 | | | | | 3.1 | | | | | 3.2 | | | | | 4.1/4.2 | | | | |
|-----------------------------------|----|---|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|
| d | l2 | Z | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min |
| 0,4 | 3 | 2 | 0,200 | 0,600 | 72 | 0,012 | 2.130 | 0,200 | 0,600 | 55 | 0,010 | 1.366 | 0,140 | 0,600 | 47 | 0,008 | 929 | 0,100 | 0,400 | 41 | 0,007 | 717 | 0,200 | 0,600 | 39 | 0,007 | 621 |
| 0,6 | 3 | 2 | 0,300 | 0,900 | 72 | 0,012 | 1.420 | 0,300 | 0,900 | 55 | 0,010 | 910 | 0,210 | 0,900 | 47 | 0,008 | 619 | 0,150 | 0,600 | 41 | 0,007 | 478 | 0,300 | 0,900 | 39 | 0,007 | 414 |
| 0,8 | 3 | 2 | 0,400 | 1,200 | 72 | 0,012 | 1.065 | 0,400 | 1,200 | 55 | 0,010 | 683 | 0,280 | 1,200 | 47 | 0,008 | 464 | 0,200 | 0,800 | 41 | 0,007 | 358 | 0,400 | 1,200 | 39 | 0,007 | 311 |
| 1,0 | 5 | 2 | 0,500 | 1,500 | 72 | 0,012 | 852 | 0,500 | 1,500 | 55 | 0,010 | 546 | 0,350 | 1,500 | 47 | 0,008 | 371 | 0,250 | 1,000 | 41 | 0,007 | 287 | 0,500 | 1,500 | 39 | 0,007 | 249 |
| 1,5 | 5 | 2 | 0,750 | 2,250 | 72 | 0,012 | 568 | 0,750 | 2,250 | 55 | 0,010 | 364 | 0,530 | 2,250 | 47 | 0,008 | 248 | 0,380 | 1,500 | 41 | 0,007 | 191 | 0,750 | 2,250 | 39 | 0,007 | 166 |

| Werkstoff Material | Guss cast iron <150 HB | | | | | Guss cast iron 150-200 HB | | | | | Guss cast iron <200-250 HB | | | | | Guss cast iron <250-300 HB | | | | | Rostfreier Stahl stainless steels <800 N/mm² | | | | |
|-----------------------|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|
| | unlegierter Stahl carbon steels <850 N/mm² | | | | | Vergütungsstahl heat treatable steels <1200 N/mm² | | | | | Werkzeugstahl tool steels 800-1350 N/mm² | | | | | Werkzeugstahl tool steels 1350-1620 N/mm² | | | | | | | | | |

**Schnittwerte: Konturfräsen / Schichten (HSC) / ~ ap= 100-150 % - ae= 10-25 %
Cutting data: Countour millig / Finishing (HS) / ~ ap= 100-150 % - ae= 10-25 %**

| Werkstoffgruppe Material group | | | 1.1-1.5 | | | | | 2.1-2.6 | | | | | 3.1 | | | | | 3.2 | | | | | 4.1/4.2 | | | | |
|-----------------------------------|----|---|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|
| d | l2 | Z | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min |
| 0,4 | 3 | 2 | 0,060 | 0,500 | 34 | 0,007 | 599 | 0,008 | 0,600 | 55 | 0,014 | 2.458 | 0,070 | 0,600 | 47 | 0,010 | 1071 | 0,050 | 0,400 | 41 | 0,008 | 827 | 0,090 | 0,600 | 39 | 0,008 | 717 |
| 0,6 | 3 | 2 | 0,090 | 0,750 | 34 | 0,007 | 400 | 0,120 | 0,900 | 55 | 0,014 | 1.639 | 0,110 | 0,900 | 47 | 0,010 | 714 | 0,070 | 0,600 | 41 | 0,008 | 551 | 0,130 | 0,900 | 39 | 0,008 | 478 |
| 0,8 | 3 | 2 | 0,120 | 1,000 | 34 | 0,007 | 300 | 0,160 | 1,200 | 55 | 0,014 | 1.229 | 0,140 | 1,200 | 47 | 0,010 | 536 | 0,100 | 0,800 | 41 | 0,008 | 414 | 0,180 | 1,200 | 39 | 0,008 | 358 |
| 1,0 | 5 | 2 | 0,150 | 1,250 | 34 | 0,007 | 240 | 0,200 | 1,500 | 55 | 0,014 | 983 | 0,180 | 1,500 | 47 | 0,010 | 429 | 0,120 | 1,000 | 41 | 0,008 | 331 | 0,220 | 1,500 | 39 | 0,008 | 287 |
| 1,5 | 5 | 2 | 0,230 | 1,880 | 34 | 0,007 | 160 | 0,300 | 2,250 | 55 | 0,014 | 655 | 0,270 | 2,250 | 47 | 0,010 | 286 | 0,180 | 1,500 | 41 | 0,008 | 221 | 0,330 | 2,250 | 39 | 0,008 | 191 |

| Rostfreier Stahl stainless steels >800 N/mm ² | | | | | Titan/Inconel/Nickel-Legierung titan/inconel/nickel-alloy | | | | | Aluminiumlegierung aluminum alloy <6 % SI. | | | | | Aluminiumlegierung aluminum alloy 6-12 % SI. | | | | | Aluminiumlegierung aluminum alloy >12 % SI. | | | | |
|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|---|----------|-------------|----------|--------------|
| 4.3 | | | | | 5.1-5.5/6.1-6.2 | | | | | 9.1-9.2 | | | | | 9.1-9.2 | | | | | 9.1-9.2 | | | | |
| ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min |
| 0,400 | 0,080 | 31 | 0,004 | 272 | 0,400 | 0,020 | 50 | 0,003 | 191 | 0,400 | 0,050 | 60 | 0,009 | 1.289 | 0,400 | 0,400 | 60 | 0,007 | 1.031 | 0,400 | 0,300 | 50 | 0,006 | 714 |
| 0,600 | 0,120 | 31 | 0,004 | 182 | 0,600 | 0,030 | 50 | 0,003 | 127 | 0,600 | 0,750 | 65 | 0,009 | 933 | 0,600 | 0,600 | 75 | 0,008 | 895 | 0,600 | 0,450 | 65 | 0,006 | 814 |
| 0,800 | 0,160 | 31 | 0,004 | 136 | 0,800 | 0,040 | 50 | 0,003 | 96 | 0,800 | 1,000 | 100 | 0,009 | 1.117 | 0,800 | 0,800 | 100 | 0,008 | 931 | 0,800 | 0,600 | 85 | 0,006 | 584 |
| 1,000 | 0,200 | 31 | 0,004 | 109 | 1,000 | 0,050 | 50 | 0,003 | 76 | 1,000 | 1,250 | 150 | 0,010 | 1.392 | 1,000 | 1,000 | 150 | 0,008 | 1.160 | 1,000 | 0,750 | 130 | 0,006 | 745 |
| 1,500 | 0,300 | 31 | 0,004 | 73 | 1,500 | 0,080 | 50 | 0,003 | 51 | 1,500 | 1,880 | 200 | 0,010 | 1.283 | 1,500 | 1,500 | 200 | 0,008 | 1.070 | 1,500 | 1,130 | 170 | 0,006 | 623 |

| Rostfreier Stahl stainless steels >800 N/mm ² | | | | | Titan/Inconel/Nickel-Legierung titan/inconel/nickel-alloy | | | | | Aluminiumlegierung aluminum alloy <6 % SI. | | | | | Aluminiumlegierung aluminum alloy 6-12 % SI. | | | | | Aluminiumlegierung aluminum alloy >12 % SI. | | | | |
|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|---|----------|-------------|----------|--------------|
| 4.3 | | | | | 5.1-5.5/6.1-6.2 | | | | | 9.1-9.2 | | | | | 9.1-9.2 | | | | | 9.1-9.2 | | | | |
| ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min |
| 0,140 | 0,500 | 34 | 0,006 | 519 | 0,100 | 0,400 | 28 | 0,005 | 364 | 0,200 | 0,800 | 65 | 0,016 | 2.476 | 0,200 | 0,700 | 65 | 0,012 | 1.857 | 0,200 | 0,600 | 55 | 0,010 | 1.310 |
| 0,210 | 0,750 | 34 | 0,006 | 346 | 0,150 | 0,600 | 28 | 0,005 | 243 | 0,300 | 1,200 | 70 | 0,016 | 1.787 | 0,300 | 1,050 | 85 | 0,013 | 1.763 | 0,300 | 0,900 | 70 | 0,010 | 1.114 |
| 0,280 | 1,000 | 34 | 0,006 | 260 | 0,200 | 0,800 | 28 | 0,005 | 182 | 0,400 | 1,600 | 110 | 0,016 | 2.130 | 0,400 | 1,400 | 110 | 0,014 | 1.775 | 0,400 | 1,200 | 95 | 0,010 | 1.135 |
| 0,350 | 1,250 | 34 | 0,006 | 208 | 0,250 | 1,000 | 28 | 0,005 | 146 | 0,500 | 2,000 | 165 | 0,017 | 2.655 | 0,500 | 1,750 | 165 | 0,014 | 2.212 | 0,500 | 1,500 | 140 | 0,010 | 1.337 |
| 0,530 | 1,880 | 34 | 0,006 | 139 | 0,380 | 1,500 | 28 | 0,005 | 97 | 0,750 | 3,000 | 220 | 0,017 | 2.447 | 0,750 | 2,630 | 220 | 0,015 | 2.039 | 0,750 | 2,250 | 190 | 0,010 | 1.210 |

| Rostfreier Stahl stainless steels >800 N/mm ² | | | | | Titan/Inconel/Nickel-Legierung titan/inconel/nickel-alloy | | | | | Aluminiumlegierung aluminum alloy <6 % SI. | | | | | Aluminiumlegierung aluminum alloy 6-12 % SI. | | | | | Aluminiumlegierung aluminum alloy >12 % SI. | | | | |
|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|---|----------|-------------|----------|--------------|
| 4.3 | | | | | 5.1-5.5/6.1-6.2 | | | | | 9.1-9.2 | | | | | 9.1-9.2 | | | | | 9.1-9.2 | | | | |
| ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min |
| 0,060 | 0,500 | 34 | 0,007 | 599 | 0,020 | 0,400 | 28 | 0,006 | 420 | 0,120 | 0,800 | 65 | 0,018 | 2.786 | 0,100 | 0,700 | 65 | 0,014 | 2.167 | 0,080 | 0,600 | 55 | 0,012 | 1.571 |
| 0,090 | 0,750 | 34 | 0,007 | 400 | 0,040 | 0,600 | 28 | 0,006 | 280 | 0,180 | 1,200 | 70 | 0,018 | 2.011 | 0,150 | 1,050 | 85 | 0,015 | 2.035 | 0,120 | 0,900 | 70 | 0,012 | 1.286 |
| 0,120 | 1,000 | 34 | 0,007 | 300 | 0,050 | 0,800 | 28 | 0,006 | 210 | 0,280 | 1,600 | 110 | 0,019 | 2.458 | 0,200 | 1,400 | 110 | 0,016 | 2.048 | 0,160 | 1,200 | 95 | 0,012 | 1.363 |
| 0,150 | 1,250 | 34 | 0,007 | 240 | 0,060 | 1,000 | 28 | 0,006 | 168 | 0,300 | 2,000 | 165 | 0,019 | 3.063 | 0,250 | 1,750 | 165 | 0,016 | 2.553 | 0,200 | 1,500 | 140 | 0,012 | 1.543 |
| 0,230 | 1,880 | 34 | 0,007 | 160 | 0,090 | 1,500 | 28 | 0,006 | 112 | 0,450 | 3,000 | 220 | 0,020 | 2.824 | 0,380 | 2,630 | 220 | 0,017 | 2.353 | 0,300 | 2,250 | 190 | 0,012 | 1.452 |



| Werkstoff Material | Guss cast iron <150 HB | | | | | Guss cast iron 150-200 HB | | | | | Guss cast iron <200-250 HB | | | | | Guss cast iron <250-300 HB | | | | | Rostfreier Stahl stainless steels <800 N/mm² | | | | |
|-----------------------|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|
| | unlegierter Stahl carbon steels <850 N/mm² | | | | | Vergütungsstahl heat treatable steels <1200 N/mm² | | | | | Werkzeugstahl tool steels 800-1350 N/mm² | | | | | Werkzeugstahl tool steels 1350-1620 N/mm² | | | | | | | | | |

**Schnittwerte: Nuten / Schruppen / ~ ap= 5-10 % - ae= 100 %
Cutting data: Slot milling / Roughing / ~ ap= 5-10 % - ae= 100 %**

| Werkstoffgruppe Material group | | | 1.1-1.5 | | | | | 2.1-2.6 | | | | | 3.1 | | | | | 3.2 | | | | | 4.1/4.2 | | | | |
|-----------------------------------|----|---|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|
| d | l2 | Z | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min |
| 0,4 | 3 | 2 | 0,400 | 0,020 | 60 | 0,010 | 917 | 0,400 | 0,020 | 45 | 0,008 | 573 | 0,400 | 0,016 | 40 | 0,006 | 408 | 0,400 | 0,012 | 35 | 0,006 | 312 | 0,400 | 0,012 | 35 | 0,005 | 290 |
| 0,6 | 3 | 2 | 0,600 | 0,030 | 90 | 0,013 | 1.261 | 0,600 | 0,030 | 70 | 0,011 | 817 | 0,600 | 0,024 | 60 | 0,009 | 561 | 0,600 | 0,018 | 50 | 0,008 | 409 | 0,600 | 0,018 | 50 | 0,007 | 380 |
| 0,8 | 3 | 2 | 0,800 | 0,040 | 120 | 0,017 | 1.605 | 0,800 | 0,040 | 90 | 0,014 | 1.003 | 0,800 | 0,032 | 80 | 0,011 | 713 | 0,800 | 0,024 | 70 | 0,010 | 546 | 0,800 | 0,024 | 65 | 0,009 | 471 |
| 1,0 | 5 | 2 | 1,000 | 0,050 | 150 | 0,020 | 1.949 | 1,000 | 0,050 | 115 | 0,017 | 1.245 | 1,000 | 0,040 | 100 | 0,014 | 866 | 1,000 | 0,030 | 85 | 0,012 | 644 | 1,000 | 0,030 | 80 | 0,011 | 563 |
| 1,5 | 5 | 2 | 1,500 | 0,075 | 180 | 0,029 | 2.201 | 1,500 | 0,075 | 135 | 0,024 | 1.376 | 1,500 | 0,060 | 115 | 0,019 | 938 | 1,500 | 0,045 | 105 | 0,017 | 749 | 1,500 | 0,045 | 95 | 0,016 | 629 |

| Werkstoff Material | Guss cast iron <150 HB | | | | | Guss cast iron 150-200 HB | | | | | Guss cast iron <200-250 HB | | | | | Guss cast iron <250-300 HB | | | | | Rostfreier Stahl stainless steels <800 N/mm² | | | | |
|-----------------------|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|
| | unlegierter Stahl carbon steels <850 N/mm² | | | | | Vergütungsstahl heat treatable steels <1200 N/mm² | | | | | Werkzeugstahl tool steels 800-1350 N/mm² | | | | | Werkzeugstahl tool steels 1350-1620 N/mm² | | | | | | | | | |

**Schnittwerte: Konturfräsen / Schruppen / ~ ap= 15-30 % - ae= 16-40 %
Cutting data: Contour milling / Roughing / ~ ap= 15-30 % - ae= 16-40 %**

| Werkstoffgruppe Material group | | | 1.1-1.5 | | | | | 2.1-2.6 | | | | | 3.1 | | | | | 3.2 | | | | | 4.1/4.2 | | | | |
|-----------------------------------|----|---|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|
| d | l2 | Z | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min |
| 0,4 | 3 | 2 | 0,200 | 0,100 | 75 | 0,032 | 3.687 | 0,200 | 0,080 | 55 | 0,027 | 2.364 | 0,152 | 0,072 | 50 | 0,022 | 1.720 | 0,144 | 0,064 | 45 | 0,019 | 1.354 | 0,200 | 0,080 | 40 | 0,018 | 1.118 |
| 0,6 | 3 | 2 | 0,300 | 0,150 | 105 | 0,043 | 4.767 | 0,300 | 0,120 | 80 | 0,036 | 3.056 | 0,228 | 0,108 | 70 | 0,029 | 2.140 | 0,216 | 0,096 | 60 | 0,025 | 1.605 | 0,300 | 0,120 | 55 | 0,023 | 1.366 |
| 0,8 | 3 | 2 | 0,400 | 0,200 | 140 | 0,054 | 5.866 | 0,400 | 0,160 | 105 | 0,045 | 3.760 | 0,304 | 0,144 | 90 | 0,036 | 2.580 | 0,288 | 0,128 | 80 | 0,032 | 2.006 | 0,400 | 0,160 | 75 | 0,029 | 1.747 |
| 1,0 | 5 | 2 | 0,500 | 0,250 | 170 | 0,065 | 6.972 | 0,500 | 0,200 | 130 | 0,054 | 4.469 | 0,380 | 0,180 | 115 | 0,043 | 3.164 | 0,360 | 0,160 | 100 | 0,038 | 2.408 | 0,500 | 0,200 | 95 | 0,035 | 2.124 |
| 1,5 | 5 | 2 | 0,750 | 0,375 | 195 | 0,090 | 7.449 | 0,750 | 0,300 | 150 | 0,075 | 4.775 | 0,570 | 0,270 | 130 | 0,060 | 3.312 | 0,540 | 0,240 | 115 | 0,053 | 2.564 | 0,750 | 0,300 | 105 | 0,049 | 2.174 |

| Werkstoff Material | Guss cast iron <150 HB | | | | | Guss cast iron 150-200 HB | | | | | Guss cast iron <200-250 HB | | | | | Guss cast iron <250-300 HB | | | | | Rostfreier Stahl stainless steels <800 N/mm² | | | | |
|-----------------------|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|--|--|
| | unlegierter Stahl carbon steels <850 N/mm² | | | | | Vergütungsstahl heat treatable steels <1200 N/mm² | | | | | Werkzeugstahl tool steels 800-1350 N/mm² | | | | | Werkzeugstahl tool steels 1350-1620 N/mm² | | | | | | | | | |

**Schnittwerte: Konturfräsen / Schlichten (HSC) / ~ ap= 5 % - ae= 5 %
Cutting data: Countour millig / Finishing (HS) / ~ ap= 5 % - ae= 5 %**

| Werkstoffgruppe Material group | | | 1.1-1.5 | | | | | 2.1-2.6 | | | | | 3.1 | | | | | 3.2 | | | | | 4.1/4.2 | | | | |
|-----------------------------------|----|---|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|----------|----------|-------------|----------|--------------|
| d | l2 | Z | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min |
| 0,4 | 3 | 2 | 0,020 | 0,020 | 75 | 0,038 | 4.370 | 0,020 | 0,020 | 55 | 0,032 | 2.801 | 0,020 | 0,020 | 50 | 0,026 | 2.038 | 0,020 | 0,020 | 40 | 0,022 | 1.427 | 0,020 | 0,020 | 40 | 0,021 | 1.325 |
| 0,6 | 3 | 2 | 0,030 | 0,030 | 110 | 0,058 | 6.515 | 0,030 | 0,030 | 85 | 0,048 | 4.176 | 0,030 | 0,030 | 70 | 0,038 | 2.854 | 0,030 | 0,030 | 65 | 0,034 | 2.318 | 0,030 | 0,030 | 60 | 0,031 | 1.987 |
| 0,8 | 3 | 2 | 0,040 | 0,040 | 145 | 0,077 | 8.660 | 0,040 | 0,040 | 110 | 0,064 | 5.551 | 0,040 | 0,040 | 95 | 0,051 | 3.873 | 0,040 | 0,040 | 85 | 0,045 | 3.032 | 0,040 | 0,040 | 80 | 0,042 | 2.650 |
| 1,0 | 5 | 2 | 0,050 | 0,050 | 180 | 0,096 | 10.806 | 0,050 | 0,050 | 140 | 0,080 | 6.927 | 0,050 | 0,050 | 120 | 0,064 | 4.892 | 0,050 | 0,050 | 105 | 0,056 | 3.745 | 0,050 | 0,050 | 95 | 0,052 | 3.146 |
| 1,5 | 5 | 2 | 0,075 | 0,075 | 215 | 0,144 | 12.951 | 0,075 | 0,075 | 165 | 0,120 | 8.302 | 0,075 | 0,075 | 140 | 0,096 | 5.707 | 0,075 | 0,075 | 125 | 0,084 | 4.459 | 0,075 | 0,075 | 115 | 0,078 | 3.809 |

Empfohlene Richtwerte für Vollhartmetall Universalfräser, Kugel
Recommended cutting data for solid carbide ball nose end mills

30 6286

| Rostfreier Stahl stainless steels >800 N/mm ² | | | | | Titan/Inconel/Nickel-Legierung titan/inconel/nickel-alloy | | | | | Aluminiumlegierung aluminum alloy <6 % SI. | | | | | Aluminiumlegierung aluminum alloy 6-12 % SI. | | | | | Aluminiumlegierung aluminum alloy >12 % SI. | | | | |
|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|---|----------|-------------|----------|--------------|
| 4.3 | | | | | 5.1-5.5/6.1-6.2 | | | | | 9.1-9.2 | | | | | 9.1-9.2 | | | | | 9.1-9.2 | | | | |
| ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min |
| 0,400 | 0,010 | 30 | 0,005 | 236 | 0,400 | 0,008 | 25 | 0,004 | 167 | 0,400 | 0,100 | 55 | 0,012 | 1.051 | 0,400 | 0,080 | 55 | 0,010 | 841 | 0,400 | 0,060 | 50 | 0,008 | 611 |
| 0,600 | 0,014 | 45 | 0,007 | 324 | 0,600 | 0,012 | 35 | 0,006 | 215 | 0,600 | 0,150 | 85 | 0,017 | 1.489 | 0,600 | 0,120 | 105 | 0,014 | 1.533 | 0,600 | 0,090 | 90 | 0,011 | 1.009 |
| 0,800 | 0,019 | 55 | 0,009 | 379 | 0,800 | 0,015 | 50 | 0,007 | 293 | 0,800 | 0,200 | 180 | 0,022 | 3.130 | 0,800 | 0,160 | 180 | 0,018 | 2.608 | 0,800 | 0,120 | 155 | 0,013 | 1.659 |
| 1,000 | 0,024 | 70 | 0,010 | 468 | 1,000 | 0,019 | 60 | 0,009 | 341 | 1,000 | 0,250 | 340 | 0,028 | 5.964 | 1,000 | 0,200 | 340 | 0,023 | 4.970 | 1,000 | 0,150 | 290 | 0,016 | 3.015 |
| 1,500 | 0,036 | 85 | 0,015 | 535 | 1,500 | 0,029 | 70 | 0,013 | 374 | 1,500 | 0,375 | 540 | 0,040 | 9.245 | 1,500 | 0,300 | 540 | 0,034 | 7.704 | 1,500 | 0,230 | 460 | 0,023 | 4.500 |

| Rostfreier Stahl stainless steels >800 N/mm ² | | | | | Titan/Inconel/Nickel-Legierung titan/inconel/nickel-alloy | | | | | Aluminiumlegierung aluminum alloy <6 % SI. | | | | | Aluminiumlegierung aluminum alloy 6-12 % SI. | | | | | Aluminiumlegierung aluminum alloy >12 % SI. | | | | |
|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|---|----------|-------------|----------|--------------|
| 4.3 | | | | | 5.1-5.5/6.1-6.2 | | | | | 9.1-9.2 | | | | | 9.1-9.2 | | | | | 9.1-9.2 | | | | |
| ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min |
| 0,152 | 0,072 | 35 | 0,017 | 929 | 0,144 | 0,064 | 30 | 0,014 | 677 | 0,240 | 0,140 | 65 | 0,041 | 4.192 | 0,220 | 0,128 | 70 | 0,032 | 3.611 | 0,200 | 0,120 | 60 | 0,026 | 2.476 |
| 0,228 | 0,108 | 50 | 0,022 | 1.180 | 0,216 | 0,096 | 40 | 0,019 | 802 | 0,360 | 0,210 | 100 | 0,054 | 5.732 | 0,330 | 0,192 | 120 | 0,045 | 5.732 | 0,300 | 0,180 | 105 | 0,035 | 3.852 |
| 0,304 | 0,144 | 65 | 0,028 | 1.438 | 0,288 | 0,128 | 55 | 0,024 | 1.034 | 0,480 | 0,280 | 210 | 0,070 | 11.737 | 0,440 | 0,256 | 210 | 0,059 | 9.781 | 0,400 | 0,240 | 180 | 0,043 | 6.191 |
| 0,380 | 0,180 | 80 | 0,033 | 1.699 | 0,360 | 0,160 | 70 | 0,028 | 1.264 | 0,600 | 0,350 | 390 | 0,087 | 21.731 | 0,550 | 0,320 | 390 | 0,073 | 18.109 | 0,500 | 0,300 | 335 | 0,052 | 11.061 |
| 0,570 | 0,270 | 95 | 0,046 | 1.868 | 0,540 | 0,240 | 80 | 0,039 | 1.337 | 0,900 | 0,525 | 600 | 0,126 | 32.102 | 0,825 | 0,480 | 600 | 0,105 | 26.752 | 0,750 | 0,450 | 510 | 0,072 | 15.592 |

| Rostfreier Stahl stainless steels >800 N/mm ² | | | | | Titan/Inconel/Nickel-Legierung titan/inconel/nickel-alloy | | | | | Aluminiumlegierung aluminum alloy <6 % SI. | | | | | Aluminiumlegierung aluminum alloy 6-12 % SI. | | | | | Aluminiumlegierung aluminum alloy >12 % SI. | | | | |
|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|--|----------|-------------|----------|--------------|---|----------|-------------|----------|--------------|
| 4.3 | | | | | 5.1-5.5/6.1-6.2 | | | | | 9.1-9.2 | | | | | 9.1-9.2 | | | | | 9.1-9.2 | | | | |
| ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | fz mm | Vf mm/min |
| 0,020 | 0,020 | 35 | 0,020 | 1.101 | 0,020 | 0,020 | 30 | 0,017 | 802 | 0,040 | 0,040 | 65 | 0,048 | 4.968 | 0,030 | 0,030 | 65 | 0,038 | 3.975 | 0,080 | 0,600 | 55 | 0,031 | 2.690 |
| 0,030 | 0,030 | 50 | 0,030 | 1.573 | 0,030 | 0,030 | 45 | 0,025 | 1.204 | 0,060 | 0,060 | 105 | 0,072 | 8.025 | 0,045 | 0,045 | 125 | 0,060 | 7.962 | 0,120 | 0,900 | 105 | 0,046 | 5.136 |
| 0,040 | 0,040 | 70 | 0,040 | 2.203 | 0,040 | 0,040 | 55 | 0,034 | 1.471 | 0,080 | 0,080 | 220 | 0,100 | 17.488 | 0,060 | 0,060 | 220 | 0,083 | 14.573 | 0,160 | 1,200 | 185 | 0,061 | 9.050 |
| 0,050 | 0,050 | 85 | 0,049 | 2.675 | 0,050 | 0,050 | 70 | 0,042 | 1.872 | 0,100 | 0,100 | 410 | 0,130 | 33.845 | 0,075 | 0,075 | 410 | 0,108 | 28.204 | 0,200 | 1,500 | 350 | 0,077 | 17.121 |
| 0,075 | 0,075 | 100 | 0,074 | 3.146 | 0,075 | 0,075 | 85 | 0,063 | 2.273 | 0,150 | 0,150 | 655 | 0,202 | 56.071 | 0,113 | 0,113 | 655 | 0,168 | 46.726 | 0,300 | 2,250 | 555 | 0,115 | 27.149 |



Index

Umfangfräsen Side milling

| Werkstoff Material | unlegierter Stahl carbon steel <850 N/mm ² | | | | Vergütungsstahl heat treatable steel <1200 N/mm ² | | | | Werkzeugstahl tool steel 1200-1350 N/mm ² | | | | Werkzeugstahl tool steel 1350-1620 N/mm ² | | | |
|-----------------------------------|---|-------|-------|------|--|-------|-------|------|--|-------|-------|------|--|-------|-------|------|
| Werkstoffgruppe Material group | 1.1-1.5 | | | | 2.1-2.6 | | | | 3.1 | | | | 3.2 | | | |
| d | n min ⁻¹ | fz mm | ae | ap | n min ⁻¹ | fz mm | ae | ap | n min ⁻¹ | fz mm | ae | ap | n min ⁻¹ | fz mm | ae | ap |
| 0,5 | 40.000 | 0,025 | 0,025 | 0,50 | 40.000 | 0,010 | 0,025 | 0,50 | 40.000 | 0,010 | 0,025 | 0,50 | 40.000 | 0,010 | 0,025 | 0,50 |
| 0,6 | 40.000 | 0,030 | 0,030 | 0,60 | 40.000 | 0,010 | 0,030 | 0,60 | 40.000 | 0,010 | 0,030 | 0,60 | 40.000 | 0,010 | 0,030 | 0,60 |
| 0,8 | 35.000 | 0,040 | 0,040 | 0,80 | 35.000 | 0,012 | 0,040 | 0,80 | 35.000 | 0,012 | 0,040 | 0,80 | 40.000 | 0,012 | 0,040 | 0,80 |
| 1,0 | 35.000 | 0,050 | 0,050 | 1,00 | 35.000 | 0,014 | 0,050 | 1,00 | 35.000 | 0,014 | 0,050 | 1,00 | 35.000 | 0,014 | 0,050 | 1,00 |
| 1,2 | 35.000 | 0,060 | 0,060 | 1,20 | 35.000 | 0,020 | 0,060 | 1,20 | 30.000 | 0,020 | 0,060 | 1,20 | 30.000 | 0,020 | 0,060 | 1,20 |
| 1,4 | 35.000 | 0,070 | 0,070 | 1,40 | 35.000 | 0,023 | 0,070 | 1,40 | 30.000 | 0,023 | 0,070 | 1,40 | 28.000 | 0,023 | 0,070 | 1,40 |
| 1,5 | 35.000 | 0,075 | 0,075 | 1,50 | 35.000 | 0,025 | 0,075 | 1,50 | 30.000 | 0,023 | 0,075 | 1,50 | 26.000 | 0,023 | 0,075 | 1,50 |
| 1,8 | 35.000 | 0,090 | 0,090 | 1,80 | 35.000 | 0,033 | 0,090 | 1,80 | 28.000 | 0,033 | 0,090 | 1,80 | 23.000 | 0,033 | 0,090 | 1,80 |
| 2,0 | 30.000 | 0,100 | 0,100 | 2,00 | 28.000 | 0,030 | 0,100 | 2,00 | 28.000 | 0,035 | 0,100 | 2,00 | 23.000 | 0,035 | 0,100 | 2,00 |
| 2,5 | 30.000 | 0,125 | 0,125 | 2,50 | 24.000 | 0,040 | 0,125 | 2,50 | 22.000 | 0,040 | 0,125 | 2,50 | 20.000 | 0,040 | 0,125 | 2,50 |
| 2,8 | 30.000 | 0,140 | 0,140 | 2,80 | 24.000 | 0,050 | 0,140 | 2,80 | 20.000 | 0,050 | 0,140 | 2,80 | 18.000 | 0,050 | 0,140 | 2,80 |
| 3,0 | 30.000 | 0,150 | 0,150 | 3,00 | 24.000 | 0,055 | 0,150 | 3,00 | 20.000 | 0,055 | 0,150 | 3,00 | 16.000 | 0,055 | 0,150 | 3,00 |
| 3,5 | 30.000 | 0,175 | 0,175 | 3,50 | 20.000 | 0,060 | 0,175 | 3,50 | 16.000 | 0,060 | 0,175 | 3,50 | 12.000 | 0,060 | 0,175 | 3,50 |
| 3,8 | 30.000 | 0,190 | 0,190 | 3,80 | 18.000 | 0,060 | 0,190 | 3,80 | 16.000 | 0,060 | 0,190 | 3,80 | 12.000 | 0,060 | 0,190 | 3,80 |
| 4,0 | 30.000 | 0,200 | 0,200 | 4,00 | 18.000 | 0,065 | 0,200 | 4,00 | 16.000 | 0,065 | 0,200 | 4,00 | 12.000 | 0,065 | 0,200 | 4,00 |
| 4,5 | 25.000 | 0,225 | 0,225 | 4,50 | 16.000 | 0,065 | 0,225 | 4,50 | 13.000 | 0,065 | 0,225 | 4,50 | 10.000 | 0,065 | 0,225 | 4,50 |
| 4,8 | 25.000 | 0,240 | 0,240 | 4,80 | 16.000 | 0,065 | 0,240 | 4,80 | 13.000 | 0,065 | 0,240 | 4,80 | 10.000 | 0,065 | 0,240 | 4,80 |
| 5,0 | 23.000 | 0,250 | 0,250 | 5,00 | 16.000 | 0,070 | 0,250 | 5,00 | 13.000 | 0,070 | 0,250 | 5,00 | 10.000 | 0,070 | 0,250 | 5,00 |
| 5,5 | 20.000 | 0,275 | 0,275 | 5,50 | 12.000 | 0,075 | 0,275 | 5,50 | 10.000 | 0,075 | 0,275 | 5,50 | 10.000 | 0,075 | 0,275 | 5,50 |
| 5,8 | 20.000 | 0,290 | 0,290 | 5,80 | 12.000 | 0,075 | 0,290 | 5,80 | 10.000 | 0,075 | 0,290 | 5,80 | 10.000 | 0,075 | 0,290 | 5,80 |
| 6,0 | 20.000 | 0,300 | 0,300 | 6,00 | 12.000 | 0,080 | 0,300 | 6,00 | 10.000 | 0,080 | 0,300 | 6,00 | 10.000 | 0,080 | 0,300 | 6,00 |

Nutfräsen Slot milling

| Werkstoff Material | unlegierter Stahl carbon steel <850 N/mm ² | | | | Vergütungsstahl heat treatable steel <1200 N/mm ² | | | | Werkzeugstahl tool steel 1200-1350 N/mm ² | | | | Werkzeugstahl tool steel 1350-1620 N/mm ² | | | |
|-----------------------------------|---|-------|-----|------|--|-------|-----|------|--|-------|-----|------|--|-------|-----|------|
| Werkstoffgruppe Material group | 1.1-1.5 | | | | 2.1-2.6 | | | | 3.1 | | | | 3.2 | | | |
| d | n min ⁻¹ | fz mm | ae | ap | n min ⁻¹ | fz mm | ae | ap | n min ⁻¹ | fz mm | ae | ap | n min ⁻¹ | fz mm | ae | ap |
| 0,5 | 40.000 | 0,003 | 0,5 | 0,10 | 33.000 | 0,002 | 0,5 | 0,10 | 28.000 | 0,002 | 0,5 | 0,08 | 25.000 | 0,002 | 0,5 | 0,08 |
| 0,6 | 40.000 | 0,003 | 0,6 | 0,10 | 33.000 | 0,002 | 0,6 | 0,10 | 28.000 | 0,002 | 0,6 | 0,08 | 25.000 | 0,002 | 0,6 | 0,08 |
| 0,8 | 40.000 | 0,004 | 0,8 | 0,20 | 33.000 | 0,003 | 0,8 | 0,20 | 28.000 | 0,003 | 0,8 | 0,10 | 25.000 | 0,003 | 0,8 | 0,08 |
| 1,0 | 35.000 | 0,005 | 1,0 | 0,20 | 28.000 | 0,004 | 1,0 | 0,20 | 23.000 | 0,004 | 1,0 | 0,20 | 20.000 | 0,004 | 1,0 | 0,10 |
| 1,2 | 35.000 | 0,008 | 1,2 | 0,20 | 24.000 | 0,006 | 1,2 | 0,20 | 20.000 | 0,006 | 1,2 | 0,20 | 18.000 | 0,005 | 1,2 | 0,10 |
| 1,4 | 34.000 | 0,008 | 1,4 | 0,35 | 21.000 | 0,006 | 1,4 | 0,35 | 17.000 | 0,006 | 1,4 | 0,35 | 15.000 | 0,005 | 1,4 | 0,35 |
| 1,5 | 32.000 | 0,008 | 1,5 | 0,40 | 18.000 | 0,010 | 1,5 | 0,40 | 16.000 | 0,006 | 1,5 | 0,40 | 14.000 | 0,006 | 1,5 | 0,40 |
| 1,8 | 28.000 | 0,015 | 1,8 | 0,45 | 18.000 | 0,010 | 1,8 | 0,45 | 15.000 | 0,010 | 1,8 | 0,45 | 12.000 | 0,010 | 1,8 | 0,45 |
| 2,0 | 28.000 | 0,015 | 2,0 | 1,00 | 18.000 | 0,010 | 2,0 | 1,00 | 15.000 | 0,010 | 2,0 | 1,00 | 12.000 | 0,010 | 2,0 | 1,00 |
| 2,5 | 22.000 | 0,015 | 2,5 | 1,25 | 13.000 | 0,012 | 2,5 | 1,25 | 12.000 | 0,012 | 2,5 | 1,25 | 9.000 | 0,010 | 2,5 | 1,25 |
| 2,8 | 20.000 | 0,020 | 2,8 | 1,40 | 12.000 | 0,015 | 2,8 | 1,40 | 10.000 | 0,015 | 2,8 | 1,40 | 9.000 | 0,015 | 2,8 | 1,40 |
| 3,0 | 20.000 | 0,020 | 3,0 | 1,50 | 12.000 | 0,018 | 3,0 | 1,50 | 10.000 | 0,015 | 3,0 | 1,50 | 9.000 | 0,015 | 3,0 | 1,50 |
| 3,5 | 20.000 | 0,020 | 3,5 | 1,75 | 12.000 | 0,020 | 3,5 | 1,75 | 10.000 | 0,015 | 3,5 | 1,75 | 8.000 | 0,015 | 3,5 | 1,75 |
| 3,8 | 16.000 | 0,025 | 3,8 | 1,90 | 10.000 | 0,020 | 3,8 | 1,90 | 8.000 | 0,020 | 3,8 | 1,90 | 7.000 | 0,020 | 3,8 | 1,90 |
| 4,0 | 16.000 | 0,025 | 4,0 | 2,00 | 10.000 | 0,025 | 4,0 | 2,00 | 8.000 | 0,025 | 4,0 | 2,00 | 7.000 | 0,025 | 4,0 | 2,00 |
| 4,5 | 14.000 | 0,025 | 4,5 | 2,25 | 10.000 | 0,025 | 4,5 | 2,25 | 8.000 | 0,025 | 4,5 | 2,25 | 7.000 | 0,025 | 4,5 | 2,25 |
| 4,8 | 14.000 | 0,025 | 4,8 | 2,40 | 8.000 | 0,025 | 4,8 | 2,40 | 7.000 | 0,025 | 4,8 | 2,40 | 6.000 | 0,025 | 4,8 | 2,40 |
| 5,0 | 14.000 | 0,025 | 5,0 | 2,50 | 8.000 | 0,025 | 5,0 | 2,50 | 7.000 | 0,025 | 5,0 | 2,50 | 6.000 | 0,025 | 5,0 | 2,50 |
| 5,5 | 12.000 | 0,025 | 5,5 | 2,75 | 8.000 | 0,030 | 5,5 | 2,75 | 7.000 | 0,025 | 5,5 | 2,75 | 5.000 | 0,025 | 5,5 | 2,75 |
| 5,8 | 12.000 | 0,030 | 5,8 | 2,90 | 7.000 | 0,030 | 5,8 | 2,90 | 6.000 | 0,030 | 5,8 | 2,90 | 5.000 | 0,030 | 5,8 | 2,90 |
| 6,0 | 12.000 | 0,035 | 6,0 | 3,00 | 7.000 | 0,035 | 6,0 | 3,00 | 6.000 | 0,035 | 6,0 | 3,00 | 5.000 | 0,035 | 6,0 | 3,00 |

Empfohlene Schnittdaten für Karnasch Micro-Schaftfräser
Recommended cutting data for Karnasch solid carbide micro end mills

30 6296

30 6297

| Rostfreier Stahl stainless steel <800 N/mm ² | | | | Rostfreier Stahl stainless steel >800 N/mm ² | | | | Titan/Inconel/Nickel-Legierung titanium/inconel/nickel-alloy | | | | Aluminiumlegierung aluminum alloy | | | |
|---|-------|-------|------|---|-------|-------|------|---|-------|-------|------|--------------------------------------|-------|-------|------|
| 4.1-4.2 | | | | 4.3 | | | | 5.1-5.5/6.1-6.2 | | | | 9.1-9.2 | | | |
| n min ⁻¹ | fz mm | ae | ap | n min ⁻¹ | fz mm | ae | ap | n min ⁻¹ | fz mm | ae | ap | n min ⁻¹ | fz mm | ae | ap |
| 30.000 | 0,008 | 0,025 | 0,50 | 25.000 | 0,008 | 0,025 | 0,50 | 30.000 | 0,008 | 0,025 | 0,50 | 50.000 | 0,015 | 0,025 | 0,50 |
| 30.000 | 0,008 | 0,030 | 0,60 | 25.000 | 0,008 | 0,030 | 0,60 | 30.000 | 0,008 | 0,030 | 0,60 | 50.000 | 0,015 | 0,030 | 0,60 |
| 30.000 | 0,010 | 0,040 | 0,80 | 20.000 | 0,010 | 0,040 | 0,80 | 30.000 | 0,010 | 0,040 | 0,80 | 50.000 | 0,015 | 0,040 | 0,80 |
| 25.000 | 0,010 | 0,050 | 1,00 | 18.000 | 0,010 | 0,050 | 1,00 | 25.000 | 0,010 | 0,050 | 1,00 | 50.000 | 0,030 | 0,050 | 1,00 |
| 20.000 | 0,010 | 0,060 | 1,20 | 16.000 | 0,010 | 0,060 | 1,20 | 22.000 | 0,020 | 0,060 | 1,20 | 50.000 | 0,030 | 0,060 | 1,20 |
| 18.000 | 0,020 | 0,070 | 1,40 | 14.000 | 0,020 | 0,070 | 1,40 | 20.000 | 0,020 | 0,070 | 1,40 | 50.000 | 0,040 | 0,070 | 1,40 |
| 18.000 | 0,020 | 0,075 | 1,50 | 14.000 | 0,020 | 0,075 | 1,50 | 19.000 | 0,020 | 0,075 | 1,50 | 50.000 | 0,040 | 0,075 | 1,50 |
| 15.000 | 0,030 | 0,090 | 1,80 | 12.000 | 0,030 | 0,090 | 1,80 | 16.000 | 0,030 | 0,090 | 1,80 | 50.000 | 0,040 | 0,090 | 1,80 |
| 15.000 | 0,030 | 0,100 | 2,00 | 12.000 | 0,030 | 0,100 | 2,00 | 15.000 | 0,030 | 0,100 | 2,00 | 50.000 | 0,050 | 0,100 | 2,00 |
| 12.000 | 0,040 | 0,125 | 2,50 | 10.000 | 0,040 | 0,125 | 2,50 | 13.000 | 0,040 | 0,125 | 2,50 | 50.000 | 0,050 | 0,125 | 2,50 |
| 12.000 | 0,050 | 0,140 | 2,80 | 9.000 | 0,050 | 0,140 | 2,80 | 12.000 | 0,050 | 0,140 | 2,80 | 50.000 | 0,055 | 0,140 | 2,80 |
| 12.000 | 0,050 | 0,150 | 3,00 | 9.000 | 0,050 | 0,150 | 3,00 | 12.000 | 0,050 | 0,150 | 3,00 | 50.000 | 0,060 | 0,150 | 3,00 |
| 10.000 | 0,060 | 0,175 | 3,50 | 6.000 | 0,060 | 0,175 | 3,50 | 10.000 | 0,060 | 0,175 | 3,50 | 50.000 | 0,060 | 0,175 | 3,50 |
| 10.000 | 0,060 | 0,190 | 3,80 | 6.000 | 0,060 | 0,190 | 3,80 | 10.000 | 0,060 | 0,190 | 3,80 | 50.000 | 0,060 | 0,190 | 3,80 |
| 10.000 | 0,060 | 0,200 | 4,00 | 6.000 | 0,060 | 0,200 | 4,00 | 10.000 | 0,060 | 0,200 | 4,00 | 50.000 | 0,065 | 0,200 | 4,00 |
| 8.000 | 0,060 | 0,225 | 4,50 | 6.000 | 0,060 | 0,225 | 4,50 | 8.000 | 0,060 | 0,225 | 4,50 | 50.000 | 0,065 | 0,225 | 4,50 |
| 8.000 | 0,060 | 0,240 | 4,80 | 6.000 | 0,060 | 0,240 | 4,80 | 8.000 | 0,060 | 0,240 | 4,80 | 50.000 | 0,070 | 0,240 | 4,80 |
| 8.000 | 0,060 | 0,250 | 5,00 | 6.000 | 0,060 | 0,250 | 5,00 | 8.000 | 0,060 | 0,250 | 5,00 | 50.000 | 0,070 | 0,250 | 5,00 |
| 6.000 | 0,065 | 0,275 | 5,50 | 5.000 | 0,060 | 0,275 | 5,50 | 6.000 | 0,060 | 0,275 | 5,50 | 50.000 | 0,070 | 0,275 | 5,50 |
| 6.000 | 0,070 | 0,290 | 5,80 | 5.000 | 0,070 | 0,290 | 5,80 | 6.000 | 0,070 | 0,290 | 5,80 | 50.000 | 0,075 | 0,290 | 5,80 |
| 6.000 | 0,075 | 0,300 | 6,00 | 5.000 | 0,075 | 0,300 | 6,00 | 6.000 | 0,075 | 0,300 | 6,00 | 50.000 | 0,080 | 0,300 | 6,00 |

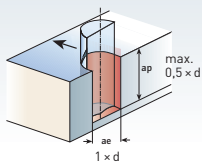
| Rostfreier Stahl stainless steel <800 N/mm ² | | | | Rostfreier Stahl stainless steel >800 N/mm ² | | | | Titan/Inconel/Nickel-Legierung titanium/inconel/nickel-alloy | | | | Aluminiumlegierung aluminum alloy | | | |
|---|-------|-----|------|---|-------|-----|------|---|-------|-----|------|--------------------------------------|-------|-----|------|
| 4.1-4.2 | | | | 4.3 | | | | 5.1-5.5/6.1-6.2 | | | | 9.1-9.2 | | | |
| n min ⁻¹ | fz mm | ae | ap | n min ⁻¹ | fz mm | ae | ap | n min ⁻¹ | fz mm | ae | ap | n min ⁻¹ | fz mm | ae | ap |
| 18.000 | 0,003 | 0,5 | 0,08 | 12.000 | 0,002 | 0,5 | 0,08 | 14.000 | 0,002 | 0,5 | 0,10 | 50.000 | 0,008 | 0,5 | 0,10 |
| 18.000 | 0,003 | 0,6 | 0,08 | 12.000 | 0,002 | 0,6 | 0,08 | 14.000 | 0,002 | 0,6 | 0,10 | 50.000 | 0,008 | 0,6 | 0,10 |
| 18.000 | 0,004 | 0,8 | 0,10 | 12.000 | 0,002 | 0,8 | 0,10 | 14.000 | 0,002 | 0,8 | 0,20 | 50.000 | 0,010 | 0,8 | 0,20 |
| 15.000 | 0,004 | 1,0 | 0,10 | 10.000 | 0,003 | 1,0 | 0,15 | 12.000 | 0,003 | 1,0 | 0,25 | 50.000 | 0,010 | 1,0 | 0,20 |
| 13.000 | 0,010 | 1,2 | 0,10 | 9.000 | 0,006 | 1,2 | 0,15 | 12.000 | 0,008 | 1,2 | 0,25 | 50.000 | 0,015 | 1,2 | 0,25 |
| 10.000 | 0,010 | 1,4 | 0,20 | 8.000 | 0,007 | 1,4 | 0,20 | 9.000 | 0,006 | 1,4 | 0,35 | 50.000 | 0,020 | 1,4 | 0,25 |
| 10.000 | 0,010 | 1,5 | 0,20 | 7.000 | 0,006 | 1,5 | 0,25 | 8.000 | 0,008 | 1,5 | 0,40 | 50.000 | 0,025 | 1,5 | 0,50 |
| 9.000 | 0,010 | 1,8 | 0,45 | 6.500 | 0,010 | 1,8 | 0,30 | 7.000 | 0,010 | 1,8 | 0,50 | 50.000 | 0,030 | 1,8 | 0,50 |
| 9.000 | 0,012 | 2,0 | 0,50 | 6.500 | 0,010 | 2,0 | 0,50 | 7.000 | 0,010 | 2,0 | 1,00 | 50.000 | 0,030 | 2,0 | 1,00 |
| 7.000 | 0,015 | 2,5 | 0,30 | 5.000 | 0,015 | 2,5 | 0,60 | 6.000 | 0,015 | 2,5 | 1,25 | 50.000 | 0,030 | 2,5 | 1,25 |
| 6.000 | 0,010 | 2,8 | 1,40 | 4.500 | 0,020 | 2,8 | 0,70 | 5.000 | 0,018 | 2,8 | 1,40 | 50.000 | 0,035 | 2,8 | 1,40 |
| 6.000 | 0,010 | 3,0 | 1,50 | 4.500 | 0,020 | 3,0 | 0,75 | 5.000 | 0,018 | 3,0 | 1,50 | 50.000 | 0,035 | 3,0 | 1,50 |
| 6.000 | 0,010 | 3,5 | 1,75 | 4.000 | 0,020 | 3,5 | 1,40 | 5.000 | 0,018 | 3,5 | 1,75 | 50.000 | 0,040 | 3,5 | 1,75 |
| 5.000 | 0,015 | 3,8 | 1,90 | 4.000 | 0,015 | 3,8 | 1,90 | 4.000 | 0,020 | 3,8 | 1,90 | 50.000 | 0,050 | 3,8 | 1,90 |
| 5.000 | 0,020 | 4,0 | 2,00 | 3.500 | 0,015 | 4,0 | 2,00 | 4.000 | 0,020 | 4,0 | 2,00 | 50.000 | 0,050 | 4,0 | 2,00 |
| 5.000 | 0,020 | 4,5 | 2,25 | 3.500 | 0,015 | 4,5 | 2,25 | 4.000 | 0,020 | 4,5 | 2,25 | 50.000 | 0,050 | 4,5 | 2,25 |
| 5.000 | 0,020 | 4,8 | 2,40 | 3.000 | 0,015 | 4,8 | 2,40 | 4.000 | 0,020 | 4,8 | 2,40 | 50.000 | 0,050 | 4,8 | 2,40 |
| 4.000 | 0,020 | 5,0 | 2,50 | 3.000 | 0,015 | 5,0 | 2,50 | 4.000 | 0,020 | 5,0 | 2,50 | 50.000 | 0,050 | 5,0 | 2,50 |
| 4.000 | 0,020 | 5,5 | 2,75 | 3.000 | 0,015 | 5,5 | 2,75 | 4.000 | 0,020 | 5,5 | 2,75 | 50.000 | 0,060 | 5,5 | 2,75 |
| 3.500 | 0,020 | 5,8 | 2,90 | 2.500 | 0,020 | 5,8 | 2,90 | 3.000 | 0,025 | 5,8 | 2,90 | 48.000 | 0,070 | 5,8 | 2,90 |
| 3.500 | 0,025 | 6,0 | 3,00 | 2.500 | 0,025 | 6,0 | 3,00 | 3.000 | 0,025 | 6,0 | 3,00 | 45.000 | 0,070 | 6,0 | 3,00 |



| | | |
|---------|---------|---------|
| 30 6331 | 30 6332 | 30 6345 |
| 30 6341 | 30 6342 | 30 6346 |

Empfohlene Schnittdaten für Karnasch Micro-Schaftfräser Recommended cutting data for Karnasch solid carbide micro end mills

1 Nuten Slot milling



Chemisch beständige und warmfeste Stähle, leg. Stähle bis 1000 N/mm², Vergütungs- und Werkzeugstähle, GG > 200 HB.
Chemical resistant and high temperature steel. Alloyed steel until 1000 N/mm². Heat treatable and tool steel, GG > 200 HB.

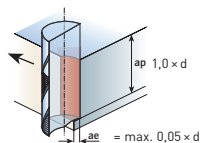
| ① Vc ≈ 130 m/min UFX-1 NANO beschichtet/coated | | | ② Vc ≈ 130 m/min UFX-1 NANO beschichtet/coated | | |
|---|--------|-----|---|--------|-----|
| d1 | n | Vf | d1 | n | Vf |
| 2 | 21.000 | 180 | 2 | 21.000 | 570 |
| 4 | 10.400 | 220 | 4 | 14.000 | 400 |
| 6 | 6.900 | 260 | 6 | 6.900 | 320 |
| 8 | 5.200 | 230 | 8 | 5.200 | 300 |
| 10 | 4.000 | 250 | 10 | 4.000 | 330 |
| 12 | 3.400 | 250 | 12 | 3.400 | 340 |
| 16 | 2.600 | 260 | 16 | 2.600 | 360 |
| 20 | 2.100 | 320 | 20 | 2.100 | 340 |

Leg. Stähle bis 1300 N/mm², Ventil-, Kaltarbeits- und Schnellarbeitsstähle, chemisch beständige Stähle.

Alloyed steel until 1300 N/mm², valve and high-speed steel, chemical resistance steel.

| ① Vc ≈ 110 m/min UFX-1 NANO beschichtet/coated | | | ② Vc ≈ 110 m/min UFX-1 NANO beschichtet/coated | | |
|---|--------|-----|---|--------|-----|
| d1 | n | Vf | d1 | n | Vf |
| 2 | 18.000 | 160 | 2 | 18.000 | 500 |
| 4 | 8.800 | 180 | 4 | 8.500 | 340 |
| 6 | 6.000 | 230 | 6 | 5.700 | 280 |
| 8 | 4.500 | 200 | 8 | 4.500 | 260 |
| 10 | 3.600 | 210 | 10 | 3.500 | 280 |
| 12 | 3.000 | 230 | 12 | 3.000 | 300 |
| 16 | 2.100 | 240 | 16 | 2.200 | 300 |
| 20 | 1.800 | 270 | 20 | 1.800 | 280 |

2 Umfangfräsen Circumference milling



Schwer zerspanbare Materialien, hochwarmfeste Stähle, Ti- und Ni-Legierungen bis 1500 N/mm².

For hard-cut material, high-temperature steel Ti- and Ni-alloys until 1500 N/mm².

| ① Vc ≈ 90 m/min UFX-1 NANO beschichtet/coated | | | ② Vc ≈ 90 m/min UFX-1 NANO beschichtet/coated | | |
|--|--------|-----|--|--------|-----|
| d1 | n | Vf | d1 | n | Vf |
| 2 | 15.000 | 130 | 2 | 15.000 | 410 |
| 4 | 7.000 | 155 | 4 | 7.000 | 280 |
| 6 | 4.800 | 180 | 6 | 4.800 | 210 |
| 8 | 3.600 | 165 | 8 | 3.600 | 210 |
| 10 | 2.800 | 170 | 10 | 2.800 | 220 |
| 12 | 2.400 | 180 | 12 | 2.400 | 250 |
| 16 | 1.800 | 195 | 16 | 1.800 | 260 |
| 20 | 1.500 | 215 | 20 | 1.500 | 220 |

Leg. Stähle bis 1600 N/mm² Kaltarbeitsstähle mit 12% Cr sowie Hitzebeständige Stähle.

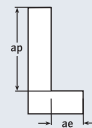
Alloyed steel until 1600 N/mm² value steel, high-temperature steel with 12% Cr.

| ① Vc ≈ 70 m/min UFX-1 NANO beschichtet/coated | | | ② Vc ≈ 70 m/min UFX-1 NANO beschichtet/coated | | |
|--|--------|-----|--|--------|-----|
| d1 | n | Vf | d1 | n | Vf |
| 2 | 11.000 | 100 | 2 | 11.000 | 320 |
| 4 | 5.700 | 125 | 4 | 5.700 | 230 |
| 6 | 3.800 | 150 | 6 | 3.800 | 180 |
| 8 | 2.800 | 130 | 8 | 2.800 | 170 |
| 10 | 2.200 | 140 | 10 | 2.200 | 180 |
| 12 | 1.800 | 140 | 12 | 1.800 | 180 |
| 16 | 1.400 | 150 | 14 | 1.400 | 200 |
| 20 | 1.100 | 170 | 16 | 1.100 | 190 |

Einsatzempfehlungen für Fräser HSC-Fräsen / Insert recommendation for miller HSC-milling

| Werkstoff N/mm ² Material | unlegierter Stahl bis 800 unalloyed steel to 800 | | legierter Stahl bis 1000 alloyed steel to 1000 | | legierter Stahl bis 1200 alloyed steel to 1200 | | legierter Stahl / VA über 1200 alloyed steel / stainless steel over 1200 | | gehärteter Stahl 45 - 55 HRC hardened steel 45 - 55 HRC | | |
|--|---|-------------------|---|-------------------|---|-------------------|--|-------------------|--|-------------------|----|
| | mm | mm/min | mm/min | mm/min | mm/min | mm/min | mm/min | mm/min | mm/min | mm/min | |
| | d1 | min ⁻¹ | Vf | min ⁻¹ | Vf | min ⁻¹ | Vf | min ⁻¹ | Vf | min ⁻¹ | Vf |
| 6 | 21.000 | 2.450 | 18.500 | 2.150 | 13.000 | 1.500 | 7.950 | 795 | 4.200 | 420 | |
| 8 | 15.500 | 2.450 | 1.350 | 2.100 | 9.900 | 1.450 | 5.950 | 795 | 3.150 | 425 | |
| 10 | 12.500 | 2.500 | 11.000 | 2.100 | 7.950 | 1.450 | 4.750 | 800 | 2.500 | 420 | |
| 12 | 10.500 | 2.450 | 9.250 | 2.100 | 6.600 | 1.450 | 3.950 | 790 | 2.100 | 410 | |
| 14 | 9.050 | 2.350 | 7.950 | 2.000 | 5.650 | 1.350 | 3.400 | 740 | 1.800 | 390 | |
| 16 | 7.950 | 2.250 | 6.150 | 1.950 | 4.950 | 1.350 | 2.950 | 715 | 1.550 | 375 | |
| 18 | 7.050 | 2.250 | 6.150 | 1.900 | 4.400 | 1.300 | 2.650 | 705 | 1.400 | 375 | |
| 20 | 6.350 | 2.100 | 5.500 | 1.850 | 3.950 | 1.300 | 2.350 | 665 | 1.250 | 355 | |

| | ap | ae |
|----------------|-------|--------|
| D ≤ Ø 8 | 1,5 D | 0,01 D |
| Ø 8 < D ≤ Ø 16 | 1,5 D | 0,02 D |
| Ø 16 < D | 1,5 D | 0,05 D |

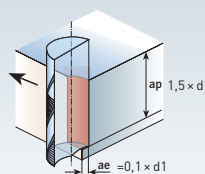


| | ap | ae |
|---------|-----|--------|
| D ≤ Ø 8 | 1 D | 0,01 D |
| Ø 8 < D | 1 D | 0,01 D |

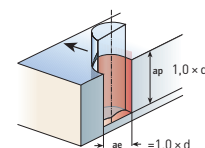


Empfohlene Schnittwerte für Vollhartmetallfräser
Recommended cutting data for solid carbide end mills

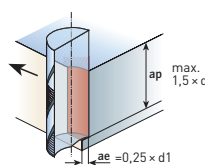
30 6353 30 6355



Schlichten/Finishing



Nutfräsen/Slotting



Schruppen/Roughing

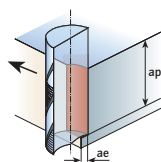
| Werkstoff Workpiece material | Zugfestigkeit Tensile strength (N/mm ²) Härte (HB) | Schnitt- geschwindigkeit Cutting speed Vc in (m/min) | Vorschub pro Zahn Feed per tooth fz (mm) | | | | | Kühlung Cooling |
|--|--|---|--|--------------|--------------|--------------|--------------|---|
| | | | Ø 4 | Ø 6-8 | Ø 10-12 | Ø 16 | Ø 20 | |
| Baustähle (allg. Bau- Vergütungs-, Einsatz-, Automaten-, Nitrierstahl) unalloyed steel | < 500 N/mm ² | 140 - 160 | 0,04 | 0,05 | 0,07 | 0,07 | 0,08 | Emulsion Schneidöl / Emulsion cutting oil Emulsion Schneidöl / Emulsion cutting oil Emulsion Schneidöl / Emulsion cutting oil |
| | 500 - 700 N/mm ² | 100 - 140 | 0,03 | 0,04 | 0,06 | 0,06 | 0,07 | |
| | 700 N/mm ² | 60 - 90 | 0,02 | 0,03 | 0,05 | 0,05 | 0,06 | |
| Werkzeugstähle tool steel | < 1400 N/mm ² | 40 - 80 | 0,01 | 0,02 | 0,03 | 0,04 | 0,05 | Emulsion Schneidöl / Emulsion cutting oil Emulsion Schneidöl / Emulsion cutting oil |
| | > 1400 N/mm ² | 30 - 50 | 0,01 | 0,02 | 0,03 | 0,04 | 0,05 | |
| Sonderstähle (hitzbets. hochwarm- fest nichtrostend chem. best.) stainless steel | | 25 - 75 | 0,01 | 0,02 | 0,03 | 0,04 | 0,05 | Emulsion Schneidöl / Emulsion cutting oil |
| Gehärtete Stähle hardened steel | 55 - 60 HRC | 20 - 30 | 0,007 | 0,01 | 0,02 | 0,03 | 0,03 | Trocken - MMKS Dry MQL |
| Stahlguss GG-GGG steel cast iron | < 500 N/mm ² > 500 N/mm ² | 80 - 140 60 - 120 | 0,04 0,02 | 0,05 0,03 | 0,06 0,04 | 0,07 0,05 | 0,08 0,06 | Emulsion Emulsion |
| Gusseisen cast iron | < 200 HB > 200 HB | 60 - 90 50 - 80 | 0,05 0,03 | 0,06 0,04 | 0,08 0,06 | 0,09 0,08 | 0,12 0,11 | Trocken - Emulsion / Dry - Emulsion Trocken - Emulsion / Dry - Emulsion |
| Kupfer copper | | 100 - 250 | 0,03 | 0,04 | 0,06 | 0,08 | 0,1 | Trocken - Emulsion / Dry - Emulsion Schneidöl / Cutting oil |
| Messing Rotguss brass, leader bronze all | | 90 - 200 | 0,03 | 0,04 | 0,06 | 0,08 | 0,1 | Trocken - Emulsion / Dry - Emulsion Schneidöl / Cutting oil |
| Bronze bronze | | 80 - 160 | 0,03 | 0,04 | 0,06 | 0,08 | 0,1 | Trocken - Emulsion / Dry - Emulsion Schneidöl / Cutting oil |
| Hochwarmfeste Leg. (Cr-Ni- Basis, Cr Ni Co- Basis) head resisting steel, Inconel | | 30 - 50 | 0,008 | 0,01 | 0,02 | 0,03 | 0,04 | Emulsion Petroleum |
| Aluminium Leg. aluminum alloy | | 100 - 400 | 0,05 | 0,06 | 0,1 | 0,14 | 0,18 | Emulsion Petroleum |

Bei Werkzeugen mit großer Ausragelänge sollte der Vorschub je nach geforderter Oberflächengüte reduziert werden.
Tools with a larger projection length the feed should be reduced according to the required surface quality.

Empfohlene Richtwerte für den Einsatz von Karnasch VHM-Fräsern „DUO“ für die HSC/HHC-Bearbeitung
Recommended cutting data for Karnasch solid carbide end mills „DUO“ for HSC/HHC-cutting

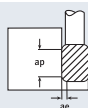
30 6425

Umfangfräsen / Circumference milling



| Werkstoff Workpiece material | Kohlenstoffstahl, Baustahl, GG / Carbon steel, mild steel, cast iron -750 N/mm ² | | legierter Stahl, Werkzeugstahl alloyed steel, tool steel -30 HRC | | legierter Stahl alloyed steel 30 - 38 HRC | | legierter Stahl VA alloyed steel VA 38 - 45 HRC | | gehärteter Stahl hardened steel 45 - 55 HRC | | gehärteter Stahl hardened steel 55 - 60 HRC | |
|---------------------------------|---|-------|--|-------|---|-------|---|-----|---|-----|---|-----|
| | Vc 200 m/min | Vf | Vc 200 m/min | Vf | Vc 200 m/min | Vf | Vc 150 m/min | Vf | Vc 150 m/min | Vf | Vc 100 m/min | Vf |
| 7 | 9.000 | 2.100 | 9.000 | 1.700 | 9.000 | 1.060 | 6.800 | 800 | 6.800 | 640 | 4.500 | 420 |
| 9 | 7.000 | 2.120 | 7.000 | 1.700 | 7.000 | 1.060 | 5.200 | 800 | 5.300 | 640 | 3.500 | 420 |
| 11 | 5.600 | 2.120 | 5.600 | 1.700 | 5.600 | 1.060 | 4.200 | 800 | 4.200 | 640 | 2.850 | 420 |
| 13 | 4.800 | 2.120 | 4.800 | 1.700 | 4.800 | 1.060 | 3.600 | 800 | 3.600 | 640 | 2.500 | 420 |

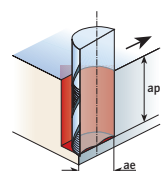
ap = 1,3 x D
ae = 0,05 x D



ap = 1,3 x D
ae = 0,03 x D

ap = 1,3 x D
ae = 0,02 x D

Konturenfräsen / Contouring



| Werkstoff Workpiece material | Kohlenstoffstahl, Baustahl, GG / Carbon steel, mild steel, cast iron -750 N/mm ² | | legierter Stahl, Werkzeugstahl alloyed steel, tool steel -30 HRC | | legierter Stahl alloyed steel 30 - 38 HRC | | legierter Stahl VA alloyed steel VA 38 - 45 HRC | | gehärteter Stahl hardened steel 45 - 55 HRC | | gehärteter Stahl hardened steel 55 - 60 HRC | |
|---------------------------------|---|-------|--|-------|---|-----|---|-----|---|-----|---|-----|
| | Vc 200 m/min | Vf | Vc 200 m/min | Vf | Vc 200 m/min | Vf | Vc 150 m/min | Vf | Vc 150 m/min | Vf | Vc 100 m/min | Vf |
| 7 | 9.000 | 1.300 | 9.000 | 1.000 | 6.800 | 800 | 6.800 | 700 | 6.800 | 400 | 4.500 | 250 |
| 9 | 7.000 | 1.300 | 7.000 | 1.000 | 5.200 | 800 | 5.200 | 700 | 5.200 | 400 | 3.500 | 250 |
| 11 | 5.600 | 1.300 | 5.600 | 1.000 | 4.200 | 800 | 4.200 | 700 | 4.200 | 400 | 2.850 | 250 |
| 13 | 4.800 | 1.300 | 4.800 | 1.000 | 3.600 | 800 | 3.600 | 700 | 3.600 | 400 | 2.500 | 250 |

ap = 0,1 x D
ae = 0,03 D - 0,5 x D



ap = 0,05 x D
ae = 0,2 - 0,3 x D

ap = 0,02 x D
ae = 0,2 - 0,3 x D

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden.
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
If the rpm available is lower than recommended please reduce the feed rate to the same ratio.

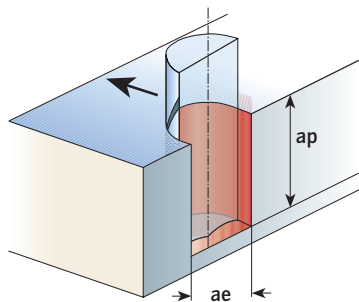
Nutfräsen / Slot milling

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit Strength N/mm ² | Schnittge- schwindigkeit Cutting speed V _c m/min | Ø 6 fz = mm Z × 4 | Ø 8 fz = mm Z × 4 | Ø 10 fz = mm Z × 4 | Ø 12 fz = mm Z × 4 | Ø 14 fz = mm Z × 4 | Ø 16 fz = mm Z × 5 | Ø 18 > 20 fz = mm Z × 5 |
|-----------------------------------|------------------------|---|--|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------------|
| | | | ± 10% | | | | | | | |
| 1.1 | 36 Mn 6 | < 450 | 240 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 1.2 | ck 45 | < 650 | 220 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 1.3 | 24 Cr Mo 5 | < 850 | 210 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 1.4 | 43 Cr Mo 4 | < 950 | 190 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 2.1 | 21 Mn Cr 5 | < 600 | 180 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 2.2 | 26 Cr Mo 4 | < 950 | 160 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 2.3 | 41 Cr Al Mo 7 | < 1100 | 150 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 3.1.1 | X 36 Cr Mo 17 | < 700-1000 | 150 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 4.1 | X 12 Cr S 13 | < 700 | 75 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 4.2 | X 38 Cr 13 | < 700 | 65 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 4.3 | X 5 Cr Ni Mo 17.12.2 | < 700 | 65 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 4.3.1 | X 2 Cr Ni Mo N 17.13.3 | < 850 | 55 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 6.1 | Ti 1 | < 850 | 60 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 6.1 | Ti Al 6 V 4 | < 1200 | 50 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 7.1 | GG 15 | < 180 HB | 140 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 7.2 | GG 35 | < 260 HB | 130 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 7.3 | GGG 50 | < 200 HB | 130 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 7.4 | GGG 70 | < 250 HB | 130 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 7.5 | GTS 40.05 | < 130 HB | 120 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |
| 7.6 | GTS 65.05 | < 230 HB | 110 | 0,03 | 0,04 | 0,06 | 0,07 | 0,08 | 0,10 | 0,12 |

Umfangfräsen / Circumference milling

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit Strength N/mm ² | Schnittge- schwindigkeit Cutting speed V _c m/min | Ø 6 fz = mm Z × 4 | Ø 8 fz = mm Z × 4 | Ø 10 fz = mm Z × 4 | Ø 12 fz = mm Z × 4 | Ø 14 fz = mm Z × 4 | Ø 16 fz = mm Z × 5 | Ø 18 > 20 fz = mm Z × 5 |
|-----------------------------------|------------------------|---|--|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------------|
| | | | ± 10% | | | | | | | |
| 1.1 | 36 Mn 6 | < 450 | 240 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,10 |
| 1.2 | ck 45 | < 650 | 220 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,10 |
| 1.3 | 24 Cr Mo 5 | < 850 | 210 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,10 |
| 1.4 | 43 Cr Mo 4 | < 950 | 190 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,10 |
| 2.1 | 21 Mn Cr 5 | < 600 | 180 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,10 |
| 2.2 | 26 Cr Mo 4 | < 950 | 160 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,10 |
| 2.3 | 41 Cr Al Mo 7 | < 1100 | 150 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,10 |
| 3.1.1 | X 36 Cr Mo 17 | < 700-1000 | 150 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,10 |
| 4.1 | X 12 Cr S 13 | < 700 | 75 | 0,02 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 |
| 4.2 | X 38 Cr 13 | < 700 | 65 | 0,02 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 |
| 4.3 | X 5 Cr Ni Mo 17.12.2 | < 700 | 65 | 0,02 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 |
| 4.3.1 | X 2 Cr Ni Mo N 17.13.3 | < 850 | 55 | 0,02 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 |
| 6.1 | Ti 1 | < 850 | 50 | 0,02 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 |
| 6.2 | Ti Al 6 V 4 | < 1200 | 45 | 0,02 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 |
| 7.1 | GG 15 | < 180 HB | 140 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,10 |
| 7.2 | GG 35 | < 260 HB | 130 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,10 |
| 7.3 | GGG 50 | < 200 HB | 130 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,10 |
| 7.4 | GGG 70 | < 250 HB | 130 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,10 |
| 7.5 | GTS 40.05 | < 130 HB | 120 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,10 |
| 7.6 | GTS 65.05 | < 230 HB | 110 | 0,03 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,10 |

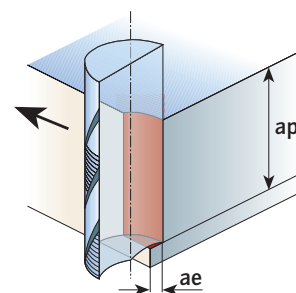
Nutenfräsen / Slot Milling



$$6 \text{ } \varnothing = ae \ 1,0 \times d1 - ap = 0,75 \times d1$$

$$8-20 \text{ } \varnothing = ap = 1,5 \times d1$$

Umfangfräsen / Circumference milling



$$6 \text{ } \varnothing = ae \ 0,5 \times d1 - ap = 1,5 \times d1$$

$$8-20 \text{ } \varnothing = ae = 2,0 \times d1$$

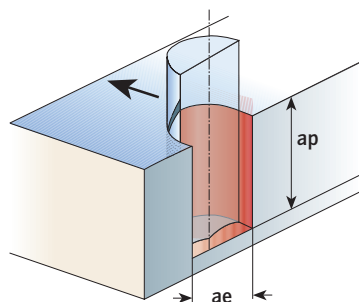
Nutfräsen / Slot milling

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit Strength N/mm ² | Schnittge- schwindigkeit Cutting speed Vc m/min ± 10% | Ø 6 fz = mm | Ø 8 fz = mm | Ø 10 fz = mm | Ø 12 fz = mm | Ø 14 fz = mm | Ø 16 fz = mm | Ø 18 fz = mm | Ø 20 fz = mm |
|-----------------------------------|------------------------|---|---|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1.1 | 36 Mn 6 | < 450 | 240 | 0,025 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 |
| 1.2 | ck 45 | < 650 | 220 | 0,027 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 |
| 1.3 | 24 Cr Mo 5 | < 850 | 210 | 0,027 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 |
| 1.4 | 43 Cr Mo 4 | < 950 | 190 | 0,027 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 |
| 2.1 | 21 Mn Cr 5 | < 600 | 180 | 0,026 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 |
| 2.2 | 26 Cr Mo 4 | < 950 | 160 | 0,026 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 |
| 2.3 | 41 Cr Al Mo 7 | < 1100 | 150 | 0,026 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 |
| 3.1 | X 36 Cr Mo 17 | < 700-1000 | 150 | 0,025 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 |
| 3.2 | X 12 Cr S 13 | < 700 | 75 | 0,025 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 |
| 4.1 | X 38 Cr 13 | < 700 | 65 | 0,020 | 0,03 | 0,04 | 0,05 | 0,055 | 0,06 | 0,07 | 0,08 |
| 4.2 | X 5 Cr Ni Mo 17.12.2 | < 700 | 65 | 0,020 | 0,03 | 0,04 | 0,05 | 0,055 | 0,06 | 0,07 | 0,08 |
| 4.3 | X 2 Cr Ni Mo N 17.13.3 | < 850 | 55 | 0,025 | 0,03 | 0,04 | 0,05 | 0,055 | 0,06 | 0,07 | 0,08 |
| 4.3.1 | Ti 1 | < 850 | 60 | 0,025 | 0,03 | 0,04 | 0,05 | 0,055 | 0,06 | 0,07 | 0,08 |
| 6.1 | Ti Al 6 V 4 | < 1200 | 50 | 0,02 | 0,03 | 0,04 | 0,05 | 0,055 | 0,06 | 0,07 | 0,08 |
| 6.2 | GG 15 | < 180 HB | 140 | 0,02 | 0,03 | 0,04 | 0,05 | 0,055 | 0,06 | 0,07 | 0,08 |
| 7.1 | GG 15 | < 260 HB | 130 | 0,026 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 |
| 7.2 | GGG 35 | < 200 HB | 130 | 0,026 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 |
| 7.3 | GGG 50 | < 250 HB | 130 | 0,026 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 |
| 7.4 | | < 130 HB | 120 | 0,026 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 |
| 7.5 | | < 230 HB | 110 | 0,026 | 0,04 | 0,05 | 0,06 | 0,07 | 0,08 | 0,09 | 0,10 |

Umfangfräsen / Circumference milling

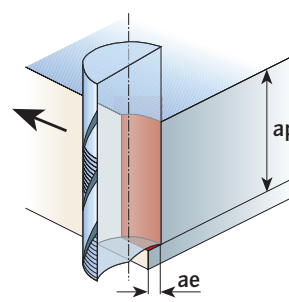
| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit Strength N/mm ² | Schnittge- schwindigkeit Cutting speed Vc m/min ± 10% | Ø 6 fz = mm | Ø 8 fz = mm | Ø 10 fz = mm | Ø 12 fz = mm | Ø 16 fz = mm | Ø 20 fz = mm |
|-----------------------------------|-----------------------|---|---|----------------|----------------|-----------------|-----------------|-----------------|-----------------|
| 1.1 | St 37.2 | < 450 | 260 | 0,03 | 0,05 | 0,06 | 0,07 | 0,09 | 0,12 |
| 1.2 | C 45 | < 650 | 240 | 0,03 | 0,05 | 0,06 | 0,07 | 0,09 | 0,12 |
| 1.3 | 16 Cr Mo 4 | < 850 | 240 | 0,03 | 0,05 | 0,06 | 0,07 | 0,09 | 0,12 |
| 1.4 | CK 60 | < 850 | 210 | 0,03 | 0,05 | 0,06 | 0,07 | 0,09 | 0,12 |
| 2.1 | 45 Ni Cr 6 | < 950 | 200 | 0,03 | 0,05 | 0,06 | 0,07 | 0,09 | 0,12 |
| 2.2 | 100 Cr Mo 5 | < 600 | 160 | 0,03 | 0,05 | 0,06 | 0,07 | 0,09 | 0,12 |
| 2.3 | 39 Cr Mo V 139 | < 950 | 140 | 0,03 | 0,05 | 0,06 | 0,07 | 0,09 | 0,12 |
| 3.1 | X 36 Cr Mo 17 | < 1100 | 180 | 0,03 | 0,05 | 0,06 | 0,07 | 0,09 | 0,12 |
| 3.2 | S 18 -1-2-10 | < 700 | 150 | 0,03 | 0,05 | 0,06 | 0,07 | 0,09 | 0,12 |
| 4.1 | X 12 Cr Mo S 17 | < 1400 | 75 | 0,03 | 0,04 | 0,05 | 0,06 | 0,08 | 0,10 |
| 4.2 | X 38 Cr 13 | < 700 | 70 | 0,03 | 0,04 | 0,05 | 0,06 | 0,08 | 0,10 |
| 4.3 | X 5 Cr Ni 18 10 | < 850 | 70 | 0,03 | 0,04 | 0,05 | 0,06 | 0,08 | 0,10 |
| 4.3.1 | X 2 Cr Ni Mo N 17133 | < 700 | 60 | 0,03 | 0,04 | 0,05 | 0,06 | 0,08 | 0,10 |
| 6.1 | Ti 1 | < 850 | 70 | 0,03 | 0,04 | 0,05 | 0,06 | 0,08 | 0,10 |
| 6.2 | Ti Al 6 V 4 | < 850 | 60 | 0,03 | 0,04 | 0,05 | 0,06 | 0,08 | 0,10 |
| 7.1 | GG 15 | < 1200 | 150 | 0,03 | 0,05 | 0,06 | 0,07 | 0,09 | 0,12 |
| 7.2 | GG 25 | < 180 HB | 140 | 0,03 | 0,05 | 0,06 | 0,07 | 0,09 | 0,12 |
| 7.3 | GGG 40 | < 180 HB | 140 | 0,03 | 0,05 | 0,06 | 0,07 | 0,09 | 0,12 |
| 7.4 | GGG 60 | < 180 HB | 140 | 0,03 | 0,05 | 0,06 | 0,07 | 0,09 | 0,12 |
| 7.5 | GTW 55 | < 250 HB | 140 | 0,03 | 0,05 | 0,06 | 0,07 | 0,09 | 0,12 |

Nutenfräsen / Slot Milling



6 Ø = ap 1,0 × d1
8 - 20 Ø = ap_{max} 1,5 × D

Umfangfräsen / Circumference milling



6 Ø = ae 0,5 × d1 - ap = 1,5 × d1
8 - 20 Ø = ap_{max} 2,0 × d1



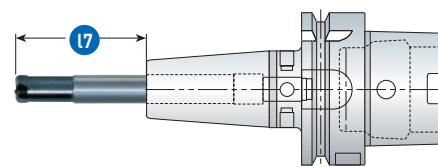
30 6433

Empfohlene Richtwerte für High-Performance Fräser Recommended cutting data for high performance mills

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit Strength | n/Vf | Ø 2 rp 0,5 | Ø 3 rp 0,75 | Ø 4 rp 1,0 | Ø 5 rp 1,2 | Ø 6 rp 1,5 | Ø 7 rp 1,5 N/mm² | Ø 8 rp 2,0 | Ø 9 rp 2,0 | Ø 10 rp 2,0 | Ø 11 rp 2,0 | Ø 12 rp 3,0 | Ø 13 rp 3,0 | Ø 16 rp 4,0 | | | |
|-----------------------------------|---------------------------|------------------------|-------------|---------------|----------------|---------------|---------------|---------------|------------------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|--------------------------------|-----------|-------------|
| 1.1 | Automatenstähle | < 450 | n (min') | 32.000 | 21.000 | 16.000 | 12.000 | 11.000 | 9.000 | 8.000 | 7.000 | 6.000 | 6.000 | 5.000 | 5.000 | 4.500 | ap = 0,1 × rp ae = 0,3 × d1 | | |
| 1.2 | unalloyed steel | < 450 | Vf (mm/min) | 10.000 | 12.000 | 12.000 | 13.000 | 14.000 | 12.000 | 13.000 | 12.000 | 13.000 | 12.000 | 13.000 | 13.000 | 12.000 | | | |
| 1.3 | | < 750 | | | | | | | | | | | | | | | | | |
| 2.1 | Vergütungsstähle | < 600 | n (min') | 32.000 | 21.000 | 15.000 | 12.000 | 11.000 | 9.000 | 8.000 | 7.000 | 6.000 | 6.000 | 5.000 | 5.000 | 5.000 | ap = 0,1 × rp ae = 0,3 × d1 | | |
| 2.2 | alloyed steel | < 950 | Vf (mm/min) | 9.000 | 12.000 | 11.000 | 12.000 | 13.000 | 10.000 | 12.000 | 11.000 | 12.000 | 11.000 | 11.000 | 11.000 | | | | |
| 4.1 | Rostfreie Stähle | < 1500 | n (min') | 24.000 | 16.000 | 12.000 | 10.000 | 8.000 | 6.500 | 6.000 | 5.000 | 4.500 | 4.000 | 4.000 | 3.500 | 3.000 | | | |
| 4.2 | ferritisch, martensitisch | < 1500 | Vf (mm/min) | 7.000 | 8.000 | 8.000 | 9.000 | 9.000 | 8.000 | 9.000 | 8.000 | 9.000 | 8.000 | 8.000 | 7.000 | 6.000 | ap = 0,1 × rp ae = 0,3 × d1 | | |
| 4.3 | Stainless steels | < 1500 | | | | | | | | | | | | | | | | | |
| 8.1 | Toolox 44 | 45-55 HRC | n (min') | 22.000 | 16.000 | 12.000 | 9.000 | 7.500 | 6.500 | 6.000 | 5.000 | 4.500 | 4.000 | 4.000 | 3.500 | 3.200 | | | |
| | | | Vf (mm/min) | 6.000 | 7.000 | 6.000 | 8.000 | 8.000 | 7.000 | 8.000 | 7.000 | 8.000 | 7.000 | 8.000 | 7.000 | 6.500 | > rp2=ap | 0,2 × rp | ae=0,3 × d1 |
| 8.2 | gehärtete Stähle | 55-60 HRC | n (min') | 16.000 | 10.000 | 8.000 | 6.000 | 5.000 | 4.500 | 4.000 | 3.500 | 3.000 | 3.000 | 2.500 | 2.500 | 2.000 | ≤ rp2=ap | 0,05 × rp | ae=0,3 × d1 |
| | hardened material | | Vf (mm/min) | 2.500 | 3.000 | 3.000 | 3.000 | 3.500 | 3.000 | 2.500 | 2.000 | 2.200 | 2.500 | 3.000 | 2.800 | 2.200 | ≤ rp2=ap | 0,1 × rp | ae=0,3 × d1 |

Bearbeitungshinweise:

- Vorausgesetzt, es werden stabile Maschinenverhältnisse und einwandfreie Werkzeugaufnahmen verwendet (Schrumpffutter)
- Die genannten Richtwerte basieren auf interpolationsfräsen auch in den Ecken. Ohne Interpolationsfräsen reduzieren Sie die Schnittgeschwindigkeit (Vc) um 50%-70% sowie die Schnitttiefe (ap) um 50%-80%.
- Kühlen Sie mit MMKS (Minimalkühlschmierung) oder Luft.
- Beim Eintauchen in Z-Achse mit einer Schräge von $\approx 2^\circ$ ist der Vorschub auf 40-60% zu reduzieren.
- Die Richtwerte beziehen sich auf eine Auskraglänge l3 von 3xD. Für tiefere Anwendungen sind Vc / ap / Vf den Gegebenheiten anzupassen.
- Um optimale Schnittbedingungen zu erreichen sind die Einsatzbedingungen vor Ort zu berücksichtigen.



Machining details:

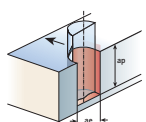
- Conditions must be: rigid machine circumstances and excellent holders. (shrinking holder)
- The mentioned standard values based on interpolation milling also in corners.
- Coolant with MMKS [MQL (mist)] on air blow.
- When dipping in Z-axis, you have to reduce the feed speed 40% > 60%.
- The standard values refer to the length l3 od 3xD. For deeper applications please adjust Vc/ap/Vf for the conditions.
- In order to achieve ideal cutting results you have to consider your local operating conditions.

| Länge außerhalb Spannfutter overhang length l7 | Vc - % | ap - % | Vf - % |
|---|--------|--------|--------|
| $l7 \leq 4 \times d1$ | 100 | 100 | 100 |
| $l7 \leq 5 \times d1$ | 70 | 70 | 80 |
| $l7 \leq 6 \times d1$ | 50 | 50 | 70 |

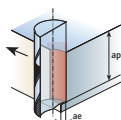
30 6349

Empfohlene Schnittdaten für Karnasch 1xD Schruppfräser HPC Recommended cutting data for Karnasch 1xD solid carbide roughing end mills

| Werkstoffgruppe Material group | Unlegierte Stähle Unalloyed steels <850 N/mm² 1.1 - 1.2 | | Vergütungsstähle Alloy steels < 1100 N/mm² 2.1 - 2.2 - 2.3 | | Hochlegierte Stähle High alloy steels < 1400 N/mm² 3.1 - 3.2 | | Rostfreie Stähle Stainless steels 35 - 45 HRC 4.1 - 4.2 - 4.3 | | Titan Titanium < 1200 N/mm² 6.1 - 6.2 | | Gusseisen Cast irons < 250 HB 7.1 - 7.2 - 7.3 - 7.4 | |
|-----------------------------------|--|---------------|---|---------------|---|---------------|--|---------------|--|---------------|--|---------------|
| | d1 | Vc mm/ min | fz/mm | Vc mm/ min | fz/mm | Vc mm/ min | fz/mm | Vc mm/ min | fz/mm | Vc mm/ min | fz/mm | Vc mm/ min |
| 6,0 | 180 | 0,028 | 180 | 0,028 | 140 | 0,028 | 60 | 0,020 | 40 | 0,020 | 120 | 0,028 |
| | 180 | 0,040 | 180 | 0,040 | 140 | 0,040 | 60 | 0,030 | 40 | 0,030 | 120 | 0,040 |
| 10,0 | 180 | 0,050 | 180 | 0,050 | 140 | 0,050 | 60 | 0,040 | 40 | 0,040 | 120 | 0,050 |
| | 180 | 0,060 | 180 | 0,060 | 140 | 0,060 | 60 | 0,050 | 40 | 0,050 | 120 | 0,060 |
| 14,0 | 180 | 0,060 | 180 | 0,060 | 140 | 0,060 | 60 | 0,050 | 40 | 0,050 | 120 | 0,060 |
| | 180 | 0,080 | 180 | 0,080 | 140 | 0,080 | 60 | 0,060 | 40 | 0,060 | 120 | 0,070 |
| 18,0 | 180 | 0,080 | 180 | 0,080 | 140 | 0,080 | 60 | 0,060 | 40 | 0,060 | 120 | 0,080 |
| | 180 | 0,100 | 180 | 0,100 | 140 | 0,100 | 60 | 0,080 | 40 | 0,080 | 120 | 0,100 |



< 6Ø = ap 0,75 × D
> 8Ø = ap 1,00 × D



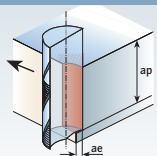
> 6Ø = ap 1,00 × D > 1,3 × D

Empfohlene Schnittwerte für Vollhartmetallfräser
Recommended cutting data for solid carbide end mills

30 6446

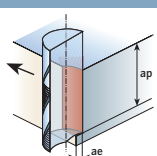
30 6447

Umfangfräsen
Circumference milling



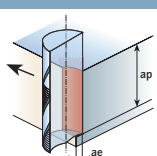
Schruppen über /
Roughing above $0,07 \times d$
 $ae < 0,07 \times d$

Umfangfräsen
Circumference milling



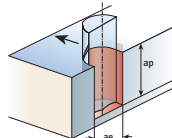
Schlichten bis /
Finishing until $0,03 \times d$
 $ae > 0,03$

Umfangfräsen
Circumference milling



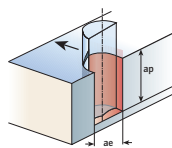
max. Spirallänge ap
bei / max. spiral length
 $0,7 fz$

Nutenfräsen
Slot milling



Schruppen max. /
Roughing max. $0,07 \times d$
ap bei $0,7 \times fz$

Nutenfräsen
Slot milling



Schlichten bis /
Finishing up to $0,03 \times d$
ap bei $1,2 fz$

| Werkstoff Workpiece material | Schnittgeschwindigkeit Cutting speed Vc in m/min. | | Vorschubgeschwindigkeit / Feeder speed Vf | | | | | | | |
|---|---|--------------------------|---|-------|-------|-------|-------|-------|---------|-------|
| | | | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12-16 | Ø 20 |
| | Schruppen/ Roughing | Schlichten/ Finishing | Fräserdurchmesser / Dimension | | | | | | | |
| Vorschub pro Zahn / Feed per teeth fz mm | | | | | | | | | | |
| unlegiert < 500 N/mm ² unalloyed steel < 500 N/mm ² | 190 | 230 | 0,01 | 0,02 | 0,03 | 0,04 | 0,06 | 0,08 | 0,1 | 0,12 |
| legiert < 500 N/mm ² alloyed steel < 500 N/mm ² | 160 | 200 | 0,01 | 0,02 | 0,03 | 0,04 | 0,06 | 0,08 | 0,1 | 0,12 |
| unlegiert < 1000 N/mm ² unalloyed steel < 1000 N/mm ² | 170 | 180 | 0,01 | 0,02 | 0,03 | 0,04 | 0,06 | 0,08 | 0,1 | 0,12 |
| legiert < 1000 N/mm ² alloyed steel < 1000 N/mm ² | 120 | 140 | 0,01 | 0,02 | 0,03 | 0,04 | 0,06 | 0,08 | 0,1 | 0,12 |
| unlegiert < 1300 N/mm ² unalloyed steel < 1300 N/mm ² | 140 | 165 | 0,08 | 0,015 | 0,025 | 0,035 | 0,055 | 0,072 | 0,090 | 0,108 |
| legiert < 1300 N/mm ² alloyed steel < 1300 N/mm ² | 100 | 125 | 0,08 | 0,015 | 0,025 | 0,035 | 0,055 | 0,072 | 0,090 | 0,108 |
| unlegiert < 1600 N/mm ² unalloyed steel < 1600 N/mm ² | 120 | 125 | 0,06 | 0,012 | 0,022 | 0,032 | 0,048 | 0,065 | 0,080 | 0,095 |
| legiert < 1600 N/mm ² alloyed steel < 1600 N/mm ² | 80 | 100 | 0,06 | 0,012 | 0,022 | 0,032 | 0,048 | 0,065 | 0,080 | 0,095 |
| Guss < 150 HB cast iron < 150 HB | 170 | 200 | 0,01 | 0,02 | 0,03 | 0,04 | 0,06 | 0,08 | 0,1 | 0,12 |
| Guss 150-200 HB cast iron 150-200 HB | 145 | 175 | 0,01 | 0,02 | 0,03 | 0,04 | 0,06 | 0,08 | 0,1 | 0,12 |
| Guss 200-250 HB cast iron 200-250 HB | 115 | 140 | 0,06 | 0,012 | 0,022 | 0,032 | 0,048 | 0,064 | 0,08 | 0,096 |
| Guss 250-300 HB cast iron 250-300 HB | 105 | 125 | 0,06 | 0,012 | 0,022 | 0,032 | 0,048 | 0,064 | 0,08 | 0,096 |
| Gehärteter Stahl < 52 HRC hardened steel < 52 HRC | - | 84 | 0,006 | 0,008 | 0,01 | 0,015 | 0,02 | 0,025 | 0,03 | 0,05 |
| rostfreier Stahl stainless steel | 94 | 113 | 0,015 | 0,02 | 0,02 | 0,025 | 0,025 | 0,05 | 0,06 | 0,08 |
| hochwarmfeste Fe-Leg. + Ni-Leg. ausgehärtet + Titan ausgehärtet titanium, titanium alloy < 1100 N/mm ² | 84 | 101 | 0,015 | 0,02 | 0,02 | 0,025 | 0,025 | 0,05 | 0,06 | 0,08 |
| hochwarmfeste Co-Leg. heat resisting steel | 73 | 88 | 0,015 | 0,02 | 0,02 | 0,025 | 0,025 | 0,05 | 0,06 | 0,08 |
| + Ni-Leg. nicht ausgeh. + Titan unleg. Nickel titanium unalloyed | 63 | 75 | 0,015 | 0,02 | 0,02 | 0,025 | 0,025 | 0,05 | 0,06 | 0,08 |
| Alu unleg., Knetleg. nicht ausgeh. + Magnes.- Knetleg. aluminum unalloyed | 440 | 528 | 0,01 | 0,02 | 0,03 | 0,04 | 0,06 | 0,08 | 0,1 | 0,12 |
| Alu Knetleg. ausgeh., Gussleg. bis 6% Si + Magnesium Gusslegierung aluminum < 6% Si | 367 | 440 | 0,01 | 0,02 | 0,03 | 0,04 | 0,06 | 0,08 | 0,12 | 0,16 |
| Aluminium Gussleg. < 12% Si aluminum < 12% Si | 294 | 352 | 0,01 | 0,02 | 0,03 | 0,04 | 0,06 | 0,08 | 0,12 | 0,16 |
| Aluminium Gussleg. über 12% Si aluminum > 12% Si | 220 | 264 | 0,01 | 0,02 | 0,03 | 0,04 | 0,06 | 0,08 | 0,1 | 0,12 |

1



2



3



4



5



6



7



8



9



Index

| Werkstoffgruppe Material group | | Ø 6,0 | | | | | Ø 8,0 | | | | | Ø 10,0 | | | | |
|--|-------------------------|--------------|------------|-----------|----------|-------------|--------------|-------------|-----------|----------|-------------|--------------|-----------|----------|----------|-------------|
| | | Vc m/min. | fz mm | ae mm | ap mm | hm mm | Vc m/min. | fz mm | ae mm | ap mm | hm mm | Vc m/min. | fz mm | ae mm | ap mm | hm mm |
| P 1.1-1.2-1.3-1.4-1.5 Unlegierte Stähle/ Non-alloy steels | <850 N/mm ² | 340-530 | 0,12-0,15 | 0,70-1,00 | 18 | 0,041-0,061 | 340-530 | 0,16-0,20 | 1,12-1,40 | 24 | 0,060-0,083 | 340-530 | 0,20-0,25 | 1,4-1,7 | 30 | 0,075-0,103 |
| | <1100 N/mm ² | 320-500 | 0,09-0,12 | 0,66-0,90 | 18 | 0,029-0,046 | 320-500 | 0,14-0,19 | 0,95-1,25 | 24 | 0,048-0,075 | 320-500 | 0,18-0,24 | 1,1-1,6 | 30 | 0,060-0,096 |
| P 2.1-2.2-2.3-2.4 Vergütungsstähle Heat treatable steel | <950 N/mm ² | 320-500 | 0,09-0,12 | 0,60-0,80 | 18 | 0,028-0,044 | 320-500 | 0,14-0,19 | 0,80-1,10 | 24 | 0,044-0,070 | 320-500 | 0,18-0,24 | 1,0-1,4 | 30 | 0,057-0,090 |
| | <1100 N/mm ² | 280-460 | 0,08-0,12 | 0,50-0,75 | 18 | 0,023-0,042 | 280-460 | 0,12-0,18 | 0,80-1,10 | 24 | 0,038-0,066 | 280-460 | 0,16-0,22 | 0,9-1,3 | 30 | 0,048-0,079 |
| | <1300 N/mm ² | 260-400 | 0,08-0,12 | 0,45-0,70 | 18 | 0,022-0,041 | 260-400 | 0,11-0,16 | 0,65-0,95 | 24 | 0,031-0,055 | 260-400 | 0,14-0,20 | 0,8-1,2 | 30 | 0,039-0,069 |
| P 2.5 Nitrierstahl/ Nitriding steels | <1000 N/mm ² | 320-500 | 0,09-0,12 | 0,60-0,80 | 18 | 0,028-0,044 | 320-500 | 0,14-0,19 | 0,80-1,10 | 24 | 0,044-0,070 | 320-500 | 0,18-0,24 | 1,0-1,4 | 30 | 0,057-0,090 |
| P 3.1-3.2 Hochlegierte Stähle/ High alloyed steels | <700 N/mm ² | 220-370 | 0,09-0,13 | 0,45-0,80 | 18 | 0,024-0,047 | 220-370 | 0,12-0,17 | 0,60-1,00 | 24 | 0,033-0,060 | 300-480 | 0,15-0,22 | 0,8-1,4 | 30 | 0,042-0,082 |
| | <1400 N/mm ² | 200-340 | 0,07-0,11 | 0,35-0,70 | 18 | 0,017-0,038 | 200-340 | 0,09-0,15 | 0,45-0,95 | 24 | 0,021-0,051 | 210-330 | 0,12-0,19 | 0,6-1,2 | 30 | 0,029-0,065 |
| M 4.1 Rostfreier Stahl / Stainless steel Ferritisch/Martensitisch, ferritic/martensitic | | 170-240 | 0,06-0,10 | 0,35-0,70 | 18 | 0,014-0,034 | 170-240 | 0,08-0,14 | 0,45-0,95 | 24 | 0,019-0,048 | 100-190 | 0,10-0,18 | 0,5-1,1 | 30 | 0,022-0,060 |
| M 4.2 Rostfreier Stahl / Stainless Steel Martensitisch/martensitic | | 105-190 | 0,035-0,06 | 0,30-0,60 | 18 | 0,007-0,019 | 105-190 | 0,045-0,08 | 0,40-0,80 | 24 | 0,010-0,025 | 120-210 | 0,06-0,10 | 0,5-1,0 | 30 | 0,013-0,031 |
| M 4.3 Rostfreier Stahl / Stainless steel Austenitisch/Ferritisch, austenitic/ferritic | | 120-210 | 0,045-0,07 | 0,30-0,70 | 18 | 0,010-0,024 | 120-210 | 0,065-0,095 | 0,45-0,95 | 24 | 0,015-0,032 | 110-190 | 0,08-0,12 | 0,5-1,1 | 30 | 0,018-0,040 |
| K 7.1 Grauguss mit Lamellengraphit Cast iron with lamellar graphite | <600 N/mm ² | 360-450 | 0,10-0,15 | 0,70-0,90 | 18 | 0,034-0,058 | 360-450 | 0,14-0,19 | 0,95-1,25 | 24 | 0,048-0,075 | 360-450 | 0,18-0,24 | 1,1-1,6 | 30 | 0,060-0,096 |
| K 7.3 Grauguss mit Kugelgraphit Cast iron with modular graphite | <600 N/mm ² | 320-480 | 0,1-0,15 | 0,70-0,90 | 18 | 0,034-0,058 | 320-480 | 0,14-0,19 | 0,95-1,25 | 24 | 0,048-0,075 | 320-480 | 0,18-0,24 | 1,0-1,6 | 30 | 0,057-0,096 |
| K 7.4 Grauguss mit Kugelgraphit Cast iron with modular graphite | <850 N/mm ² | 280-460 | 0,09-0,13 | 0,60-0,80 | 18 | 0,028-0,047 | 280-460 | 0,125-0,175 | 0,80-1,12 | 24 | 0,039-0,065 | 280-460 | 0,16-0,21 | 1,0-1,3 | 30 | 0,050-0,075 |
| K 7.5 Temperguss/Malleable cast iron | <450 N/mm ² | 260-370 | 0,09-0,13 | 0,60-1,00 | 18 | 0,028-0,053 | 260-370 | 0,125-0,175 | 0,80-1,25 | 24 | 0,039-0,069 | 260-370 | 0,15-0,21 | 0,9-1,5 | 30 | 0,045-0,081 |
| K 7.6 Temperguss/Malleable cast iron | <800 N/mm ² | 200-350 | 0,08-0,12 | 0,60-1,00 | 18 | 0,025-0,049 | 200-350 | 0,1-0,16 | 0,80-1,25 | 24 | 0,031-0,063 | 200-350 | 0,13-0,18 | 0,9-1,5 | 30 | 0,039-0,070 |
| S 5.4 Nickel-Chromlegierungen Nickel-chromium alloy | <950 N/mm ² | 50-80 | 0,02-0,06 | 0,30-0,60 | 18 | 0,004-0,019 | 50-80 | 0,025-0,07 | 0,40-0,80 | 24 | 0,005-0,022 | 50-80 | 0,03-0,08 | 0,4-0,9 | 30 | 0,006-0,024 |
| S 5.5 Nickel-Chromlegierungen Nickel-chromium alloy | <1300 N/mm ² | 50-80 | 0,02-0,05 | 0,25-0,45 | 18 | 0,004-0,013 | 50-80 | 0,025-0,07 | 0,30-0,60 | 24 | 0,005-0,019 | 50-80 | 0,03-0,07 | 0,4-0,8 | 30 | 0,006-0,020 |

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden.
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.

$$\text{Spanmittendicke } hm: hm \text{ (mm)} = fz \times \sqrt{\frac{ae}{D}}$$

$$\text{Average chip thickness } hm: hm \text{ (mm)} = fz \times \sqrt{\frac{ae}{D}}$$

Empfohlene Richtwerte für Vollhartmetall Trochoidalfräser mit Spanteiler
Recommended cutting data for solid carbide trochoidal milling cutters with chip breaker

30 6460

| | Ø 12,0 | | | | | Ø 16,0 | | | | | Ø 20,0 | | | | |
|--|--------------|-----------|-----------|----------|-------------|--------------|-----------|-----------|----------|-------------|--------------|-----------|----------|----------|-------------|
| | Vc m/min. | fz mm | ae mm | ap mm | hm mm | Vc m/min. | fz mm | ae mm | ap mm | hm mm | Vc m/min. | fz mm | ae mm | ap mm | hm mm |
| | 340-530 | 0,24-0,30 | 1,65-2,10 | 36 | 0,089-0,125 | 340-530 | 0,30-0,40 | 2,20-2,80 | 48 | 0,111-0,167 | 340-530 | 0,40-0,50 | 2,5-3,5 | 60 | 0,141-0,209 |
| | 320-500 | 0,20-0,25 | 1,44-1,90 | 36 | 0,069-0,099 | 320-500 | 0,25-0,35 | 1,90-2,50 | 48 | 0,086-0,138 | 320-500 | 0,35-0,50 | 2,4-3,0 | 60 | 0,121-0,193 |
| | 320-500 | 0,20-0,25 | 1,20-1,65 | 36 | 0,063-0,092 | 320-500 | 0,25-0,35 | 1,60-2,20 | 48 | 0,079-0,130 | 320-500 | 0,35-0,50 | 2,0-2,5 | 60 | 0,110-0,177 |
| | 280-460 | 0,18-0,24 | 1,00-1,50 | 36 | 0,052-0,085 | 280-460 | 0,23-0,33 | 1,40-2,00 | 48 | 0,068-0,116 | 280-460 | 0,35-0,45 | 1,8-2,4 | 60 | 0,105-0,156 |
| | 260-400 | 0,15-0,24 | 0,95-1,40 | 36 | 0,042-0,082 | 260-400 | 0,22-0,32 | 1,20-1,90 | 48 | 0,060-0,110 | 260-400 | 0,30-0,43 | 1,6-2,4 | 60 | 0,085-0,149 |
| | 320-500 | 0,20-0,25 | 1,20-1,65 | 36 | 0,063-0,092 | 320-500 | 0,25-0,35 | 1,60-2,20 | 48 | 0,079-0,130 | 320-500 | 0,25-0,40 | 2,0-2,5 | 60 | 0,079-0,141 |
| | 300-480 | 0,18-0,25 | 0,95-1,65 | 36 | 0,050-0,092 | 300-480 | 0,25-0,35 | 1,25-2,20 | 48 | 0,070-0,130 | 300-480 | 0,30-0,45 | 1,5-2,5 | 60 | 0,082-0,159 |
| | 210-330 | 0,14-0,20 | 0,70-1,45 | 36 | 0,033-0,069 | 210-330 | 0,18-0,30 | 1,00-1,90 | 48 | 0,045-0,103 | 210-330 | 0,25-0,35 | 1,2-2,4 | 60 | 0,061-0,121 |
| | 100-190 | 0,12-0,20 | 0,70-1,45 | 36 | 0,029-0,069 | 100-190 | 0,15-0,25 | 1,00-1,90 | 48 | 0,037-0,086 | 100-190 | 0,20-0,35 | 1,2-2,4 | 60 | 0,049-0,121 |
| | 120-210 | 0,07-0,12 | 0,60-1,20 | 36 | 0,015-0,038 | 120-210 | 0,09-0,15 | 0,80-1,60 | 48 | 0,020-0,047 | 120-210 | 0,12-0,20 | 1,0-2,0 | 60 | 0,027-0,063 |
| | 110-190 | 0,09-0,14 | 0,70-1,45 | 36 | 0,021-0,048 | 110-190 | 0,15-0,19 | 1,00-1,90 | 48 | 0,037-0,065 | 110-190 | 0,15-0,25 | 1,2-2,2 | 60 | 0,036-0,083 |
| | 360-450 | 0,20-0,28 | 1,40-1,90 | 36 | 0,068-0,111 | 360-450 | 0,25-0,35 | 1,90-2,50 | 48 | 0,086-0,138 | 360-450 | 0,35-0,45 | 2,2-3,0 | 60 | 0,116-0,174 |
| | 320-480 | 0,20-0,28 | 1,40-1,90 | 36 | 0,068-0,111 | 320-480 | 0,25-0,35 | 1,90-2,50 | 48 | 0,086-0,138 | 320-480 | 0,35-0,45 | 2,2-3,0 | 60 | 0,116-0,174 |
| | 280-460 | 0,19-0,25 | 1,20-1,65 | 36 | 0,060-0,092 | 280-460 | 0,25-0,35 | 1,60-2,20 | 48 | 0,079-0,130 | 280-460 | 0,30-0,45 | 2,0-2,8 | 60 | 0,095-0,168 |
| | 260-370 | 0,19-0,25 | 1,20-1,90 | 36 | 0,060-0,099 | 260-370 | 0,25-0,35 | 1,60-2,50 | 48 | 0,079-0,138 | 260-370 | 0,30-0,45 | 2,0-3,0 | 60 | 0,095-0,174 |
| | 200-350 | 0,15-0,24 | 1,20-1,90 | 36 | 0,047-0,095 | 200-350 | 0,22-0,30 | 1,60-2,50 | 48 | 0,070-0,118 | 200-350 | 0,25-0,40 | 2,0-3,0 | 60 | 0,079-0,155 |
| | 50-80 | 0,03-0,09 | 0,60-1,20 | 36 | 0,006-0,028 | 50-80 | 0,05-0,14 | 0,80-1,60 | 48 | 0,011-0,044 | 50-80 | 0,06-0,18 | 1,0-2,0 | 60 | 0,013-0,057 |
| | 50-80 | 0,03-0,09 | 0,45-0,95 | 36 | 0,005-0,025 | 50-80 | 0,04-0,12 | 0,60-1,25 | 48 | 0,007-0,033 | 50-80 | 0,06-0,15 | 0,8-1,6 | 60 | 0,012-0,042 |

1



2



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4



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6



7



8



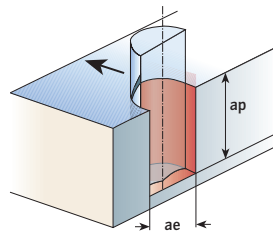
9



| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit Strength N/mm ² | Schnittgeschwindigkeit Cutting speed Vc m/min | Ø 2-3 fz = mm Z x 4 | Ø 4-6 fz = mm Z x 6 | Ø 8 fz = mm Z x 6 | Ø 10 fz = mm Z x 6 | Ø 12 fz = mm Z x 6 | Ø 14 fz = mm Z x 6 | Ø 16 fz = mm Z x 8 | Ø 18 fz = mm Z x 8 | Ø 20 fz = mm Z x 10 |
|-----------------------------------|---|---|---|---------------------------|---------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------------------|
| | | | ± 10% | | | | | | | | | |
| 3.1 3.2 | X 45 Ni Cr Mo 4 S 65 25 | 1100-1400 | 180 | 0,012 | 0,020 | 0,025 | 0,028 | 0,032 | 0,035 | 0,040 | 0,042 | 0,045 |
| 8.1 | Toolox 44 gehärteter Stahl hardened steel | 45-55 HRC | 170 | 0,012 | 0,020 | 0,025 | 0,028 | 0,032 | 0,035 | 0,040 | 0,042 | 0,045 |
| 8.2 | gehärteter Stahl hardened steel | 45-60 HRC | 140 | 0,010 | 0,018 | 0,022 | 0,024 | 0,030 | 0,032 | 0,035 | 0,040 | 0,042 |
| 8.3 | gehärteter Stahl hardened steel | 60-70 HRC | 100 | 0,008 | 0,015 | 0,020 | 0,023 | 0,025 | 0,030 | 0,032 | 0,035 | 0,038 |
| 12.0 | Hardox 400 | 1350 N/mm ² | 170 | 0,012 | 0,020 | 0,025 | 0,028 | 0,030 | 0,035 | 0,040 | 0,044 | 0,045 |
| 12.1 | Hardox 500 | 1800 N/mm ² | 140 | 0,016 | 0,018 | 0,020 | 0,025 | 0,028 | 0,032 | 0,030 | 0,040 | 0,042 |

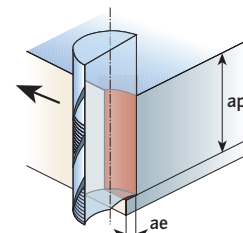
| Werkstoffgruppe Material group | N/mm ² / HRC | Vorschub Korrekturfaktor Feed correction factor |
|-----------------------------------|-----------------------------|---|
| 3.1/3.2 | 1100-1400 N/mm ² | 1.2 |
| 8.1 | 45-55 HRC | 1.1 |
| 8.2 | 55-60 HRC | 1.0 |
| 8.3 | 60-70 HRC | 0.9 |
| 12.0 | 1350 N/mm ² | 1.1 |
| 12.1 | 1800 N/mm ² | 1.0 |

Nutenfräsen / Slot milling



fz gültig für ae max. 1.0 x d1 und ap 0,25 x d1
fz usable for ae max. 1.0 x d1 and ap 0,25 x d1

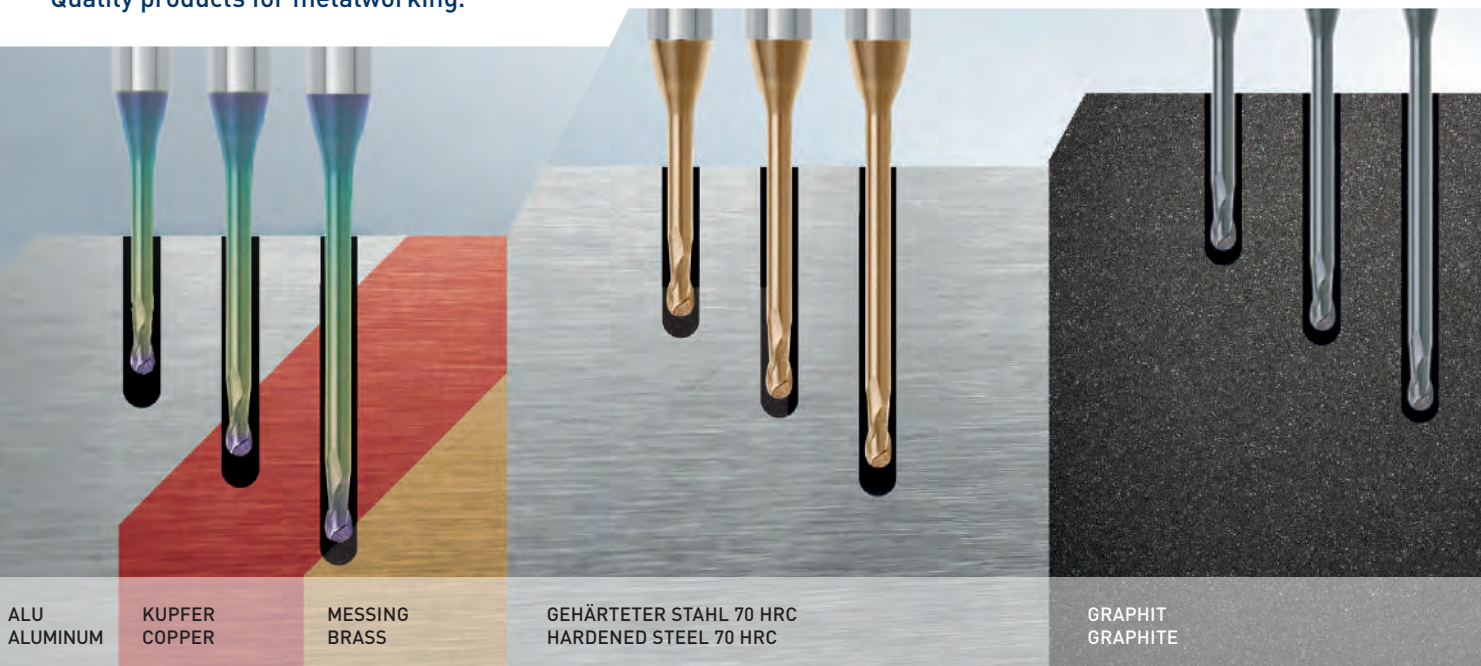
Umfangfräsen / Circumference milling



fz gültig für ae max. 0.07 x d1 und ap 1,0 - 1,5 x d1
fz usable for ae max. 0.07 x d1 and ap 1,0 - 1,5 x d1

Qualitätsprodukte für die Metallbearbeitung.
Quality products for metalworking.

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PROFESSIONAL TOOLS



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KUPFER
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MESSING
BRASS

GEHÄRTETER STAHL 70 HRC
HARDENED STEEL 70 HRC

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Edition für den Formenbau weltweit einmalig und ab Lager lieferbar. Über 2000 Variationen Vollhartmetallfräser von 0,05 Ø bis 6,0 Ø mm < 30 x D.

Edition for the mouldmaker useable worldwide and all tools in stock. More than 2000 possible variations from 0,05 Ø to 6,0 Ø mm < 30 x D.



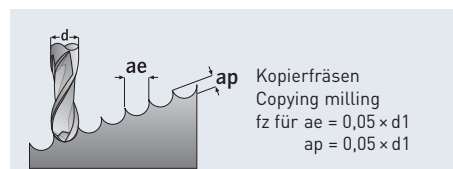
Empfohlene Richtwerte für den Einsatz von Karnasch Rockwell-Cutter HHC/HSC Recommended cutting data for Karnasch Rockwell cutter for hardened steel HHC/HSC

| | | |
|----------------|----------------|----------------|
| 30 5955 | 30 6474 | 30 6476 |
| 30 5958 | 30 6475 | 30 6477 |

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit Strength N/mm ² | Schnittgeschwindigkeit Cutting speed Vc m/min | Ø 0,1 – 1,0 fz = mm/Z Z × 2 | Ø 1,2 – 2,0 fz = mm/Z Z × 2 | Ø 2,5 – 4,0 fz = mm/Z Z × 2 | Ø 5,0 – 6,0 fz = mm/Z Z × 2 | Ø 8,0 fz = mm/Z Z × 2 | Ø 10,0 fz = mm/Z Z × 2 | Ø 12 fz = mm/Z Z × 2 |
|-----------------------------------|--|---|---|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------|------------------------------|----------------------------|
| | | | ± 10% | | | | | | | |
| 3.1 3.2 | X 36 Cr Mo 17 X 50 Ni Cr W 1313 | 1100-1400 | 210 | 0,008 | 0,012 | 0,08 | 0,04 | 0,08 | 0,09 | 0,10 |
| 8.1 | Toolox 44/gehärteter Stahl/hardened steel | 45-55 HRC | 180 | 0,004 | 0,006 | 0,03 | 0,06 | 0,07 | 0,08 | 0,09 |
| 8.2 | gehärtete Stähle hardened steel | 45-60 HRC | 160 | 0,004 | 0,005 | 0,02 | 0,05 | 0,06 | 0,07 | 0,08 |
| 8.3 | gehärtete Stähle hardened steel | 60-70 HRC | 120 | 0,003 | 0,005 | 0,018 | 0,045 | 0,055 | 0,065 | 0,075 |

| Werkstoffgruppe Material group | N/mm ² / HRC | Vorschub Korrekturfaktor Feed correction factor |
|-----------------------------------|-----------------------------|---|
| 3.1/3.2 | 1100-1400 N/mm ² | 1.2 |
| 8.1 | 45-55 HRC | 1.1 |
| 8.2 | 55-60 HRC | 1.0 |
| 8.3 | 60-70 HRC | 0.9 |

Korrekturfaktor für/Correction factor for
30 6475 = 0,7

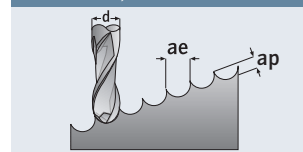


Empfohlene Richtwerte für den Einsatz von Karnasch Radiusfräsern HSC Recommended cutting data for ball end mills HSC

30 6478 **30 6479**

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit Strength N/mm ² | ae und ap = | | | | | | | |
|-----------------------------------|--|---|---|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|
| | | | Schnittgeschwindigkeit Cutting speed Vc m/min | Ø 1,0 - 1,5 fz = mm/Z Z × 2 | Ø 2,0 - 3,0 fz = mm/Z Z × 2 | Ø 4,0 - 5,0 fz = mm/Z Z × 2 | Ø 6,0 fz = mm/Z Z × 2 | Ø 8,0 fz = mm/Z Z × 2 | Ø 10,0 fz = mm/Z Z × 2 | Ø 12,0 fz = mm/Z Z × 2 |
| | | | ± 10% | | | | | | | |
| 1.1 1.2 1.3 | 36 Mn 6 ck 45 24 Cr Mo 5 | < 450 < 650 < 850 | 350 350 350 | 0,009 | 0,012 | 0,040 | 0,055 | 0,070 | 0,080 | 0,10 |
| 2.1 2.2 | 21 Mu Cr 5 26 Cr Mo 4 | < 600 < 950 | 300 260 | 0,008 | 0,012 | 0,040 | 0,055 | 0,070 | 0,080 | 0,10 |
| 2.5 2.6 | 34 Cr Al 6 31 Cr Mo V9 | < 1000 > 1000 | 300 260 | 0,008 | 0,012 | 0,040 | 0,055 | 0,070 | 0,080 | 0,10 |
| 3.1 3.2 | X 36 Cr Mo 17 S 18 -1-2-10 | < 700 < 1400 | 360 200 | 0,008 | 0,012 | 0,040 | 0,055 | 0,070 | 0,080 | 0,10 |
| 4.1 4.2 4.3 | X 12 Cr S 13 X 38 Cr 13 X 5 Cr Ni Mo | < 700 < 700 17122 < 700 | 280 280 280 | 0,008 | 0,012 | 0,040 | 0,055 | 0,070 | 0,080 | 0,10 |
| 7.1 7.2 7.3 | GG 15 GG 35 GGG 50 | < 180 HB < 260 HB | 500 500 370 | 0,008 | 0,012 | 0,040 | 0,055 | 0,070 | 0,080 | 0,10 |
| 8.10 | Toolox 44 | 45-55 HRC | 140 | 0,008 | 0,012 | 0,040 | 0,055 | 0,060 | 0,070 | 0,080 |

Korrekturfaktor für/ Correction factor
for 30 6479 = 0,7



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- 3
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- 5
- 6
- 7
- 8
- 9

30 6486

Richtwerte für den Einsatz von Karnasch VHM- HSC- HRC Radiusfräsern 3D - Z=4 – High-Performance
Recommended cutting data for Karnasch solid carbide ball nose 3D – 4 flutes

| Werkstoffgruppe Material group | Festigkeit Strength N/mm ² | | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø8 | Ø10 | Ø12 | |
|--|---|----|--------|--------|--------|--------|--------|-------|-------|-------|-------------------|
| 1.1-1.2-1.3-1.4-1.5 Unlegierte Stähle / Unalloyed steels | <1100 N/mm ² | ap | < 0,2 | < 0,3 | < 0,4 | < 0,5 | < 0,6 | < 0,8 | < 0,9 | < 1,0 | ap max. 1,0 mm |
| | | ae | < 0,2 | < 0,3 | < 0,5 | < 0,8 | < 1,0 | < 1,6 | < 2,0 | < 2,4 | |
| | | n | 33.500 | 22.500 | 17.000 | 14.000 | 11.000 | 8.400 | 6.700 | 5.500 | |
| | | vf | 6.000 | 6.000 | 5.800 | 5.500 | 6.000 | 5.800 | 5.700 | 5.200 | |
| 2.1-2.2-2.3-2.4-2.5-2.6 Vergütungsstähle / Alloy steels | <30 HRC | ap | <0,2 | <0,3 | <0,4 | <0,6 | <0,6 | <0,8 | <0,9 | <1,0 | ap max. 1,0 mm |
| | | ae | <0,2 | <0,3 | <0,5 | <0,8 | <1,0 | <1,6 | <2,0 | <2,4 | |
| | | n | 33.300 | 22.500 | 17.000 | 14.000 | 11.000 | 8.400 | 6.000 | 5.000 | |
| | | vf | 6.000 | 6.000 | 5.800 | 5.500 | 6.000 | 5.800 | 5.000 | 4.500 | |
| 3.1-3.2 Hochlegierte Stähle / High alloy steels | <35 HRC | ap | <0,2 | <0,3 | <0,4 | <0,6 | <0,6 | <0,8 | <0,9 | <1,0 | ap max. 1,0 mm |
| | | ae | <0,2 | <0,3 | <0,5 | <0,8 | <1,0 | <1,6 | <2,0 | <2,4 | |
| | | n | 33.000 | 22.500 | 17.000 | 14.000 | 8.400 | 6.300 | 5.000 | 4.200 | |
| | | vf | 6.000 | 6.000 | 5.700 | 5.500 | 4.500 | 4.500 | 4.200 | 4.000 | |
| 4.1-4.2-4.3 Rostfreie Stähle / Stainless steels | <45 HRC | ap | <0,2 | <0,3 | <0,4 | <0,6 | <0,6 | <0,8 | <0,9 | <1,0 | ap max. 1,0 mm |
| | | ae | <0,2 | <0,3 | <0,5 | <0,8 | <1,0 | <1,6 | <2,0 | <2,4 | |
| | | n | 24.000 | 16.000 | 12.000 | 10.000 | 8.000 | 6.000 | 4.700 | 4.000 | |
| | | vf | 3.800 | 3.700 | 3.500 | 3.300 | 3.900 | 3.800 | 3.600 | 3.200 | |
| 8.1 Gehärtete Stähle / Hardened steels | <55 HRC | ap | <0,2 | <0,3 | <0,4 | <0,6 | <0,6 | <0,8 | <0,9 | <1,0 | ap max. 1,0 mm |
| | | ae | <0,2 | <0,3 | <0,5 | <0,8 | <1,0 | <1,6 | <2,0 | <2,4 | |
| | | n | 20.000 | 14.000 | 10.000 | 8.500 | 6.000 | 4.600 | 3.800 | 3.100 | |
| | | vf | 3.300 | 3.100 | 2.900 | 2.800 | 2.700 | 2.600 | 2.500 | 2.300 | |
| 8.2 Gehärtete Stähle / Hardened Steels | <60 HRC | ap | <0,1 | <0,15 | <0,2 | <0,25 | <0,3 | <0,5 | <0,5 | <0,5 | ap max. 0,5 mm |
| | | ae | <0,2 | <0,3 | <0,4 | <0,5 | <0,6 | <0,8 | <1,0 | <1,2 | |
| | | n | 16.000 | 10.500 | 8.000 | 6.500 | 5.000 | 4.000 | 3.200 | 2.700 | |
| | | vf | 2.500 | 2.200 | 2.000 | 2.000 | 2.000 | 2.000 | 1.900 | 1.800 | |
| 8.3 Gehärtete Stähle / Hardened steels | <65 HRC | ap | <0,2 | <0,15 | <0,2 | <0,25 | <0,25 | <0,6 | <0,5 | <0,5 | ap max. 0,5 mm |
| | | ae | <0,2 | <0,3 | <0,4 | <0,5 | <0,6 | <0,8 | <1,0 | <1,2 | |
| | | n | 14.000 | 10.000 | 7.000 | 6.000 | 4.200 | 3.200 | 2.500 | 2.000 | |
| | | vf | 2.200 | 2.000 | 1.800 | 1.700 | 1.500 | 1.500 | 1.500 | 1.200 | |
| 8.3 Gehärtete Stähle / Hardened steels | <70 HRC | ap | <0,1 | <0,15 | <0,2 | <0,25 | <0,25 | <0,3 | <0,5 | <0,5 | ap max. 0,5 mm |
| | | ae | <0,2 | <0,3 | <0,4 | <0,5 | <0,6 | <0,8 | <1,0 | <1,2 | |
| | | n | 9.000 | 6.000 | 4.500 | 3.700 | 2.500 | 2.000 | 1.500 | 1.200 | |
| | | vf | 1.400 | 1.200 | 1.100 | 1.100 | 900 | 900 | 900 | 700 | |

30 6486

Richtwerte für den Einsatz von Karnasch VHM- HSC- HRC Radiusfräsern 3D - Z=4 – High-Performance
Recommended cutting data for Karnasch solid carbide ball nose 3D – 4 flutes

| Werkstoffgruppe Material group | Festigkeit Strength N/mm ² | | Ø2 | Ø3 | Ø4 | Ø5 | Ø6 | Ø8 | Ø10 | Ø12 | |
|--|---|----|--------|--------|--------|--------|--------|--------|--------|-------|-------------------|
| 1.1-1.2-1.3-1.4-1.5 Unlegierte Stähle / Unalloyed steels | <1100 N/mm ² | ap | <0,2 | <0,3 | <0,4 | <0,5 | <0,6 | <0,8 | <1,0 | <1,0 | ap max. 1,0 mm |
| | | ae | 0,4 | 0,5 | 0,6 | 0,8 | 1,0 | <1,2 | <1,6 | <2,0 | |
| | | n | 50.000 | 33.000 | 25.000 | 20.000 | 17.000 | 12.000 | 10.000 | 8.000 | |
| | | vf | 9.000 | 8.800 | 8.500 | 8.200 | 9.000 | 9.000 | 8.500 | 8.000 | |
| 2.1-2.2-2.3-2.4-2.5-2.6 Vergütungsstähle / Alloy steels | <30 HRC | ap | <0,2 | <0,3 | <0,4 | <0,5 | <0,6 | <0,8 | <1,0 | <1,0 | ap max. 1,0 mm |
| | | ae | 0,4 | 0,5 | 0,6 | 0,8 | 1,0 | <1,2 | <1,6 | <2,0 | |
| | | n | 50.000 | 33.000 | 25.000 | 20.000 | 17.000 | 12.500 | 10.000 | 8.000 | |
| | | vf | 9.000 | 8.800 | 8.500 | 8.200 | 9.000 | 8.000 | 8.000 | 7.000 | |
| 3.1-3.2 Hochlegierte Stähle / High alloy steels | <35 HRC | ap | <0,2 | <0,3 | <0,4 | <0,5 | <0,6 | <0,8 | <1,0 | <1,0 | ap max. 1,0 mm |
| | | ae | <0,4 | <0,5 | <0,6 | <0,8 | <1,0 | <1,2 | <1,6 | <2,0 | |
| | | n | 42.000 | 28.000 | 21.000 | 18.000 | 16.000 | 12.000 | 10.000 | 8.000 | |
| | | vf | 8.000 | 7.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | 6.000 | |
| 4.1-4.2-4.3 Rostfreie Stähle / Stainless steels | <45 HRC | ap | <0,2 | <0,3 | <0,4 | <0,5 | <0,6 | <0,8 | <1,0 | <1,0 | ap max. 1,0 mm |
| | | ae | <0,4 | <0,5 | <0,6 | <0,8 | <1,0 | <1,2 | <1,6 | <2,0 | |
| | | n | 40.000 | 26.000 | 20.000 | 17.000 | 16.000 | 12.000 | 10.000 | 8.000 | |
| | | vf | 7.000 | 6.500 | 6.000 | 5.500 | 7.000 | 7.000 | 6.500 | 6.000 | |
| 8.1 Gehärtete Stähle / Hardened steels | <55 HRC | ap | <0,15 | <0,24 | <0,30 | <0,4 | <0,45 | <0,6 | <0,8 | <0,8 | ap max. 0,8 mm |
| | | ae | <0,4 | <0,5 | <0,6 | <0,8 | <1,0 | <1,2 | <1,6 | <2,0 | |
| | | n | 35.000 | 23.000 | 17.000 | 14.500 | 13.000 | 10.000 | 8.000 | 6.500 | |
| | | vf | 5.500 | 5.000 | 4.500 | 4.500 | 5.000 | 5.000 | 5.000 | 5.000 | |
| 8.2 Gehärtete Stähle / Hardened Steels | <60 HRC | ap | <0,1 | <0,15 | <0,20 | <0,25 | <0,3 | <0,4 | <0,5 | <0,5 | ap max. 0,5 mm |
| | | ae | <0,2 | <0,3 | <0,4 | <0,5 | <0,6 | <0,8 | <1,0 | <1,2 | |
| | | n | 25.000 | 17.000 | 12.000 | 10.500 | 10.000 | 7.500 | 6.000 | 5.000 | |
| | | vf | 4.000 | 3.500 | 3.300 | 3.000 | 4.000 | 4.000 | 3.500 | 3.000 | |
| 8.3 Gehärtete Stähle / Hardened steels | <65 HRC | ap | 0,1 | 0,15 | 0,20 | 0,25 | 0,3 | <0,4 | <0,5 | <0,5 | ap max. 0,5 mm |
| | | ae | 0,2 | 0,3 | 0,4 | 0,5 | 0,6 | <0,8 | <1,0 | <1,2 | |
| | | n | 24.000 | 16.000 | 12.000 | 10.000 | 9.000 | 7.000 | 5.500 | 4.500 | |
| | | vf | 3.500 | 3.400 | 3.100 | 2.900 | 2.900 | 2.900 | 2.800 | 2.500 | |
| 8.3 Gehärtete Stähle / Hardened steels | <70 HRC | ap | <0,06 | <0,09 | <0,12 | <0,15 | <0,18 | <0,24 | <0,30 | <0,30 | ap max. 0,3 mm |
| | | ae | <0,2 | <0,3 | <0,4 | <0,5 | <0,6 | <0,8 | <1,0 | <1,2 | |
| | | n | 17.000 | 11.000 | 8.000 | 6.000 | 6.000 | 4.800 | 3.800 | 3.200 | |
| | | vf | 2.600 | 2.400 | 2.100 | 2.000 | 2.000 | 2.000 | 2.000 | 1.800 | |

Bearbeitungshinweise:

- Vorausgesetzt, es werden stabile Maschinenverhältnisse und einwandfreie Werkzeugaufnahmen verwendet.
- Bei größeren Auskraglängen müssen die Schnittdaten entsprechend reduziert werden.
- Die angegebenen Schnittdaten sind auf eine Auskraglänge von max. 4xD und eine Werkstückschräge von max. 15° angelegt.
- Ist der Eckenradius der Werkstückkontur kleiner als 1,5 x Werkzeugradius, oder die Kontur zu steil, müssen die Schnittdaten um ≈ 50% reduziert werden.

HPC-Schlichten/HPC-Finishing

Richtwerte für den Einsatz von Karnasch VHM- HSC- HRC Radiusfräsern 3D - Z=4 – High-Performance
Recommended cutting data for Karnasch solid carbide ball nose 3D – 4 flutes

30 6486

| Werkstoffgruppe Material group | Festigkeit Strength N/mm ² | | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | |
|---|---|----|--------|--------|--------|--------|--------|-------|-------|-------|-------|
| 1.1-1.2-1.3-1.4-1.5 Unlegierte Stähle / Unalloyed steels | <1100 N/mm ² | ap | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 38.000 | 25.500 | 19.000 | 16.000 | 12.000 | 9.000 | 7.000 | 6.000 | 5.500 |
| | | vf | 7.500 | 7.000 | 6.500 | 6.000 | 7.500 | 6.500 | 6.000 | 5.500 | 5.000 |
| 2.1-2.2-2.3-2.4-2.5- 2.6 Vergütungsstähle / Alloy steels | <30 HRC | ap | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 38.000 | 25.500 | 19.000 | 16.000 | 12.000 | 9.000 | 7.000 | 6.000 | 5.500 |
| | | vf | 7.500 | 7.000 | 6.500 | 6.000 | 7.000 | 6.000 | 5.000 | 5.000 | 5.000 |
| 3.1-3.2 Hochlegierte Stähle / High alloy steels | <35 HRC | ap | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 28.000 | 28.000 | 24.000 | 12.000 | 9.000 | 7.000 | 5.500 | 4.500 | 4.000 |
| | | vf | 7.000 | 6.700 | 6.000 | 5.800 | 5.500 | 5.000 | 4.500 | 4.000 | 4.000 |
| 4.1-4.2-4.3 Rostfreie Stähle / Stainless steels | <45 HRC | ap | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 26.000 | 17.000 | 13.000 | 11.000 | 8.500 | 6.500 | 5.000 | 4.000 | 3.500 |
| | | vf | 4.500 | 4.500 | 4.000 | 3.800 | 5.000 | 4.500 | 4.000 | 3.500 | 3.500 |
| 8.1 Gehärtete Stähle / Hardened steels | <55 HRC | a | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 22.000 | 15.000 | 11.000 | 9.000 | 7.000 | 5.200 | 4.000 | 3.500 | 3.000 |
| | | vf | 3.200 | 3.100 | 3.000 | 3.000 | 3.500 | 3.200 | 2.600 | 2.400 | 2.400 |
| 8.2 Gehärtete Stähle / Hardened Steels | <60 HRC | ap | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 17.000 | 11.500 | 8.500 | 7.200 | 6.500 | 5.000 | 4.000 | 3.200 | 2.200 |
| | | vf | 2.700 | 2.500 | 2.200 | 2.000 | 3.000 | 2.800 | 2.500 | 2.200 | 2.200 |
| 8.3 Gehärtete Stähle / Hardened steels | <65 HRC | ap | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 14.000 | 9.000 | 7.000 | 5.500 | 5.800 | 4.200 | 3.500 | 2.800 | 2.000 |
| | | vf | 2.300 | 2.200 | 2.000 | 1.900 | 2.500 | 2.200 | 2.000 | 1.500 | 1.500 |
| 8.3 Gehärtete Stähle / Hardened steels | <70 HRC | ap | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 8.500 | 5.500 | 4.400 | 3.500 | 3.700 | 2.800 | 2.200 | 1.800 | 1.800 |
| | | vf | 1.400 | 1.300 | 1.200 | 1.100 | 1.500 | 1.300 | 1.200 | 1.000 | 1.000 |

HSC-Schlichten/HSC-Finishing

Richtwerte für den Einsatz von Karnasch VHM- HSC- HRC Radiusfräsern 3D - Z=4 – High-Performance
Recommended cutting data for Karnasch solid carbide ball nose 3D – 4 flutes

30 6486

| Werkstoffgruppe Material group | Festigkeit Strength N/mm ² | | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | |
|---|---|----|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| 1.1-1.2-1.3-1.4-1.5 Unlegierte Stähle / Unalloyed steels | <1100 N/mm ² | ap | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 55.000 | 35.000 | 27.000 | 22.000 | 18.000 | 13.500 | 11.000 | 9.000 | 8.500 |
| | | vf | 10.000 | 9.500 | 9.000 | 8.000 | 11.000 | 10.000 | 9.000 | 8.500 | 8.500 |
| 2.1-2.2-2.3-2.4-2.5- 2.6 Vergütungsstähle / Alloy steels | <30 HRC | ap | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 55.000 | 35.000 | 27.000 | 22.000 | 18.000 | 13.500 | 11.000 | 9.000 | 8.000 |
| | | vf | 9.500 | 9.000 | 8.500 | 7.500 | 10.000 | 9.500 | 8.500 | 8.000 | 8.000 |
| 3.1-3.2 Hochlegierte Stähle / High alloy steels | <35 HRC | ap | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 45.000 | 30.000 | 23.000 | 20.000 | 17.000 | 12.500 | 10.000 | 8.500 | 8.000 |
| | | vf | 9.000 | 8.500 | 8.000 | 7.500 | 10.000 | 9.500 | 8.500 | 8.000 | 8.000 |
| 4.1-4.2-4.3 Rostfreie Stähle / Stainless steels | <45 HRC | ap | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 44.000 | 29.000 | 22.000 | 18.000 | 16.500 | 12.500 | 9.500 | 8.000 | 7.000 |
| | | vf | 8.200 | 7.500 | 6.500 | 6.200 | 9.800 | 8.500 | 7.500 | 7.000 | 7.000 |
| 8.1 Gehärtete Stähle / Hardened steels | <55 HRC | ap | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 36.000 | 24.500 | 18.000 | 15.000 | 14.000 | 10.000 | 8.000 | 7.000 | 6.000 |
| | | vf | 6.200 | 5.200 | 4.800 | 5.000 | 7.000 | 6.000 | 5.500 | 5.000 | 5.000 |
| 8.2 Gehärtete Stähle / Hardened steels | <60 HRC | ap | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 27.000 | 18.000 | 13.000 | 11.000 | 11.000 | 8.000 | 6.500 | 5.500 | 5.000 |
| | | vf | 4.200 | 3.800 | 3.500 | 3.200 | 5.000 | 4.500 | 4.000 | 3.500 | 3.500 |
| 8.3 Gehärtete Stähle / Hardened steels | <65 HRC | ap | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 25.000 | 17.000 | 13.000 | 10.000 | 10.000 | 7.500 | 6.000 | 5.000 | 4.500 |
| | | vf | 4.000 | 3.500 | 3.200 | 3.000 | 4.500 | 4.000 | 3.200 | 2.800 | 2.800 |
| 8.3 Gehärtete Stähle / Hardened steels | <70 HRC | ap | 0,04 | 0,06 | 0,08 | 0,10 | 0,12 | 0,16 | 0,20 | 0,24 | |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 | |
| | | n | 17.500 | 11.500 | 8.500 | 7.000 | 7.000 | 5.100 | 4.100 | 3.500 | 3.000 |
| | | vf | 2.700 | 2.500 | 2.200 | 2.000 | 2.500 | 2.400 | 2.200 | 1.800 | 1.800 |

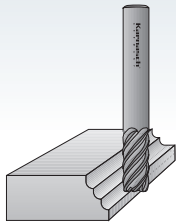
Processing information:

1. Conditions must be: rigid machine circumstances and excellent holders.
2. Reduce the cutting data when you machine with long neck length.
3. The stated cutting data belongs to a neck length of max 4xD and a tapered workpiece of max. 15°.
4. If the corner radius of the workpiece contour is smaller than 1,5x end mill radius or the workpiece contour is too steep, you have to reduce the cutting data up to 50%

30 6434 30 6485
30 6435 30 6439

Empfohlene Schnittdaten für VHM-Radiusfräser HSC/HHC-beschichtet Recommended cutting data for solid carbide end mills, coated –3D– HSC/HHC

Z 4-6



30 6434 30 6435

30 6439

ae < 0,05 × d1
ap < 0,02 × d1

Z 2



30 6485

ae = 0,05 × d1
ap = 0,02 × d1

| d1 | 1 Werkzeugstähle / Tool steel < 1200 N/mm ² Vc = 300 - 400 m/min | | | | | 2 Vergütungsstähle / Heat treatable steel < 1600 N/mm ² Vc = 280 - 370 m/min | | | | | 3 gehärtete Stähle / Hardened steel < 54 HRC Vc = 220 - 260 m/min | | | | |
|-----|--|-------|--------|-------|---------|--|-------|--------|-------|---------|--|-------|--------|-------|---------|
| | Vc | fz | n | Vf/Z2 | Vf/Z4-6 | Vc | fz | n | Vf/Z2 | Vf/Z4-6 | Vc | fz | n | Vf/Z2 | Vf/Z4-6 |
| 1-3 | 300 | 0,04 | 32.000 | 2.600 | 5.200 | 280 | 0,04 | 30.000 | 2.400 | 4.800 | 220 | 0,04 | 25.000 | 2.000 | 4.000 |
| | 400 | 0,04 | 43.000 | 3.400 | 6.800 | 370 | 0,04 | 40.000 | 3.200 | 6.400 | 260 | 0,04 | 28.000 | 2.200 | 4.400 |
| 4 | 300 | 0,045 | 24.000 | 2.200 | 4.400 | 280 | 0,045 | 23.000 | 2.000 | 4.000 | 220 | 0,045 | 18.000 | 1.700 | 3.400 |
| | 400 | 0,045 | 32.000 | 2.900 | 5.800 | 370 | 0,045 | 31.000 | 2.700 | 5.400 | 260 | 0,045 | 21.000 | 1.900 | 3.800 |
| 5 | 300 | 0,05 | 19.000 | 2.000 | 4.000 | 280 | 0,05 | 18.000 | 1.800 | 3.600 | 220 | 0,05 | 15.000 | 1.500 | 3.000 |
| | 400 | 0,05 | 26.000 | 2.500 | 5.000 | 370 | 0,05 | 24.000 | 2.400 | 4.800 | 260 | 0,05 | 17.000 | 1.700 | 3.400 |
| 6 | 300 | 0,055 | 16.000 | 1.700 | 3.400 | 280 | 0,055 | 15.000 | 1.600 | 3.200 | 220 | 0,055 | 12.000 | 1.300 | 2.600 |
| | 400 | 0,055 | 22.000 | 2.400 | 4.800 | 370 | 0,055 | 20.000 | 2.200 | 4.400 | 260 | 0,055 | 14.000 | 1.500 | 3.000 |
| 8 | 300 | 0,065 | 12.000 | 1.600 | 3.200 | 280 | 0,065 | 11.000 | 1.500 | 3.000 | 220 | 0,065 | 9.000 | 1.200 | 2.400 |
| | 400 | 0,065 | 16.000 | 2.000 | 4.000 | 370 | 0,065 | 15.000 | 2.000 | 4.000 | 260 | 0,065 | 11.000 | 1.400 | 2.800 |
| 10 | 300 | 0,07 | 9.000 | 1.500 | 3.000 | 280 | 0,07 | 9.000 | 1.300 | 2.600 | 220 | 0,07 | 7.000 | 1.000 | 2.000 |
| | 400 | 0,07 | 13.000 | 2.000 | 4.000 | 370 | 0,07 | 12.000 | 1.700 | 3.400 | 260 | 0,07 | 9.000 | 1.200 | 2.400 |
| 12 | 300 | 0,08 | 8.000 | 1.300 | 2.600 | 280 | 0,08 | 7.000 | 1.200 | 2.400 | 220 | 0,08 | 6.000 | 1.000 | 2.000 |
| | 400 | 0,08 | 11.000 | 1.700 | 3.400 | 370 | 0,08 | 10.000 | 1.600 | 3.200 | 260 | 0,08 | 7.000 | 1.100 | 2.200 |
| 16 | 300 | 0,09 | 6.000 | 1.100 | 2.200 | 280 | 0,09 | 5.500 | 1.000 | 2.000 | 220 | 0,09 | 4.500 | 800 | 1.600 |
| | 400 | 0,09 | 8.000 | 1.400 | 2.800 | 370 | 0,09 | 7.600 | 1.350 | 2.700 | 260 | 0,09 | 5.200 | 900 | 1.800 |

| d1 | 4 gehärtete Stähle / hardened steel < 68 HRC Vc = 100 - 150 m/min | | | | | 5 Cr - Ni - Legierungen / Cr-Ni alloys < 900 N/mm ² Vc = 440 - 600 m/min | | | | | 6 Titanlegierungen / Titanium alloys < 850 N/mm ² Vc = 400 - 500 m/min | | | | |
|-----|--|-------|--------|-------|---------|--|-------|--------|-------|---------|--|-------|--------|-------|---------|
| | Vc | fz | n | Vf/Z2 | Vf/Z4-6 | Vc | fz | n | Vf/Z2 | Vf/Z4-6 | Vc | fz | n | Vf/Z2 | Vf/Z4-6 |
| 1-3 | 100 | 0,04 | 11.000 | 900 | 1.800 | 440 | 0,04 | 48.000 | 4.000 | 8.000 | 400 | 0,04 | 43.000 | 3.400 | 6.800 |
| | 150 | 0,04 | 16.000 | 1.300 | 2.600 | 600 | 0,04 | 64.000 | 5.100 | 10.200 | 500 | 0,04 | 53.000 | 4.300 | 8.600 |
| 4 | 100 | 0,045 | 8.000 | 700 | 1.400 | 440 | 0,045 | 36.000 | 3.200 | 6.400 | 400 | 0,045 | 32.000 | 2.900 | 5.800 |
| | 150 | 0,045 | 12.000 | 1.100 | 2.200 | 600 | 0,045 | 48.000 | 4.300 | 8.600 | 500 | 0,045 | 40.000 | 3.600 | 7.200 |
| 5 | 100 | 0,05 | 6.000 | 600 | 1.200 | 440 | 0,05 | 29.000 | 2.800 | 5.600 | 400 | 0,05 | 26.000 | 2.600 | 5.200 |
| | 150 | 0,05 | 9.000 | 1.000 | 2.000 | 600 | 0,05 | 38.000 | 3.800 | 7.600 | 500 | 0,05 | 32.000 | 3.200 | 6.400 |
| 6 | 100 | 0,055 | 5.000 | 500 | 1.000 | 440 | 0,055 | 24.000 | 2.600 | 5.200 | 400 | 0,055 | 21.000 | 2.300 | 4.600 |
| | 150 | 0,055 | 8.000 | 900 | 1.800 | 600 | 0,055 | 32.000 | 3.500 | 7.000 | 500 | 0,055 | 27.000 | 2.900 | 5.800 |
| 8 | 100 | 0,065 | 4.000 | 500 | 1.000 | 440 | 0,065 | 18.000 | 2.300 | 4.600 | 400 | 0,065 | 16.000 | 2.100 | 4.200 |
| | 150 | 0,065 | 6.000 | 800 | 1.600 | 600 | 0,065 | 24.000 | 3.100 | 6.200 | 500 | 0,065 | 20.000 | 2.600 | 5.200 |
| 10 | 100 | 0,07 | 3.000 | 400 | 800 | 440 | 0,07 | 15.000 | 2.000 | 4.000 | 400 | 0,07 | 13.000 | 1.800 | 3.600 |
| | 150 | 0,07 | 5.000 | 700 | 1.400 | 600 | 0,07 | 19.000 | 2.700 | 5.400 | 500 | 0,07 | 16.000 | 2.200 | 4.400 |
| 12 | 100 | 0,08 | 3.000 | 400 | 800 | 440 | 0,08 | 12.000 | 1.900 | 3.800 | 400 | 0,08 | 11.000 | 1.700 | 3.400 |
| | 150 | 0,08 | 4.000 | 600 | 1.200 | 600 | 0,08 | 16.000 | 2.600 | 5.200 | 500 | 0,08 | 13.000 | 2.100 | 4.100 |
| 16 | 100 | 0,09 | 2.000 | 350 | 700 | 440 | 0,09 | 9.000 | 1.600 | 3.200 | 400 | 0,09 | 8.000 | 1.500 | 3.000 |
| | 150 | 0,09 | 3.000 | 520 | 1.040 | 600 | 0,09 | 12.000 | 2.100 | 4.100 | 500 | 0,09 | 10.000 | 1.800 | 3.600 |

| d1 | 7 GG Grauguss / Cast iron < 240 HB-Gusslegierungen (< 900 N/mm ²) • Vc = 700 - 900 m/min | | | | | 8 Graphit / Graphite Vc = 800 - 1200 m/min | | | | | 9 Alulegierungen / Aluminum alloys < 600 N/mm ² Vc = 1000 - 3000 m/min | | | | |
|-----|--|-------|--------|-------|---------|---|-------|---------|--------|---------|--|-------|---------|--------|---------|
| | Vc | fz | n | Vf/Z2 | Vf/Z4-6 | Vc | fz | n | Vf/Z2 | Vf/Z4-6 | Vc | fz | n | Vf/Z2 | Vf/Z4-6 |
| 1-3 | 700 | 0,04 | 80.000 | 6.400 | 12.800 | 800 | 0,05 | 85.000 | 9.000 | 18.000 | 1.000 | 0,05 | 106.000 | 11.000 | 22.000 |
| | 900 | 0,04 | 96.000 | 7.700 | 15.400 | 1.200 | 0,05 | 128.000 | 13.000 | 26.000 | 3.000 | 0,05 | 320.000 | 32.000 | 64.000 |
| 4 | 700 | 0,045 | 60.000 | 5.400 | 10.800 | 800 | 0,055 | 64.000 | 7.000 | 14.000 | 1.000 | 0,055 | 80.000 | 9.000 | 18.000 |
| | 900 | 0,045 | 72.000 | 6.500 | 13.000 | 1.200 | 0,055 | 96.000 | 11.000 | 22.000 | 3.000 | 0,055 | 240.000 | 26.000 | 52.000 |
| 5 | 700 | 0,05 | 48.000 | 4.800 | 9.600 | 800 | 0,06 | 51.000 | 6.100 | 12.200 | 1.000 | 0,06 | 64.000 | 7.700 | 15.400 |
| | 900 | 0,05 | 57.000 | 5.700 | 11.400 | 1.200 | 0,06 | 75.000 | 9.200 | 18.400 | 3.000 | 0,06 | 190.000 | 23.000 | 46.000 |
| 6 | 700 | 0,055 | 40.000 | 4.400 | 8.800 | 800 | 0,065 | 43.000 | 5.500 | 11.000 | 1.000 | 0,065 | 53.000 | 7.000 | 14.000 |
| | 900 | 0,055 | 48.000 | 5.300 | 10.600 | 1.200 | 0,065 | 64.000 | 8.300 | 16.600 | 3.000 | 0,065 | 160.000 | 21.000 | 42.000 |
| 8 | 700 | 0,065 | 30.000 | 3.900 | 7.800 | 800 | 0,075 | 32.000 | 4.800 | 9.600 | 1.000 | 0,075 | 40.000 | 6.000 | 12.000 |
| | 900 | 0,065 | 36.000 | 4.700 | 9.400 | 1.200 | 0,075 | 48.000 | 7.200 | 14.400 | 3.000 | 0,075 | 120.000 | 18.000 | 36.000 |
| 10 | 700 | 0,07 | 24.000 | 3.300 | 6.600 | 800 | 0,08 | 26.000 | 4.100 | 8.200 | 1.000 | 0,08 | 32.000 | 5.000 | 10.000 |
| | 900 | 0,07 | 29.000 | 4.000 | 8.000 | 1.200 | 0,08 | 39.000 | 6.200 | 12.400 | 3.000 | 0,08 | 96.000 | 15.000 | 30.000 |
| 12 | 700 | 0,08 | 20.000 | 3.200 | 6.400 | 800 | 0,09 | 22.000 | 3.800 | 7.600 | 1.000 | 0,09 | 27.000 | 4.800 | 9.600 |
| | 900 | 0,08 | 24.000 | 3.800 | 7.600 | 1.200 | 0,09 | 32.000 | 5.700 | 11.400 | 3.000 | 0,09 | 80.000 | 14.000 | 28.000 |
| 16 | 700 | 0,09 | 15.000 | 2.700 | 5.400 | 800 | 0,100 | 16.000 | 3.200 | 6.400 | 1.000 | 0,100 | 20.000 | 4.000 | 8.000 |
| | 900 | 0,09 | 18.000 | 3.200 | 6.400 | 1.200 | 0,100 | 24.000 | 4.800 | 9.600 | 3.000 | 0,100 | 60.000 | 12.000 | 24.000 |

Bei Werkzeugen mit großer Auskraglänge sollte der Vorschub je nach geforderter Oberflächengüte reduziert werden.
Tools with a larger projection length the feed should be reduced according to the required surface quality.

Tabelle zur Ermittlung der Senktiefe für Kegelsenker auf CNC-Bearbeitungsmaschinen
 Tables for determination of the counter bore depth for calculating cone counter borer on CNC processing machines

30 6497

20 1755

40 3045

| d1 * d3 Außen- Senkungs-Ø Countersink Ø | Ø 31,0 4,2 [-0,2] Z-Wert Z-value | Ø 25,0 3,8 [-0,2] Z-Wert Z-value | Ø 20,5 3,5 [-0,2] Z-Wert Z-value | Ø 16,5 3,2 [-0,2] Z-Wert Z-value | Ø 15,0 3,2 [-0,2] Z-Wert Z-value | Ø 12,4 2,8 [-0,2] Z-Wert Z-value | Ø 10,4 2,5 [-0,2] Z-Wert Z-value | Ø 8,3 2,0 [-0,2] Z-Wert Z-value | Ø 6,3 1,5 [-0,2] Z-Wert Z-value |
|---|---|---|---|---|---|---|---|--|--|
| 4 mm | 0 | -0,15 | -0,3 | -0,45 | -0,45 | -0,65 | -0,8 | -1,05 | -1,3 |
| 6 mm | -0,95 | -1,15 | -1,3 | -1,45 | -1,45 | -1,65 | -1,8 | -2,05 | -2,3 |
| 8 mm | -1,95 | -2,15 | -2,3 | -2,45 | -2,45 | -2,65 | -2,8 | -3,05 | |
| 10 mm | -2,95 | -3,15 | -3,3 | -3,45 | -3,45 | -3,65 | -3,8 | | |
| 12 mm | -3,95 | -4,15 | -4,3 | -4,45 | -4,45 | -4,65 | | | |
| 14 mm | 4,95 | -5,15 | -5,3 | -5,45 | -5,45 | | | | |
| 16 mm | -5,95 | -6,15 | -6,3 | -6,35 | | | | | |
| 20 mm | -7,95 | -8,15 | -8,3 | | | | | | |
| 24 mm | -9,95 | -10,15 | | | | | | | |
| 30 mm | -12,95 | | | | | | | | |

**Nicht für 3-Backenfutter geeignet!
 Not suitable for 3 jaw chucks!**

Alle Z-Maße mitte Toleranz/All Z dimensions middle tolerance

Senktiefe ermitteln am Einstellgerät oder Fertigenradius minus Radius
 d3 = Senktiefe (nicht nachgeschliffene Senker)
 * d3 Angaben mit Fertigungstoleranz.

Counter bore depth calculated on the adjustment device or finished
 counter bore radius minus radius d3 = counter bored depth (not retro-
 ground counter borer)
 * d3 information including finishing tolerance.

Schnittdaten für Vollhartmetall Kegelsenker
 Cutting data for solid carbide countersinks

30 6497

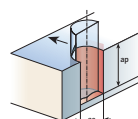
20 1755

| Werkstoff Workpiece material | Werkstoffgruppe Material group | Schnittgeschwindigkeit Vc (m/min) cutting speed Vc (m/min) | Vorschub f (mm/U) bei Senker-Ø feed f (mm/U) for countersinker Ø | | |
|--|-----------------------------------|---|---|-------------|-------------|
| | | | <6 | 8-12,4 | 16,5-31 |
| Stahl bis 500 N/mm ² steel up to 500 N/mm ² | 1.1 - 1.2 | 45 - 75 | 0,03 - 0,08 | 0,08 - 0,10 | 0,10 - 0,20 |
| Stahl bis 800 N/mm ² steel up to 800 N/mm ² | 1.3 - 1.4 | 45 - 75 | 0,03 - 0,08 | 0,08 - 0,10 | 0,10 - 0,20 |
| Stahl über 800 N/mm ² steel over 800 N/mm ² | 1.5 | 30 - 45 | 0,02 - 0,05 | 0,04 - 0,08 | 0,08 - 0,10 |
| rostfreier Stahl stainless steel | 2.1-2.2-2.3-2.4 | 22 - 40 | 0,02 - 0,05 | 0,04 - 0,08 | 0,08 - 0,10 |
| hochhitzebeständiger Stahl heat resisting steel | 1.6 | 12 - 24 | 0,02 - 0,04 | 0,03 - 0,06 | 0,06 - 0,08 |
| Grau-, Temper-, Hartguss cast iron, malleable cast iron | 7.1-7.2-7.3 | 22 - 45 | 0,04 - 0,08 | 0,08 - 0,12 | 0,12 - 0,16 |
| HHC < 65 HRC HHC < 65 HRC | 8.1-8.2 | 25 - 45 | 0,03 - 0,07 | 0,05 - 0,1 | 0,1 - 0,15 |
| Alu, Alulegierung über 80 HB aluminum, alu. alloy over 80 HB | 9.1-9.2 | 75 - 150 | 0,04 - 0,10 | 0,10 - 0,20 | 0,16 - 0,25 |
| Messing, Bronze, Kupfer, Rotguss brass, bronze, copper, leaded bronze all | 10.1-10.2-10.3 | 38 - 75 | 0,04 - 0,08 | 0,08 - 0,12 | 0,12 - 0,16 |
| Kunststoffe plastics | 11.1-11.2-11.3-11.4 | 38 - 75 | 0,03 - 0,08 | 0,08 - 0,12 | 0,12 - 0,20 |

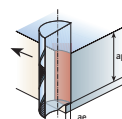
Empfohlene Schnittdaten für Karnasch · HPC · INOX Fräser
 Recommended cutting data for Karnasch · high performance stainless steel end mills

30 7415

| Werkstoffgruppe Material group | < 700 N/mm ² 4.1 | | < 700 N/mm ² 4.2 | | < 1100 N/mm ² | |
|-----------------------------------|--------------------------------|-------|--------------------------------|-------|--------------------------|-------|
| | Vc mm/ min | fz/mm | Vc mm/ min | fz/mm | Vc mm/ min | fz/mm |
| 3,0 | 130 | 0,020 | 120 | 0,020 | 100 | 0,020 |
| 4,0 | 130 | 0,020 | 120 | 0,020 | 100 | 0,020 |
| 5,0 | 130 | 0,020 | 120 | 0,020 | 100 | 0,020 |
| 6,0 | 130 | 0,030 | 120 | 0,030 | 100 | 0,030 |
| 8,0 | 130 | 0,040 | 120 | 0,040 | 100 | 0,040 |
| 10,0 | 130 | 0,050 | 120 | 0,050 | 100 | 0,050 |
| 12,0 | 130 | 0,060 | 120 | 0,060 | 100 | 0,060 |
| 16,0 | 130 | 0,080 | 120 | 0,080 | 100 | 0,080 |
| 20,0 | 130 | 0,100 | 120 | 0,100 | 100 | 0,100 |



$ap = 1 \times D$ $ae = 1 \times D$



$ap = 2 \times D$ $ae = 0,02 \times D$



| Werkstoffgruppe Material Group | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels <850 N/mm ² | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat treated steels <35 HRC (1200 N/mm ²) | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 - 4.1 - 4.2 - 4.3 Vergütungsstähle - Rostfreie Stähle / Heat treated steels - Stainless steels 35 - 45 HRC | | | |
|-----------------------------------|-----|---|-----------|-------|-------|--|-----------|-------|-------|--|-----------|-------|-------|
| d1 | r | min ⁻¹ | Vf mm/min | fz mm | ap mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | min ⁻¹ | Vf mm/min | fz mm | ap mm |
| 1 | 0,1 | 26.000 | 1.248 | 0,012 | 0,010 | 24.000 | 1.152 | 0,012 | 0,010 | 20.000 | 800 | 0,010 | 0,010 |
| 1 | 0,2 | 26.000 | 1.248 | 0,012 | 0,015 | 24.000 | 1.152 | 0,012 | 0,015 | 20.000 | 800 | 0,010 | 0,010 |
| 2 | 0,2 | 20.000 | 3.200 | 0,040 | 0,036 | 18.000 | 2.880 | 0,040 | 0,036 | 16.000 | 2.048 | 0,032 | 0,012 |
| 3 | 0,3 | 13.500 | 4.104 | 0,076 | 0,060 | 12.000 | 2.880 | 0,060 | 0,060 | 10.800 | 2.592 | 0,060 | 0,024 |
| 4 | 0,2 | 10.000 | 4.320 | 0,108 | 0,050 | 9.000 | 3.600 | 0,100 | 0,050 | 8.000 | 2.560 | 0,080 | 0,016 |
| 4 | 0,4 | 10.000 | 4.320 | 0,108 | 0,100 | 9.000 | 3.600 | 0,100 | 0,100 | 8.000 | 2.560 | 0,080 | 0,032 |
| 4 | 0,5 | 10.000 | 4.320 | 0,108 | 0,120 | 9.000 | 3.600 | 0,100 | 0,120 | 8.000 | 2.560 | 0,080 | 0,040 |
| 4 | 1,0 | 10.000 | 4.320 | 0,108 | 0,240 | 9.000 | 3.600 | 0,100 | 0,240 | 8.000 | 2.560 | 0,080 | 0,080 |
| 5 | 0,5 | 8.000 | 3.840 | 0,120 | 0,120 | 7.000 | 3.360 | 0,120 | 0,120 | 6.500 | 2.600 | 0,100 | 0,040 |
| 5 | 1,0 | 8.000 | 3.840 | 0,120 | 0,240 | 7.000 | 3.360 | 0,120 | 0,240 | 6.500 | 2.600 | 0,100 | 0,080 |
| 6 | 0,2 | 6.500 | 4.160 | 0,160 | 0,048 | 6.000 | 3.840 | 0,160 | 0,048 | 5.500 | 2.640 | 0,120 | 0,016 |
| 6 | 0,5 | 6.500 | 4.160 | 0,160 | 0,120 | 6.000 | 3.840 | 0,160 | 0,120 | 5.500 | 2.640 | 0,120 | 0,040 |
| 6 | 1,0 | 6.500 | 4.160 | 0,160 | 0,240 | 6.000 | 3.840 | 0,160 | 0,240 | 5.500 | 2.640 | 0,120 | 0,080 |
| 6 | 1,5 | 6.500 | 4.160 | 0,160 | 0,360 | 6.000 | 3.840 | 0,160 | 0,360 | 5.500 | 2.640 | 0,120 | 0,120 |
| 8 | 0,2 | 5.000 | 4.400 | 0,220 | 0,048 | 4.500 | 3.600 | 0,200 | 0,048 | 4.000 | 2.560 | 0,160 | 0,016 |
| 8 | 0,5 | 5.000 | 4.400 | 0,220 | 0,120 | 4.500 | 3.600 | 0,200 | 0,120 | 4.000 | 2.560 | 0,160 | 0,040 |
| 8 | 1,0 | 5.000 | 4.400 | 0,220 | 0,240 | 4.500 | 3.600 | 0,200 | 0,240 | 4.000 | 2.560 | 0,160 | 0,080 |
| 8 | 1,5 | 5.000 | 4.400 | 0,220 | 0,360 | 4.500 | 3.600 | 0,200 | 0,360 | 4.000 | 2.560 | 0,160 | 0,120 |
| 8 | 2,0 | 5.000 | 4.400 | 0,220 | 0,480 | 4.500 | 3.600 | 0,200 | 0,480 | 4.000 | 2.560 | 0,160 | 0,160 |
| 10 | 0,2 | 4.000 | 4.480 | 0,280 | 0,048 | 3.500 | 3.640 | 0,260 | 0,048 | 3.500 | 2.800 | 0,200 | 0,016 |
| 10 | 0,5 | 4.000 | 4.480 | 0,280 | 0,120 | 3.500 | 3.640 | 0,260 | 0,120 | 3.500 | 2.800 | 0,200 | 0,040 |
| 10 | 1,0 | 4.000 | 4.480 | 0,280 | 0,240 | 3.500 | 3.640 | 0,260 | 0,240 | 3.500 | 2.800 | 0,200 | 0,080 |
| 10 | 1,5 | 4.000 | 4.480 | 0,280 | 0,360 | 3.500 | 3.640 | 0,260 | 0,360 | 3.500 | 2.800 | 0,200 | 0,120 |
| 10 | 2,0 | 4.000 | 4.480 | 0,280 | 0,480 | 3.500 | 3.640 | 0,260 | 0,480 | 3.500 | 2.800 | 0,200 | 0,160 |
| 12 | 0,5 | 3.500 | 4.480 | 0,320 | 0,120 | 3.000 | 3.840 | 0,320 | 0,120 | 3.000 | 2.640 | 0,220 | 0,040 |
| 12 | 1,0 | 3.500 | 4.480 | 0,320 | 0,240 | 3.000 | 3.840 | 0,320 | 0,240 | 3.000 | 2.640 | 0,220 | 0,080 |
| 12 | 1,5 | 3.500 | 4.480 | 0,320 | 0,300 | 3.000 | 3.840 | 0,320 | 0,300 | 3.000 | 2.640 | 0,220 | 0,120 |
| 12 | 2,0 | 3.500 | 4.480 | 0,320 | 0,480 | 3.000 | 3.840 | 0,320 | 0,480 | 3.000 | 2.640 | 0,220 | 0,160 |

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. Verwenden Sie ausschließlich stabile und hochgenaue Maschinen. Wir empfehlen beim fräsen in Ecken den Vorschub um ca. 50% zu reduzieren. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio. Use only accurate and highly rigid machines. We recommend to reduce the feed rate about 50% when milling in corners.

| Werkstoffgruppe Material Group | | 8.1 Gehärtete Stähle / Hardened steels 45 - 55 HRC | | | | 8.2-8.3 Gehärtete Stähle / Hardened steels 55 - 70 HRC | | | |
|-----------------------------------|-----|--|-----------|-------|-------|--|-----------|-------|-------|
| | | min ⁻¹ | Vf mm/min | fz mm | ap mm | min ⁻¹ | Vf mm/min | fz mm | ap mm |
| 1 | 0,1 | 16.000 | 640 | 0,010 | 0,060 | 12.000 | 288 | 0,006 | 0,050 |
| 1 | 0,2 | 16.000 | 640 | 0,010 | 0,080 | 12.000 | 288 | 0,006 | 0,050 |
| 2 | 0,2 | 13.000 | 1.664 | 0,032 | 0,025 | 11.000 | 528 | 0,012 | 0,018 |
| 3 | 0,3 | 8.500 | 2.040 | 0,060 | 0,050 | 7.500 | 600 | 0,020 | 0,035 |
| 4 | 0,2 | 6.500 | 2.080 | 0,080 | 0,035 | 5.500 | 704 | 0,032 | 0,025 |
| 4 | 0,4 | 6.500 | 2.080 | 0,080 | 0,070 | 5.500 | 704 | 0,032 | 0,045 |
| 4 | 0,5 | 6.500 | 2.080 | 0,080 | 0,090 | 5.500 | 704 | 0,032 | 0,060 |
| 4 | 1,0 | 6.500 | 2.080 | 0,080 | 0,180 | 5.500 | 704 | 0,032 | 0,120 |
| 5 | 0,5 | 5.000 | 2.000 | 0,100 | 0,090 | 4.500 | 720 | 0,040 | 0,060 |
| 5 | 1,0 | 5.000 | 2.000 | 0,100 | 0,180 | 4.500 | 720 | 0,040 | 0,120 |
| 6 | 0,2 | 4.500 | 2.160 | 0,120 | 0,035 | 4.000 | 768 | 0,048 | 0,025 |
| 6 | 0,5 | 4.500 | 2.160 | 0,120 | 0,090 | 4.000 | 768 | 0,048 | 0,060 |
| 6 | 1,0 | 4.500 | 2.160 | 0,120 | 0,180 | 4.000 | 768 | 0,048 | 0,120 |
| 6 | 1,5 | 4.500 | 2.160 | 0,120 | 0,270 | 4.000 | 768 | 0,048 | 0,180 |
| 8 | 0,2 | 3.500 | 2.240 | 0,160 | 0,035 | 3.000 | 768 | 0,064 | 0,025 |
| 8 | 0,5 | 3.500 | 2.240 | 0,160 | 0,090 | 3.000 | 768 | 0,064 | 0,060 |
| 8 | 1,0 | 3.500 | 2.240 | 0,160 | 0,180 | 3.000 | 768 | 0,064 | 0,120 |
| 8 | 1,5 | 3.500 | 2.240 | 0,160 | 0,250 | 3.000 | 768 | 0,064 | 0,180 |
| 8 | 2,0 | 3.500 | 2.240 | 0,160 | 0,350 | 3.000 | 768 | 0,064 | 0,240 |
| 10 | 0,2 | 2.500 | 2.000 | 0,200 | 0,035 | 2.500 | 800 | 0,080 | 0,025 |
| 10 | 0,5 | 2.500 | 2.000 | 0,200 | 0,090 | 2.500 | 800 | 0,080 | 0,060 |
| 10 | 1,0 | 2.500 | 2.000 | 0,200 | 0,180 | 2.500 | 800 | 0,080 | 0,120 |
| 10 | 1,5 | 2.500 | 2.000 | 0,200 | 0,250 | 2.500 | 800 | 0,080 | 0,180 |
| 10 | 2,0 | 2.500 | 2.000 | 0,200 | 0,350 | 2.500 | 800 | 0,080 | 0,240 |
| 12 | 0,5 | 2.000 | 1.760 | 0,220 | 0,090 | 2.000 | 736 | 0,092 | 0,060 |
| 12 | 1,0 | 2.000 | 1.760 | 0,220 | 0,180 | 2.000 | 736 | 0,092 | 0,120 |
| 12 | 1,5 | 2.000 | 1.760 | 0,220 | 0,250 | 2.000 | 736 | 0,092 | 0,150 |
| 12 | 2,0 | 2.000 | 1.760 | 0,220 | 0,350 | 2.000 | 736 | 0,092 | 0,240 |

1



2



3



4



5



6



7



8



9



Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. Verwenden Sie ausschließlich stabile und hochgenaue Maschinen. Wir empfehlen beim fräsen in Ecken den Vorschub um ca. 50% zu reduzieren. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio. Use only accurate and highly rigid machines. We recommend to reduce the feed rate about 50% when milling in corners.

Schruppen Roughing

| Werkstoffgruppe Material Group | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels < 850 N/mm ² | | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat treated steels < 35 HRC (1200 N/mm ²) | | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 - 4.1 - 4.2 - 4.3 Vergütungsstahl - Rostfreie Stähle / Heat treated steels - Stainless steels 35 - 45 HRC | | | | | |
|-----------------------------------|-----|--|-----------|-------|-------|-------|-------------------|---|-------|-------|-------|-------------------|-----------|---|-------|-------|--|--|--|
| d1 | r | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | | | |
| 1 | 0,1 | 26.000 | 3.120 | 0,03 | 0,010 | 0,4 | 24.000 | 2.880 | 0,03 | 0,010 | 0,4 | 20.000 | 2.000 | 0,025 | 0,01 | 0,4 | | | |
| 1 | 0,2 | 26.000 | 3.120 | 0,03 | 0,015 | 0,4 | 24.000 | 2.880 | 0,03 | 0,015 | 0,4 | 20.000 | 2.000 | 0,025 | 0,01 | 0,4 | | | |
| 2 | 0,2 | 20.000 | 8.000 | 0,10 | 0,036 | 0,8 | 18.000 | 7.200 | 0,10 | 0,036 | 0,8 | 16.000 | 5.120 | 0,080 | 0,03 | 0,8 | | | |
| 3 | 0,3 | 13.500 | 10.260 | 0,19 | 0,060 | 1,2 | 12.000 | 7.200 | 0,15 | 0,060 | 1,2 | 10.800 | 6.480 | 0,150 | 0,06 | 1,2 | | | |
| 4 | 0,2 | 10.000 | 10.800 | 0,27 | 0,050 | 1,8 | 9.000 | 9.000 | 0,25 | 0,050 | 1,8 | 8.000 | 6.400 | 0,200 | 0,04 | 1,8 | | | |
| 4 | 0,4 | 10.000 | 10.800 | 0,27 | 0,100 | 1,6 | 9.000 | 9.000 | 0,25 | 0,100 | 1,6 | 8.000 | 6.400 | 0,200 | 0,08 | 1,6 | | | |
| 4 | 0,5 | 10.000 | 10.800 | 0,27 | 0,120 | 1,5 | 9.000 | 9.000 | 0,25 | 0,120 | 1,5 | 8.000 | 6.400 | 0,200 | 0,10 | 1,5 | | | |
| 4 | 1,0 | 10.000 | 10.800 | 0,27 | 0,240 | 1,0 | 9.000 | 9.000 | 0,25 | 0,240 | 1,0 | 8.000 | 6.400 | 0,200 | 0,20 | 1,0 | | | |
| 5 | 0,5 | 8.000 | 9.600 | 0,30 | 0,120 | 2,0 | 7.000 | 8.400 | 0,30 | 0,120 | 2,0 | 6.500 | 6.500 | 0,250 | 0,10 | 2,0 | | | |
| 5 | 1,0 | 8.000 | 9.600 | 0,30 | 0,240 | 1,5 | 7.000 | 8.400 | 0,30 | 0,240 | 1,5 | 6.500 | 6.500 | 0,250 | 0,20 | 1,5 | | | |
| 6 | 0,2 | 6.500 | 10.400 | 0,40 | 0,048 | 2,8 | 6.000 | 9.600 | 0,40 | 0,048 | 2,8 | 5.500 | 6.600 | 0,300 | 0,04 | 2,8 | | | |
| 6 | 0,5 | 6.500 | 10.400 | 0,40 | 0,120 | 2,5 | 6.000 | 9.600 | 0,40 | 0,120 | 2,5 | 5.500 | 6.600 | 0,300 | 0,10 | 2,5 | | | |
| 6 | 1,0 | 6.500 | 10.400 | 0,40 | 0,240 | 2,0 | 6.000 | 9.600 | 0,40 | 0,240 | 2,0 | 5.500 | 6.600 | 0,300 | 0,20 | 2,0 | | | |
| 6 | 1,5 | 6.500 | 10.400 | 0,40 | 0,360 | 1,5 | 6.000 | 9.600 | 0,40 | 0,360 | 1,5 | 5.500 | 6.600 | 0,300 | 0,30 | 1,5 | | | |
| 8 | 0,2 | 5.000 | 11.000 | 0,55 | 0,048 | 3,8 | 4.500 | 9.000 | 0,50 | 0,048 | 3,8 | 4.000 | 6.400 | 0,400 | 0,04 | 3,8 | | | |
| 8 | 0,5 | 5.000 | 11.000 | 0,55 | 0,120 | 3,5 | 4.500 | 9.000 | 0,50 | 0,120 | 3,5 | 4.000 | 6.400 | 0,400 | 0,10 | 3,5 | | | |
| 8 | 1,0 | 5.000 | 11.000 | 0,55 | 0,240 | 3,0 | 4.500 | 9.000 | 0,50 | 0,240 | 3,0 | 4.000 | 6.400 | 0,400 | 0,20 | 3,0 | | | |
| 8 | 1,5 | 5.000 | 11.000 | 0,55 | 0,360 | 2,5 | 4.500 | 9.000 | 0,50 | 0,360 | 2,5 | 4.000 | 6.400 | 0,400 | 0,30 | 2,5 | | | |
| 8 | 2,0 | 5.000 | 11.000 | 0,55 | 0,480 | 2,0 | 4.500 | 9.000 | 0,50 | 0,480 | 2,0 | 4.000 | 6.400 | 0,400 | 0,40 | 2,0 | | | |
| 10 | 0,2 | 4.000 | 11.200 | 0,70 | 0,048 | 4,8 | 3.500 | 9.100 | 0,65 | 0,048 | 4,8 | 3.500 | 7.000 | 0,500 | 0,04 | 4,8 | | | |
| 10 | 0,5 | 4.000 | 11.200 | 0,70 | 0,120 | 4,5 | 3.500 | 9.100 | 0,65 | 0,120 | 4,5 | 3.500 | 7.000 | 0,500 | 0,10 | 4,5 | | | |
| 10 | 1,0 | 4.000 | 11.200 | 0,70 | 0,240 | 4,0 | 3.500 | 9.100 | 0,65 | 0,240 | 4,0 | 3.500 | 7.000 | 0,500 | 0,20 | 4,0 | | | |
| 10 | 1,5 | 4.000 | 11.200 | 0,70 | 0,360 | 3,5 | 3.500 | 9.100 | 0,65 | 0,360 | 3,5 | 3.500 | 7.000 | 0,500 | 0,30 | 3,5 | | | |
| 10 | 2,0 | 4.000 | 11.200 | 0,70 | 0,480 | 3,0 | 3.500 | 9.100 | 0,65 | 0,480 | 3,0 | 3.500 | 7.000 | 0,500 | 0,40 | 3,0 | | | |
| 12 | 0,5 | 3.500 | 11.200 | 0,80 | 0,120 | 5,5 | 3.000 | 9.600 | 0,80 | 0,120 | 5,5 | 3.000 | 6.600 | 0,550 | 0,10 | 5,5 | | | |
| 12 | 1,0 | 3.500 | 11.200 | 0,80 | 0,240 | 5,0 | 3.000 | 9.600 | 0,80 | 0,240 | 5,0 | 3.000 | 6.600 | 0,550 | 0,20 | 5,0 | | | |
| 12 | 1,5 | 3.500 | 11.200 | 0,80 | 0,300 | 4,5 | 3.000 | 9.600 | 0,80 | 0,300 | 4,5 | 3.000 | 6.600 | 0,550 | 0,30 | 4,5 | | | |
| 12 | 2,0 | 3.500 | 11.200 | 0,80 | 0,480 | 4,0 | 3.000 | 9.600 | 0,80 | 0,480 | 4,0 | 3.000 | 6.600 | 0,550 | 0,40 | 4,0 | | | |

Schlichten Finishing

| Werkstoffgruppe Material Group | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels < 850 N/mm ² | | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat treated steels < 35 HRC (1200 N/mm ²) | | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 - 4.1 - 4.2 - 4.3 Vergütungsstahl - Rostfreie Stähle / Heat treated steels - Stainless steels 35 - 45 HRC | | | | | |
|-----------------------------------|-----|--|-----------|-------|-------|-------|-------------------|---|-------|-------|-------|-------------------|-----------|---|-------|-------|--|--|--|
| d1 | r | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | | | |
| 1 | 0,1 | 40.000 | 1.600 | 0,01 | 0,02 | 0,01 | 35.000 | 840 | 0,006 | 0,02 | 0,01 | 30.000 | 720 | 0,006 | 0,02 | 0,01 | | | |
| 1 | 0,2 | 40.000 | 1.600 | 0,01 | 0,02 | 0,01 | 35.000 | 840 | 0,006 | 0,02 | 0,01 | 30.000 | 720 | 0,006 | 0,02 | 0,01 | | | |
| 2 | 0,2 | 30.000 | 2.400 | 0,02 | 0,05 | 0,02 | 25.000 | 1.000 | 0,010 | 0,05 | 0,02 | 20.000 | 800 | 0,010 | 0,05 | 0,02 | | | |
| 3 | 0,3 | 19.000 | 2.280 | 0,03 | 0,06 | 0,03 | 16.000 | 1.280 | 0,020 | 0,05 | 0,03 | 13.000 | 1.040 | 0,020 | 0,05 | 0,03 | | | |
| 4 | 0,2 | 14.500 | 2.320 | 0,04 | 0,10 | 0,02 | 12.000 | 1.440 | 0,030 | 0,05 | 0,02 | 10.000 | 800 | 0,020 | 0,05 | 0,02 | | | |
| 4 | 0,4 | 14.500 | 2.320 | 0,04 | 0,10 | 0,04 | 12.000 | 1.440 | 0,030 | 0,05 | 0,04 | 10.000 | 800 | 0,020 | 0,05 | 0,04 | | | |
| 4 | 0,5 | 14.500 | 2.320 | 0,04 | 0,10 | 0,05 | 12.000 | 1.440 | 0,030 | 0,05 | 0,05 | 10.000 | 800 | 0,020 | 0,05 | 0,05 | | | |
| 4 | 1,0 | 14.500 | 2.320 | 0,04 | 0,10 | 0,10 | 12.000 | 1.440 | 0,030 | 0,05 | 0,10 | 10.000 | 800 | 0,020 | 0,05 | 0,10 | | | |
| 5 | 0,5 | 11.500 | 2.300 | 0,05 | 0,10 | 0,05 | 10.000 | 1.600 | 0,040 | 0,05 | 0,05 | 8.000 | 960 | 0,030 | 0,05 | 0,05 | | | |
| 5 | 1,0 | 11.500 | 2.300 | 0,05 | 0,10 | 0,10 | 10.000 | 1.600 | 0,040 | 0,05 | 0,10 | 8.000 | 960 | 0,030 | 0,05 | 0,10 | | | |
| 6 | 0,2 | 9.500 | 2.280 | 0,06 | 0,20 | 0,02 | 8.000 | 1.600 | 0,050 | 0,10 | 0,02 | 6.500 | 1.040 | 0,040 | 0,10 | 0,02 | | | |
| 6 | 0,5 | 9.500 | 2.280 | 0,06 | 0,20 | 0,05 | 8.000 | 1.600 | 0,050 | 0,10 | 0,05 | 6.500 | 1.040 | 0,040 | 0,10 | 0,05 | | | |
| 6 | 1,0 | 9.500 | 2.280 | 0,06 | 0,20 | 0,10 | 8.000 | 1.600 | 0,050 | 0,10 | 0,10 | 6.500 | 1.040 | 0,040 | 0,10 | 0,10 | | | |
| 6 | 1,5 | 9.500 | 2.280 | 0,06 | 0,20 | 0,15 | 8.000 | 1.600 | 0,050 | 0,10 | 0,15 | 6.500 | 1.040 | 0,040 | 0,10 | 0,15 | | | |
| 8 | 0,2 | 7.500 | 2.400 | 0,08 | 0,20 | 0,02 | 6.000 | 1.440 | 0,060 | 0,10 | 0,02 | 5.000 | 1.000 | 0,050 | 0,10 | 0,02 | | | |
| 8 | 0,5 | 7.500 | 2.400 | 0,08 | 0,20 | 0,05 | 6.000 | 1.440 | 0,060 | 0,10 | 0,05 | 5.000 | 1.000 | 0,050 | 0,10 | 0,05 | | | |
| 8 | 1,0 | 7.500 | 2.400 | 0,08 | 0,20 | 0,10 | 6.000 | 1.440 | 0,060 | 0,10 | 0,10 | 5.000 | 1.000 | 0,050 | 0,10 | 0,10 | | | |
| 8 | 1,5 | 7.500 | 2.400 | 0,08 | 0,20 | 0,15 | 6.000 | 1.440 | 0,060 | 0,10 | 0,15 | 5.000 | 1.000 | 0,050 | 0,10 | 0,15 | | | |
| 8 | 2,0 | 7.500 | 2.400 | 0,08 | 0,20 | 0,20 | 6.000 | 1.440 | 0,060 | 0,10 | 0,20 | 5.000 | 1.000 | 0,050 | 0,10 | 0,20 | | | |
| 10 | 0,2 | 6.000 | 2.400 | 0,10 | 0,20 | 0,02 | 5.000 | 1.600 | 0,080 | 0,10 | 0,02 | 4.000 | 960 | 0,060 | 0,10 | 0,02 | | | |
| 10 | 0,5 | 6.000 | 2.400 | 0,10 | 0,20 | 0,05 | 5.000 | 1.600 | 0,080 | 0,10 | 0,05 | 4.000 | 960 | 0,060 | 0,10 | 0,05 | | | |
| 10 | 1,0 | 6.000 | 2.400 | 0,10 | 0,20 | 0,10 | 5.000 | 1.600 | 0,080 | 0,10 | 0,10 | 4.000 | 960 | 0,060 | 0,10 | 0,10 | | | |
| 10 | 1,5 | 6.000 | 2.400 | 0,10 | 0,20 | 0,15 | 5.000 | 1.600 | 0,080 | 0,10 | 0,15 | 4.000 | 960 | 0,060 | 0,10 | 0,15 | | | |
| 10 | 2,0 | 6.000 | 2.400 | 0,10 | 0,20 | 0,20 | 5.000 | 1.600 | 0,080 | 0,10 | 0,20 | 4.000 | 960 | 0,060 | 0,10 | 0,20 | | | |
| 12 | 0,5 | 5.000 | 2.200 | 0,11 | 0,20 | 0,05 | 4.000 | 1.440 | 0,090 | 0,10 | 0,05 | 3.500 | 980 | 0,070 | 0,10 | 0,05 | | | |
| 12 | 1,0 | 5.000 | 2.200 | 0,11 | 0,20 | 0,10 | 4.000 | 1.440 | 0,090 | 0,10 | 0,10 | 3.500 | 980 | 0,070 | 0,10 | 0,10 | | | |
| 12 | 1,5 | 5.000 | 2.200 | 0,11 | 0,20 | 0,15 | 4.000 | 1.440 | 0,090 | 0,10 | 0,15 | 3.500 | 980 | 0,070 | 0,10 | 0,15 | | | |
| 12 | 2,0 | 5.000 | 2.200 | 0,11 | 0,20 | 0,20 | 4.000 | 1.440 | 0,090 | 0,10 | 0,20 | 3.500 | 980 | 0,070 | 0,10 | 0,20 | | | |

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. Verwenden Sie ausschließlich stabile und hochgenaue Maschinen. Wir empfehlen beim fräsen in Ecken den Vorschub um ca. 50% zu reduzieren. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio. Use only accurate and highly rigid machines. We recommend to reduce the feed rate about 50% when milling in corners.

Schruppen
Roughing

| Werkstoffgruppe Material Group | 8.1 Gehärtete Stähle / Hardened steels 45 - 55 HRC | | | | | | 8.2-8.3 Gehärtete Stähle / Hardened steels 55 - 70 HRC | | | | | |
|-----------------------------------|--|--------|-------------------|-----------|-------|-------|--|-------------------|-----------|-------|-------|-------|
| | d1 | r | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 1 | 0,1 | 16.000 | 1.600 | 0,025 | 0,006 | 0,4 | 12.000 | 720 | 0,015 | 0,005 | 0,4 | |
| 1 | 0,2 | 16.000 | 1.600 | 0,025 | 0,008 | 0,4 | 12.000 | 720 | 0,015 | 0,005 | 0,4 | |
| 2 | 0,2 | 13.000 | 4.160 | 0,080 | 0,025 | 0,8 | 11.000 | 1.320 | 0,030 | 0,018 | 0,8 | |
| 3 | 0,3 | 8.500 | 5.100 | 0,150 | 0,050 | 1,2 | 7.500 | 1.500 | 0,050 | 0,035 | 1,2 | |
| 4 | 0,2 | 6.500 | 5.200 | 0,200 | 0,035 | 1,8 | 5.500 | 1.760 | 0,080 | 0,025 | 1,8 | |
| 4 | 0,4 | 6.500 | 5.200 | 0,200 | 0,070 | 1,6 | 5.500 | 1.760 | 0,080 | 0,045 | 1,6 | |
| 4 | 0,5 | 6.500 | 5.200 | 0,200 | 0,090 | 1,5 | 5.500 | 1.760 | 0,080 | 0,060 | 1,5 | |
| 4 | 1,0 | 6.500 | 5.200 | 0,200 | 0,180 | 1,0 | 5.500 | 1.760 | 0,080 | 0,120 | 1,0 | |
| 5 | 0,5 | 5.000 | 5.000 | 0,250 | 0,090 | 2,0 | 4.500 | 1.800 | 0,100 | 0,060 | 2,0 | |
| 5 | 1,0 | 5.000 | 5.000 | 0,250 | 0,180 | 1,5 | 4.500 | 1.800 | 0,100 | 0,120 | 1,5 | |
| 6 | 0,2 | 4.500 | 5.400 | 0,300 | 0,035 | 2,8 | 4.000 | 1.920 | 0,120 | 0,025 | 2,8 | |
| 6 | 0,5 | 4.500 | 5.400 | 0,300 | 0,090 | 2,5 | 4.000 | 1.920 | 0,120 | 0,060 | 2,5 | |
| 6 | 1,0 | 4.500 | 5.400 | 0,300 | 0,180 | 2,0 | 4.000 | 1.920 | 0,120 | 0,120 | 2,0 | |
| 6 | 1,5 | 4.500 | 5.400 | 0,300 | 0,270 | 1,5 | 4.000 | 1.920 | 0,120 | 0,180 | 1,5 | |
| 8 | 0,2 | 3.500 | 5.600 | 0,400 | 0,035 | 3,8 | 3.000 | 1.920 | 0,160 | 0,025 | 3,8 | |
| 8 | 0,5 | 3.500 | 5.600 | 0,400 | 0,090 | 3,5 | 3.000 | 1.920 | 0,160 | 0,060 | 3,5 | |
| 8 | 1,0 | 3.500 | 5.600 | 0,400 | 0,180 | 3,0 | 3.000 | 1.920 | 0,160 | 0,120 | 3,0 | |
| 8 | 1,5 | 3.500 | 5.600 | 0,400 | 0,250 | 2,5 | 3.000 | 1.920 | 0,160 | 0,180 | 2,5 | |
| 8 | 2,0 | 3.500 | 5.600 | 0,400 | 0,350 | 2,0 | 3.000 | 1.920 | 0,160 | 0,240 | 2,0 | |
| 10 | 0,2 | 2.500 | 5.000 | 0,500 | 0,035 | 4,8 | 2.500 | 2.000 | 0,200 | 0,025 | 4,8 | |
| 10 | 0,5 | 2.500 | 5.000 | 0,500 | 0,090 | 4,5 | 2.500 | 2.000 | 0,200 | 0,060 | 4,5 | |
| 10 | 1,0 | 2.500 | 5.000 | 0,500 | 0,180 | 4,0 | 2.500 | 2.000 | 0,200 | 0,120 | 4,0 | |
| 10 | 1,5 | 2.500 | 5.000 | 0,500 | 0,250 | 3,5 | 2.500 | 2.000 | 0,200 | 0,180 | 3,5 | |
| 10 | 2,0 | 2.500 | 5.000 | 0,500 | 0,350 | 3,0 | 2.500 | 2.000 | 0,200 | 0,240 | 3,0 | |
| 12 | 0,5 | 2.000 | 4.400 | 0,550 | 0,090 | 5,5 | 2.000 | 1.840 | 0,230 | 0,060 | 5,5 | |
| 12 | 1,0 | 2.000 | 4.400 | 0,550 | 0,180 | 5,0 | 2.000 | 1.840 | 0,230 | 0,120 | 5,0 | |
| 12 | 1,5 | 2.000 | 4.400 | 0,550 | 0,250 | 4,5 | 2.000 | 1.840 | 0,230 | 0,150 | 4,5 | |
| 12 | 2,0 | 2.000 | 4.400 | 0,550 | 0,350 | 4,0 | 2.000 | 1.840 | 0,230 | 0,240 | 4,0 | |

Schlichten
Finishing

| Werkstoffgruppe Material Group | 8.1 Gehärtete Stähle / Hardened steels 45 - 55 HRC | | | | | | 8.2-8.3 Gehärtete Stähle / Hardened steels 55 - 70 HRC | | | | | |
|-----------------------------------|--|--------|-------------------|-----------|-------|-------|--|-------------------|-----------|-------|-------|-------|
| | d1 | r | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 1 | 0,1 | 25.000 | 500 | 0,005 | 0,02 | 0,01 | 20.000 | 0,005 | 0,005 | 0,02 | 0,01 | |
| 1 | 0,2 | 25.000 | 500 | 0,005 | 0,02 | 0,01 | 20.000 | 0,005 | 0,005 | 0,02 | 0,01 | |
| 2 | 0,2 | 14.500 | 580 | 0,010 | 0,05 | 0,02 | 11.000 | 0,010 | 0,010 | 0,05 | 0,02 | |
| 3 | 0,3 | 9.500 | 380 | 0,010 | 0,05 | 0,03 | 7.500 | 0,010 | 0,010 | 0,05 | 0,03 | |
| 4 | 0,2 | 7.500 | 600 | 0,020 | 0,05 | 0,02 | 7.500 | 0,020 | 0,020 | 0,05 | 0,02 | |
| 4 | 0,4 | 7.500 | 600 | 0,020 | 0,05 | 0,04 | 7.500 | 0,020 | 0,020 | 0,05 | 0,04 | |
| 4 | 0,5 | 7.500 | 600 | 0,020 | 0,05 | 0,05 | 7.500 | 0,020 | 0,020 | 0,05 | 0,05 | |
| 4 | 1,0 | 7.500 | 600 | 0,020 | 0,05 | 0,10 | 7.500 | 0,020 | 0,020 | 0,05 | 0,10 | |
| 5 | 0,5 | 6.000 | 480 | 0,020 | 0,05 | 0,05 | 4.500 | 0,020 | 0,020 | 0,05 | 0,05 | |
| 5 | 1,0 | 6.000 | 480 | 0,020 | 0,05 | 0,10 | 4.500 | 0,020 | 0,020 | 0,05 | 0,10 | |
| 6 | 0,2 | 5.000 | 600 | 0,030 | 0,10 | 0,02 | 4.000 | 0,030 | 0,020 | 0,10 | 0,02 | |
| 6 | 0,5 | 5.000 | 600 | 0,030 | 0,10 | 0,05 | 4.000 | 0,030 | 0,020 | 0,10 | 0,05 | |
| 6 | 1,0 | 5.000 | 600 | 0,030 | 0,10 | 0,10 | 4.000 | 0,030 | 0,020 | 0,10 | 0,10 | |
| 6 | 1,5 | 5.000 | 600 | 0,030 | 0,10 | 0,15 | 4.000 | 0,030 | 0,020 | 0,10 | 0,15 | |
| 8 | 0,2 | 3.500 | 560 | 0,040 | 0,10 | 0,02 | 3.000 | 0,040 | 0,030 | 0,10 | 0,02 | |
| 8 | 0,5 | 3.500 | 560 | 0,040 | 0,10 | 0,05 | 3.000 | 0,040 | 0,030 | 0,10 | 0,05 | |
| 8 | 1,0 | 3.500 | 560 | 0,040 | 0,10 | 0,10 | 3.000 | 0,040 | 0,030 | 0,10 | 0,10 | |
| 8 | 1,5 | 3.500 | 560 | 0,040 | 0,10 | 0,15 | 3.000 | 0,040 | 0,030 | 0,10 | 0,15 | |
| 8 | 2,0 | 3.500 | 560 | 0,040 | 0,10 | 0,20 | 3.000 | 0,040 | 0,030 | 0,10 | 0,20 | |
| 10 | 0,2 | 3.000 | 600 | 0,050 | 0,10 | 0,02 | 2.500 | 0,050 | 0,040 | 0,10 | 0,02 | |
| 10 | 0,5 | 3.000 | 600 | 0,050 | 0,10 | 0,05 | 2.500 | 0,050 | 0,040 | 0,10 | 0,05 | |
| 10 | 1,0 | 3.000 | 600 | 0,050 | 0,10 | 0,10 | 2.500 | 0,050 | 0,040 | 0,10 | 0,10 | |
| 10 | 1,5 | 3.000 | 600 | 0,050 | 0,10 | 0,15 | 2.500 | 0,050 | 0,040 | 0,10 | 0,15 | |
| 10 | 2,0 | 3.000 | 600 | 0,050 | 0,10 | 0,20 | 2.500 | 0,050 | 0,040 | 0,10 | 0,20 | |
| 12 | 0,5 | 2.500 | 600 | 0,060 | 0,10 | 0,05 | 2.000 | 0,060 | 0,050 | 0,10 | 0,05 | |
| 12 | 1,0 | 2.500 | 600 | 0,060 | 0,10 | 0,10 | 2.000 | 0,060 | 0,050 | 0,10 | 0,10 | |
| 12 | 1,5 | 2.500 | 600 | 0,060 | 0,10 | 0,15 | 2.000 | 0,060 | 0,050 | 0,10 | 0,15 | |
| 12 | 2,0 | 2.500 | 600 | 0,060 | 0,10 | 0,20 | 2.000 | 0,060 | 0,050 | 0,10 | 0,20 | |

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. Verwenden Sie ausschließlich stabile und hochgenaue Maschinen. Wir empfehlen beim fräsen in Ecken den Vorschub um ca. 50% zu reduzieren. These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio. Use only accurate and highly rigid machines. We recommend to reduce the feed rate about 50% when milling in corners.



Schruppen Roughing

| Werkstoffgruppe Material Group | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels < 850 N/mm ² | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat treated steels < 35 HRC (1200 N/mm ²) | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 - 4.1 - 4.2 - 4.3 Vergütungsstähle - Rostfreie Stähle / Heat treated steels - Stainless steels 35 - 45 HRC | | | | |
|-----------------------------------|-----|--|-----------|-------|-------|-------|---|-----------|-------|-------|-------|--|-----------|-------|-------|-------|
| d1 | r | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 6 | 0,5 | 6.500 | 10.400 | 0,40 | 0,08 | 2,5 | 6.000 | 9.600 | 0,40 | 0,08 | 2,5 | 5.500 | 6.600 | 0,30 | 0,07 | 2,5 |
| 6 | 1,0 | 6.500 | 10.400 | 0,40 | 0,16 | 2,0 | 6.000 | 9.600 | 0,40 | 0,16 | 2,0 | 5.500 | 6.600 | 0,30 | 0,13 | 2,0 |
| 8 | 0,5 | 5.000 | 11.000 | 0,55 | 0,09 | 3,5 | 4.500 | 9.000 | 0,50 | 0,09 | 3,5 | 4.000 | 6.400 | 0,40 | 0,07 | 3,5 |
| 8 | 1,0 | 5.000 | 11.000 | 0,55 | 0,18 | 3,0 | 4.500 | 9.000 | 0,50 | 0,18 | 3,0 | 4.000 | 6.400 | 0,40 | 0,15 | 3,0 |
| 10 | 0,5 | 3.500 | 9.800 | 0,70 | 0,09 | 4,5 | 3.500 | 9.100 | 0,65 | 0,09 | 4,5 | 3.500 | 7.000 | 0,50 | 0,08 | 4,5 |
| 10 | 1,0 | 3.500 | 9.800 | 0,70 | 0,18 | 4,0 | 3.500 | 9.100 | 0,65 | 0,18 | 4,0 | 3.500 | 7.000 | 0,50 | 0,16 | 4,0 |
| 12 | 0,5 | 3.000 | 9.600 | 0,80 | 0,09 | 5,5 | 3.000 | 9.600 | 0,80 | 0,09 | 5,5 | 3.000 | 6.600 | 0,55 | 0,07 | 5,5 |
| 12 | 1,0 | 3.000 | 9.600 | 0,80 | 0,18 | 5,0 | 3.000 | 9.600 | 0,80 | 0,18 | 5,0 | 3.000 | 6.600 | 0,55 | 0,15 | 5,0 |
| 12 | 1,5 | 3.000 | 9.600 | 0,80 | 0,27 | 4,5 | 3.000 | 9.600 | 0,80 | 0,27 | 4,5 | 3.000 | 6.600 | 0,55 | 0,22 | 4,5 |

Schlichten Finishing

| Werkstoffgruppe Material Group | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels < 850 N/mm ² | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat treated steels < 35 HRC (1200 N/mm ²) | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 - 4.1 - 4.2 - 4.3 Vergütungsstähle - Rostfreie Stähle / Heat treated steels - Stainless steels 35 - 45 HRC | | | | |
|-----------------------------------|-----|--|-----------|-------|-------|-------|---|-----------|-------|-------|-------|--|-----------|-------|-------|-------|
| d1 | r | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 6 | 0,5 | 9.500 | 2.280 | 0,06 | 0,15 | 0,05 | 8.000 | 1.600 | 0,05 | 0,1 | 0,05 | 6.500 | 1.040 | 0,04 | 0,1 | 0,05 |
| 6 | 1,0 | 9.500 | 2.280 | 0,06 | 0,15 | 0,10 | 8.000 | 1.600 | 0,05 | 0,1 | 0,10 | 6.500 | 1.040 | 0,04 | 0,1 | 0,10 |
| 8 | 0,5 | 7.500 | 2.400 | 0,08 | 0,15 | 0,05 | 6.000 | 1.440 | 0,06 | 0,1 | 0,05 | 5.000 | 1.000 | 0,05 | 0,1 | 0,05 |
| 8 | 1,0 | 7.500 | 2.400 | 0,08 | 0,15 | 0,10 | 6.000 | 1.440 | 0,06 | 0,1 | 0,10 | 5.000 | 1.000 | 0,05 | 0,1 | 0,10 |
| 10 | 0,5 | 6.000 | 2.400 | 0,10 | 0,15 | 0,05 | 5.000 | 1.600 | 0,08 | 0,1 | 0,05 | 4.000 | 960 | 0,06 | 0,1 | 0,05 |
| 10 | 1,0 | 6.000 | 2.400 | 0,10 | 0,15 | 0,10 | 5.000 | 1.600 | 0,08 | 0,1 | 0,10 | 4.000 | 960 | 0,06 | 0,1 | 0,10 |
| 12 | 0,5 | 5.000 | 2.200 | 0,11 | 0,15 | 0,05 | 4.000 | 1.440 | 0,09 | 0,1 | 0,05 | 3.500 | 980 | 0,07 | 0,1 | 0,05 |
| 12 | 1,0 | 5.000 | 2.200 | 0,11 | 0,15 | 0,10 | 4.000 | 1.440 | 0,09 | 0,1 | 0,10 | 3.500 | 980 | 0,07 | 0,1 | 0,10 |
| 12 | 1,5 | 5.000 | 2.200 | 0,11 | 0,15 | 0,15 | 4.000 | 1.440 | 0,09 | 0,1 | 0,15 | 3.500 | 980 | 0,07 | 0,1 | 0,15 |

Nuten Slotting

| Werkstoffgruppe Material Group | | 1.1 - 1.2 - 1.3 - 1.4 - 1.5 Unlegierte Stähle / Unalloyed steels < 850 N/mm ² | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat treated steels < 35 HRC (1200 N/mm ²) | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 - 4.1 - 4.2 - 4.3 Vergütungsstähle - Rostfreie Stähle / Heat treated steels - Stainless steels 35 - 45 HRC | | | | |
|-----------------------------------|-----|--|-----------|-------|-------|-------|---|-----------|-------|-------|-------|--|-----------|-------|-------|-------|
| d1 | r | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 6 | 0,5 | 6.500 | 10.400 | 0,40 | 0,09 | | 6.000 | 9.600 | 0,40 | 0,09 | | 5.500 | 6.600 | 0,30 | 0,08 | |
| 6 | 1,0 | 6.500 | 10.400 | 0,40 | 0,18 | | 6.000 | 9.600 | 0,40 | 0,18 | | 5.500 | 6.600 | 0,30 | 0,15 | |
| 8 | 0,5 | 5.000 | 11.000 | 0,55 | 0,10 | | 4.500 | 9.000 | 0,50 | 0,10 | | 4.000 | 6.400 | 0,40 | 0,08 | |
| 8 | 1,0 | 5.000 | 11.000 | 0,55 | 0,20 | | 4.500 | 9.000 | 0,50 | 0,20 | | 4.000 | 6.400 | 0,40 | 0,17 | |
| 10 | 0,5 | 3.500 | 9.800 | 0,70 | 0,10 | | 3.500 | 9.100 | 0,65 | 0,10 | | 3.500 | 7.000 | 0,50 | 0,09 | |
| 10 | 1,0 | 3.500 | 9.800 | 0,70 | 0,20 | | 3.500 | 9.100 | 0,65 | 0,20 | | 3.500 | 7.000 | 0,50 | 0,18 | |
| 12 | 0,5 | 3.000 | 9.600 | 0,80 | 0,10 | | 3.000 | 9.600 | 0,80 | 0,10 | | 3.000 | 6.600 | 0,55 | 0,08 | |
| 12 | 1,0 | 3.000 | 9.600 | 0,80 | 0,20 | | 3.000 | 9.600 | 0,80 | 0,20 | | 3.000 | 6.600 | 0,55 | 0,17 | |
| 12 | 1,5 | 3.000 | 9.600 | 0,80 | 0,30 | | 3.000 | 9.600 | 0,80 | 0,30 | | 3.000 | 6.600 | 0,55 | 0,25 | |

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. Verwenden Sie ausschließlich stabile und hochgenaue Maschinen. Reduzieren Sie beim Nuten die Vorschubgeschwindigkeit um 60%. Wir empfehlen beim fräsen in Ecken den Vorschub um ca. 50% zu reduzieren.
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio.
Use only accurate and highly rigid machines. Decrease the feed rate about 50% from the milling parameters when slot milling. We recommend to reduce the feed rate about 50% when milling in corners.

Empfohlene Schnittdaten für VHM-Fräser mit Eckenradius HSC/HHC-beschichtet
Recommended cutting data for solid carbide end mills with cornder radius HSC/HHC

30 6437

Schruppen
Roughing

| Werkstoffgruppe Material Group | 8.1 Gehärtete Stähle / Hardened steels 45 - 55 HRC | | | | | | | 8.2-8.3 Gehärtete Stähle / Hardened steels 55 - 70 HRC | | | | |
|-----------------------------------|--|-------|-------------------|-----------|-------|-------|-------|--|-----------|-------|-------|-------|
| | d1 | r | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 6 | 0,5 | 4.500 | 5.400 | 0,30 | 0,060 | 2,5 | 4.000 | 1.920 | 0,12 | 0,04 | 2,5 | |
| 6 | 1,0 | 4.500 | 5.400 | 0,30 | 0,110 | 2,0 | 4.000 | 1.920 | 0,12 | 0,08 | 2,0 | |
| 8 | 0,5 | 3.500 | 5.600 | 0,40 | 0,060 | 3,5 | 3.000 | 1.920 | 0,16 | 0,04 | 3,5 | |
| 8 | 1,0 | 3.500 | 5.600 | 0,40 | 0,130 | 3,0 | 3.000 | 1.920 | 0,16 | 0,09 | 3,0 | |
| 10 | 0,5 | 2.500 | 5.000 | 0,50 | 0,072 | 4,5 | 2.500 | 2.000 | 0,20 | 0,04 | 4,5 | |
| 10 | 1,0 | 2.500 | 5.000 | 0,50 | 0,140 | 4,0 | 2.500 | 2.000 | 0,20 | 0,09 | 4,0 | |
| 12 | 0,5 | 2.000 | 4.400 | 0,55 | 0,060 | 5,5 | 2.000 | 1.840 | 0,23 | 0,04 | 5,5 | |
| 12 | 1,0 | 2.000 | 4.400 | 0,55 | 0,130 | 5,0 | 2.000 | 1.840 | 0,23 | 0,09 | 5,0 | |
| 12 | 1,5 | 2.000 | 4.400 | 0,55 | 0,180 | 4,5 | 2.000 | 1.840 | 0,23 | 0,13 | 4,5 | |

Schlichten
Finishing

| Werkstoffgruppe Material Group | 8.1 Gehärtete Stähle / Hardened steels 45 - 55 HRC | | | | | | | 8.2-8.3 Gehärtete Stähle / Hardened steels 55 - 70 HRC | | | | |
|-----------------------------------|--|-------|-------------------|-----------|-------|-------|-------|--|-----------|-------|-------|-------|
| | d1 | r | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 6 | 0,5 | 5.000 | 600 | 0,03 | 0,1 | 0,05 | 4.000 | | 0,02 | 0,1 | 0,05 | |
| 6 | 1,0 | 5.000 | 600 | 0,03 | 0,1 | 0,10 | 4.000 | | 0,02 | 0,1 | 0,10 | |
| 8 | 0,5 | 3.500 | 560 | 0,04 | 0,1 | 0,05 | 3.000 | | 0,03 | 0,1 | 0,05 | |
| 8 | 1,0 | 3.500 | 560 | 0,04 | 0,1 | 0,10 | 3.000 | | 0,03 | 0,1 | 0,10 | |
| 10 | 0,5 | 3.000 | 600 | 0,05 | 0,1 | 0,05 | 2.500 | | 0,04 | 0,1 | 0,05 | |
| 10 | 1,0 | 3.000 | 600 | 0,05 | 0,1 | 0,10 | 2.500 | | 0,04 | 0,1 | 0,10 | |
| 12 | 0,5 | 2.500 | 600 | 0,06 | 0,1 | 0,05 | 2.000 | | 0,05 | 0,1 | 0,05 | |
| 12 | 1,0 | 2.500 | 600 | 0,06 | 0,1 | 0,10 | 2.000 | | 0,05 | 0,1 | 0,10 | |
| 12 | 1,5 | 2.500 | 600 | 0,06 | 0,1 | 0,15 | 2.000 | | 0,05 | 0,1 | 0,15 | |

Nuten
Slotting

| Werkstoffgruppe Material Group | 8.1 Gehärtete Stähle / Hardened steels 45 - 55 HRC | | | | | | | 8.2-8.3 Gehärtete Stähle / Hardened steels 55 - 70 HRC | | | |
|-----------------------------------|--|-------|-------------------|-----------|-------|-------|-------------------|--|-------|-------|--|
| | d1 | r | min ⁻¹ | Vf mm/min | fz mm | ap mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | |
| 6 | 0,5 | 4.500 | 5.400 | 0,30 | 0,07 | 4.000 | 1.920 | 0,12 | 0,05 | | |
| 6 | 1,0 | 4.500 | 5.400 | 0,30 | 0,13 | 4.000 | 1.920 | 0,12 | 0,09 | | |
| 8 | 0,5 | 3.500 | 5.600 | 0,40 | 0,07 | 3.000 | 1.920 | 0,16 | 0,05 | | |
| 8 | 1,0 | 3.500 | 5.600 | 0,40 | 0,15 | 3.000 | 1.920 | 0,16 | 0,10 | | |
| 10 | 0,5 | 2.500 | 5.000 | 0,50 | 0,08 | 2.500 | 2.000 | 0,20 | 0,05 | | |
| 10 | 1,0 | 2.500 | 5.000 | 0,50 | 0,16 | 2.500 | 2.000 | 0,20 | 0,10 | | |
| 12 | 0,5 | 2.000 | 4.400 | 0,55 | 0,07 | 2.000 | 1.840 | 0,23 | 0,05 | | |
| 12 | 1,0 | 2.000 | 4.400 | 0,55 | 0,15 | 2.000 | 1.840 | 0,23 | 0,10 | | |
| 12 | 1,5 | 2.000 | 4.400 | 0,55 | 0,20 | 2.000 | 1.840 | 0,23 | 0,15 | | |

Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. Verwenden Sie ausschließlich stabile und hochgenaue Maschinen. Reduzieren Sie beim Nuten die Vorschubgeschwindigkeit um 60%. Wir empfehlen beim fräsen in Ecken den Vorschub um ca. 50% zu reduzieren.
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio. Use only accurate and highly rigid machines. Decrease the feed rate about 50% from the milling parameters when slot milling. We recommend to reduce the feed rate about 50% when milling in corners.



Fräsen mit dem Wirkradius r3 Cutting conditions for arc radius r3

| Werkstoffgruppe Material Group | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat treated steels < 35 HRC (1200 N/mm ²) | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 - 4.1 - 4.2 - 4.3 Vergütungsstähle – Rostfreie Stähle / Heat treated steels – Stainless steels 35 - 45 HRC | | | | |
|-----------------------------------|------|-------|--------|---|-----------|-------|-------|----------|--|-----------|-------|-------|----------|
| d4 | r1 | r3 | a/2 | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 2,50 | 0,50 | 12,5 | 10,17° | 24.000 | 2.880 | 0,03 | 0,22 | 0,05-0,1 | 19.000 | 2.280 | 0,030 | 0,22 | 0,05-0,1 |
| 5,00 | 0,50 | 350 | 12,60° | 12.000 | 2.400 | 0,05 | 1,18 | 0,05-0,1 | 10.500 | 2.100 | 0,050 | 1,18 | 0,05-0,1 |
| 3,75 | 0,75 | 18,75 | 10,19° | 16.000 | 2.560 | 0,04 | 0,27 | 0,05-0,1 | 14.000 | 2.520 | 0,045 | 0,27 | 0,05-0,1 |
| 5,00 | 1,00 | 25 | 10,18° | 12.000 | 2.400 | 0,05 | 0,32 | 0,05-0,1 | 10.500 | 2.100 | 0,050 | 0,32 | 0,05-0,1 |
| 7,00 | 1,00 | 350 | 13,39° | 8.000 | 1.920 | 0,06 | 1,18 | 0,05-0,1 | 7.000 | 1.680 | 0,060 | 1,18 | 0,05-0,1 |
| 7,50 | 1,50 | 37,5 | 10,18° | 8.000 | 1.920 | 0,06 | 0,39 | 0,05-0,1 | 7.000 | 1.680 | 0,060 | 0,39 | 0,05-0,1 |
| 10,00 | 2,00 | 50 | 10,18° | 6.000 | 1.680 | 0,07 | 0,45 | 0,05-0,1 | 5.000 | 1.400 | 0,070 | 0,45 | 0,05-0,1 |
| 9,00 | 2,00 | 350 | 12,16° | 6.000 | 1.680 | 0,07 | 1,18 | 0,05-0,1 | 5.000 | 1.400 | 0,070 | 1,18 | 0,05-0,1 |

Fräsen mit Kugelradius r1 Cutting conditions for ball radius r1

| Werkstoffgruppe Material Group | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat treated steels < 35 HRC (1200 N/mm ²) | | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 - 4.1 - 4.2 - 4.3 Vergütungsstähle – Rostfreie Stähle / Heat treated steels – Stainless steels 35 - 45 HRC | | | | |
|-----------------------------------|------|-------|--------|---|-----------|-------|-------|-------|--|-----------|-------|-------|-------|
| d4 | r1 | r3 | a/2 | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 2,50 | 0,50 | 12,5 | 10,17° | 34.500 | 2.484 | 0,018 | 0,09 | 0,30 | 28.500 | 2.052 | 0,018 | 0,08 | 0,25 |
| 5,00 | 0,50 | 350 | 12,60° | 34.500 | 2.484 | 0,018 | 0,09 | 0,30 | 28.500 | 2.052 | 0,018 | 0,08 | 0,25 |
| 3,75 | 0,75 | 18,75 | 10,19° | 25.500 | 2.856 | 0,028 | 0,10 | 0,30 | 21.500 | 2.150 | 0,025 | 0,09 | 0,25 |
| 5,00 | 1,00 | 25 | 10,18° | 22.000 | 3.080 | 0,035 | 0,19 | 0,55 | 18.500 | 2.590 | 0,035 | 0,15 | 0,45 |
| 7,00 | 1,00 | 350 | 13,39° | 22.000 | 3.080 | 0,035 | 0,19 | 0,55 | 18.500 | 2.590 | 0,035 | 0,15 | 0,45 |
| 7,50 | 1,50 | 37,5 | 10,18° | 20.500 | 3.280 | 0,040 | 0,28 | 0,85 | 17.000 | 2.584 | 0,038 | 0,24 | 0,70 |
| 10,00 | 2,00 | 50 | 10,18° | 15.500 | 2.790 | 0,045 | 0,38 | 1,15 | 13.000 | 2.340 | 0,045 | 0,32 | 0,95 |
| 9,00 | 2,00 | 350 | 12,16° | 15.500 | 2.790 | 0,045 | 0,38 | 1,15 | 13.000 | 2.340 | 0,045 | 0,32 | 0,95 |

Fräsen mit Kugelradius r1 und Wirkradius r3 Cutting conditions for ball radius r1 and arc radius r3

| Werkstoffgruppe Material Group | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat treated steels <35 HRC (1200 N/mm ²) | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 - 4.1 - 4.2 - 4.3 Vergütungsstähle – Rostfreie Stähle / Heat treated steels – Stainless steels 35 - 45 HRC | | |
|-----------------------------------|------|-------|--------|---|-----------|-------|--|-----------|-------|
| d4 | r1 | r3 | a/2 | min ⁻¹ | Vf mm/min | fz mm | min ⁻¹ | Vf mm/min | fz mm |
| 2,50 | 0,50 | 12,5 | 10,17° | 29.000 | 2.900 | 0,025 | 24.000 | 2.208 | 0,023 |
| 5,00 | 0,50 | 350 | 12,60° | 17.000 | 2.720 | 0,040 | 14.500 | 2.320 | 0,040 |
| 3,75 | 0,75 | 18,75 | 10,19° | 20.500 | 2.706 | 0,033 | 17.500 | 2.100 | 0,030 |
| 5,00 | 1,00 | 25 | 10,18° | 17.000 | 2.720 | 0,040 | 14.500 | 2.320 | 0,040 |
| 7,00 | 1,00 | 350 | 13,39° | 14.000 | 2.520 | 0,045 | 12.000 | 2.160 | 0,045 |
| 7,50 | 1,50 | 37,5 | 10,18° | 14.000 | 2.520 | 0,045 | 12.000 | 2.160 | 0,045 |
| 10,00 | 2,00 | 50 | 10,18° | 11.000 | 2.420 | 0,055 | 9.000 | 1.800 | 0,050 |
| 9,00 | 2,00 | 350 | 12,16° | 11.000 | 2.420 | 0,055 | 9.000 | 1.800 | 0,050 |

Die Schnitttiefe und Schnittbreite (ap+ae) entnehmen Sie bitte der jeweiligen Anwendung in den oberen Tabellen.
For cutting depth and cutting width (ap+ae) refer to the above conditions for each section.

Schnitttiefe ap in Abhängigkeit der zu erzielenden theoretischen Rautiefe R_{th} Cutting depth ap based on the desired theoretical roughness depth R_{th}

| Artikelnummer | Parabelradius | Theoretische Rautiefe R _{th} in mm Theoretical roughness depth R _{th} (mm) | | | | | |
|-----------------------|---------------|---|--------------------|--------------------|-------------------|-------------------|-------------------|
| | | 0,0001 mm ap mm | 0,0003 mm ap mm | 0,0005 mm ap mm | 0,001 mm ap mm | 0,003 mm ap mm | 0,005 mm ap mm |
| 30 6276 0250 0125 10 | 12,5 | 0,10 | 0,17 | 0,22 | 0,32 | 0,55 | 0,71 |
| 30 6276 0500 350 175 | 350 | 0,53 | 0,92 | 1,18 | 1,67 | 2,90 | 3,74 |
| 30 6276 0375 01875 15 | 18,75 | 0,12 | 0,21 | 0,27 | 0,39 | 0,67 | 0,87 |
| 30 6276 0500 025 20 | 25 | 0,14 | 0,24 | 0,32 | 0,45 | 0,77 | 1,00 |
| 30 6276 0700 350 175 | 350 | 0,53 | 0,92 | 1,18 | 1,67 | 2,90 | 3,74 |
| 30 6276 0750 0375 30 | 37,5 | 0,17 | 0,30 | 0,39 | 0,55 | 0,95 | 1,22 |
| 30 6276 1000 050 40 | 50 | 0,20 | 0,35 | 0,45 | 0,63 | 1,10 | 1,41 |
| 30 6276 0900 350 175 | 350 | 0,53 | 0,92 | 1,18 | 1,67 | 2,90 | 3,74 |

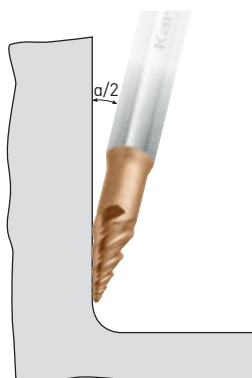
Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. Verwenden Sie ausschließlich stabile und hochgenaue Maschinen.
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio. Use only accurate and highly rigid machines.

| 8.1 Gehärtete Stähle / Hardened steels 45 - 55 HRC | | | | | 8.2-8.3 Gehärtete Stähle / Hardened steels 55 - 65 HRC | | | | | 8.3 Gehärtete Stähle / Hardened steels 65 - 72 HRC | | | | |
|--|-----------|-------|-------|----------|--|-----------|-------|-------|----------|--|-----------|-------|-------|----------|
| min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 18.000 | 1.944 | 0,027 | 0,22 | 0,05-0,1 | 16.500 | 1.650 | 0,025 | 0,22 | 0,05-0,1 | 13.000 | 1.300 | 0,025 | 0,22 | 0,05-0,1 |
| 9.000 | 1.620 | 0,045 | 1,18 | 0,05-0,1 | 7.000 | 1.400 | 0,050 | 1,18 | 0,05-0,1 | 6.500 | 1.040 | 0,040 | 1,18 | 0,05-0,1 |
| 12.000 | 1.680 | 0,035 | 0,27 | 0,05-0,1 | 11.500 | 1.610 | 0,035 | 0,27 | 0,05-0,1 | 8.500 | 1.190 | 0,035 | 0,27 | 0,05-0,1 |
| 9.000 | 1.620 | 0,045 | 0,32 | 0,05-0,1 | 7.000 | 1.400 | 0,050 | 0,32 | 0,05-0,1 | 6.500 | 1.040 | 0,040 | 0,32 | 0,05-0,1 |
| 6.000 | 1.320 | 0,055 | 1,18 | 0,05-0,1 | 4.500 | 1.260 | 0,070 | 1,18 | 0,05-0,1 | 4.000 | 880 | 0,055 | 1,18 | 0,05-0,1 |
| 6.000 | 1.320 | 0,055 | 0,39 | 0,05-0,1 | 4.500 | 1.260 | 0,070 | 0,39 | 0,05-0,1 | 4.000 | 880 | 0,055 | 0,39 | 0,05-0,1 |
| 4.500 | 1.080 | 0,060 | 0,45 | 0,05-0,1 | 3.500 | 980 | 0,070 | 0,45 | 0,05-0,1 | 3.000 | 720 | 0,060 | 0,45 | 0,05-0,1 |
| 4.500 | 1.080 | 0,060 | 1,18 | 0,05-0,1 | 3.500 | 980 | 0,070 | 1,18 | 0,05-0,1 | 3.000 | 720 | 0,060 | 1,18 | 0,05-0,1 |

| 8.1 Gehärtete Stähle / Hardened steels 45 - 55 HRC | | | | | 8.2-8.3 Gehärtete Stähle / Hardened steels 55 - 65 HRC | | | | | 8.3 Gehärtete Stähle / Hardened steels 65 - 72 HRC | | | | |
|--|-----------|-------|-------|-------|--|-----------|-------|-------|-------|--|-----------|-------|-------|-------|
| min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 26.000 | 1.560 | 0,015 | 0,06 | 0,18 | 25.000 | 1.500 | 0,015 | 0,06 | 0,18 | 20.500 | 1.066 | 0,013 | 0,05 | 0,15 |
| 26.000 | 1.560 | 0,015 | 0,06 | 0,18 | 25.000 | 1.500 | 0,015 | 0,06 | 0,18 | 20.500 | 1.066 | 0,013 | 0,05 | 0,15 |
| 19.500 | 1.950 | 0,025 | 0,07 | 0,20 | 18.500 | 1.850 | 0,025 | 0,07 | 0,20 | 15.500 | 1.240 | 0,020 | 0,06 | 0,18 |
| 16.500 | 2.310 | 0,035 | 0,13 | 0,40 | 16.000 | 1.920 | 0,03 | 0,12 | 0,35 | 13.500 | 1.350 | 0,025 | 0,10 | 0,30 |
| 16.500 | 2.310 | 0,035 | 0,13 | 0,40 | 16.000 | 1.920 | 0,03 | 0,12 | 0,35 | 13.500 | 1.350 | 0,025 | 0,10 | 0,30 |
| 15.500 | 1.860 | 0,030 | 0,20 | 0,60 | 14.500 | 1.740 | 0,03 | 0,19 | 0,55 | 11.000 | 1.320 | 0,030 | 0,15 | 0,45 |
| 11.000 | 1.760 | 0,040 | 0,25 | 0,80 | 10.500 | 1.470 | 0,035 | 0,25 | 0,75 | 8.000 | 1.120 | 0,035 | 0,20 | 0,60 |
| 11.000 | 1.760 | 0,040 | 0,25 | 0,80 | 10.500 | 1.470 | 0,035 | 0,25 | 0,75 | 8.000 | 1.120 | 0,035 | 0,20 | 0,60 |

| 8.1 Gehärtete Stähle / Hardened steels 45 - 55 HRC | | | 8.2-8.3 Gehärtete Stähle / Hardened steels 55 - 65 HRC | | | 8.3 Gehärtete Stähle / Hardened steels 65 - 72 HRC | | |
|--|-----------|-------|--|-----------|-------|--|-----------|-------|
| min ⁻¹ | Vf mm/min | fz mm | min ⁻¹ | Vf mm/min | fz mm | min ⁻¹ | Vf mm/min | fz mm |
| 22.000 | 1.760 | 0,020 | 21.000 | 1.680 | 0,020 | 17.000 | 1.224 | 0,018 |
| 13.000 | 2.080 | 0,040 | 11.500 | 1.610 | 0,035 | 10.000 | 1.200 | 0,030 |
| 16.000 | 1.920 | 0,030 | 15.000 | 1.800 | 0,030 | 12.000 | 1.200 | 0,025 |
| 13.000 | 2.080 | 0,040 | 11.500 | 1.840 | 0,040 | 10.000 | 1.200 | 0,030 |
| 11.000 | 1.540 | 0,035 | 9.500 | 1.520 | 0,040 | 8.000 | 1.120 | 0,035 |
| 11.000 | 1.540 | 0,035 | 9.500 | 1.520 | 0,040 | 8.000 | 1.120 | 0,035 |
| 8.000 | 1.440 | 0,045 | 7.000 | 1.260 | 0,045 | 5.500 | 990 | 0,045 |
| 8.000 | 1.440 | 0,045 | 7.000 | 1.260 | 0,045 | 5.500 | 990 | 0,045 |

Wir empfehlen die Fräser mit dem Anstellwinkel $\alpha/2$ einzusetzen.
We recommend to use the end mills with work angle $\alpha/2$.



Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist die Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. Verwenden Sie ausschließlich stabile und hochgenaue Maschinen.
These conditons are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio. Use only accurate and highly rigid machines.



Fräsen mit dem Wirkradius r3
Cutting conditions for arc radius r3

| Werkstoffgruppe Material Group | | | | 14.0 Graphit / Graphite | | | | |
|-----------------------------------|------|-------|--------|----------------------------|-----------|-------|-------|----------|
| d4 | r1 | r3 | a/2 | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 2,50 | 0,50 | 12,5 | 10,17° | 35.000 | 4.200 | 0,03 | 0,22 | 0,05-0,1 |
| 5,00 | 0,50 | 350 | 12,60° | 33.000 | 6.600 | 0,05 | 1,18 | 0,05-0,1 |
| 3,75 | 0,75 | 18,75 | 10,19° | 33.000 | 5.280 | 0,04 | 0,27 | 0,05-0,1 |
| 5,00 | 1,00 | 25 | 10,18° | 32.000 | 6.400 | 0,05 | 0,32 | 0,05-0,1 |
| 7,00 | 1,00 | 350 | 13,39° | 25.000 | 6.000 | 0,06 | 1,18 | 0,05-0,1 |
| 7,50 | 1,50 | 37,5 | 10,18° | 25.000 | 6.000 | 0,06 | 0,39 | 0,05-0,1 |
| 10,00 | 2,00 | 50 | 10,18° | 16.000 | 4.480 | 0,07 | 0,45 | 0,05-0,1 |
| 9,00 | 2,00 | 350 | 12,16° | 20.000 | 5.600 | 0,07 | 1,18 | 0,05-0,1 |

Fräsen mit Kugelradius r1
Cutting conditions for ball radius r1

| Werkstoffgruppe Material Group | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat treated steels < 35 HRC (1200 N/mm ²) | | | | |
|-----------------------------------|------|-------|--------|---|-----------|-------|-------|-------|
| d4 | r1 | r3 | a/2 | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 2,50 | 0,50 | 12,5 | 10,17° | 42.000 | 3.024 | 0,018 | 0,09 | 0,30 |
| 5,00 | 0,50 | 350 | 12,60° | 39.500 | 2.844 | 0,018 | 0,09 | 0,30 |
| 3,75 | 0,75 | 18,75 | 10,19° | 39.500 | 4.424 | 0,028 | 0,10 | 0,30 |
| 5,00 | 1,00 | 25 | 10,18° | 38.500 | 5.390 | 0,035 | 0,19 | 0,55 |
| 7,00 | 1,00 | 350 | 13,39° | 30.000 | 4.200 | 0,035 | 0,19 | 0,55 |
| 7,50 | 1,50 | 37,5 | 10,18° | 30.000 | 4.800 | 0,040 | 0,28 | 0,85 |
| 10,00 | 2,00 | 50 | 10,18° | 19.500 | 3.510 | 0,045 | 0,38 | 1,15 |
| 9,00 | 2,00 | 350 | 12,16° | 24.000 | 4.320 | 0,045 | 0,38 | 1,15 |

Fräsen mit Kugelradius r1 und Wirkradius r3
Cutting conditions for ball radius r1 and arc radius r3

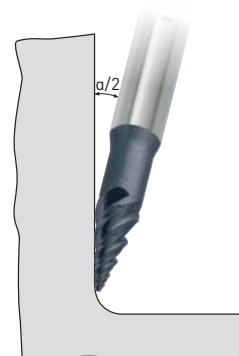
| Werkstoffgruppe Material Group | | | | 2.1 - 2.2 - 2.3 - 2.4 - 2.5 - 2.6 - 3.1 - 3.2 Vergütungsstähle / Heat treated steels < 35 HRC (1200 N/mm ²) | | |
|-----------------------------------|------|-------|--------|---|-----------|-------|
| d4 | r1 | r3 | a/2 | min ⁻¹ | Vf mm/min | fz mm |
| 2,50 | 0,50 | 12,5 | 10,17° | 37.500 | 3.750 | 0,025 |
| 5,00 | 0,50 | 350 | 12,60° | 35.500 | 5.680 | 0,040 |
| 3,75 | 0,75 | 18,75 | 10,19° | 35.500 | 4.686 | 0,033 |
| 5,00 | 1,00 | 25 | 10,18° | 34.500 | 5.520 | 0,040 |
| 7,00 | 1,00 | 350 | 13,39° | 27.000 | 4.860 | 0,045 |
| 7,50 | 1,50 | 37,5 | 10,18° | 27.000 | 4.860 | 0,045 |
| 10,00 | 2,00 | 50 | 10,18° | 17.500 | 3.850 | 0,055 |
| 9,00 | 2,00 | 350 | 12,16° | 21.600 | 4.752 | 0,055 |

Die Schnitttiefe und Schnittbreite (ap+ae) entnehmen Sie bitte der jeweiligen Anwendung in den oberen Tabellen.
For cutting depth and cutting width (ap+ae) refer to the above conditions for each section.

Schnitttiefe ap in Abhängigkeit der zu erzielenden theoretischen Rautiefe R_{th}
Cutting depth ap based on the desired theoretical roughness depth R_{th}

| Artikelnummer | Parabelradius | Theoretische Rautiefe R _{th} in mm Theoretical roughness depth R _{th} (mm) | | | | | |
|-----------------------|---------------|---|--------------------|--------------------|-------------------|-------------------|-------------------|
| | | 0,0001 mm ap mm | 0,0003 mm ap mm | 0,0005 mm ap mm | 0,001 mm ap mm | 0,003 mm ap mm | 0,005 mm ap mm |
| 30 6557 0250 0125 10 | 12,5 | 0,10 | 0,17 | 0,22 | 0,32 | 0,55 | 0,71 |
| 30 6557 0500 350 175 | 350 | 0,53 | 0,92 | 1,18 | 1,67 | 2,90 | 3,74 |
| 30 6557 0375 01875 15 | 18,75 | 0,12 | 0,21 | 0,27 | 0,39 | 0,67 | 0,87 |
| 30 6557 0500 025 20 | 25 | 0,14 | 0,24 | 0,32 | 0,45 | 0,77 | 1,00 |
| 30 6557 0700 350 175 | 350 | 0,53 | 0,92 | 1,18 | 1,67 | 2,90 | 3,74 |
| 30 6557 0750 0375 30 | 37,5 | 0,17 | 0,30 | 0,39 | 0,55 | 0,95 | 1,22 |
| 30 6557 1000 050 40 | 50 | 0,20 | 0,35 | 0,45 | 0,63 | 1,10 | 1,41 |
| 30 6557 0900 350 175 | 350 | 0,53 | 0,92 | 1,18 | 1,67 | 2,90 | 3,74 |

Wir empfehlen die Fräser mit dem Anstellwinkel a/2 einzusetzen.
We recommend to use the end mills with work angle a/2.



Die angegebenen Schnittdaten sind eine Empfehlung. Die tatsächlichen Schnittdaten sollten immer an die Bearbeitung und Maschine angepasst werden. Ist Ihnen zur Verfügung stehende Drehzahl niedriger als die in der Tabelle angegebene, sollte der Vorschub im gleichen Verhältnis reduziert werden. Verwenden Sie ausschließlich stabile und hochgenaue Maschinen.
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions. If the rpm available is lower than recommended please reduce the feed rate to the same ratio. Use only accurate and highly rigid machines.

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- 8 
- 9 



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20 1786 045 40 3045
20 1776 045 20 1796 040

Schnittdaten für Vollhartmetall Kegelsenker Cutting data for solid carbide countersinks

| Werkstoff Workpiece material | Werkstoffgruppe Material group | Schnittgeschwindigkeit Vc (m/min) cutting speed VC (m/min) | Vorschub f (mm/U) bei Senker - Ø feed f (mm/U) for countersinker - Ø | | | | | | | |
|--|-----------------------------------|--|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | | Ø 10,4 | Ø 12,4 | Ø 16,5 | Ø 20,5 | Ø 25 | Ø 31 | Ø 40 | Ø 45 |
| Stahl bis 900 N/mm ² steel up to 900 N/mm ² | 1.4 | ~ 20-30 | 0,07-0,12 | 0,07-0,12 | 0,07-0,12 | 0,07-0,12 | 0,07-0,12 | 0,07-0,12 | 0,07-0,12 | 0,05-0,15 |
| Stahl bis 1100 N/mm ² steel up to 1100 N/mm ² | 1.5 | ~ 14-18 | 0,06-0,11 | 0,06-0,11 | 0,06-0,11 | 0,06-0,11 | 0,06-0,11 | 0,06-0,11 | 0,06-0,11 | 0,06-0,11 |
| Stahl über 1400 N/mm ² steel over 1400 N/mm ² | 8.1 | ~ 8 | 0,05-0,08 | 0,05-0,08 | 0,05-0,08 | 0,06-0,11 | 0,06-0,11 | 0,06-0,11 | 0,06-0,11 | 0,04-0,08 |
| Stahl <60 HRC steel <60 HRC | 8.2 | ~ 8 | 0,06-0,10 | 0,06-0,10 | 0,06-0,10 | 0,07-0,11 | 0,07-0,11 | 0,07-0,11 | 0,07-0,11 | 0,04-0,11 |
| Edelstahl < 900 N stainless steel < 900 N | 4.1-4.2-4.3 | ~ 12-16 | 0,07-0,12 | 0,07-0,12 | 0,07-0,12 | 0,07-0,12 | 0,07-0,12 | 0,07-0,12 | 0,07-0,12 | 0,10-0,20 |
| Edelstahl > 900 N stainless steel > 900 N | 4.1-4.2-4.3 | ~ 8-10 | 0,06-0,11 | 0,06-0,11 | 0,06-0,11 | 0,06-0,11 | 0,06-0,11 | 0,06-0,11 | 0,06-0,11 | 0,12-0,22 |
| Titanlegierungen > 850 N titanium alloys > 850 N | 6.1-6.2 | ~ 6 | 0,04-0,08 | 0,04-0,08 | 0,04-0,08 | 0,05-0,09 | 0,05-0,09 | 0,05-0,09 | 0,05-0,09 | 0,04-0,10 |
| Guss cast iron | 7 | ~ 20 | 0,07-0,14 | 0,07-0,14 | 0,07-0,14 | 0,08-0,15 | 0,08-0,15 | 0,08-0,15 | 0,08-0,15 | 0,10-0,20 |
| Grafit, GFK, CFK graphite, GFK, CFK | - | ~ 5 | 0,03-0,07 | 0,03-0,07 | 0,03-0,07 | 0,03-0,07 | 0,04-0,08 | 0,04-0,08 | 0,04-0,08 | 0,04-0,08 |
| Hardox < 400 Hardox < 400 | - | ~ 30 | | | | | | | 0,15 | 0,15 |
| Hardox < 500, exotische Materialien Hardox < 500, exotic materials | 12-5.3-5.4-5.5 | ~ 8 | 0,06-0,10 | 0,06-0,10 | 0,06-0,10 | 0,07-0,11 | 0,07-0,11 | 0,07-0,11 | 0,07-0,11 | 0,10-0,20 |

Achtung: Schnittdaten für Hardox 500 nur anwendbar auf Artikelgruppe 40 3045. Schnittdaten für Hardox 400 nur anwendbar auf Artikel 20 1786 045, 20 1776 045, 20 1796 040.

Kühlung beim Bearbeiten von Hardox: Verwenden Sie zur Kühlung nur ölhaltige Kühlmittel ohne Wasseranteile wie zum Beispiel unser Mecutoil 100 (siehe Seite 1144/1145 Artikel 60 1100 10, 60 1100 5, 60 1100 25), Mecut-MMKS-MQL / Steel+Alu (siehe Seite 1144/1145 Artikel 60 1154, 60 1153), Mecutspray (siehe Seite 1146/1147 Artikel 60 1150) oder unsere Schneidpaste (siehe Seite 1146/1147 Artikel 60 1159, 60 1157).

Attention: Cutting data for Hardox 500 only applicable to article group 40 3045. Cutting data for Hardox 400 only applicable to article 20 1786 045, 20 1776 045, 20 1796 040.

Cooling advice while machining Hardox: For cooling, only use oily coolants without water, such as our Mecutoil 100 [see page 1144/1145 article 60 1100 10, 60 1100 5, 60 1100 25], Mecut-MMKS-MQL / Steel+Alu (see page 1144/1145 article 60 1154, 60 1153), Mecutspray (see page 1146/1147 article 60 1150) or our cutting paste (see page 1146/1147 article 60 1159, 60 1157).

29 1771

Empfohlene Schnittdaten für Diamantbeschichteten Composites Cross Finish Router Recommended cutting data for diamond coated Composites Cross Finish Router

| Werkstoffgruppe Material group | Werkstoff Material | Schnittdaten Cutting Data | Ø 4 | Ø 6 | Ø 8 | Ø 10 |
|-----------------------------------|-----------------------|--------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| 11.3 | CFK / CFRP | ae+ap mm fz mm Vc m/min. | 1xD 0,03 - 0,04 250 - 300 | 1xD 0,04 - 0,05 250 - 300 | 1xD 0,05 - 0,06 250 - 300 | 1xD 0,05 - 0,06 250 - 300 |
| 11.3 | GFK / GFRP | ae+ap mm fz mm Vc m/min. | 1xD 0,03 - 0,04 250 - 300 | 1xD 0,04 - 0,05 250 - 300 | 1xD 0,05 - 0,06 250 - 300 | 1xD 0,05 - 0,06 250 - 300 |

i

9

Index

Schnittdaten für VHM Vorwärts- und Rückwärtsentgrater
Cutting data for solid carbide forward- and backward burr remover

30 6489 30 6490

30 6491

| Werkstoff Workpiece material | Werkstoffgruppe Material group | Schnittgeschwindigkeit Vc (m/min) cutting speed Vc (m/min) | Vorschub f (mm/U) bei Senker-Ø feed ft (mm/U) for countersinker Ø | | | | |
|--|-----------------------------------|---|--|-------------|-------------|---------------|-------------|
| | | | r=0,2-3,0 | Ø 1,8-5,8 | Ø 7,8 | Ø 9,8 | Ø 11,8 |
| Stahl bis 500 N/mm ² steel up to 500 N/mm ² | 1.1 - 1.2 | 60 - 75 | 0,01 - 0,02 | 0,01 - 0,02 | 0,01 - 0,02 | 0,015 - 0,025 | 0,02 - 0,03 |
| Stahl bis 800 N/mm ² steel up to 800 N/mm ² | 1.3 - 1.4 | 35 - 45 | 0,01 - 0,02 | 0,01 - 0,02 | 0,01 - 0,02 | 0,015 - 0,025 | 0,02 - 0,03 |
| Stahl über 800 N/mm ² steel over 800 N/mm ² | 1.5 | 35 - 45 | 0,01 - 0,02 | 0,01 - 0,02 | 0,01 - 0,02 | 0,015 - 0,025 | 0,02 - 0,03 |
| rostfreier Stahl stainless steel | 2.1-2.2-2.3-2.4 | 30 - 40 | 0,01 - 0,02 | 0,01 - 0,02 | 0,01 - 0,02 | 0,015 - 0,025 | 0,02 - 0,03 |
| hochhitzebeständiger Stahl heat resisting steel | 1.6 | 30 - 40 | 0,01 - 0,02 | 0,01 - 0,02 | 0,01 - 0,02 | 0,015 - 0,025 | 0,02 - 0,03 |
| Grau,- Temper,- Hartguss cast iron, malleable cast iron | 7.1-7.2-7.3 | 35 - 45 | 0,01 - 0,02 | 0,01 - 0,02 | 0,01 - 0,02 | 0,015 - 0,025 | 0,02 - 0,03 |
| HHC < 65 HRC HHC < 65 HRC | 8.1-8.2 | 30 - 40 | 0,01 - 0,02 | 0,01 - 0,02 | 0,01 - 0,02 | 0,015 - 0,025 | 0,02 - 0,03 |
| Alu., Alu.legierung über 80 HB aluminum, alu. alloy over 80 HB | 9.1-9.2 | 110 - 130 | 0,01 - 0,08 | 0,01 - 0,08 | 0,01 - 0,08 | 0,02 - 0,10 | 0,03 - 0,12 |
| Messing, Bronze, Kupfer, Rotguss brass, bronze, copper, leaded bronze all | 10.1-10.2-10.3 | 110 - 120 | 0,01 - 0,05 | 0,01 - 0,05 | 0,01 - 0,05 | 0,02 - 0,06 | 0,02 - 0,08 |
| Kunststoffe plastics | 11.1-11.2-11.3-11.4 | 110 - 130 | 0,01 - 0,05 | 0,01 - 0,05 | 0,01 - 0,05 | 0,02 - 0,06 | 0,02 - 0,08 |

Schnittdaten für VHM-Entgrater
Cutting data for solid carbide deburring cutter

30 6200 30 6493 20 1755

30 6492 30 6497

| Werkstoff Workpiece material | Werkstoffgruppe Material group | Schnittgeschwindigkeit Vc (m/min) cutting speed Vc (m/min) | Vorschub fz (mm pro Zahn) feed ft (mm per tooth) | | | | | | |
|--|-----------------------------------|---|---|---------------|---------------|---------------|---------------|---------------|---------------|
| | | | <Ø 1,5 | Ø 2-3 | Ø 4 | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
| Stahl bis 500 N/mm ² steel up to 500 N/mm ² | 1.1 - 1.2 | 110 - 130 | 0,004 - 0,008 | 0,01 - 0,02 | 0,02 - 0,03 | 0,03 - 0,04 | 0,04 - 0,05 | 0,05 - 0,06 | 0,06 - 0,07 |
| Stahl bis 800 N/mm ² steel up to 800 N/mm ² | 1.3 - 1.4 | 90 - 110 | 0,004 - 0,008 | 0,01 - 0,02 | 0,02 - 0,03 | 0,03 - 0,04 | 0,04 - 0,05 | 0,05 - 0,06 | 0,06 - 0,07 |
| Stahl über 800 N/mm ² steel over 800 N/mm ² | 1.5 | 60 - 80 | 0,004 - 0,007 | 0,01 - 0,015 | 0,02 - 0,03 | 0,03 - 0,04 | 0,04 - 0,05 | 0,05 - 0,06 | 0,06 - 0,07 |
| rostfreier Stahl stainless steel | 2.1-2.2-2.3-2.4 | 60 - 80 | 0,004 - 0,008 | 0,01 - 0,015 | 0,02 - 0,03 | 0,03 - 0,04 | 0,04 - 0,05 | 0,05 - 0,06 | 0,06 - 0,07 |
| hochhitzebeständiger Stahl heat resisting steel | 1.6 | 30 - 40 | 0,004 - 0,006 | 0,01 - 0,015 | 0,015 - 0,025 | 0,025 - 0,035 | 0,035 - 0,040 | 0,045 - 0,055 | 0,06 - 0,07 |
| Grau,- Temper,- Hartguss cast iron, malleable cast iron | 7.1-7.2-7.3 | 80 - 100 | 0,004 - 0,008 | 0,01 - 0,02 | 0,02 - 0,03 | 0,03 - 0,04 | 0,04 - 0,05 | 0,05 - 0,06 | 0,06 - 0,07 |
| HHC < 65 HRC HHC < 65 HRC | 8.1-8.2 | 25 - 35 | 0,004 - 0,006 | 0,008 - 0,015 | 0,015 - 0,025 | 0,025 - 0,035 | 0,035 - 0,045 | 0,045 - 0,055 | 0,055 - 0,065 |
| Alu., Alu.legierung über 80 HB aluminum, alu. alloy over 80 HB | 9.1-9.2 | 130 - 300 | 0,005 - 0,01 | 0,01 - 0,03 | 0,02 - 0,04 | 0,03 - 0,05 | 0,04 - 0,06 | 0,05 - 0,07 | 0,06 - 0,1 |
| Messing, Bronze, Kupfer, Rotguss brass, bronze, copper, leaded bronze all | 10.1-10.2-10.3 | 170 - 200 | 0,005 - 0,01 | 0,01 - 0,03 | 0,02 - 0,04 | 0,03 - 0,05 | 0,04 - 0,06 | 0,05 - 0,07 | 0,06 - 0,1 |
| Kunststoffe plastics | 11.1-11.2-11.3-11.4 | 170 - 200 | 0,005 - 0,01 | 0,01 - 0,03 | 0,02 - 0,04 | 0,03 - 0,05 | 0,04 - 0,06 | 0,05 - 0,07 | 0,06 - 0,1 |

Schnittdaten für VHM-Viertelkreis-Profilfräser
Cutting data for solid carbide rounding cutters

30 6494

30 6495

| Werkstoff Workpiece material | Werkstoffgruppe Material group | Schnittgeschwindigkeit Vc (m/min) cutting speed Vc (m/min) | Vorschub fz (mm pro Zahn) feed ft (mm per tooth) | | | | | |
|--|-----------------------------------|---|---|---------------|---------------|--------------|--------------|-------------|
| | | | r=0,2-0,4 | r=0,5-0,8 | r=1,0-1,5 | r=2,0-3,5 | r=4,0-5,0 | r~6 |
| Stahl bis 500 N/mm ² steel up to 500 N/mm ² | 1.1 - 1.2 | 180 - 200 | 0,002 - 0,004 | 0,003 - 0,006 | 0,006 - 0,012 | 0,014 - 0,02 | 0,03 - 0,035 | 0,05 - 0,06 |
| Stahl bis 800 N/mm ² steel up to 800 N/mm ² | 1.3 - 1.4 | 160 - 180 | 0,002 - 0,004 | 0,003 - 0,006 | 0,006 - 0,012 | 0,014 - 0,02 | 0,03 - 0,035 | 0,05 - 0,06 |
| Stahl über 800 N/mm ² steel over 800 N/mm ² | 1.5 | 80 - 110 | 0,002 - 0,004 | 0,003 - 0,006 | 0,006 - 0,012 | 0,014 - 0,02 | 0,03 - 0,035 | 0,05 - 0,06 |
| rostfreier Stahl stainless steel | 2.1-2.2-2.3-2.4 | 70 - 100 | 0,002 - 0,004 | 0,003 - 0,006 | 0,006 - 0,012 | 0,014 - 0,02 | 0,03 - 0,035 | 0,05 - 0,06 |
| hochhitzebeständiger Stahl heat resisting steel | 1.6 | 80 - 110 | 0,002 - 0,004 | 0,003 - 0,006 | 0,006 - 0,012 | 0,014 - 0,02 | 0,03 - 0,035 | 0,05 - 0,06 |
| Grau,- Temper,- Hartguss cast iron, malleable cast iron | 7.1-7.2-7.3 | 100 - 130 | 0,002 - 0,004 | 0,003 - 0,006 | 0,006 - 0,012 | 0,014 - 0,02 | 0,03 - 0,035 | 0,05 - 0,06 |
| HHC < 65 HRC HHC < 65 HRC | 8.1-8.2 | 70 - 90 | 0,002 - 0,004 | 0,003 - 0,006 | 0,006 - 0,012 | 0,014 - 0,02 | 0,03 - 0,035 | 0,05 - 0,06 |
| Alu., Alu.legierung über 80 HB aluminum, alu. alloy over 80 HB | 9.1-9.2 | 500 - 800 | 0,003 - 0,01 | 0,005 - 0,015 | 0,01 - 0,02 | 0,02 - 0,04 | 0,04 - 0,06 | 0,06 - 0,1 |
| Messing, Bronze, Kupfer, Rotguss brass, bronze, copper, leaded bronze all | 10.1-10.2-10.3 | 500 - 800 | 0,003 - 0,01 | 0,005 - 0,015 | 0,01 - 0,02 | 0,02 - 0,04 | 0,04 - 0,06 | 0,06 - 0,1 |
| Kunststoffe plastics | 11.1-11.2-11.3-11.4 | 600 - 900 | 0,003 - 0,01 | 0,005 - 0,015 | 0,01 - 0,02 | 0,02 - 0,04 | 0,04 - 0,06 | 0,06 - 0,1 |



| Werkstoffgruppe Material group | Werkstoff/Material | | Ø 2 r = 0,2 Z3 | Ø 3 r = 0,3 Z3 | Ø 4 r = 0,5 Z3 | Ø 5 r = 0,5 Z3 | Ø 6 r = 0,5 Z4 | Ø 8 r = 0,5/1/2 Z4 | Ø 10 r = 0,5/1/2 Z4 | Ø 12 r = 0,5/1/2/3 Z4 | Ø 16 r = 0,5/1/2/3 Z4 | Ø 20 r = 0,5/1/2/3 Z4 |
|-----------------------------------|--|---|--|---|---|---|---|---|--|--|--|---|
| 2.1 | 1.4104 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 2 ap 0,5 vc 80 n 12.800 fz 0,007 vf 269 | ae 3 ap 0,75 vc 85 n 9.000 fz 0,018 vf 486 | ae 4 ap 1 vc 88 n 7.000 fz 0,026 vf 546 | ae 5 ap 2,5 vc 86 n 5.500 fz 0,015 vf 247 | ae 6 ap 3 vc 89 n 4.700 fz 0,015 vf 282 | ae 8 ap 4 vc 90 n 3.600 fz 0,025 vf 360 | ae 10 ap 5 vc 94 n 3.000 fz 0,032 vf 384 | ae 12 ap 6 vc 94 n 2.500 fz 0,040 vf 400 | ae 16 ap 8 vc 100 n 2.000 fz 0,051 vf 408 | ae 20 ap 10 vc 101 n 1.600 fz 0,061 vf 390 |
| | 1.4305 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 2 ap 0,5 vc 97 n 15.400 fz 0,007 vf 323 | ae 3 ap 0,75 vc 102 n 10.800 fz 0,018 vf 583 | ae 4 ap 1 vc 106 n 8.400 fz 0,026 vf 655 | ae 5 ap 2,5 vc 102 n 6.500 fz 0,015 vf 293 | ae 6 ap 3 vc 107 n 5.650 fz 0,015 vf 340 | ae 8 ap 4 vc 108 n 4.300 fz 0,025 vf 430 | ae 10 ap 5 vc 110 n 3.500 fz 0,032 vf 448 | ae 12 ap 6 vc 113 n 3.000 fz 0,040 vf 480 | ae 16 ap 8 vc 121 n 2.400 fz 0,051 vf 490 | ae 20 ap 10 vc 119 n 1.900 fz 0,061 vf 463 |
| 2.2 | 1.4110-1.4112-1.4192 1.4319-1.4404-1.4406 1.4408-1.4429-1.4435 1.4436-1.4438-1.4439 1.4441-1.4452-1.4528 1.4541-1.4542-1.4545 1.4546-1.4550-1.4552 1.4568-1.4718-1.4724 1.4731-1.4742-1.4760 1.4762-1.4828-1.4871 1.4873-1.4912-1.4961 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 2 ap 0,5 vc 65 n 10.300 fz 0,006 vf 185 | ae 3 ap 0,75 vc 68 n 7.200 fz 0,017 vf 367 | ae 4 ap 1 vc 70 n 5.600 fz 0,025 vf 420 | ae 5 ap 2,5 vc 69 n 4.400 fz 0,014 vf 185 | ae 6 ap 3 vc 72 n 3.800 fz 0,015 vf 228 | ae 8 ap 4 vc 73 n 2.900 fz 0,025 vf 291 | ae 10 ap 5 vc 75 n 2.400 fz 0,032 vf 307 | ae 12 ap 6 vc 75 n 2.000 fz 0,040 vf 320 | ae 16 ap 8 vc 80 n 1.600 fz 0,051 vf 326 | ae 20 ap 10 vc 82 n 1.300 fz 0,061 vf 317 |
| | 1.4301-1.4306 1.4308-1.4310 1.4311-1.4312 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 2 ap 0,25 vc 83 n 13.200 fz 0,014 vf 554 | ae 3 ap 0,75 vc 81 n 8.600 fz 0,017 vf 439 | ae 4 ap 1 vc 85 n 6.800 fz 0,025 vf 510 | ae 5 ap 2,5 vc 83 n 5.300 fz 0,014 vf 223 | ae 6 ap 3 vc 85 n 4.500 fz 0,015 vf 252 | ae 8 ap 4 vc 88 n 3.500 fz 0,025 vf 350 | ae 10 ap 5 vc 88 n 2.800 fz 0,032 vf 358 | ae 12 ap 6 vc 90 n 2.400 fz 0,040 vf 384 | ae 16 ap 8 vc 96 n 1.900 fz 0,051 vf 388 | ae 20 ap 10 vc 94 n 1.500 fz 0,061 vf 366 |
| | 1.4303 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 2 ap 0,5 vc 71 n 11.300 fz 0,006 vf 203 | ae 3 ap 0,75 vc 75 n 7.900 fz 0,017 vf 403 | ae 4 ap 1 vc 78 n 6.200 fz 0,025 vf 465 | ae 5 ap 2,5 vc 78 n 4.800 fz 0,014 vf 202 | ae 6 ap 3 vc 79 n 4.200 fz 0,015 vf 252 | ae 8 ap 4 vc 80 n 3.200 fz 0,025 vf 320 | ae 10 ap 5 vc 82 n 2.600 fz 0,032 vf 332 | ae 12 ap 6 vc 83 n 2.200 fz 0,040 vf 352 | ae 16 ap 8 vc 86 n 1.700 fz 0,051 vf 347 | ae 20 ap 10 vc 88 n 1.400 fz 0,061 vf 342 |
| | 1.4571-1.4580 1.4581-1.4583 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 2 ap 0,5 vc 58 n 9.300 fz 0,006 vf 167 | ae 3 ap 0,75 vc 61 n 6.500 fz 0,017 vf 332 | ae 4 ap 1 vc 64 n 5.100 fz 0,025 vf 383 | ae 5 ap 2,5 vc 63 n 4.000 fz 0,014 vf 168 | ae 6 ap 3 vc 65 n 3.400 fz 0,015 vf 205 | ae 8 ap 4 vc 65 n 2.600 fz 0,025 vf 260 | ae 10 ap 5 vc 66 n 2.100 fz 0,032 vf 269 | ae 12 ap 6 vc 68 n 1.800 fz 0,040 vf 288 | ae 16 ap 8 vc 70 n 1.400 fz 0,051 vf 286 | ae 20 ap 10 vc 75 n 1.200 fz 0,061 vf 293 |
| | 1.4833-1.4841 1.4842-1.4845 1.4864-1.4941 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 2 ap 0,5 vc 52 n 8.200 fz 0,006 vf 148 | ae 3 ap 0,75 vc 55 n 5.800 fz 0,017 vf 296 | ae 4 ap 1 vc 57 n 4.500 fz 0,025 vf 338 | ae 5 ap 2,5 vc 55 n 3.500 fz 0,014 vf 147 | ae 6 ap 3 vc 57 n 3.000 fz 0,015 vf 182 | ae 8 ap 4 vc 58 n 2.300 fz 0,025 vf 230 | ae 10 ap 5 vc 60 n 1.900 fz 0,032 vf 243 | ae 12 ap 6 vc 60 n 1.600 fz 0,040 vf 256 | ae 16 ap 8 vc 65 n 1.300 fz 0,051 vf 265 | ae 20 ap 10 vc 63 n 1.000 fz 0,061 vf 244 |
| | 1.4000-1.4001 1.4002-1.4005 1.4006-1.4008 1.4016-1.4021 1.4028-1.4031 1.4034-1.4125 1.4313-1.4460 1.4462-1.4510 1.4511-1.4512 1.4521 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 2 ap 0,25 vc 57 n 9.000 fz 0,014 vf 378 | ae 3 ap 0,75 vc 56 n 5.900 fz 0,016 vf 283 | ae 4 ap 1 vc 58 n 4.600 fz 0,022 vf 304 | ae 5 ap 2,5 vc 57 n 3.600 fz 0,013 vf 140 | ae 6 ap 3 vc 58 n 3.100 fz 0,015 vf 186 | ae 8 ap 4 vc 60 n 2.400 fz 0,025 vf 240 | ae 10 ap 5 vc 60 n 1.900 fz 0,032 vf 243 | ae 12 ap 6 vc 60 n 1.600 fz 0,040 vf 256 | ae 16 ap 8 vc 65 n 1.300 fz 0,051 vf 265 | ae 20 ap 10 vc 69 n 1.100 fz 0,061 vf 268 |
| 2.4 | 1.4466-1.4539 1.4547-1.4865 1.4876-1.4939 1.4944-1.4971 1.4466-1.4539 1.4547-1.4558 1.4854-1.4865 1.4922-1.4944 1.4971-1.4977 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 2 ap 0,25 vc 42 n 6.600 fz 0,013 vf 257 | ae 3 ap 0,75 vc 41 n 4.300 fz 0,013 vf 168 | ae 4 ap 1 vc 43 n 3.400 fz 0,019 vf 194 | ae 5 ap 2,5 vc 41 n 2.600 fz 0,011 vf 86 | ae 6 ap 3 vc 43 n 2.300 fz 0,015 vf 138 | ae 8 ap 4 vc 43 n 1.700 fz 0,024 vf 163 | ae 10 ap 5 vc 44 n 1.400 fz 0,032 vf 179 | ae 12 ap 6 vc 45 n 1.200 fz 0,040 vf 192 | ae 16 ap 8 vc 50 n 1.000 fz 0,051 vf 204 | ae 20 ap 10 vc 50 n 800 fz 0,061 vf 195 |
| | 1.4558-1.4563 1.4854-1.4958 1.4977-1.4980 1.4563-1.4876 1.4958-1.4980 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 2 ap 0,25 vc 37 n 5.900 fz 0,013 vf 230 | ae 3 ap 0,75 vc 37 n 3.900 fz 0,013 vf 152 | ae 4 ap 1 vc 38 n 3.000 fz 0,019 vf 171 | ae 5 ap 2,5 vc 38 n 2.400 fz 0,011 vf 79 | ae 6 ap 3 vc 39 n 2.050 fz 0,015 vf 123 | ae 8 ap 4 vc 40 n 1.600 fz 0,024 vf 153 | ae 10 ap 5 vc 41 n 1.300 fz 0,032 vf 166 | ae 12 ap 6 vc 42 n 1.100 fz 0,040 vf 176 | ae 16 ap 8 vc 45 n 900 fz 0,051 vf 183 | ae 20 ap 10 vc 44 n 700 fz 0,061 vf 171 |

Empfohlene Richtwerte für VHM-Schaftfräser "Goldwin" mit Eckenradius
Recommended cutting data for solid carbide end mill "Goldwin" with corner radius

Nutfräsen
Slot milling

30 7425

| Werkstoff- gruppe Material group | Werkstoff/Material | | Ø 2 r = 0,2 Z3 | Ø 3 r = 0,3 Z3 | Ø 4 r = 0,5 Z3 | Ø 5 r = 0,5 Z3 | Ø 6 r = 0,5 Z4 | Ø 8 r = 0,5/1/2 Z4 | Ø 10 r = 0,5/1/2 Z4 | Ø 12 r = 0,5/1/2/3 Z4 | Ø 16 r = 0,5/1/2/3 Z4 | Ø 20 r = 0,5/1/2/3 Z4 |
|--|---|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------------|---------------------------|-----------------------------|-----------------------------|-----------------------------|
| 4.1 | 3.7024-3.7025 3.7034-3.7035 3.7055-3.7064 | ae mm | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 |
| | | ap mm | 0,5 | 0,75 | 1 | 2,5 | 3 | 4 | 5 | 6 | 8 | 10 |
| | | Vc m/min. | 150 | 157 | 165 | 160 | 166 | 168 | 173 | 173 | 181 | 183 |
| | | n min ⁻¹ | 23.900 | 16.700 | 13.100 | 10.200 | 8.800 | 6.700 | 5.500 | 4.600 | 3.600 | 2.900 |
| | | fz mm | 0,013 | 0,021 | 0,031 | 0,023 | 0,022 | 0,042 | 0,054 | 0,064 | 0,083 | 0,102 |
| | | Vf mm/min. | 932 | 1052 | 1218 | 704 | 774 | 1126 | 1188 | 1177 | 1195 | 1184 |
| 4.2 | 3.7105-3.7115 3.7124-3.7184 | ae mm | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 |
| | | ap mm | 0,5 | 0,75 | 1 | 2,5 | 3 | 4 | 5 | 6 | 8 | 10 |
| | | Vc m/min. | 54 | 57 | 59 | 58 | 60 | 60 | 63 | 64 | 65 | 69 |
| | | n min ⁻¹ | 8.600 | 6.000 | 4.700 | 3.700 | 3.200 | 2.400 | 2.000 | 1.700 | 1.300 | 1.100 |
| | | fz mm | 0,012 | 0,021 | 0,026 | 0,018 | 0,015 | 0,025 | 0,032 | 0,040 | 0,051 | 0,061 |
| | | Vf mm/min. | 310 | 378 | 367 | 200 | 192 | 240 | 256 | 272 | 265 | 268 |
| 4.3 | 3.7154-3.7164 3.7124 | ae mm | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 |
| | | ap mm | 0,5 | 0,75 | 1 | 2,5 | 3 | 4 | 5 | 6 | 8 | 10 |
| | | Vc m/min. | 43 | 45 | 48 | 47 | 48 | 50 | 50 | 49 | 55 | 56 |
| | | n min ⁻¹ | 6.900 | 4.800 | 3.800 | 3.000 | 2.550 | 2.000 | 1.600 | 1.300 | 1.100 | 900 |
| | | fz mm | 0,009 | 0,021 | 0,026 | 0,018 | 0,015 | 0,025 | 0,032 | 0,040 | 0,051 | 0,061 |
| | | Vf mm/min. | 186 | 302 | 296 | 162 | 153 | 200 | 205 | 208 | 224 | 220 |
| 5.1 | 1.3911-1.3926 1.3927 | ae mm | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 |
| | | ap mm | 0,5 | 0,75 | 1 | 2,5 | 3 | 4 | 5 | 6 | 8 | 10 |
| | | Vc m/min. | 241 | 252 | 264 | 255 | 264 | 269 | 273 | 275 | 291 | 295 |
| | | n min ⁻¹ | 38.300 | 26.800 | 21.000 | 16.200 | 14.000 | 10.700 | 8.700 | 7.300 | 5.800 | 4.700 |
| | | fz mm | 0,013 | 0,021 | 0,031 | 0,023 | 0,022 | 0,042 | 0,054 | 0,064 | 0,083 | 0,102 |
| | | Vf mm/min. | 1494 | 1688 | 1953 | 1118 | 1232 | 1798 | 1879 | 1869 | 1926 | 1917 |
| 5.2 | 1.3912-1.3981 | ae mm | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 |
| | | ap mm | 0,5 | 0,75 | 1 | 2,5 | 3 | 4 | 5 | 6 | 8 | 10 |
| | | Vc m/min. | 45 | 47 | 49 | 47 | 49 | 50 | 50 | 53 | 55 | 57 |
| | | n min ⁻¹ | 7.100 | 5.000 | 3.900 | 3.000 | 2.600 | 2.000 | 1.600 | 1.400 | 1.100 | 900 |
| | | fz mm | 0,011 | 0,021 | 0,026 | 0,018 | 0,015 | 0,025 | 0,032 | 0,040 | 0,051 | 0,061 |
| | | Vf mm/min. | 234 | 315 | 304 | 162 | 156 | 200 | 205 | 224 | 224 | 220 |
| 5.3 | 1.3913-1.3915-1.3916 1.3917-1.3918-1.3920 1.3921-1.3922-1.3923 1.3924-1.3928-2.4360 2.4375-2.4602-2.4630 2.4631-2.4634-2.4636 2.4642-2.4650-2.4654 2.4662-2.4665-2.4668 2.4669-2.4672-2.4674 2.4676-2.4816-2.4851 2.4856-2.4858-2.4916 2.4973-2.4983 | ae mm | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 |
| | | ap mm | 0,5 | 0,75 | 1 | 2,5 | 3 | 4 | 5 | 6 | 8 | 10 |
| | | Vc m/min. | 26 | 27 | 29 | 28 | 29 | 30 | 31 | 30 | 35 | 32 |
| | | n min ⁻¹ | 4.200 | 2.900 | 2.300 | 1.800 | 1.550 | 1.200 | 1.000 | 800 | 700 | 500 |
| | | fz mm | 0,009 | 0,021 | 0,026 | 0,018 | 0,015 | 0,025 | 0,032 | 0,040 | 0,051 | 0,061 |
| | | Vf mm/min. | 113 | 183 | 180 | 97 | 93 | 120 | 128 | 128 | 143 | 122 |
| | 2.4633 | ae mm | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 |
| | | ap mm | 0,5 | 0,75 | 1 | 2,5 | 3 | 4 | 5 | 6 | 8 | 10 |
| | | Vc m/min. | 18 | 20 | 20 | 21 | 21 | 20 | 22 | 22 | 25 | 25 |
| | | n min ⁻¹ | 2.900 | 2.100 | 1.600 | 1.300 | 1.100 | 800 | 700 | 600 | 500 | 400 |
| | | fz mm | 0,009 | 0,021 | 0,026 | 0,018 | 0,015 | 0,025 | 0,032 | 0,040 | 0,051 | 0,061 |
| | | Vf mm/min. | 78 | 132 | 125 | 70 | 66 | 80 | 90 | 96 | 102 | 98 |
| 2.4670-2.4672 2.4674 | ae mm | 2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 | |
| | ap mm | 0,5 | 0,75 | 1 | 2,5 | 3 | 4 | 5 | 6 | 8 | 10 | |
| | Vc m/min. | 23 | 25 | 26 | 25 | 26 | 28 | 28 | 27 | 30 | 31 | |
| | n min ⁻¹ | 3.700 | 2.600 | 2.100 | 1.600 | 1.400 | 1.100 | 900 | 700 | 600 | 500 | |
| | fz mm | 0,009 | 0,021 | 0,026 | 0,018 | 0,015 | 0,025 | 0,032 | 0,040 | 0,051 | 0,061 | |
| | Vf mm/min. | 100 | 164 | 164 | 86 | 84 | 110 | 115 | 112 | 122 | 122 | |



8



9

Index

| Werkstoffgruppe Material group | Werkstoff/Material | | Ø 2 r = 0,2 Z3 | Ø 3 r = 0,3 Z3 | Ø 4 r = 0,5 Z3 | Ø 5 r = 0,5 Z3 | Ø 6 r = 0,5 Z4 | Ø 8 r = 0,5/1/2 Z4 | Ø 10 r = 0,5/1/2 Z4 | Ø 12 r = 0,5/1/2/3 Z4 | Ø 16 r = 0,5/1/2/3 Z4 | Ø 20 r = 0,5/1/2/3 Z4 |
|-----------------------------------|--|---|--|--|--|--|---|--|--|--|--|--|
| 2.1 | 1.4104 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 3 vc 127 n 20.200 fz 0,011 vf 667 | ae 0,3 ap 4 vc 135 n 14.300 fz 0,035 vf 1.502 | ae 0,4 ap 6 vc 138 n 11.000 fz 0,042 vf 1.386 | ae 0,5 ap 7,5 vc 145 n 9.200 fz 0,035 vf 966 | ae 0,6 ap 9 vc 132 n 7.000 fz 0,030 vf 840 | ae 0,8 ap 12 vc 126 n 5.000 fz 0,050 vf 1.000 | ae 1,0 ap 15 vc 123 n 3.900 fz 0,063 vf 983 | ae 1,2 ap 18 vc 136 n 3.600 fz 0,078 vf 1.123 | ae 1,6 ap 24 vc 141 n 2.800 fz 0,100 vf 1.120 | ae 2,0 ap 30 vc 170 n 2.700 fz 0,119 vf 1.285 |
| | 1.4305 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 3 vc 152 n 24.100 fz 0,012 vf 868 | ae 0,3 ap 4 vc 161 n 17.100 fz 0,035 vf 1.796 | ae 0,4 ap 6 vc 167 n 13.300 fz 0,042 vf 1.676 | ae 0,5 ap 7,5 vc 173 n 11.000 fz 0,035 vf 1.155 | ae 0,6 ap 9 vc 179 n 9.500 fz 0,030 vf 1.140 | ae 0,8 ap 12 vc 181 n 7.200 fz 0,050 vf 1.440 | ae 1,0 ap 15 vc 185 n 5.900 fz 0,063 vf 1.487 | ae 1,2 ap 18 vc 188 n 5.000 fz 0,078 vf 1.560 | ae 1,6 ap 24 vc 197 n 3.900 fz 0,100 vf 1.560 | ae 2,0 ap 30 vc 201 n 3.200 fz 0,119 vf 1.526 |
| 2.2 | 1.4110-1.4112-1.4192 1.4319-1.4404-1.4406 1.4408-1.4429-1.4435 1.4436-1.4438-1.4439 1.4441-1.4452-1.4528 1.4541-1.4542-1.4545 1.4546-1.4550-1.4552 1.4568-1.4718-1.4724 1.4731-1.4742-1.4760 1.4762-1.4828-1.4871 1.4873-1.4912-1.4961 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 3 vc 102 n 16.200 fz 0,011 vf 535 | ae 0,3 ap 4 vc 108 n 11.500 fz 0,035 vf 1.208 | ae 0,4 ap 6 vc 112 n 8.900 fz 0,042 vf 1.121 | ae 0,5 ap 7,5 vc 116 n 7.400 fz 0,035 vf 777 | ae 0,6 ap 9 vc 121 n 6.400 fz 0,030 vf 768 | ae 0,8 ap 12 vc 123 n 4.900 fz 0,050 vf 980 | ae 1,0 ap 15 vc 126 n 4.000 fz 0,063 vf 1.008 | ae 1,2 ap 18 vc 124 n 3.300 fz 0,078 vf 1.030 | ae 1,6 ap 24 vc 131 n 2.600 fz 0,100 vf 1.040 | ae 2,0 ap 30 vc 132 n 2.100 fz 0,119 vf 1.000 |
| | 1.4301-1.4306 1.4308-1.4310 1.4311-1.4312 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 3 vc 120 n 19.000 fz 0,011 vf 627 | ae 0,3 ap 4 vc 130 n 13.800 fz 0,035 vf 1.449 | ae 0,4 ap 6 vc 133 n 10.600 fz 0,042 vf 1.336 | ae 0,5 ap 7,5 vc 138 n 8.800 fz 0,035 vf 924 | ae 0,6 ap 9 vc 143 n 7.600 fz 0,030 vf 912 | ae 0,8 ap 12 vc 146 n 5.800 fz 0,050 vf 1.160 | ae 1,0 ap 15 vc 151 n 4.800 fz 0,063 vf 1.210 | ae 1,2 ap 18 vc 151 n 4.000 fz 0,078 vf 1.248 | ae 1,6 ap 24 vc 161 n 3.200 fz 0,100 vf 1.280 | ae 2,0 ap 30 vc 163 n 2.600 fz 0,119 vf 1.238 |
| | 1.4303 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 3 vc 112 n 17.800 fz 0,011 vf 587 | ae 0,3 ap 4 vc 119 n 12.600 fz 0,035 vf 1.323 | ae 0,4 ap 6 vc 122 n 9.700 fz 0,042 vf 1.222 | ae 0,5 ap 7,5 vc 127 n 8.100 fz 0,035 vf 851 | ae 0,6 ap 9 vc 132 n 7.000 fz 0,030 vf 840 | ae 0,8 ap 12 vc 133 n 5.300 fz 0,050 vf 1.060 | ae 1,0 ap 15 vc 138 n 4.400 fz 0,063 vf 1.109 | ae 1,2 ap 18 vc 140 n 3.700 fz 0,078 vf 1.154 | ae 1,6 ap 24 vc 146 n 2.900 fz 0,100 vf 1.160 | ae 2,0 ap 30 vc 145 n 2.300 fz 0,119 vf 1.095 |
| | 1.4571-1.4580 1.4581-1.4583 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 3 vc 92 n 14.600 fz 0,011 vf 482 | ae 0,3 ap 4 vc 97 n 10.300 fz 0,035 vf 1.082 | ae 0,4 ap 6 vc 101 n 8.000 fz 0,042 vf 1.008 | ae 0,5 ap 7,5 vc 104 n 6.600 fz 0,035 vf 693 | ae 0,6 ap 9 vc 108 n 5.700 fz 0,030 vf 684 | ae 0,8 ap 12 vc 111 n 4.400 fz 0,050 vf 880 | ae 1,0 ap 15 vc 113 n 3.600 fz 0,063 vf 907 | ae 1,2 ap 18 vc 113 n 3.000 fz 0,078 vf 936 | ae 1,6 ap 24 vc 121 n 2.400 fz 0,100 vf 960 | ae 2,0 ap 30 vc 119 n 1.900 fz 0,119 vf 904 |
| | 1.4833-1.4841 1.4842-1.4845 1.4864-1.4941 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 3 vc 82 n 13.000 fz 0,011 vf 429 | ae 0,3 ap 4 vc 87 n 9.200 fz 0,035 vf 966 | ae 0,4 ap 6 vc 89 n 7.100 fz 0,042 vf 895 | ae 0,5 ap 7,5 vc 93 n 5.900 fz 0,035 vf 620 | ae 0,6 ap 9 vc 96 n 5.100 fz 0,030 vf 612 | ae 0,8 ap 12 vc 98 n 3.900 fz 0,050 vf 780 | ae 1,0 ap 15 vc 101 n 3.200 fz 0,063 vf 806 | ae 1,2 ap 18 vc 102 n 2.700 fz 0,078 vf 842 | ae 1,6 ap 24 vc 106 n 2.100 fz 0,100 vf 840 | ae 2,0 ap 30 vc 107 n 1.700 fz 0,119 vf 809 |
| | 1.4000-1.4001-1.4002 1.4005-1.4006-1.4008 1.4016-1.4021-1.4028 1.4031-1.4034-1.4125 1.4313-1.4460-1.4462 1.4510-1.4511-1.4512 1.4521 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 3 vc 83 n 13.200 fz 0,010 vf 396 | ae 0,3 ap 4 vc 88 n 9.300 fz 0,033 vf 921 | ae 0,4 ap 6 vc 91 n 7.200 fz 0,042 vf 907 | ae 0,5 ap 7,5 vc 94 n 6.000 fz 0,035 vf 630 | ae 0,6 ap 9 vc 98 n 5.200 fz 0,030 vf 624 | ae 0,8 ap 12 vc 101 n 4.000 fz 0,050 vf 800 | ae 1,0 ap 15 vc 101 n 3.200 fz 0,063 vf 806 | ae 1,2 ap 18 vc 102 n 2.700 fz 0,078 vf 842 | ae 1,6 ap 24 vc 111 n 2.200 fz 0,100 vf 880 | ae 2,0 ap 30 vc 108 n 1.700 fz 0,119 vf 809 |
| 2.4 | 1.4466-1.4539-1.4547 1.4865-1.4876-1.4939 1.4944-1.4971-1.4466 1.4539-1.4547-1.4558 1.4854-1.4865-1.4922 1.4944-1.4971-1.4977 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 3 vc 83 n 13.200 fz 0,010 vf 396 | ae 0,3 ap 4 vc 88 n 9.300 fz 0,033 vf 921 | ae 0,4 ap 6 vc 91 n 7.200 fz 0,042 vf 907 | ae 0,5 ap 7,5 vc 94 n 6.000 fz 0,035 vf 630 | ae 0,6 ap 9 vc 98 n 5.200 fz 0,030 vf 624 | ae 0,8 ap 12 vc 101 n 4.000 fz 0,050 vf 800 | ae 1,0 ap 15 vc 101 n 3.200 fz 0,063 vf 806 | ae 1,2 ap 18 vc 102 n 2.700 fz 0,078 vf 842 | ae 1,6 ap 24 vc 111 n 2.200 fz 0,100 vf 880 | ae 2,0 ap 30 vc 107 n 1.700 fz 0,119 vf 809 |
| | 1.4558-1.4563 1.4854-1.4958 1.4977-1.4980 1.4563-1.4876 1.4958-1.4980 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,1 ap 3 vc 63 n 10.100 fz 0,017 vf 515 | ae 0,3 ap 4 vc 58 n 6.200 fz 0,024 vf 446 | ae 0,4 ap 6 vc 60 n 4.800 fz 0,030 vf 432 | ae 0,5 ap 7,5 vc 63 n 4.000 fz 0,035 vf 420 | ae 0,6 ap 9 vc 64 n 3.400 fz 0,030 vf 408 | ae 0,8 ap 12 vc 65 n 2.600 fz 0,050 vf 520 | ae 1,0 ap 15 vc 69 n 2.200 fz 0,063 vf 554 | ae 1,2 ap 18 vc 68 n 1.800 fz 0,078 vf 562 | ae 1,6 ap 24 vc 71 n 1.400 fz 0,100 vf 560 | ae 2,0 ap 30 vc 75 n 1.200 fz 0,119 vf 571 |
| | 1.4865 | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,1 ap 3 vc 70 n 11.200 fz 0,020 vf 672 | ae 0,3 ap 4 vc 65 n 6.900 fz 0,028 vf 580 | ae 0,4 ap 6 vc 67 n 5.300 fz 0,034 vf 541 | ae 0,5 ap 7,5 vc 69 n 4.400 fz 0,035 vf 462 | ae 0,6 ap 9 vc 72 n 3.800 fz 0,030 vf 456 | ae 0,8 ap 12 vc 73 n 2.900 fz 0,050 vf 580 | ae 1,0 ap 15 vc 75 n 2.400 fz 0,063 vf 605 | ae 1,2 ap 18 vc 75 n 2.000 fz 0,078 vf 624 | ae 1,6 ap 24 vc 80 n 1.600 fz 0,100 vf 640 | ae 2,0 ap 30 vc 82 n 1.300 fz 0,119 vf 619 |

Empfohlene Richtwerte für VHM-Schaftfräser "Goldwin" mit Eckenradius
Recommended cutting data for solid carbide and mill "Goldwin" with corner radius

Umfangfräsen
Side milling

30 7425

| Werkstoff- gruppe Material group | Werkstoff/Material | | Ø 2 r = 0,2 Z3 | Ø 3 r = 0,3 Z3 | Ø 4 r = 0,5 Z3 | Ø 5 r = 0,5 Z3 | Ø 6 r = 0,5 Z4 | Ø 8 r = 0,5/1/2 Z4 | Ø 10 r = 0,5/1/2 Z4 | Ø 12 r = 0,5/1/2/3 Z4 | Ø 16 r = 0,5/1/2/3 Z4 | Ø 20 r = 0,5/1/2/3 Z4 |
|--|---|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------------|---------------------------|-----------------------------|-----------------------------|-----------------------------|
| 4.1 | 3.7024-3.7025 3.7034-3.7035 3.7055-3.7064 | ae mm | 0,2 | 0,3 | 0,4 | 0,5 | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 2,0 |
| | | ap mm | 3 | 4 | 6 | 7,5 | 9 | 12 | 15 | 18 | 24 | 30 |
| | | Vc m/min. | 277 | 294 | 303 | 316 | 326 | 332 | 339 | 339 | 362 | 364 |
| | | n min ⁻¹ | 44.100 | 31.200 | 24.100 | 20.100 | 17.300 | 13.200 | 10.800 | 9.000 | 7.200 | 5.800 |
| | | fz mm | 0,021 | 0,035 | 0,050 | 0,044 | 0,043 | 0,083 | 0,100 | 0,110 | 0,126 | 0,141 |
| | | Vf mm/min. | 2.778 | 3.276 | 3.615 | 2.653 | 2.976 | 4.382 | 4.320 | 3.960 | 3.629 | 3.271 |
| 4.2 | 3.7105-3.7115 3.7124-3.7184 | ae mm | 0,2 | 0,3 | 0,4 | 0,5 | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 2,0 |
| | | ap mm | 3 | 4 | 6 | 7,5 | 9 | 12 | 15 | 18 | 24 | 30 |
| | | Vc m/min. | 117 | 124 | 128 | 133 | 138 | 141 | 145 | 143 | 151 | 157 |
| | | n min ⁻¹ | 18.600 | 13.200 | 10.200 | 8.500 | 7.300 | 5.600 | 4.600 | 3.800 | 3.000 | 2.500 |
| | | fz mm | 0,019 | 0,035 | 0,042 | 0,035 | 0,030 | 0,050 | 0,063 | 0,078 | 0,100 | 0,119 |
| | | Vf mm/min. | 1.060 | 1.386 | 1.285 | 892 | 876 | 1.120 | 1.159 | 1.186 | 1.200 | 1.190 |
| 4.3 | 3.7154-3.7164 3.7124 | ae mm | 0,2 | 0,3 | 0,4 | 0,5 | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 2,0 |
| | | ap mm | 3 | 4 | 6 | 7,5 | 9 | 12 | 15 | 18 | 24 | 30 |
| | | Vc m/min. | 94 | 100 | 103 | 107 | 111 | 113 | 116 | 117 | 121 | 126 |
| | | n min ⁻¹ | 14.900 | 10.600 | 8.200 | 6.800 | 5.900 | 4.500 | 3.700 | 3.100 | 2.400 | 2.000 |
| | | fz mm | 0,016 | 0,035 | 0,042 | 0,035 | 0,030 | 0,050 | 0,063 | 0,078 | 0,100 | 0,119 |
| | | Vf mm/min. | 715 | 1.113 | 1.033 | 714 | 708 | 900 | 932 | 967 | 960 | 952 |
| 5.1 | 1.3911-1.3926 1.3927 | ae mm | 0,2 | 0,3 | 0,4 | 0,5 | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 2,0 |
| | | ap mm | 3 | 4 | 6 | 7,5 | 9 | 12 | 15 | 18 | 24 | 30 |
| | | Vc m/min. | 379 | 402 | 415 | 432 | 447 | 452 | 462 | 464 | 493 | 496 |
| | | n min ⁻¹ | 60.300 | 42.700 | 33.000 | 27.500 | 23.700 | 18.000 | 14.700 | 12.300 | 9.800 | 7.900 |
| | | fz mm | 0,021 | 0,035 | 0,050 | 0,044 | 0,043 | 0,083 | 0,100 | 0,110 | 0,126 | 0,141 |
| | | Vf mm/min. | 3.799 | 4.484 | 4.950 | 3.630 | 4.076 | 5.976 | 5.880 | 5.412 | 4.939 | 4.455 |
| 5.2 | 1.3912-1.3981 | ae mm | 0,2 | 0,3 | 0,4 | 0,5 | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 2,0 |
| | | ap mm | 3 | 4 | 6 | 7,5 | 9 | 12 | 15 | 18 | 24 | 30 |
| | | Vc m/min. | 83 | 88 | 90 | 94 | 98 | 101 | 101 | 102 | 111 | 107 |
| | | n min ⁻¹ | 13.200 | 9.300 | 7.200 | 6.000 | 5.200 | 4.000 | 3.200 | 2.700 | 2.200 | 1.700 |
| | | fz mm | 0,019 | 0,035 | 0,042 | 0,035 | 0,030 | 0,050 | 0,063 | 0,100 | 0,100 | 0,119 |
| | | Vf mm/min. | 752 | 977 | 907 | 630 | 624 | 800 | 806 | 842 | 880 | 809 |
| 5.3 | 1.3913-1.3915-1.3916 1.3917-1.3918-1.3920 1.3921-1.3922-1.3923 1.3924-1.3928-2.4360 2.4375-2.4602-2.4630 2.4631-2.4634-2.4636 2.4642-2.4650-2.4654 2.4662-2.4665-2.4668 2.4669-2.4672-2.4674 2.4676-2.4816-2.4851 2.4856-2.4858-2.4916 2.4973-2.4983 | ae mm | 0,2 | 0,3 | 0,4 | 0,5 | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 2,0 |
| | | ap mm | 3 | 4 | 6 | 7,5 | 9 | 12 | 15 | 18 | 24 | 30 |
| | | Vc m/min. | 48 | 51 | 53 | 55 | 57 | 58 | 60 | 60 | 65 | 63 |
| | | n min ⁻¹ | 7.700 | 5.400 | 4.200 | 3.500 | 3.000 | 2.300 | 1.900 | 1.600 | 1.300 | 1.000 |
| | | fz mm | 0,016 | 0,035 | 0,042 | 0,035 | 0,030 | 0,050 | 0,063 | 0,078 | 0,100 | 0,119 |
| | | Vf mm/min. | 370 | 567 | 529 | 369 | 360 | 460 | 479 | 499 | 520 | 476 |
| | 2.4633 | ae mm | 0,2 | 0,3 | 0,4 | 0,5 | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 2,0 |
| | | ap mm | 3 | 4 | 6 | 7,5 | 9 | 12 | 15 | 18 | 24 | 30 |
| | | Vc m/min. | 34 | 36 | 38 | 39 | 40 | 40 | 41 | 42 | 45 | 44 |
| | | n min ⁻¹ | 5.400 | 3.800 | 3.000 | 2.500 | 2.100 | 1.600 | 1.300 | 1.100 | 900 | 700 |
| | | fz mm | 0,016 | 0,035 | 0,042 | 0,035 | 0,030 | 0,050 | 0,063 | 0,078 | 0,100 | 0,119 |
| | | Vf mm/min. | 259 | 399 | 378 | 263 | 252 | 320 | 328 | 343 | 360 | 333 |
| 2.4670-2.4672 2.4674 | ae mm | 0,2 | 0,3 | 0,4 | 0,5 | 0,6 | 0,8 | 1,0 | 1,2 | 1,6 | 2,0 | |
| | ap mm | 3 | 4 | 6 | 7,5 | 9 | 12 | 15 | 18 | 24 | 30 | |
| | Vc m/min. | 43 | 46 | 48 | 50 | 51 | 53 | 53 | 53 | 60 | 57 | |
| | n min ⁻¹ | 6.900 | 4.900 | 3.800 | 3.200 | 2.700 | 2.100 | 1.700 | 1.400 | 1.200 | 900 | |
| | fz mm | 0,016 | 0,035 | 0,042 | 0,035 | 0,030 | 0,050 | 0,063 | 0,078 | 0,100 | 0,119 | |
| | Vf mm/min. | 331 | 515 | 479 | 336 | 324 | 420 | 428 | 437 | 480 | 428 | |



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Index

30 6271

Empfohlene Schnittdaten für DIAMANT-beschichtete VHM-Fräser zur Bearbeitung von HARTMETALL
Recommended cutting data for DIAMOND-coated solid carbide end mills for machining CEMENTED CARBIDE

| Werkstoff: Hartmetall Material: cemented carbide | | | 5-Achsfräsen Z-Level Milling | | | | Flächenfräsen Flat Milling | | | | Umfangfräsen Side Milling | | | | Nutfräsen Slotting | | |
|---|------|-----|---------------------------------|-----------|-------|-------|-------------------------------|-----------|-------|-------|------------------------------|-----------|-------|-------|-----------------------|-----------|-------|
| d1 | r | l1 | min ⁻¹ | Vf mm/min | ae mm | ap mm | min ⁻¹ | Vf mm/min | ae mm | ap mm | min ⁻¹ | Vf mm/min | ae mm | ap mm | min ⁻¹ | Vf mm/min | ae mm |
| 0,3 | 0,03 | 0,6 | 25.000-35.000 | 220 | 0,010 | 0,200 | 25.000-35.000 | 220 | 0,010 | 0,200 | 25.000-35.000 | 110 | 0,050 | 0,001 | 25.000-35.000 | 110 | 0,010 |
| 0,3 | 0,05 | 0,6 | 25.000-35.000 | 220 | 0,010 | 0,200 | 25.000-35.000 | 220 | 0,010 | 0,200 | 25.000-35.000 | 110 | 0,050 | 0,001 | 25.000-35.000 | 110 | 0,010 |
| 0,5 | 0,03 | 0,5 | 25.000-35.000 | 185 | 0,010 | 0,400 | 25.000-35.000 | 185 | 0,010 | 0,400 | 25.000-35.000 | 375 | 0,250 | 0,005 | 25.000-35.000 | 375 | 0,010 |
| 0,5 | 0,03 | 1,0 | 25.000-35.000 | 185 | 0,010 | 0,400 | 25.000-35.000 | 185 | 0,010 | 0,400 | 25.000-35.000 | 180 | 0,125 | 0,005 | 25.000-35.000 | 375 | 0,010 |
| 0,5 | 0,05 | 0,5 | 25.000-35.000 | 375 | 0,010 | 0,400 | 25.000-35.000 | 375 | 0,010 | 0,400 | 25.000-35.000 | 375 | 0,250 | 0,005 | 25.000-35.000 | 375 | 0,010 |
| 0,5 | 0,05 | 1,0 | 25.000-35.000 | 375 | 0,010 | 0,400 | 25.000-35.000 | 375 | 0,010 | 0,400 | 25.000-35.000 | 180 | 0,125 | 0,005 | 25.000-35.000 | 375 | 0,010 |
| 0,8 | 0,03 | 0,8 | 25.000-35.000 | 185 | 0,010 | 0,600 | 25.000-35.000 | 185 | 0,010 | 0,600 | 25.000-35.000 | 600 | 0,400 | 0,008 | 25.000-35.000 | 375 | 0,010 |
| 0,8 | 0,03 | 1,6 | 25.000-35.000 | 185 | 0,010 | 0,600 | 25.000-35.000 | 185 | 0,010 | 0,600 | 25.000-35.000 | 300 | 0,200 | 0,008 | 25.000-35.000 | 375 | 0,010 |
| 0,8 | 0,05 | 0,8 | 25.000-35.000 | 375 | 0,010 | 0,600 | 25.000-35.000 | 375 | 0,010 | 0,600 | 25.000-35.000 | 600 | 0,400 | 0,008 | 25.000-35.000 | 375 | 0,010 |
| 0,8 | 0,05 | 1,6 | 25.000-35.000 | 375 | 0,010 | 0,600 | 25.000-35.000 | 375 | 0,010 | 0,600 | 25.000-35.000 | 300 | 0,200 | 0,008 | 25.000-35.000 | 375 | 0,010 |
| 0,8 | 0,10 | 0,8 | 25.000-35.000 | 375 | 0,010 | 0,600 | 25.000-35.000 | 375 | 0,010 | 0,600 | 25.000-35.000 | 600 | 0,400 | 0,008 | 25.000-35.000 | 375 | 0,010 |
| 0,8 | 0,10 | 1,6 | 25.000-35.000 | 375 | 0,010 | 0,600 | 25.000-35.000 | 375 | 0,010 | 0,600 | 25.000-35.000 | 300 | 0,200 | 0,008 | 25.000-35.000 | 375 | 0,010 |
| 1,0 | 0,03 | 1,0 | 25.000-35.000 | 185 | 0,010 | 0,800 | 25.000-35.000 | 185 | 0,010 | 0,800 | 25.000-35.000 | 750 | 0,500 | 0,010 | 25.000-35.000 | 375 | 0,010 |
| 1,0 | 0,03 | 2,0 | 25.000-35.000 | 185 | 0,010 | 0,800 | 25.000-35.000 | 185 | 0,010 | 0,800 | 25.000-35.000 | 375 | 0,250 | 0,010 | 25.000-35.000 | 375 | 0,010 |
| 1,0 | 0,05 | 1,0 | 25.000-35.000 | 375 | 0,010 | 0,800 | 25.000-35.000 | 375 | 0,010 | 0,800 | 25.000-35.000 | 750 | 0,500 | 0,010 | 25.000-35.000 | 375 | 0,010 |
| 1,0 | 0,05 | 2,0 | 25.000-35.000 | 375 | 0,010 | 0,800 | 25.000-35.000 | 375 | 0,010 | 0,800 | 25.000-35.000 | 375 | 0,250 | 0,010 | 25.000-35.000 | 375 | 0,010 |
| 1,0 | 0,10 | 1,0 | 25.000-35.000 | 375 | 0,010 | 0,800 | 25.000-35.000 | 375 | 0,010 | 0,800 | 25.000-35.000 | 750 | 0,500 | 0,010 | 25.000-35.000 | 375 | 0,010 |
| 1,0 | 0,10 | 2,0 | 25.000-35.000 | 375 | 0,010 | 0,800 | 25.000-35.000 | 375 | 0,010 | 0,800 | 25.000-35.000 | 375 | 0,250 | 0,010 | 25.000-35.000 | 375 | 0,010 |
| 1,5 | 0,03 | 1,5 | 20.000-30.000 | 185 | 0,010 | 1,300 | 20.000-30.000 | 185 | 0,010 | 1,300 | 20.000-30.000 | 750 | 0,750 | 0,010 | 20.000-30.000 | 375 | 0,015 |
| 1,5 | 0,03 | 3,0 | 20.000-30.000 | 185 | 0,010 | 1,300 | 20.000-30.000 | 185 | 0,010 | 1,300 | 20.000-30.000 | 375 | 0,375 | 0,010 | 20.000-30.000 | 375 | 0,015 |
| 1,5 | 0,05 | 1,5 | 20.000-30.000 | 375 | 0,015 | 1,300 | 20.000-30.000 | 375 | 0,015 | 1,300 | 20.000-30.000 | 750 | 0,750 | 0,010 | 20.000-30.000 | 375 | 0,015 |
| 1,5 | 0,05 | 3,0 | 20.000-30.000 | 375 | 0,015 | 1,300 | 20.000-30.000 | 375 | 0,015 | 1,300 | 20.000-30.000 | 375 | 0,375 | 0,010 | 20.000-30.000 | 375 | 0,015 |
| 1,5 | 0,10 | 1,5 | 20.000-30.000 | 375 | 0,015 | 1,300 | 20.000-30.000 | 375 | 0,015 | 1,300 | 20.000-30.000 | 750 | 0,750 | 0,010 | 20.000-30.000 | 375 | 0,015 |
| 1,5 | 0,10 | 3,0 | 20.000-30.000 | 375 | 0,015 | 1,300 | 20.000-30.000 | 375 | 0,015 | 1,300 | 20.000-30.000 | 375 | 0,375 | 0,010 | 20.000-30.000 | 375 | 0,015 |
| 2,0 | 0,03 | 2,0 | 15.000-25.000 | 185 | 0,010 | 1,800 | 15.000-25.000 | 185 | 0,010 | 1,800 | 15.000-25.000 | 750 | 1,000 | 0,010 | 15.000-25.000 | 375 | 0,020 |
| 2,0 | 0,03 | 4,0 | 15.000-25.000 | 185 | 0,010 | 1,800 | 15.000-25.000 | 185 | 0,010 | 1,800 | 15.000-25.000 | 375 | 0,500 | 0,010 | 15.000-25.000 | 375 | 0,020 |
| 2,0 | 0,05 | 2,0 | 15.000-25.000 | 375 | 0,020 | 1,800 | 15.000-25.000 | 375 | 0,020 | 1,800 | 15.000-25.000 | 750 | 1,000 | 0,010 | 15.000-25.000 | 375 | 0,020 |
| 2,0 | 0,05 | 4,0 | 15.000-25.000 | 375 | 0,020 | 1,800 | 15.000-25.000 | 375 | 0,020 | 1,800 | 15.000-25.000 | 375 | 0,500 | 0,010 | 15.000-25.000 | 375 | 0,020 |
| 2,0 | 0,10 | 2,0 | 15.000-25.000 | 375 | 0,020 | 1,800 | 15.000-25.000 | 375 | 0,020 | 1,800 | 15.000-25.000 | 750 | 1,000 | 0,010 | 15.000-25.000 | 375 | 0,020 |
| 2,0 | 0,10 | 4,0 | 15.000-25.000 | 375 | 0,020 | 1,800 | 15.000-25.000 | 375 | 0,020 | 1,800 | 15.000-25.000 | 375 | 0,500 | 0,010 | 15.000-25.000 | 375 | 0,020 |

30 6274

Empfohlene Schnittdaten für DIAMANT-beschichtete Vollhartmetallfräser zur Bearbeitung von HARTMETALL
Recommended cutting data for DIAMOND-coated solid carbide end mills for machining CEMENTED CARBIDE

| Werkstoffgruppe Material group | d1 | l3 | min ⁻¹ | Vf mm/min | ap mm | ae mm |
|-----------------------------------|-----|-----|-------------------|-----------|-------|-------|
| Hartmetall Cemented Carbide | 0,2 | - | 25.000-35.000 | 100 | 0,010 | 0,010 |
| | 0,2 | 0,3 | 25.000-35.000 | 100 | 0,010 | 0,010 |
| | 0,2 | 0,5 | 25.000-35.000 | 30 | 0,005 | 0,008 |
| | 0,2 | 0,8 | 25.000-35.000 | 30 | 0,005 | 0,006 |
| | 0,2 | 1,0 | 25.000-35.000 | 25 | 0,005 | 0,005 |
| | 0,3 | - | 25.000-35.000 | 125 | 0,015 | 0,030 |
| | 0,4 | - | 25.000-35.000 | 150 | 0,020 | 0,080 |
| | 0,4 | 0,5 | 25.000-35.000 | 150 | 0,020 | 0,080 |
| | 0,4 | 1,0 | 25.000-35.000 | 100 | 0,015 | 0,070 |
| | 0,4 | 1,5 | 25.000-35.000 | 60 | 0,010 | 0,060 |
| | 0,4 | 2,0 | 25.000-35.000 | 30 | 0,008 | 0,050 |
| | 0,5 | - | 25.000-35.000 | 175 | 0,025 | 0,110 |
| | 0,6 | - | 25.000-35.000 | 200 | 0,030 | 0,140 |
| | 0,6 | 1,0 | 25.000-35.000 | 200 | 0,030 | 0,140 |
| | 0,6 | 1,5 | 25.000-35.000 | 200 | 0,030 | 0,140 |
| | 0,6 | 2,0 | 25.000-35.000 | 150 | 0,022 | 0,110 |
| | 0,6 | 3,0 | 25.000-35.000 | 75 | 0,010 | 0,080 |
| | 0,7 | - | 25.000-35.000 | 225 | 0,035 | 0,170 |
| | 0,8 | - | 25.000-35.000 | 250 | 0,040 | 0,190 |
| | 0,8 | 2,0 | 25.000-35.000 | 250 | 0,040 | 0,190 |
| | 0,8 | 3,0 | 25.000-35.000 | 230 | 0,037 | 0,170 |
| | 0,8 | 4,0 | 25.000-35.000 | 210 | 0,035 | 0,160 |
| | 0,9 | - | 25.000-35.000 | 275 | 0,045 | 0,220 |
| | 1,0 | - | 25.000-35.000 | 300 | 0,050 | 0,250 |
| | 1,0 | 2,0 | 25.000-35.000 | 300 | 0,050 | 0,250 |
| | 1,0 | 2,5 | 25.000-35.000 | 300 | 0,050 | 0,250 |

| Werkstoffgruppe Material group | d1 | l3 | min ⁻¹ | Vf mm/min | ap mm | ae mm |
|-----------------------------------|------|---------------|-------------------|-----------|-------|-------|
| Hartmetall Cemented Carbide | 1,0 | 3,0 | 25.000-35.000 | 300 | 0,050 | 0,250 |
| | 1,0 | 4,0 | 25.000-35.000 | 300 | 0,050 | 0,250 |
| | 1,0 | 5,0 | 25.000-35.000 | 300 | 0,050 | 0,250 |
| | 2,0 | - | 25.000-35.000 | 300 | 0,100 | 0,300 |
| | 2,0 | 3,0 | 25.000-35.000 | 300 | 0,100 | 0,300 |
| | 2,0 | 4,0 | 25.000-35.000 | 300 | 0,100 | 0,300 |
| | 2,0 | 6,0 | 25.000-35.000 | 300 | 0,100 | 0,300 |
| | 2,0 | 8,0 | 25.000-35.000 | 300 | 0,100 | 0,300 |
| | 2,0 | 10,0 | 25.000-35.000 | 300 | 0,100 | 0,300 |
| | 3,0 | - | 22.500-32.500 | 275 | 0,125 | 0,330 |
| | 3,0 | 6,0 | 25.000-35.000 | 275 | 0,125 | 0,330 |
| | 3,0 | 8,0 | 25.000-35.000 | 275 | 0,125 | 0,330 |
| | 3,0 | 10,0 | 25.000-35.000 | 275 | 0,125 | 0,330 |
| | 3,0 | 12,0 | 25.000-35.000 | 220 | 0,125 | 0,330 |
| | 3,0 | 14,0 | 25.000-35.000 | 220 | 0,125 | 0,330 |
| | 4,0 | - | 20.000-28.000 | 240 | 0,175 | 0,370 |
| | 4,0 | 8,0 | 20.000-28.000 | 240 | 0,150 | 0,350 |
| | 4,0 | 10,0 | 20.000-28.000 | 240 | 0,150 | 0,350 |
| | 4,0 | 15,0 | 20.000-28.000 | 240 | 0,150 | 0,350 |
| | 5,0 | - | 18.000-26.000 | 220 | 0,175 | 0,370 |
| | 5,0 | 10,0 | 18.000-26.000 | 220 | 0,175 | 0,370 |
| | 5,0 | 15,0 | 18.000-26.000 | 220 | 0,175 | 0,370 |
| 6,0 | - | 15.000-25.000 | 200 | 0,200 | 0,400 | |
| 6,0 | 10,0 | 15.000-25.000 | 200 | 0,200 | 0,400 | |
| 6,0 | 15,0 | 15.000-25.000 | 200 | 0,200 | 0,400 | |

Empfohlene Schnittdaten für DIAMANT-beschichtete Fräswerkzeuge / HSC-Bearbeitung
Recommended cutting data for diamond coated solid carbide end mills HSC

| | | | |
|---------|---------|---------|---------|
| 30 6545 | 30 6553 | 30 6544 | 30 6542 |
| 30 6546 | 30 6552 | 30 6554 | 30 6551 |

| Werkstoffgruppe Material group | d1 | Schruppen/roughing ap=0,5xD, ae=1,0xD | | | | | Schruppen/roughing ap=0,5xD, ae=0,5xD | | | | | Schlichten/finishing ap=0,2xD, ae=0,2xD | | | | |
|-----------------------------------|-------|---------------------------------------|-----------|-------|--------|-------|---------------------------------------|-----------|-------|-------|-------|---|-----------|-------|-------|-------|
| | | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 14 | 0,1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,8 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 1,0 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 1,2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 1,5 | 8.000 | 230 | 0,014 | 0,750 | 1,500 | 8.000 | 290 | 0,018 | 0,750 | 0,750 | 8.000 | 320 | 0,020 | 0,300 | 0,3 |
| | 2,0 | 8.000 | 260 | 0,016 | 1,000 | 2,000 | 8.000 | 320 | 0,020 | 1,000 | 1,000 | 8.000 | 400 | 0,025 | 0,400 | 0,4 |
| | 3,0 | 8.000 | 380 | 0,024 | 1,500 | 3,000 | 8.000 | 400 | 0,025 | 1,500 | 1,500 | 8.000 | 560 | 0,035 | 0,600 | 0,6 |
| | 4,0 | 8.000 | 520 | 0,033 | 2,000 | 4,000 | 8.000 | 640 | 0,040 | 2,000 | 2,000 | 8.000 | 800 | 0,050 | 0,800 | 0,8 |
| | 5,0 | 8.000 | 640 | 0,040 | 2,500 | 5,000 | 8.000 | 800 | 0,050 | 2,500 | 2,500 | 8.000 | 960 | 0,060 | 1,000 | 1,0 |
| 6,0 | 8.000 | 780 | 0,049 | 3,000 | 6,000 | 8.000 | 1.050 | 0,066 | 3,000 | 3,000 | 8.000 | 1.150 | 0,072 | 1,200 | 1,2 | |
| 8,0 | 8.000 | 1.050 | 0,066 | 4,000 | 8,000 | 8.000 | 1.300 | 0,081 | 4,000 | 4,000 | 8.000 | 1.350 | 0,084 | 1,600 | 1,6 | |
| 10,0 | 8.000 | 1.300 | 0,081 | 5,000 | 10,000 | 8.000 | 1.600 | 0,100 | 5,000 | 5,000 | 8.000 | 1.750 | 0,109 | 2,000 | 2,0 | |
| 12,0 | 8.000 | 1.600 | 0,100 | 6,000 | 12,000 | 8.000 | 1.900 | 0,119 | 6,000 | 6,000 | 8.000 | 2.100 | 0,131 | 2,400 | 2,4 | |

| Werkstoffgruppe Material group | d1 | Schruppen/roughing ap=0,5xD, ae=1,0xD | | | | | Schruppen/roughing ap=0,5xD, ae=0,5xD | | | | | Schlichten/finishing ap=0,2xD, ae=0,2xD | | | | |
|-----------------------------------|--------|---------------------------------------|-----------|-------|-------|--------|---------------------------------------|-----------|-------|-------|--------|---|-----------|-------|-------|-------|
| | | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 14 | 0,1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,5 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,6 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,8 | 15.000 | 240 | 0,008 | 0,4 | 0,8 | 15.000 | 300 | 0,010 | 0,4 | 0,4 | 15.000 | 360 | 0,012 | 0,16 | 0,16 |
| | 1,0 | 15.000 | 300 | 0,010 | 0,5 | 1,0 | 15.000 | 360 | 0,012 | 0,5 | 0,5 | 15.000 | 450 | 0,015 | 0,2 | 0,2 |
| | 1,2 | 15.000 | 300 | 0,010 | 0,6 | 1,2 | 15.000 | 360 | 0,012 | 0,6 | 0,6 | 15.000 | 450 | 0,015 | 0,24 | 0,24 |
| | 1,5 | 15.000 | 420 | 0,014 | 0,75 | 1,5 | 15.000 | 540 | 0,018 | 0,75 | 0,75 | 15.000 | 600 | 0,020 | 0,3 | 0,3 |
| | 2,0 | 15.000 | 480 | 0,016 | 1,0 | 2,0 | 15.000 | 600 | 0,020 | 1,0 | 1,0 | 15.000 | 750 | 0,025 | 0,4 | 0,4 |
| | 3,0 | 15.000 | 720 | 0,024 | 1,5 | 3,0 | 15.000 | 760 | 0,025 | 1,5 | 1,5 | 15.000 | 1.050 | 0,035 | 0,6 | 0,6 |
| | 4,0 | 15.000 | 950 | 0,032 | 2,0 | 4,0 | 15.000 | 1.100 | 0,037 | 2,0 | 2,0 | 15.000 | 1.500 | 0,050 | 0,8 | 0,8 |
| | 5,0 | 15.000 | 1.200 | 0,040 | 2,5 | 5,0 | 15.000 | 1.500 | 0,050 | 2,5 | 2,5 | 15.000 | 1.800 | 0,060 | 1,0 | 1,0 |
| 6,0 | 15.000 | 1.500 | 0,050 | 3,0 | 6,0 | 15.000 | 1.900 | 0,063 | 3,0 | 3,0 | 15.000 | 2.100 | 0,070 | 1,2 | 1,2 | |
| 8,0 | 15.000 | 1.900 | 0,063 | 4,0 | 8,0 | 15.000 | 2.400 | 0,080 | 4,0 | 4,0 | 15.000 | 2.600 | 0,087 | 1,6 | 1,6 | |
| 10,0 | 15.000 | 2.400 | 0,080 | 5,0 | 10,0 | 15.000 | 3.000 | 0,100 | 5,0 | 5,0 | 15.000 | 3.300 | 0,110 | 2,0 | 2,0 | |
| 12,0 | 15.000 | 3.000 | 0,100 | 6,0 | 12,0 | 15.000 | 3.600 | 0,120 | 6,0 | 6,0 | 15.000 | 4.000 | 0,133 | 2,4 | 2,4 | |

Diese Schnittdaten stehen in Abhängigkeit der Auskraglänge. Korrigieren Sie gegebenenfalls Vc + fz sowie ae und ap um ein optimales Ergebnis zu erzielen!
This cutting data depends upon the projecting length. If necessary correct Vc + fz as well as ae and ap for archieving an optimal result!



| | | | |
|---------|---------|---------|---------|
| 30 6545 | 30 6553 | 30 6544 | 30 6542 |
| 30 6546 | 30 6552 | 30 6554 | 30 6551 |

Empfohlene Schnittdaten für DIAMANT-beschichtete Fräswerkzeuge / HSC-Bearbeitung
Recommended cutting data for diamond coated solid carbide end mills HSC

| Werkstoffgruppe Material group | 24000 U/min | Schruppen/roughing ap=0,5xD, ae=1,0xD | | | | | Schruppen/roughing ap=0,5xD, ae=0,5xD | | | | | Schlichten/finishing ap=0,2xD, ae=0,2xD | | | | | |
|-----------------------------------|----------------|---------------------------------------|-------------------|-----------|-------|--------|---------------------------------------|-------------------|-----------|-------|--------|---|-------------------|-----------|-------|-------|-------|
| | | d1 | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 14 | 0,1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,3 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 0,5 | 24.000 | 240 | 0,005 | 0,25 | 0,5 | 24.000 | 340 | 0,007 | 0,25 | 0,25 | 24.000 | 380 | 0,008 | 0,1 | 0,1 | 0,1 |
| | 0,6 | 24.000 | 290 | 0,006 | 0,3 | 0,6 | 24.000 | 390 | 0,008 | 0,3 | 0,3 | 24.000 | 480 | 0,010 | 0,12 | 0,12 | 0,12 |
| | 0,8 | 24.000 | 390 | 0,008 | 0,4 | 0,8 | 24.000 | 490 | 0,010 | 0,4 | 0,4 | 24.000 | 580 | 0,012 | 0,16 | 0,16 | 0,16 |
| | 1,0 | 24.000 | 480 | 0,010 | 0,5 | 1,0 | 24.000 | 580 | 0,012 | 0,5 | 0,5 | 24.000 | 720 | 0,015 | 0,2 | 0,2 | 0,2 |
| | 1,2 | 24.000 | 480 | 0,010 | 0,6 | 1,2 | 24.000 | 580 | 0,012 | 0,6 | 0,6 | 24.000 | 720 | 0,015 | 0,24 | 0,24 | 0,24 |
| | 1,5 | 24.000 | 680 | 0,014 | 0,75 | 1,5 | 24.000 | 880 | 0,018 | 0,75 | 0,75 | 24.000 | 960 | 0,020 | 0,3 | 0,3 | 0,3 |
| | 2,0 | 24.000 | 760 | 0,016 | 1,0 | 2,0 | 24.000 | 960 | 0,020 | 1,0 | 1,0 | 24.000 | 1.200 | 0,025 | 0,4 | 0,4 | 0,4 |
| | 3,0 | 24.000 | 1.100 | 0,023 | 1,5 | 3,0 | 24.000 | 1.200 | 0,025 | 1,5 | 1,5 | 24.000 | 1.700 | 0,035 | 0,6 | 0,6 | 0,6 |
| | 4,0 | 24.000 | 1.500 | 0,031 | 2,0 | 4,0 | 24.000 | 1.900 | 0,040 | 2,0 | 2,0 | 24.000 | 2.400 | 0,050 | 0,8 | 0,8 | 0,8 |
| | 5,0 | 24.000 | 1.900 | 0,040 | 2,5 | 5,0 | 24.000 | 2.400 | 0,050 | 2,5 | 2,5 | 24.000 | 2.900 | 0,060 | 1,0 | 1,0 | 1,0 |
| 6,0 | 24.000 | 2.300 | 0,048 | 3,0 | 6,0 | 24.000 | 3.100 | 0,065 | 3,0 | 3,0 | 24.000 | 3.400 | 0,071 | 1,2 | 1,2 | 1,2 | |
| 8,0 | 24.000 | 3.100 | 0,065 | 4,0 | 8,0 | 24.000 | 3.800 | 0,079 | 4,0 | 4,0 | 24.000 | 4.100 | 0,085 | 1,6 | 1,6 | 1,6 | |
| 10,0 | 24.000 | 3.800 | 0,079 | 5,0 | 10,0 | 24.000 | 4.800 | 0,100 | 5,0 | 5,0 | 24.000 | 5.300 | 0,110 | 2,0 | 2,0 | 2,0 | |
| 12,0 | 24.000 | 4.800 | 0,100 | 6,0 | 12,0 | 24.000 | 5.800 | 0,121 | 6,0 | 6,0 | 24.000 | 6.300 | 0,131 | 2,4 | 2,4 | 2,4 | |

| Werkstoffgruppe Material group | 30000 U/min | Schruppen/roughing ap=0,5xD, ae=1,0xD | | | | | Schruppen/roughing ap=0,5xD, ae=0,5xD | | | | | Schlichten/finishing ap=0,2xD, ae=0,2xD | | | | | |
|-----------------------------------|----------------|---------------------------------------|-------------------|-----------|-------|--------|---------------------------------------|-------------------|-----------|-------|--------|---|-------------------|-----------|-------|-------|-------|
| | | d1 | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm |
| 14 | 0,1 | 30.000 | 110 | 0,002 | 0,05 | 0,1 | 30.000 | 170 | 0,003 | 0,05 | 0,05 | 30.000 | 220 | 0,004 | 0,02 | 0,02 | 0,02 |
| | 0,2 | 30.000 | 120 | 0,002 | 0,1 | 0,2 | 30.000 | 180 | 0,003 | 0,1 | 0,1 | 30.000 | 240 | 0,004 | 0,04 | 0,04 | 0,04 |
| | 0,3 | 30.000 | 120 | 0,002 | 0,15 | 0,3 | 30.000 | 180 | 0,003 | 0,15 | 0,15 | 30.000 | 240 | 0,004 | 0,06 | 0,06 | 0,06 |
| | 0,4 | 30.000 | 240 | 0,004 | 0,2 | 0,4 | 30.000 | 300 | 0,005 | 0,2 | 0,2 | 30.000 | 360 | 0,006 | 0,08 | 0,08 | 0,08 |
| | 0,5 | 30.000 | 300 | 0,005 | 0,25 | 0,5 | 30.000 | 420 | 0,007 | 0,25 | 0,25 | 30.000 | 480 | 0,008 | 0,1 | 0,1 | 0,1 |
| | 0,6 | 30.000 | 360 | 0,006 | 0,3 | 0,6 | 30.000 | 480 | 0,008 | 0,3 | 0,3 | 30.000 | 600 | 0,010 | 0,12 | 0,12 | 0,12 |
| | 0,8 | 30.000 | 480 | 0,008 | 0,4 | 0,8 | 30.000 | 600 | 0,010 | 0,4 | 0,4 | 30.000 | 730 | 0,012 | 0,16 | 0,16 | 0,16 |
| | 1,0 | 30.000 | 600 | 0,010 | 0,5 | 1,0 | 30.000 | 720 | 0,012 | 0,5 | 0,5 | 30.000 | 900 | 0,015 | 0,2 | 0,2 | 0,2 |
| | 1,2 | 30.000 | 600 | 0,010 | 0,6 | 1,2 | 30.000 | 720 | 0,012 | 0,6 | 0,6 | 30.000 | 900 | 0,015 | 0,24 | 0,24 | 0,24 |
| | 1,5 | 30.000 | 850 | 0,014 | 0,75 | 1,5 | 30.000 | 1.050 | 0,018 | 0,75 | 0,75 | 30.000 | 1.200 | 0,020 | 0,3 | 0,3 | 0,3 |
| | 2,0 | 30.000 | 950 | 0,016 | 1,0 | 2,0 | 30.000 | 1.200 | 0,020 | 1,0 | 1,0 | 30.000 | 1.500 | 0,025 | 0,4 | 0,4 | 0,4 |
| | 3,0 | 30.000 | 1.450 | 0,024 | 1,5 | 3,0 | 30.000 | 1.550 | 0,026 | 1,5 | 1,5 | 30.000 | 2.100 | 0,035 | 0,6 | 0,6 | 0,6 |
| | 4,0 | 30.000 | 1.900 | 0,032 | 2,0 | 4,0 | 30.000 | 2.400 | 0,040 | 2,0 | 2,0 | 30.000 | 3.000 | 0,050 | 0,8 | 0,8 | 0,8 |
| | 5,0 | 30.000 | 2.400 | 0,040 | 2,5 | 5,0 | 30.000 | 3.000 | 0,050 | 2,5 | 2,5 | 30.000 | 3.600 | 0,060 | 1,0 | 1,0 | 1,0 |
| 6,0 | 30.000 | 2.900 | 0,048 | 3,0 | 6,0 | 30.000 | 3.900 | 0,065 | 3,0 | 3,0 | 30.000 | 4.200 | 0,070 | 1,2 | 1,2 | 1,2 | |
| 8,0 | 30.000 | 3.900 | 0,065 | 4,0 | 8,0 | 30.000 | 4.800 | 0,080 | 4,0 | 4,0 | 30.000 | 5.100 | 0,085 | 1,6 | 1,6 | 1,6 | |
| 10,0 | 30.000 | 4.800 | 0,080 | 5,0 | 10,0 | 30.000 | 6.000 | 0,100 | 5,0 | 5,0 | 30.000 | 6.600 | 0,110 | 2,0 | 2,0 | 2,0 | |
| 12,0 | 30.000 | 6.000 | 0,100 | 6,0 | 12,0 | 30.000 | 7.200 | 0,120 | 6,0 | 6,0 | 30.000 | 7.800 | 0,130 | 2,4 | 2,4 | 2,4 | |

Diese Schnittdaten stehen in Abhängigkeit der Ausraglänge. Korrigieren Sie gegebenenfalls Vc + fz sowie ae und ap um ein optimales Ergebnis zu erzielen!
This cutting data depends upon the projecting length. If necessary correct Vc + fz as well as ae and ap for archieving an optimal result!

30 6561-5TEC

| Zirkonium • Graphite • Schruppbearbeitung/Roughing | | | | | | | | |
|--|-----|----------------|-------------|------------------------|---------|---------|-----------|--------------|
| d Ø | r | l _n | Vc (m/min.) | n (min ⁻¹) | ap (mm) | ae (mm) | fz (mm/t) | Vf (mm/min.) |
| 1,0 | 0,5 | 15 | 120-160 | 40.000-50.000 | 0,15 | 0,40 | 0,020 | 2,000 |
| | | 20 | 100-130 | 34.000-42.000 | 0,10 | 0,20 | 0,015 | 1,270 |
| 2,0 | 1,0 | 15 | 250-310 | 40.000-50.000 | 0,30 | 0,80 | 0,040 | 4,000 |
| | | 20 | 200-250 | 34.000-42.000 | 0,20 | 0,60 | 0,030 | 4,000 |
| 3,0 | 1,5 | 15 | 370-470 | 40.000-50.000 | 0,45 | 1,20 | 0,060 | 6,000 |
| | | 20 | 320-400 | 34.000-42.500 | 0,30 | 0,60 | 0,045 | 3,820 |

Schruppen roughing ▼

| | | |
|---------------|---------------|--------------|
| HSK 32 | HSK 40 | SK 40 |
|---------------|---------------|--------------|

| Zirkonium • Graphite • Schlichtbearbeitung/Finishing | | | | | | | | |
|--|-----|----------------|-------------|------------------------|---------|-------------|-----------|--------------|
| d Ø | r | l _n | Vc (m/min.) | n (min ⁻¹) | ap (mm) | ae (mm) | fz (mm/t) | Vf (mm/min.) |
| 1,0 | 0,5 | 15 | 120-160 | 40.000-50.000 | 0,050 | 0,050-0,150 | 0,015 | 1,500 |
| | | 20 | 100-130 | 34.000-42.000 | 0,030 | 0,030-0,090 | 0,010 | 850 |
| 2,0 | 1,0 | 15 | 250-310 | 40.000-50.000 | 0,100 | 0,100-0,300 | 0,030 | 3,000 |
| | | 20 | 250-310 | 40.000-50.000 | 0,100 | 0,100-0,200 | 0,020 | 3,000 |
| 3,0 | 1,5 | 15 | 370-470 | 40.000-50.000 | 0,150 | 0,150-0,450 | 0,045 | 4,500 |
| | | 20 | 320-400 | 34.000-42.500 | 0,090 | 0,090-0,270 | 0,030 | 2,500 |

Schlichten finishing ▼▼▼

| | | |
|---------------|---------------|--------------|
| HSK 32 | HSK 40 | SK 40 |
|---------------|---------------|--------------|

Empfohlene Schnittdaten für DIAMANT-beschichtete Fräswerkzeuge / HSC-Bearbeitung
Recommended cutting data for diamond coated solid carbide end mills HSC

| | | | |
|---------|---------|---------|---------|
| 30 6545 | 30 6553 | 30 6544 | 30 6542 |
| 30 6546 | 30 6552 | 30 6554 | 30 6551 |

| Werkstoffgruppe Material group | 36000 U/min | Schruppen/roughing ap=0,5xD, ae=1,0xD | | | | | Schruppen/roughing ap=0,5xD, ae=0,5xD | | | | | Schlichten/finishing ap=0,2xD, ae=0,2xD | | | | |
|-----------------------------------|----------------|---------------------------------------|-------------------|-----------|-------|--------|---------------------------------------|-------------------|-----------|-------|--------|---|-------------------|-----------|-------|-------|
| | | d1 | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm |
| 14 | 0,1 | 36.000 | 130 | 0,002 | 0,05 | 0,1 | 36.000 | 190 | 0,003 | 0,05 | 0,05 | 36.000 | 260 | 0,004 | 0,02 | 0,02 |
| | 0,2 | 36.000 | 140 | 0,002 | 0,1 | 0,2 | 36.000 | 210 | 0,003 | 0,1 | 0,1 | 36.000 | 280 | 0,004 | 0,04 | 0,04 |
| | 0,3 | 36.000 | 140 | 0,002 | 0,15 | 0,3 | 36.000 | 210 | 0,003 | 0,15 | 0,15 | 36.000 | 280 | 0,004 | 0,06 | 0,06 |
| | 0,4 | 36.000 | 290 | 0,004 | 0,2 | 0,4 | 36.000 | 360 | 0,005 | 0,2 | 0,2 | 36.000 | 440 | 0,006 | 0,08 | 0,08 |
| | 0,5 | 36.000 | 360 | 0,005 | 0,25 | 0,5 | 36.000 | 500 | 0,007 | 0,25 | 0,25 | 36.000 | 580 | 0,008 | 0,1 | 0,1 |
| | 0,6 | 36.000 | 440 | 0,006 | 0,3 | 0,6 | 36.000 | 580 | 0,008 | 0,3 | 0,3 | 36.000 | 720 | 0,010 | 0,12 | 0,12 |
| | 0,8 | 36.000 | 580 | 0,008 | 0,4 | 0,8 | 36.000 | 720 | 0,010 | 0,4 | 0,4 | 36.000 | 880 | 0,012 | 0,16 | 0,16 |
| | 1,0 | 36.000 | 720 | 0,010 | 0,5 | 1,0 | 36.000 | 880 | 0,012 | 0,5 | 0,5 | 36.000 | 1.100 | 0,015 | 0,2 | 0,2 |
| | 1,2 | 36.000 | 720 | 0,010 | 0,6 | 1,2 | 36.000 | 880 | 0,012 | 0,6 | 0,6 | 36.000 | 1.100 | 0,015 | 0,24 | 0,24 |
| | 1,5 | 36.000 | 1.000 | 0,014 | 0,75 | 1,5 | 36.000 | 1.300 | 0,018 | 0,75 | 0,75 | 36.000 | 1.450 | 0,020 | 0,3 | 0,3 |
| | 2,0 | 36.000 | 1.200 | 0,017 | 1,0 | 2,0 | 36.000 | 1.450 | 0,020 | 1,0 | 1,0 | 36.000 | 1.800 | 0,025 | 0,4 | 0,4 |
| | 3,0 | 36.000 | 1.700 | 0,024 | 1,5 | 3,0 | 36.000 | 1.800 | 0,025 | 1,5 | 1,5 | 36.000 | 2.600 | 0,036 | 0,6 | 0,6 |
| | 4,0 | 36.000 | 2.300 | 0,032 | 2,0 | 4,0 | 36.000 | 2.900 | 0,040 | 2,0 | 2,0 | 36.000 | 3.600 | 0,050 | 0,8 | 0,8 |
| | 5,0 | 36.000 | 2.900 | 0,040 | 2,5 | 5,0 | 36.000 | 3.600 | 0,050 | 2,5 | 2,5 | 36.000 | 4.400 | 0,061 | 1,0 | 1,0 |
| 6,0 | 36.000 | 3.500 | 0,049 | 3,0 | 6,0 | 36.000 | 4.700 | 0,065 | 3,0 | 3,0 | 36.000 | 5.100 | 0,071 | 1,2 | 1,2 | |
| 8,0 | 36.000 | 4.600 | 0,064 | 4,0 | 8,0 | 36.000 | 5.800 | 0,081 | 4,0 | 4,0 | 36.000 | 6.200 | 0,086 | 1,6 | 1,6 | |
| 10,0 | 36.000 | 5.800 | 0,081 | 5,0 | 10,0 | 36.000 | 7.200 | 0,100 | 5,0 | 5,0 | 36.000 | 7.400 | 0,103 | 2,0 | 2,0 | |
| 12,0 | 36.000 | 7.200 | 0,100 | 6,0 | 12,0 | 36.000 | 7.600 | 0,106 | 6,0 | 6,0 | 36.000 | 8.200 | 0,114 | 2,4 | 2,4 | |

| Werkstoffgruppe Material group | 45000 U/min | Schruppen/roughing ap=0,5xD, ae=1,0xD | | | | | Schruppen/roughing ap=0,5xD, ae=0,5xD | | | | | Schlichten/finishing ap=0,2xD, ae=0,2xD | | | | |
|-----------------------------------|----------------|---------------------------------------|-------------------|-----------|-------|--------|---------------------------------------|-------------------|-----------|-------|--------|---|-------------------|-----------|-------|-------|
| | | d1 | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm | ae mm | min ⁻¹ | Vf mm/min | fz mm | ap mm |
| 14 | 0,1 | 45.000 | 170 | 0,002 | 0,05 | 0,1 | 45.000 | 250 | 0,003 | 0,05 | 0,05 | 45.000 | 340 | 0,004 | 0,02 | 0,02 |
| | 0,2 | 45.000 | 180 | 0,002 | 0,1 | 0,2 | 45.000 | 270 | 0,003 | 0,1 | 0,1 | 45.000 | 360 | 0,004 | 0,04 | 0,04 |
| | 0,3 | 45.000 | 180 | 0,002 | 0,15 | 0,3 | 45.000 | 270 | 0,003 | 0,15 | 0,15 | 45.000 | 360 | 0,004 | 0,06 | 0,06 |
| | 0,4 | 45.000 | 360 | 0,004 | 0,2 | 0,4 | 45.000 | 450 | 0,005 | 0,2 | 0,2 | 45.000 | 550 | 0,006 | 0,08 | 0,08 |
| | 0,5 | 45.000 | 450 | 0,005 | 0,25 | 0,5 | 45.000 | 640 | 0,007 | 0,25 | 0,25 | 45.000 | 730 | 0,008 | 0,1 | 0,1 |
| | 0,6 | 45.000 | 540 | 0,006 | 0,3 | 0,6 | 45.000 | 730 | 0,008 | 0,3 | 0,3 | 45.000 | 900 | 0,010 | 0,12 | 0,12 |
| | 0,8 | 45.000 | 720 | 0,008 | 0,4 | 0,8 | 45.000 | 900 | 0,010 | 0,4 | 0,4 | 45.000 | 1.100 | 0,012 | 0,16 | 0,16 |
| | 1,0 | 45.000 | 900 | 0,010 | 0,5 | 1,0 | 45.000 | 1.100 | 0,012 | 0,5 | 0,5 | 45.000 | 1.400 | 0,016 | 0,2 | 0,2 |
| | 1,2 | 45.000 | 900 | 0,010 | 0,6 | 1,2 | 45.000 | 1.100 | 0,012 | 0,6 | 0,6 | 45.000 | 1.400 | 0,016 | 0,24 | 0,24 |
| | 1,5 | 45.000 | 1.300 | 0,014 | 0,75 | 1,5 | 45.000 | 1.600 | 0,018 | 0,75 | 0,75 | 45.000 | 1.800 | 0,020 | 0,3 | 0,3 |
| | 2,0 | 45.000 | 1.500 | 0,017 | 1,0 | 2,0 | 45.000 | 1.800 | 0,020 | 1,0 | 1,0 | 45.000 | 2.300 | 0,026 | 0,4 | 0,4 |
| | 3,0 | 45.000 | 2.200 | 0,024 | 1,5 | 3,0 | 45.000 | 2.500 | 0,028 | 1,5 | 1,5 | 45.000 | 3.200 | 0,036 | 0,6 | 0,6 |
| | 4,0 | 45.000 | 2.900 | 0,032 | 2,0 | 4,0 | 45.000 | 3.600 | 0,040 | 2,0 | 2,0 | 45.000 | 4.500 | 0,050 | 0,8 | 0,8 |
| | 5,0 | 45.000 | 3.600 | 0,040 | 2,5 | 5,0 | 45.000 | 4.500 | 0,050 | 2,5 | 2,5 | 45.000 | 5.400 | 0,060 | 1,0 | 1,0 |
| 6,0 | 45.000 | 4.400 | 0,049 | 3,0 | 6,0 | 45.000 | 5.900 | 0,066 | 3,0 | 3,0 | 45.000 | 6.300 | 0,070 | 1,2 | 1,2 | |
| 8,0 | 45.000 | 5.800 | 0,064 | 4,0 | 8,0 | 45.000 | 7.200 | 0,080 | 4,0 | 4,0 | 45.000 | 7.700 | 0,086 | 1,6 | 1,6 | |
| 10,0 | 45.000 | 7.200 | 0,080 | 5,0 | 10,0 | 45.000 | 7.400 | 0,082 | 5,0 | 5,0 | 45.000 | 7.800 | 0,087 | 2,0 | 2,0 | |
| 12,0 | 45.000 | 7.400 | 0,082 | 6,0 | 12,0 | 45.000 | 7.800 | 0,087 | 6,0 | 6,0 | 45.000 | 8.200 | 0,091 | 2,4 | 2,4 | |

Diese Schnittdaten stehen in Abhängigkeit der Auskraglänge. Korrigieren Sie gegebenenfalls Vc + fz sowie ae und ap um ein optimales Ergebnis zu erzielen!
This cutting data depends upon the projecting length. If necessary correct Vc + fz as well as ae and ap for achieving an optimal result!

Empfohlene Schnittdaten für DIAMANT-beschichtete Schruppfräser / HSC-Bearbeitung
Recommended cutting data for diamond coated solid carbide end mills HSC

| | |
|---------|---------|
| 30 6591 | 30 6593 |
| 30 6592 | |

| d1 [mm] | 14.1 Vc [m/min] Feine Graphitkörnung Fine grained graphite | 14.2 Vc [m/min] Mittlere Graphitkörnung Medium grained graphite | 14.3 Vc [m/min] Grobe Graphitkörnung Coarse grained graphite | Vf (mm/min) | ap (mm) | ae (mm) |
|---------|---|--|---|----------------|------------|------------|
| 3 | 400 | 600 | 800 | 3.000 - 5.000 | 2 | 3 |
| 4 | 400 | 600 | 800 | 3.500 - 5.500 | 3 | 4 |
| 5 | 400 | 600 | 800 | 3.750 - 6.250 | 4 | 5 |
| 6 | 400 | 600 | 800 | 4.000 - 7.000 | 5 | 6 |
| 8 | 400 | 600 | 800 | 4.500 - 8.000 | 6 | 8 |
| 10 | 400 | 600 | 800 | 5.000 - 8.500 | 9 | 10 |
| 12 | 400 | 600 | 800 | 6.000 - 9.000 | 10 | 12 |
| 16 | 400 | 600 | 800 | 7.000 - 10.000 | 12 | 16 |



| Material / material | | Graphitkörnung Fein / graphite grain fine | | | | | | Graphitkörnung Mittel / graphite grain middle | | | | | | Graphitkörnung Grob / graphite grain rough | | | | | | | |
|----------------------------------|------|---|---|-------|-------|----------|---------------------|---|-----------|-------|-------|----------|---------------------|--|-----------|-------|-------|----------|---------------------|-------|-----------|
| Werkstoffgruppe / material group | | 14.1 | | | | | | 14.2 | | | | | | 14.3 | | | | | | | |
| | | Schruppen / Roughing | | | | | | | | | | | | | | | | | | | |
| d1 | r | ls | z | ae mm | ap mm | Vc m/min | n min ⁻¹ | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | n min ⁻¹ | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | n min ⁻¹ | fz mm | Vf mm/min |
| 0,1 | 0,05 | 0,2 | 2 | 0,048 | 0,011 | 13,2 | 42.000 | 0,008 | 672 | 0,060 | 0,015 | 15,1 | 48.000 | 0,010 | 960 | 0,055 | 0,018 | 15,1 | 48.000 | 0,012 | 1.152 |
| 0,1 | 0,05 | 0,4 | 2 | 0,042 | 0,010 | 13,2 | 42.000 | 0,006 | 504 | 0,055 | 0,013 | 15,1 | 48.000 | 0,008 | 768 | 0,050 | 0,015 | 15,1 | 48.000 | 0,009 | 864 |
| 0,2 | 0,10 | 0,6 | 2 | 0,100 | 0,023 | 22,0 | 35.000 | 0,010 | 700 | 0,118 | 0,030 | 27,0 | 43.000 | 0,014 | 1.204 | 0,100 | 0,035 | 28,3 | 45.000 | 0,018 | 1.620 |
| 0,2 | 0,10 | 0,8 | 2 | 0,090 | 0,022 | 22,0 | 35.000 | 0,009 | 630 | 0,115 | 0,030 | 27,0 | 43.000 | 0,013 | 1.118 | 0,090 | 0,032 | 28,3 | 45.000 | 0,015 | 1.350 |
| 0,2 | 0,10 | 1 | 2 | 0,090 | 0,020 | 21,4 | 34.000 | 0,008 | 544 | 0,113 | 0,026 | 25,7 | 41.000 | 0,012 | 984 | 0,090 | 0,032 | 27,6 | 44.000 | 0,015 | 1.331 |
| 0,2 | 0,10 | 1,5 | 2 | 0,080 | 0,020 | 20,7 | 33.000 | 0,007 | 462 | 0,100 | 0,020 | 25,7 | 41.000 | 0,010 | 820 | 0,080 | 0,025 | 27,6 | 44.000 | 0,013 | 1.144 |
| 0,3 | 0,15 | 0,5 | 2 | 0,168 | 0,050 | 32,0 | 34.000 | 0,015 | 1.020 | 0,210 | 0,060 | 39,6 | 42.000 | 0,023 | 1.932 | 0,168 | 0,074 | 42,4 | 45.000 | 0,026 | 2.340 |
| 0,3 | 0,15 | 1 | 2 | 0,165 | 0,045 | 32,0 | 34.000 | 0,014 | 952 | 0,206 | 0,059 | 38,6 | 41.000 | 0,021 | 1.722 | 0,165 | 0,072 | 42,4 | 45.000 | 0,026 | 2.381 |
| 0,3 | 0,15 | 1,5 | 2 | 0,158 | 0,042 | 31,1 | 33.000 | 0,013 | 858 | 0,200 | 0,054 | 38,6 | 41.000 | 0,020 | 1.640 | 0,158 | 0,064 | 41,4 | 44.000 | 0,025 | 2.200 |
| 0,3 | 0,15 | 2 | 2 | 0,150 | 0,038 | 31,1 | 33.000 | 0,013 | 825 | 0,188 | 0,049 | 37,7 | 40.000 | 0,019 | 1.500 | 0,150 | 0,060 | 40,5 | 43.000 | 0,024 | 2.032 |
| 0,3 | 0,15 | 3 | 2 | 0,135 | 0,030 | 29,2 | 31.000 | 0,012 | 744 | 0,169 | 0,039 | 34,9 | 37.000 | 0,018 | 1.332 | 0,135 | 0,048 | 37,7 | 40.000 | 0,023 | 1.814 |
| 0,3 | 0,15 | 4,5 | 2 | 0,130 | 0,028 | 28,3 | 30.000 | 0,011 | 660 | 0,160 | 0,035 | 34,9 | 37.000 | 0,016 | 1.184 | 0,130 | 0,041 | 36,7 | 39.000 | 0,020 | 1.560 |
| 0,3 | 0,15 | 5 | 2 | 0,120 | 0,024 | 28,3 | 30.000 | 0,010 | 600 | 0,150 | 0,031 | 33,9 | 36.000 | 0,015 | 1.080 | 0,120 | 0,038 | 36,7 | 39.000 | 0,019 | 1.474 |
| 0,3 | 0,15 | 6 | 2 | 0,116 | 0,020 | 28,3 | 30.000 | 0,008 | 480 | 0,130 | 0,025 | 33,0 | 35.000 | 0,010 | 700 | 0,116 | 0,025 | 35,8 | 38.000 | 0,016 | 1.216 |
| 0,4 | 0,20 | 1 | 2 | 0,200 | 0,050 | 44,0 | 35.000 | 0,018 | 1.260 | 0,240 | 0,060 | 54,0 | 43.000 | 0,030 | 2.580 | 0,200 | 0,075 | 56,5 | 45.000 | 0,038 | 3.420 |
| 0,4 | 0,20 | 2 | 2 | 0,192 | 0,050 | 44,0 | 35.000 | 0,015 | 1.050 | 0,230 | 0,055 | 54,0 | 43.000 | 0,028 | 2.408 | 0,192 | 0,070 | 56,5 | 45.000 | 0,035 | 3.150 |
| 0,4 | 0,20 | 3 | 2 | 0,188 | 0,044 | 42,7 | 34.000 | 0,015 | 1.020 | 0,230 | 0,055 | 51,5 | 41.000 | 0,025 | 2.050 | 0,188 | 0,068 | 55,3 | 44.000 | 0,033 | 2.904 |
| 0,4 | 0,20 | 4 | 2 | 0,180 | 0,040 | 42,7 | 34.000 | 0,016 | 1.088 | 0,225 | 0,052 | 51,5 | 41.000 | 0,024 | 1.968 | 0,180 | 0,064 | 55,3 | 44.000 | 0,030 | 2.661 |
| 0,4 | 0,20 | 6 | 2 | 0,170 | 0,036 | 38,9 | 31.000 | 0,014 | 868 | 0,213 | 0,047 | 47,7 | 38.000 | 0,021 | 1.596 | 0,170 | 0,058 | 51,5 | 41.000 | 0,026 | 2.170 |
| 0,4 | 0,20 | 8 | 2 | 0,160 | 0,032 | 36,4 | 29.000 | 0,012 | 696 | 0,200 | 0,042 | 44,0 | 35.000 | 0,018 | 1.260 | 0,160 | 0,051 | 47,7 | 38.000 | 0,023 | 1.724 |
| 0,5 | 0,25 | 2 | 2 | 0,240 | 0,055 | 53,4 | 34.000 | 0,020 | 1.360 | 0,300 | 0,070 | 65,9 | 42.000 | 0,028 | 2.352 | 0,240 | 0,090 | 70,7 | 45.000 | 0,036 | 3.240 |
| 0,5 | 0,25 | 4 | 2 | 0,230 | 0,052 | 51,8 | 33.000 | 0,018 | 1.188 | 0,285 | 0,068 | 65,9 | 42.000 | 0,025 | 2.100 | 0,230 | 0,085 | 69,1 | 44.000 | 0,033 | 2.904 |
| 0,5 | 0,25 | 5 | 2 | 0,225 | 0,050 | 51,8 | 33.000 | 0,016 | 1.056 | 0,281 | 0,065 | 62,8 | 40.000 | 0,024 | 1.920 | 0,225 | 0,080 | 69,1 | 44.000 | 0,030 | 2.661 |
| 0,5 | 0,25 | 6 | 2 | 0,225 | 0,048 | 50,2 | 32.000 | 0,015 | 960 | 0,270 | 0,060 | 62,8 | 40.000 | 0,022 | 1.760 | 0,225 | 0,078 | 67,5 | 43.000 | 0,028 | 2.408 |
| 0,5 | 0,25 | 8 | 2 | 0,213 | 0,045 | 48,7 | 31.000 | 0,014 | 868 | 0,266 | 0,059 | 59,7 | 38.000 | 0,021 | 1.596 | 0,213 | 0,072 | 62,8 | 40.000 | 0,026 | 2.117 |
| 0,5 | 0,25 | 10 | 2 | 0,200 | 0,040 | 45,5 | 29.000 | 0,012 | 696 | 0,250 | 0,052 | 55,0 | 35.000 | 0,018 | 1.260 | 0,200 | 0,064 | 59,7 | 38.000 | 0,023 | 1.724 |
| 0,6 | 0,30 | 2 | 2 | 0,296 | 0,092 | 64,1 | 34.000 | 0,021 | 1.428 | 0,370 | 0,115 | 77,2 | 41.000 | 0,030 | 2.460 | 0,296 | 0,140 | 84,8 | 45.000 | 0,040 | 3.600 |
| 0,6 | 0,30 | 3 | 2 | 0,290 | 0,085 | 64,1 | 34.000 | 0,019 | 1.292 | 0,360 | 0,110 | 77,2 | 41.000 | 0,028 | 2.296 | 0,290 | 0,133 | 82,9 | 44.000 | 0,036 | 3.168 |
| 0,6 | 0,30 | 4 | 2 | 0,285 | 0,080 | 64,1 | 34.000 | 0,018 | 1.224 | 0,356 | 0,104 | 75,4 | 40.000 | 0,027 | 2.160 | 0,285 | 0,128 | 82,9 | 44.000 | 0,034 | 2.994 |
| 0,6 | 0,30 | 6 | 2 | 0,270 | 0,057 | 60,3 | 32.000 | 0,017 | 1.088 | 0,338 | 0,074 | 71,6 | 38.000 | 0,026 | 1.938 | 0,270 | 0,091 | 79,1 | 42.000 | 0,032 | 2.699 |
| 0,6 | 0,30 | 8 | 2 | 0,264 | 0,060 | 56,5 | 30.000 | 0,015 | 900 | 0,330 | 0,078 | 69,7 | 37.000 | 0,023 | 1.665 | 0,264 | 0,096 | 75,4 | 40.000 | 0,028 | 2.268 |
| 0,6 | 0,30 | 9 | 2 | 0,258 | 0,054 | 54,6 | 29.000 | 0,014 | 812 | 0,323 | 0,070 | 65,9 | 35.000 | 0,021 | 1.470 | 0,258 | 0,086 | 71,6 | 38.000 | 0,026 | 2.011 |
| 0,6 | 0,30 | 10 | 2 | 0,252 | 0,051 | 52,8 | 28.000 | 0,014 | 756 | 0,315 | 0,064 | 62,2 | 33.000 | 0,020 | 1.337 | 0,252 | 0,082 | 67,8 | 36.000 | 0,026 | 1.837 |
| 0,6 | 0,30 | 12 | 2 | 0,240 | 0,048 | 49,0 | 26.000 | 0,013 | 676 | 0,300 | 0,062 | 58,4 | 31.000 | 0,020 | 1.209 | 0,240 | 0,077 | 64,1 | 34.000 | 0,025 | 1.671 |
| 0,7 | 0,35 | 14 | 2 | 0,336 | 0,100 | 59,3 | 27.000 | 0,015 | 783 | 0,420 | 0,130 | 70,3 | 32.000 | 0,022 | 1.392 | 0,336 | 0,160 | 76,9 | 35.000 | 0,027 | 1.918 |
| 0,8 | 0,40 | 2 | 2 | 0,412 | 0,100 | 82,9 | 33.000 | 0,028 | 1.848 | 0,480 | 0,120 | 100,5 | 40.000 | 0,035 | 2.800 | 0,412 | 0,146 | 110,5 | 44.000 | 0,050 | 4.400 |
| 0,8 | 0,40 | 4 | 2 | 0,390 | 0,091 | 82,9 | 33.000 | 0,025 | 1.650 | 0,480 | 0,110 | 100,5 | 40.000 | 0,035 | 2.800 | 0,390 | 0,139 | 108,0 | 43.000 | 0,044 | 3.784 |
| 0,8 | 0,40 | 6 | 2 | 0,380 | 0,086 | 80,4 | 32.000 | 0,023 | 1.472 | 0,460 | 0,105 | 95,5 | 38.000 | 0,032 | 2.432 | 0,380 | 0,132 | 108,0 | 43.000 | 0,040 | 3.440 |
| 0,8 | 0,40 | 8 | 2 | 0,360 | 0,080 | 80,4 | 32.000 | 0,020 | 1.280 | 0,450 | 0,104 | 95,5 | 38.000 | 0,030 | 2.280 | 0,360 | 0,128 | 105,5 | 42.000 | 0,038 | 3.175 |
| 0,8 | 0,40 | 10 | 2 | 0,350 | 0,076 | 77,9 | 31.000 | 0,019 | 1.178 | 0,438 | 0,099 | 92,9 | 37.000 | 0,029 | 2.109 | 0,350 | 0,122 | 100,5 | 40.000 | 0,036 | 2.873 |
| 0,8 | 0,40 | 12 | 2 | 0,340 | 0,072 | 72,8 | 29.000 | 0,018 | 1.044 | 0,425 | 0,094 | 87,9 | 35.000 | 0,027 | 1.890 | 0,340 | 0,115 | 95,5 | 38.000 | 0,034 | 2.586 |
| 0,8 | 0,40 | 14 | 2 | 0,334 | 0,068 | 70,3 | 28.000 | 0,017 | 952 | 0,418 | 0,088 | 85,4 | 34.000 | 0,026 | 1.734 | 0,334 | 0,109 | 92,9 | 37.000 | 0,032 | 2.378 |
| 0,8 | 0,40 | 16 | 2 | 0,320 | 0,064 | 65,3 | 26.000 | 0,016 | 832 | 0,400 | 0,083 | 80,4 | 32.000 | 0,024 | 1.536 | 0,320 | 0,102 | 87,9 | 35.000 | 0,030 | 2.117 |
| 1,0 | 0,50 | 2 | 2 | 0,521 | 0,134 | 109,9 | 35.000 | 0,030 | 2.100 | 0,673 | 0,161 | 131,9 | 42.000 | 0,040 | 3.360 | 0,521 | 0,213 | 141,3 | 45.000 | 0,051 | 4.590 |
| 1,0 | 0,50 | 5 | 2 | 0,500 | 0,120 | 106,8 | 34.000 | 0,025 | 1.700 | 0,625 | 0,156 | 128,7 | 41.000 | 0,038 | 3.075 | 0,500 | 0,192 | 141,3 | 45.000 | 0,047 | 4.253 |
| 1,0 | 0,50 | 8 | 2 | 0,473 | 0,110 | 10,4 | 3.300 | 0,024 | 158 | 0,572 | 0,140 | 122,5 | 39.000 | 0,036 | 2.808 | 0,480 | 0,173 | 135,0 | 43.000 | 0,045 | 3.870 |
| 1,0 | 0,50 | 10 | 2 | 0,450 | 0,100 | 100,5 | 32.000 | 0,024 | 1.536 | 0,563 | 0,130 | 119,3 | 38.000 | 0,036 | 2.736 | 0,450 | 0,160 | 131,9 | 42.000 | 0,045 | 3.810 |
| 1,0 | 0,50 | 15 | 2 | 0,425 | 0,090 | 91,1 | 29.000 | 0,023 | 1.334 | 0,531 | 0,117 | 109,9 | 35.000 | 0,035 | 2.415 | 0,425 | 0,144 | 119,3 | 38.000 | 0,043 | 3.304 |
| 1,0 | 0,50 | 20 | 2 | 0,400 | 0,080 | 81,6 | 26.000 | 0,022 | 1.144 | 0,500 | 0,104 | 97,3 | 31.000 | 0,033 | 2.046 | 0,400 | 0,128 | 106,8 | 34.000 | 0,042 | 2.827 |
| 1,0 | 0,50 | 25 | 2 | 0,350 | 0,065 | 72,2 | 23.000 | 0,021 | 966 | 0,438 | 0,085 | 87,9 | 28.000 | 0,032 | 1.764 | 0,350 | 0,104 | 94,2 | 30.000 | 0,040 | 2.381 |
| 1,0 | 0,50 | 30 | 2 | 0,320 | 0,052 | 62,8 | 20.000 | 0,020 | 800 | 0,350 | 0,068 | 75,4 | 24.000 | 0,030 | 1.440 | 0,280 | 0,083 | 81,6 | 26.000 | 0,038 | 1.966 |
| 1,2 | 0,60 | 5 | 2 | 0,600 | 0,144 | 131,9 | 35.000 | 0,028 | 1.925 | 0,750 | 0,187 | 158,3 | 42.000 | 0,041 | 3.465 | 0,600 | 0,230 | 169,6 | 45.000 | 0,052 | 4.678 |
| 1,2 | 0,60 | 10 | 2 | 0,540 | 0,120 | 120,6 | 32.000 | 0,026 | 1.664 | 0,675 | 0,156 | 143,2 | 38.000 | 0,039 | 2.964 | 0,540 | 0,192 | 158,3 | 42.000 | 0,049 | 4.128 |
| 1,2 | 0,60 | 15 | 2 | 0,510 | 0,108 | 109,3 | 29.000 | 0,025 | 1.450 | 0,638 | 0,140 | 131,9 | 35.000 | 0,038 | 2.625 | 0,510 | 0,173 | 143,2 | 38.000 | 0,047 | 3.591 |
| 1,5 | 0,75 | 5 | 2 | 0,825 | 0,195 | 150,7 | 32.000 | 0,030 | 1.920 | 1,031 | 0,254 | 179,0 | 38.000 | 0,045 | 3.420 | 0,825 | 0,31 | | | | |

Empfohlene Schnittdaten für Karnasch Micro-Schaftfräser
Recommended cutting data for Karnasch solid carbide micro end mills

30 6551

30 6553

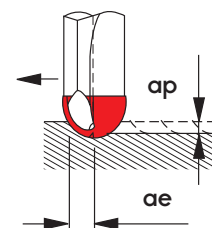
30 6554

| Zirkonium / zirconium | | | | | | | Graphitkörnung Fein / graphite grain fine | | | | | | Zirkonium / zirconium | | | | | |
|----------------------------------|-------|----------|---------------------|-------|-----------|-------|---|----------|---------------------|-------|-----------|-------|-----------------------|----------|---------------------|-------|-----------|--|
| 8.1 | | | | | | | 14.1 | | | | | | 8.1 | | | | | |
| Schlichten Max. / Finishing max. | | | | | | | | | | | | | | | | | | |
| ae mm | ap mm | Vc m/min | n min ⁻¹ | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | n min ⁻¹ | fz mm | Vf mm/min | ae mm | ap mm | Vc m/min | n min ⁻¹ | fz mm | Vf mm/min | |
| 0,055 | 0,015 | 15,1 | 48.000 | 0,010 | 960 | 0,010 | 0,012 | 14,1 | 45.000 | 0,005 | 450 | 0,015 | 0,012 | 11,3 | 36.000 | 0,006 | 432 | |
| 0,050 | 0,013 | 15,1 | 48.000 | 0,008 | 768 | 0,008 | 0,010 | 14,1 | 45.000 | 0,005 | 450 | 0,011 | 0,010 | 11,3 | 36.000 | 0,006 | 432 | |
| 0,110 | 0,400 | 28,3 | 45.000 | 0,015 | 1.350 | 0,028 | 0,018 | 25,1 | 40.000 | 0,010 | 800 | 0,023 | 0,025 | 20,7 | 33.000 | 0,008 | 528 | |
| 0,100 | 0,038 | 28,3 | 45.000 | 0,013 | 1.170 | 0,025 | 0,015 | 25,1 | 40.000 | 0,009 | 720 | 0,020 | 0,023 | 20,7 | 33.000 | 0,007 | 462 | |
| 0,100 | 0,035 | 27,6 | 44.000 | 0,013 | 1.109 | 0,023 | 0,014 | 22,0 | 35.000 | 0,009 | 617 | 0,019 | 0,023 | 18,8 | 30.000 | 0,007 | 450 | |
| 0,090 | 0,030 | 27,6 | 44.000 | 0,010 | 880 | 0,018 | 0,010 | 20,7 | 33.000 | 0,008 | 528 | 0,015 | 0,020 | 17,6 | 28.000 | 0,006 | 336 | |
| 0,150 | 0,086 | 42,4 | 45.000 | 0,025 | 2.250 | 0,038 | 0,035 | 35,8 | 38.000 | 0,018 | 1.368 | 0,032 | 0,055 | 28,3 | 30.000 | 0,013 | 780 | |
| 0,150 | 0,079 | 42,4 | 45.000 | 0,022 | 1.985 | 0,035 | 0,031 | 33,9 | 36.000 | 0,015 | 1.111 | 0,029 | 0,051 | 28,3 | 30.000 | 0,013 | 787 | |
| 0,150 | 0,070 | 41,4 | 44.000 | 0,021 | 1.848 | 0,035 | 0,028 | 33,9 | 36.000 | 0,014 | 1.008 | 0,029 | 0,046 | 27,3 | 29.000 | 0,012 | 696 | |
| 0,150 | 0,066 | 40,5 | 43.000 | 0,020 | 1.693 | 0,035 | 0,026 | 33,0 | 35.000 | 0,014 | 965 | 0,029 | 0,043 | 27,3 | 29.000 | 0,012 | 679 | |
| 0,150 | 0,053 | 37,7 | 40.000 | 0,019 | 1.512 | 0,035 | 0,020 | 30,1 | 32.000 | 0,013 | 847 | 0,028 | 0,034 | 26,4 | 28.000 | 0,011 | 630 | |
| 0,150 | 0,045 | 36,7 | 39.000 | 0,018 | 1.404 | 0,035 | 0,018 | 30,1 | 32.000 | 0,011 | 704 | 0,027 | 0,030 | 25,4 | 27.000 | 0,010 | 540 | |
| 0,150 | 0,042 | 36,7 | 39.000 | 0,016 | 1.229 | 0,035 | 0,020 | 29,2 | 31.000 | 0,011 | 684 | 0,027 | 0,027 | 25,4 | 27.000 | 0,009 | 506 | |
| 0,140 | 0,038 | 35,8 | 38.000 | 0,015 | 1.140 | 0,034 | 0,160 | 29,2 | 31.000 | 0,010 | 620 | 0,025 | 0,025 | 24,5 | 26.000 | 0,006 | 312 | |
| 0,200 | 0,086 | 56,5 | 45.000 | 0,035 | 3.150 | 0,060 | 0,035 | 47,7 | 38.000 | 0,023 | 1.748 | 0,048 | 0,053 | 41,4 | 33.000 | 0,018 | 1.188 | |
| 0,200 | 0,080 | 56,5 | 45.000 | 0,032 | 2.880 | 0,055 | 0,033 | 47,7 | 38.000 | 0,021 | 1.596 | 0,045 | 0,050 | 41,4 | 33.000 | 0,018 | 1.188 | |
| 0,200 | 0,075 | 55,3 | 44.000 | 0,028 | 2.664 | 0,053 | 0,030 | 44,0 | 35.000 | 0,019 | 1.330 | 0,043 | 0,048 | 37,7 | 30.000 | 0,016 | 960 | |
| 0,200 | 0,070 | 55,3 | 44.000 | 0,025 | 2.218 | 0,050 | 0,027 | 44,0 | 35.000 | 0,018 | 1.235 | 0,040 | 0,046 | 37,7 | 30.000 | 0,015 | 900 | |
| 0,200 | 0,063 | 51,5 | 41.000 | 0,022 | 1.808 | 0,048 | 0,025 | 41,4 | 33.000 | 0,015 | 1.019 | 0,038 | 0,041 | 35,2 | 28.000 | 0,013 | 735 | |
| 0,200 | 0,056 | 47,7 | 38.000 | 0,019 | 1.436 | 0,047 | 0,022 | 37,7 | 30.000 | 0,013 | 794 | 0,037 | 0,036 | 32,7 | 26.000 | 0,011 | 585 | |
| 0,250 | 0,100 | 70,7 | 45.000 | 0,032 | 2.880 | 0,065 | 0,035 | 59,7 | 38.000 | 0,023 | 1.748 | 0,055 | 0,065 | 51,8 | 33.000 | 0,017 | 1.122 | |
| 0,250 | 0,093 | 67,5 | 43.000 | 0,028 | 2.408 | 0,063 | 0,034 | 55,0 | 35.000 | 0,020 | 1.400 | 0,052 | 0,060 | 47,1 | 30.000 | 0,015 | 900 | |
| 0,250 | 0,088 | 67,5 | 43.000 | 0,025 | 2.167 | 0,063 | 0,034 | 55,0 | 35.000 | 0,018 | 1.235 | 0,050 | 0,057 | 47,1 | 30.000 | 0,015 | 900 | |
| 0,250 | 0,080 | 65,8 | 42.000 | 0,025 | 2.100 | 0,060 | 0,033 | 55,0 | 35.000 | 0,017 | 1.190 | 0,048 | 0,053 | 44,0 | 28.000 | 0,014 | 784 | |
| 0,250 | 0,079 | 62,9 | 40.000 | 0,022 | 1.764 | 0,060 | 0,031 | 50,2 | 32.000 | 0,015 | 988 | 0,048 | 0,051 | 44,0 | 28.000 | 0,013 | 735 | |
| 0,250 | 0,070 | 59,7 | 38.000 | 0,019 | 1.436 | 0,058 | 0,027 | 47,1 | 30.000 | 0,013 | 794 | 0,047 | 0,046 | 40,8 | 26.000 | 0,011 | 585 | |
| 0,300 | 0,160 | 84,8 | 45.000 | 0,035 | 3.150 | 0,085 | 0,062 | 71,6 | 38.000 | 0,025 | 1.900 | 0,068 | 0,100 | 60,3 | 32.000 | 0,020 | 1.280 | |
| 0,300 | 0,150 | 82,9 | 44.000 | 0,030 | 2.640 | 0,083 | 0,058 | 65,9 | 35.000 | 0,022 | 1.540 | 0,065 | 0,095 | 56,5 | 30.000 | 0,017 | 1.020 | |
| 0,300 | 0,140 | 82,9 | 44.000 | 0,028 | 2.495 | 0,080 | 0,055 | 65,9 | 35.000 | 0,020 | 1.400 | 0,064 | 0,091 | 56,5 | 30.000 | 0,017 | 1.012 | |
| 0,300 | 0,100 | 79,1 | 42.000 | 0,027 | 2.249 | 0,078 | 0,039 | 62,2 | 33.000 | 0,019 | 1.237 | 0,062 | 0,065 | 52,8 | 28.000 | 0,016 | 892 | |
| 0,300 | 0,105 | 75,4 | 40.000 | 0,024 | 1.890 | 0,074 | 0,041 | 60,3 | 32.000 | 0,017 | 1.058 | 0,059 | 0,068 | 50,9 | 27.000 | 0,014 | 759 | |
| 0,300 | 0,095 | 71,6 | 38.000 | 0,022 | 1.676 | 0,070 | 0,037 | 56,5 | 30.000 | 0,015 | 926 | 0,056 | 0,061 | 49,0 | 26.000 | 0,013 | 682 | |
| 0,300 | 0,089 | 67,8 | 36.000 | 0,021 | 1.531 | 0,066 | 0,035 | 54,6 | 29.000 | 0,015 | 863 | 0,053 | 0,058 | 47,1 | 25.000 | 0,013 | 633 | |
| 0,300 | 0,084 | 64,1 | 34.000 | 0,020 | 1.392 | 0,064 | 0,033 | 50,9 | 27.000 | 0,014 | 774 | 0,051 | 0,055 | 43,3 | 23.000 | 0,012 | 560 | |
| 0,350 | 0,175 | 76,9 | 35.000 | 0,023 | 1.599 | 0,075 | 0,068 | 61,5 | 28.000 | 0,016 | 895 | 0,060 | 0,055 | 52,8 | 24.000 | 0,014 | 652 | |
| 0,400 | 0,160 | 113,0 | 45.000 | 0,040 | 3.600 | 0,120 | 0,065 | 87,9 | 35.000 | 0,031 | 2.170 | 0,095 | 0,100 | 75,4 | 30.000 | 0,030 | 1.800 | |
| 0,400 | 0,150 | 105,5 | 42.000 | 0,038 | 3.192 | 0,116 | 0,060 | 87,9 | 35.000 | 0,028 | 1.960 | 0,092 | 0,098 | 75,4 | 30.000 | 0,027 | 1.620 | |
| 0,400 | 0,145 | 105,5 | 42.000 | 0,035 | 2.940 | 0,110 | 0,058 | 85,4 | 34.000 | 0,025 | 1.700 | 0,088 | 0,095 | 70,3 | 28.000 | 0,025 | 1.400 | |
| 0,400 | 0,140 | 105,5 | 42.000 | 0,032 | 2.646 | 0,107 | 0,055 | 85,4 | 34.000 | 0,022 | 1.499 | 0,085 | 0,091 | 70,3 | 28.000 | 0,024 | 1.344 | |
| 0,400 | 0,133 | 100,5 | 40.000 | 0,030 | 2.394 | 0,101 | 0,052 | 80,4 | 32.000 | 0,021 | 1.341 | 0,081 | 0,086 | 67,8 | 27.000 | 0,023 | 1.242 | |
| 0,400 | 0,126 | 95,5 | 38.000 | 0,028 | 2.155 | 0,096 | 0,049 | 77,9 | 31.000 | 0,020 | 1.230 | 0,077 | 0,082 | 65,3 | 26.000 | 0,022 | 1.144 | |
| 0,400 | 0,119 | 92,9 | 37.000 | 0,027 | 1.981 | 0,091 | 0,046 | 72,8 | 29.000 | 0,019 | 1.087 | 0,073 | 0,077 | 62,8 | 25.000 | 0,020 | 1.000 | |
| 0,400 | 0,112 | 85,4 | 34.000 | 0,025 | 1.714 | 0,085 | 0,044 | 70,3 | 28.000 | 0,018 | 988 | 0,068 | 0,073 | 60,3 | 24.000 | 0,019 | 912 | |
| 0,500 | 0,230 | 141,3 | 45.000 | 0,042 | 3.780 | 0,140 | 0,085 | 113,0 | 36.000 | 0,030 | 2.160 | 0,112 | 0,140 | 97,3 | 31.000 | 0,034 | 2.108 | |
| 0,500 | 0,210 | 141,3 | 45.000 | 0,039 | 3.544 | 0,133 | 0,082 | 113,0 | 36.000 | 0,028 | 1.985 | 0,107 | 0,137 | 97,3 | 31.000 | 0,030 | 1.860 | |
| 0,500 | 0,186 | 131,9 | 42.000 | 0,038 | 3.192 | 0,128 | 0,073 | 106,8 | 34.000 | 0,026 | 1.768 | 0,103 | 0,118 | 87,9 | 28.000 | 0,029 | 1.624 | |
| 0,500 | 0,175 | 131,9 | 42.000 | 0,038 | 3.175 | 0,125 | 0,068 | 103,6 | 33.000 | 0,026 | 1.746 | 0,100 | 0,114 | 87,9 | 28.000 | 0,029 | 1.624 | |
| 0,500 | 0,158 | 119,3 | 38.000 | 0,034 | 2.753 | 0,117 | 0,061 | 94,2 | 30.000 | 0,025 | 1.521 | 0,093 | 0,102 | 81,6 | 26.000 | 0,028 | 1.456 | |
| 0,500 | 0,140 | 106,8 | 34.000 | 0,035 | 2.356 | 0,107 | 0,055 | 84,8 | 27.000 | 0,024 | 1.310 | 0,085 | 0,091 | 72,2 | 23.000 | 0,027 | 1.242 | |
| 0,500 | 0,114 | 94,2 | 30.000 | 0,033 | 1.985 | 0,093 | 0,044 | 75,4 | 24.000 | 0,023 | 1.111 | 0,072 | 0,074 | 62,8 | 20.000 | 0,025 | 1.000 | |
| 0,500 | 0,091 | 81,6 | 26.000 | 0,032 | 1.638 | 0,080 | 0,035 | 65,9 | 21.000 | 0,022 | 926 | 0,064 | 0,059 | 56,5 | 18.000 | 0,024 | 864 | |
| 0,600 | 0,252 | 169,6 | 45.000 | 0,043 | 3.898 | 0,160 | 0,098 | 135,6 | 36.000 | 0,039 | 2.808 | 0,128 | 0,164 | 116,8 | 31.000 | 0,033 | 2.046 | |
| 0,600 | 0,210 | 158,3 | 42.000 | 0,041 | 3.440 | 0,150 | 0,082 | 124,3 | 33.000 | 0,037 | 2.442 | 0,120 | 0,137 | 105,5 | 28.000 | 0,031 | 1.736 | |
| 0,600 | 0,189 | 143,2 | 38.000 | 0,039 | 2.993 | 0,140 | 0,074 | 116,8 | 31.000 | 0,035 | 2.170 | 0,112 | 0,123 | 98,0 | 26.000 | 0,030 | 1.560 | |
| 0,750 | 0,341 | 197,8 | 42.000 | 0,047 | 3.969 | 0,200 | 0,133 | 155,4 | 33.000 | 0,061 | 4.026 | 0,160 | 0,222 | 136,6 | 29.000 | 0,052 | 3.016 | |
| 0,750 | 0,302 | 188,4 | 40.000 | 0,044 | 3.528 | 0,194 | 0,118 | 150,7 | 32.000 | 0,060 | 3.840 | 0,155 | 0,196 | 127,2 | 27.000 | 0,051 | 2.754 | |
| 0,750 | 0,263 | 179,0 | 38.000 | 0,040 | 3.052 | 0,188 | 0,102 | 141,3 | 30.000 | 0,058 | 3.480 | 0,150 | 0,171 | 122,5 | 26.000 | 0,049 | 2.548 | |
| 0,750 | 0,239 | 174,3 | 37.000 | 0,039 | 2.879 | 0,180 | 0,093 | 141,3 | 30.000 | 0,057 | 3.420 | 0,144 | 0,155 | 122,5 | 26.000 | 0,048 | 2.496 | |
| 0,750 | 0,215 | 169,6 | 36.000 | 0,038 | 2.722 | 0,175 | 0,084 | 136,6 | 29.000 | 0,055 | 3.190 | 0,140 | 0,140 | 117,8 | 25.000 | 0,047 | 2.350 | |
| 0,900 | 0,299 | 220,4 | 39.000 | 0,063 | 4.914 | 0,234 | 0,117 | 180,9 | 32.000 | 0,078 | 4.992 | 0,187 | 0,195 | 152,6 | 27.000 | 0,066 | 3.564 | |
| 0,900 | 0,284 | 209,1 | 37.000 | 0,050 | 3.700 | 0,228 | 0,111 | 169,6 | 30.000 | 0,074 | 4.440 | 0,182 | 0,184 | 141,3 | 25.000 | 0,063 | 3.100 | |
| 1,000 | 0,480 | 276,3 | 44.000 | 0,068 | 5.984 | 0,280 | 0,175 | 219,8 | 35.000 | 0,100 | 7.000 | 0,228 | 0,286 | 188,4 | 30.000 | 0,085 | 5.100 | |
| 1,000 | 0,450 | 276,3 | 44.000 | 0,060 | 5.280 | 0,275 | 0,172 | 219,8 | 35.000 | 0,095 | 6.650 | 0,223 | 0,280 | 188,4 | 30.000 | 0,080 | 4.800 | |
| 1,000 | 0,430 | 276,3 | 44.000 | 0,055 | 4.840 | 0,270 | 0,168 | 219,8 | 35.000 | 0,093 | 6.510 | 0,216 | 0,275 | 188,4 | 30.000 | 0,077 | 4.620 | |
| 1,000 | | | | | | | | | | | | | | | | | | |

30 6522 30 6523
30 6524 30 6526

Empfohlene Schnittdaten für PKD-Schaftfräser
Recommended cutting data for PCD-ball milling cutter

| Material | Vc | Vorschub pro Zahn/Feed per tooth fz mm | | | | | | | | | |
|---|-------------|--|-------------------|-------------------|-------------------|-------------------|--------------------|---------------------|---------------------|---------------------|--|
| | | Ø d1 2,00 | Ø d1 3,00-4,00 | Ø d1 4,00-5,00 | Ø d1 5,00-6,00 | Ø d1 6,00-8,00 | Ø d1 8,00-10,00 | Ø d1 10,00-12,00 | Ø d1 12,00-14,00 | Ø d1 14,00-20,00 | |
| Kupfer-Legierung – gut zerspanbar (Messing – Bronze) Copper alloys – good machinability (brass – bronze) | 600-700 | 0,006-0,03 | 0,010-0,04 | 0,012-0,05 | 0,016-0,06 | 0,018-0,08 | 0,025-0,10 | 0,04-0,12 | 0,04-0,15 | 0,04-0,20 | |
| Kupfer-Legierung – schwer zerspanbar (Aluminium – Bronze) (CuAlFe/Ampco) Copper alloys – difficult to machine (Aluminum-bronze-CuAlFe/Ampco) | 400-600 | 0,006-0,03 | 0,010-0,04 | 0,012-0,05 | 0,016-0,06 | 0,018-0,08 | 0,025-0,10 | 0,04-0,12 | 0,04-0,15 | 0,04-0,20 | |
| Aluminium-Knetlegierung – Magnesiumlegierung Aluminum wrought alloys – magnesium alloys | 1.000-2.000 | 0,006-0,03 | 0,010-0,04 | 0,012-0,05 | 0,016-0,06 | 0,018-0,08 | 0,025-0,10 | 0,04-0,12 | 0,04-0,15 | 0,04-0,20 | |
| Aluminium-Gusslegierung Cast aluminum alloys | 800-1.800 | 0,006-0,03 | 0,010-0,04 | 0,012-0,05 | 0,016-0,06 | 0,018-0,08 | 0,025-0,10 | 0,04-0,12 | 0,04-0,15 | 0,04-0,20 | |
| Aluminium-Gusslegierung Cast aluminum alloys | 600-1.200 | 0,006-0,03 | 0,010-0,04 | 0,012-0,05 | 0,016-0,06 | 0,018-0,08 | 0,025-0,10 | 0,04-0,12 | 0,04-0,15 | 0,04-0,20 | |
| Gold, Silber Gold, silver | 400-750 | 0,006-0,03 | 0,010-0,04 | 0,012-0,05 | 0,016-0,06 | 0,018-0,08 | 0,025-0,10 | 0,04-0,12 | 0,04-0,15 | 0,04-0,20 | |
| Graphit Graphite | 600-1.000 | 0,006-0,03 | 0,010-0,04 | 0,012-0,05 | 0,016-0,06 | 0,018-0,08 | 0,025-0,10 | 0,04-0,12 | 0,04-0,15 | 0,04-0,20 | |
| WC und Keramik grün TC and ceramic green body | 400-700 | 0,006-0,03 | 0,010-0,04 | 0,012-0,05 | 0,016-0,06 | 0,018-0,08 | 0,025-0,10 | 0,04-0,12 | 0,04-0,15 | 0,04-0,20 | |



$$ap \approx 0,1 \times \varnothing d$$

$$ae \approx 0,5 \times \varnothing d$$

Kopierfräsen Copying milling

Theoret. Rauhtiefe R_{th} (in mm)

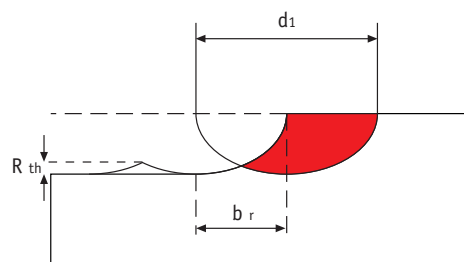
Theoretical rough milling depth R_{th} (in mm)

$$R_{th} = \frac{d_1}{2} - \sqrt{\frac{d_1^2 - b_r^2}{4}}$$

Zeilensprung b_r (in mm)

Line spring b_r (in mm)

$$b_r = 2 \cdot \sqrt{R_{th} \cdot (d_1 - R_{th})}$$



Rauhtiefen nach DIN

Rough milling depth as per the requirements of DIN

| $R_{max.} \leq 0,001$ | $R_{max.}$ Angabe Specification | entspricht R_a - Wert equates R_a - value | Rauheits- kennzahl Roughness coefficient |
|-----------------------|------------------------------------|---|--|
| 71 - 10 | 100 | 17 - 26 | N11 |
| 50 - 71 | 71 | 12 - 18 | |
| 40 - 50 | 50 | 9 - 13 | N10 |
| 31,5 - 40 | 40 | 6,3 - 10 | |
| 25 - 31,5 | 31,5 | 5,2 - 7,6 | N9 |
| 18 - 25 | 25 | 3,5 - 6 | |
| 12,5 - 18 | 18 | 2,5 - 4 | N8 |
| 8 - 12,5 | 12,5 | 1,5 - 2,8 | |
| 5 - 8 | 8 | 0,8 - 1,8 | N7 |
| 2,5 - 5 | 5 | 0,4 - 1 | N6 |
| 1,4 - 2,5 | 2,5 | 0,2 - 0,47 | N5 |
| 0,14 - 1,4 | 1,4 | 0,025 - 0,25 | N1 - N4 |

Empfohlene Richtwerte zu Vollhartmetallfräsern für exotisches Material
Recommended cutting data for solid carbide mills for exotic materials

30 7421

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit Strength N/mm ² | Schnittgeschwindigkeit Cutting speed Vc m/min | ap max. | Ø 6,0 fz = mm Z x 4 | Ø 8,0 fz = mm Z x 4 | Ø 10,0 fz = mm Z x 4 | Ø 12,0 fz = mm Z x 4 | Ø 16/20 fz = mm Z x 4 |
|-----------------------------------|-----------------------|---|---|---------|---------------------------|---------------------------|----------------------------|----------------------------|-----------------------------|
| | | | ± 10% | | | | | | |
| 1.1 | St 37 2 | < 450 | 250 | 1,0 x D | 0,028 | 0,048 | 0,08 | 0,10 | 0,12 |
| 1.2 | C 45 | < 650 | 240 | 1,0 x D | 0,025 | 0,045 | 0,07 | 0,09 | 0,11 |
| 1.3 | 16 Cr Mo 44 | < 850 | 230 | 1,0 x D | 0,020 | 0,040 | 0,06 | 0,08 | 0,10 |
| 2.1 | 45 Ni Cr 6 | < 600 | 210 | 1,0 x D | 0,020 | 0,040 | 0,06 | 0,08 | 0,10 |
| 2.2 | 100 Cr Mo 5 | < 950 | 190 | 1,0 x D | 0,020 | 0,040 | 0,06 | 0,08 | 0,10 |
| 2.3 | 41 Cr Al Mo 7 | < 1100 | 170 | 1,0 x D | 0,020 | 0,040 | 0,06 | 0,08 | 0,10 |
| 2.5 | 34 Cr Al 6 | < 1000 | 190 | 1,0 x D | 0,020 | 0,040 | 0,06 | 0,08 | 0,10 |
| 2.6 | 31 Cr Mo V9 | > 1000 | 160 | 1,0 x D | 0,015 | 0,030 | 0,05 | 0,07 | 0,08 |
| 3.1 | X 36 Cr Mo 7 | < 700 | 180 | 1,5 x D | 0,020 | 0,040 | 0,06 | 0,08 | 0,10 |
| 3.2 | S 6-5-2 | < 1400 | 160 | 1,5 x D | 0,020 | 0,030 | 0,05 | 0,07 | 0,09 |
| 4.1 | X 6 Cr 13 | < 700 | 130 | 1,0 x D | 0,012 | 0,025 | 0,04 | 0,05 | 0,07 |
| 4.2 | X 38 Cr 13 | < 700 | 120 | 1,0 x D | 0,012 | 0,025 | 0,04 | 0,05 | 0,07 |
| 4.3 | X 2 Cr Ni Mo 17.113.2 | < 1100 | 100 | 1,0 x D | 0,012 | 0,025 | 0,04 | 0,05 | 0,07 |
| 5.3 | Monel 400 | < 1200 | 50 | 0,5 x D | 0,010 | 0,020 | 0,03 | 0,04 | 0,05 |
| 5.5 | Inconel 718 | < 1300 | 30 | 0,5 x D | 0,010 | 0,020 | 0,03 | 0,04 | 0,05 |
| 6.1 | Ti 1 | < 850 | 80 | 1,0 x D | 0,020 | 0,040 | 0,06 | 0,08 | 0,10 |
| 6.2 | Ti Al 6 V4 | < 1200 | 60 | 1,0 x D | 0,015 | 0,030 | 0,05 | 0,06 | 0,08 |
| 10.1 | Cu Zn 39 Pb 3 | < 400 | 300 | 1,0 x D | 0,030 | 0,040 | 0,07 | 0,10 | 0,12 |
| 10.2 | Cu Zn 30 | < 400 | 330 | 1,0 x D | 0,030 | 0,040 | 0,07 | 0,10 | 0,12 |
| 10.2.1 | Cu Be 2 | < 1200 | 160 | 1,0 x D | 0,030 | 0,040 | 0,07 | 0,10 | 0,12 |
| 10.3 | Su Cu | < 300 | 300 | 1,0 x D | 0,030 | 0,040 | 0,07 | 0,10 | 0,12 |

Empfohlene Richtwerte zu Vollhartmetallfräsern für exotisches Material
Recommended cutting data for solid carbide mills for exotic materials

30 7486

| Werkstoffgruppe Material group | Werkstoff Material | | Ø 2 | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 |
|-----------------------------------|-----------------------|----|-----------------|-----------|-------|-------|-------|-------|-------|-------|
| | | | 4.1 - 4.2 - 4.3 | X10CrAL13 | ap | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 |
| | X8Cr14 | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 |
| | 16CrMo44 | n | 16.000 | 10.000 | 8.000 | 6.500 | 5.500 | 4.000 | 3.200 | 2.600 |
| | X12CrNiMo12 | vf | 640 | 400 | 320 | 260 | 440 | 320 | 380 | 400 |
| 5.1 | NiMo28 | ap | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 |
| 5.2 | Monell400 | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 |
| 5.3 | Inconel718 | n | 9.500 | 6.500 | 4.800 | 4.000 | 3.200 | 2.500 | 1.900 | 1.600 |
| 5.4 | | vf | 400 | 260 | 200 | 190 | 180 | 200 | 220 | 160 |
| 5.5 | | | | | | | | | | |
| 6.1 - 6.2 | TIAL6V4 | ap | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 |
| | | ae | 0,10 | 0,15 | 0,20 | 0,25 | 0,30 | 0,40 | 0,50 | 0,60 |
| | | n | 12.500 | 8.500 | 6.500 | 5.000 | 4.200 | 3.200 | 2.500 | 2.100 |
| | | vf | 500 | 340 | 260 | 240 | 250 | 380 | 450 | 500 |

VORTEILE HSC-FRÄSEN
ADVANTAGES FOR HSC MILLING

- 1 Verkürzung der Fräszeit um 20 bis 50%.
Shortening of the milling time from 20 up to 50%.
- 2 Reduzierung der manuellen Nacharbeit bis zu 80%.
Reduction of the hand retro-processing by up to 80%.

Fazit/Conclusion:


Beim HSC-Fräsen reduziert sich die Herstellung und Durchlaufzeit um ca. 50%.
With HSC milling the manufacturing process and through put time is reduced by approximately 50%.

Anwendungshinweis/Application instructions:

- a) Zum Schrappen und Vorschlichten verwenden Sie torische Fräser.
Utilize toric grinders for rough cutting and pre-finishing.
- b) Zur Fertigbearbeitung/Schlichten sollten 3D-Radiusfräser eingesetzt werden.
3D radius cutters should be utilized for finishing processes/plane processing.

| Bild/Picture 1 | Bild/Picture 2 | Bild/Picture 3 | Bild/Picture 4 |
|---|----------------|--|--|
| | | | |
| Der Ziehchnitt ist dem Bohrschnitt vorzuziehen. Mandrel cutting should be utilized in preference to drill cutting. | | Vorzugsweise empfehlen wir einen Kippwinkel von 12°-15° um eine Zerspanung im Zentrum zu vermeiden. We preferably recommend tilted angle of 12°-15° so that a cutting in the middle can be avoided. | Diese Abbildung zeigt den positiven Einfluss des Kippwinkels auf die Schnittgeschwindigkeit Vc ¹ = niedrigste Schnittgeschw. Vc ² = höchste Schnittgeschw. This illustration shows the positive influence of the tilted angle on the cutting speed Vc ¹ = lowest cutting speed Vc ² = highest cutting speed |



| Werkstoffgruppe Material group | 8.1 – 8.11 – 12.0 / 45-55 HRC Toolox – Hardox 400 – Stavax | | | | 8.2 – 12.1 / 55-60 HRC Hardox 500 – Vanadis4 superclean | | | | 8.3 / 60-70 HRC DC 53 – CPM 420V Pulverstahl / Powder steel | | | |
|-----------------------------------|---|-------------------|-----------|-------|--|-------------------|-----------|-------|--|-------------------|-----------|-------|
| | D1* r  | min ⁻¹ | Vf mm/min | ap mm | ae mm | min ⁻¹ | Vf mm/min | ap mm | ae mm | min ⁻¹ | Vf mm/min | ap mm |
| 0,3 0,03 × 1 | 50.000 | 300-400 | 0,01 | 0,03 | 50.000 | 200-300 | 0,01 | 0,03 | 50.000 | 100-200 | 0,005 | 0,03 |
| 0,3 0,03 × 2 | 50.000 | 200-300 | 0,008 | 0,03 | 50.000 | 150-250 | 0,008 | 0,03 | 50.000 | 80-150 | 0,003 | 0,03 |
| 0,4 0,04 × 1 | 50.000 | 400-500 | 0,01 | 0,04 | 50.000 | 200-350 | 0,01 | 0,04 | 50.000 | 200-300 | 0,01 | 0,04 |
| 0,4 0,04 × 2 | 50.000 | 300-400 | 0,008 | 0,04 | 50.000 | 200-250 | 0,008 | 0,04 | 50.000 | 150-200 | 0,01 | 0,04 |
| 0,4 0,05 – | 50.000 | 550 | 0,008 | 0,008 | 50.000 | 490 | 0,005 | 0,006 | 50.000 | 430 | 0,005 | 0,005 |
| 0,4 0,05 × 1 | 50.000 | 530 | 0,008 | 0,005 | 50.000 | 470 | 0,005 | 0,005 | 50.000 | 420 | 0,005 | 0,005 |
| 0,4 0,05 × 1,5 | 50.000 | 300 | 0,005 | 0,005 | 50.000 | 355 | 0,005 | 0,003 | 50.000 | 315 | 0,003 | 0,004 |
| 0,4 0,05 × 2 | 50.000 | 250 | 0,004 | 0,004 | 50.000 | 240 | 0,003 | 0,003 | 50.000 | 210 | 0,002 | 0,003 |
| 0,5 0,05 – | 50.000 | 940 | 0,01 | 0,01 | 50.000 | 810 | 0,05 | 0,01 | 50.000 | 730 | 0,005 | 0,01 |
| 0,5 0,05 × 1 | 50.000 | 620 | 0,008 | 0,01 | 50.000 | 600 | 0,06 | 0,01 | 50.000 | 550 | 0,05 | 0,01 |
| 0,5 0,05 × 1,5 | 50.000 | 650 | 0,008 | 0,01 | 50.000 | 600 | 0,005 | 0,01 | 50.000 | 520 | 0,005 | 0,01 |
| 0,5 0,05 × 2 | 50.000 | 600 | 0,008 | 0,01 | 50.000 | 580 | 0,07 | 0,01 | 50.000 | 550 | 0,06 | 0,01 |
| 0,5 0,05 × 3 | 50.000 | 580 | 0,007 | 0,01 | 50.000 | 550 | 0,07 | 0,07 | 50.000 | 530 | 0,06 | 0,01 |
| 0,5 0,05 × 4 | 50.000 | 530 | 0,006 | 0,01 | 50.000 | 500 | 0,005 | 0,01 | 50.000 | 480 | 0,005 | 0,01 |
| 0,5 0,05 × 5 | 50.000 | 450 | 0,005 | 0,01 | 50.000 | 400 | 0,005 | 0,008 | 50.000 | 400 | 0,005 | 0,005 |
| 0,6 0,05 – | 50.000 | 1.000 | 0,01 | 0,2 | 50.000 | 940 | 0,05 | 0,01 | 50.000 | 810 | 0,01 | 0,01 |
| 0,6 0,05 × 1 | 50.000 | 880 | 0,01 | 0,2 | 50.000 | 835 | 0,005 | 0,01 | 50.000 | 720 | 0,01 | 0,01 |
| 0,6 0,05 × 2 | 50.000 | 760 | 0,01 | 0,015 | 50.000 | 730 | 0,005 | 0,01 | 50.000 | 635 | 0,01 | 0,008 |
| 0,6 0,05 × 3 | 50.000 | 640 | 0,01 | 0,015 | 50.000 | 620 | 0,005 | 0,01 | 50.000 | 550 | 0,008 | 0,008 |
| 0,6 0,05 × 4 | 50.000 | 580 | 0,01 | 0,01 | 50.000 | 530 | 0,005 | 0,01 | 50.000 | 480 | 0,005 | 0,005 |
| 0,6 0,05 × 6 | 50.000 | 460 | 0,01 | 0,01 | 50.000 | 420 | 0,005 | 0,005 | 50.000 | 390 | 0,003 | 0,003 |
| 0,8 0,08 × 1 | 50.000 | 700-800 | 0,015 | 0,07 | 50.000 | 700-800 | 0,015 | 0,07 | 50.000 | 500-600 | 0,012 | 0,07 |
| 0,8 0,08 × 2 | 50.000 | 600-700 | 0,01 | 0,07 | 50.000 | 600-700 | 0,012 | 0,07 | 50.000 | 400-500 | 0,012 | 0,07 |
| 0,8 0,08 × 3 | 50.000 | 400-500 | 0,008 | 0,07 | 50.000 | 400-500 | 0,012 | 0,06 | 50.000 | 300-400 | 0,01 | 0,06 |
| 0,8 0,10 – | 50.000 | 1.500 | 0,02 | 0,02 | 50.000 | 1.250 | 0,015 | 0,015 | 50.000 | 1.080 | 0,01 | 0,01 |
| 0,8 0,10 × 2 | 50.000 | 1.400 | 0,02 | 0,02 | 50.000 | 1.170 | 0,01 | 0,01 | 50.000 | 1.060 | 0,01 | 0,01 |
| 0,8 0,10 × 4 | 40.000 | 860 | 0,015 | 0,02 | 40.000 | 700 | 0,01 | 0,01 | 40.000 | 620 | 0,01 | 0,01 |
| 0,8 0,10 × 6 | 30.000 | 440 | 0,015 | 0,05 | 30.000 | 390 | 0,01 | 0,01 | 30.000 | 280 | 0,005 | 0,005 |
| 0,8 0,20 – | 50.000 | 1.500 | 0,02 | 0,02 | 50.000 | 1.250 | 0,015 | 0,015 | 50.000 | 1.080 | 0,01 | 0,01 |
| 0,8 0,20 × 2 | 50.000 | 1.400 | 0,02 | 0,02 | 50.000 | 1.170 | 0,01 | 0,01 | 50.000 | 1.060 | 0,01 | 0,01 |
| 0,8 0,20 × 4 | 40.000 | 860 | 0,015 | 0,02 | 40.000 | 700 | 0,01 | 0,01 | 40.000 | 620 | 0,01 | 0,01 |
| 0,8 0,20 × 6 | 30.000 | 440 | 0,015 | 0,05 | 30.000 | 390 | 0,01 | 0,01 | 30.000 | 280 | 0,005 | 0,005 |
| 1,0 0,10 – | 50.000 | 1.700 | 0,02 | 0,03 | 50.000 | 1.300 | 0,02 | 0,02 | 50.000 | 1.230 | 0,01 | 0,02 |
| 1,0 0,10 × 1 | 40.000 | 900 | 0,02 | 0,02 | 40.000 | 900 | 0,015 | 0,02 | 35.000 | 700 | 0,015 | 0,02 |
| 1,0 0,10 × 2 | 40.000 | 900 | 0,02 | 0,02 | 40.000 | 900 | 0,015 | 0,015 | 35.000 | 700 | 0,01 | 0,015 |
| 1,0 0,10 × 3 | 40.000 | 800 | 0,015 | 0,015 | 40.000 | 800 | 0,015 | 0,015 | 35.000 | 700 | 0,01 | 0,015 |
| 1,0 0,10 × 4 | 40.000 | 800 | 0,01 | 0,015 | 40.000 | 800 | 0,01 | 0,01 | 35.000 | 600 | 0,01 | 0,01 |
| 1,0 0,10 × 5 | 40.000 | 700 | 0,01 | 0,015 | 40.000 | 700 | 0,01 | 0,01 | 35.000 | 600 | 0,01 | 0,01 |
| 1,0 0,10 × 6 | 40.000 | 700 | 0,01 | 0,01 | 40.000 | 700 | 0,01 | 0,01 | 35.000 | 600 | 0,008 | 0,008 |
| 1,0 0,10 × 8 | 24.000 | 650 | 0,008 | 0,01 | 24.000 | 440 | 0,008 | 0,008 | 24.000 | 340 | 0,005 | 0,005 |
| 1,0 0,10 × 10 | 24.000 | 500 | 0,005 | 0,008 | 24.000 | 350 | 0,004 | 0,005 | 24.000 | 250 | 0,003 | 0,003 |
| 1,2 0,10 – | 50.000 | 1.700 | 0,02 | 0,03 | 50.000 | 1.310 | 0,02 | 0,02 | 50.000 | 1.230 | 0,01 | 0,02 |
| 1,2 0,10 × 2 | 40.000 | 1.400 | 0,02 | 0,02 | 40.000 | 960 | 0,015 | 0,015 | 50.000 | 870 | 0,01 | 0,015 |
| 1,2 0,10 × 4 | 30.000 | 1.100 | 0,015 | 0,015 | 30.000 | 620 | 0,01 | 0,015 | 50.000 | 600 | 0,01 | 0,01 |
| 1,2 0,10 × 6 | 30.000 | 810 | 0,015 | 0,015 | 30.000 | 530 | 0,01 | 0,01 | 50.000 | 470 | 0,01 | 0,01 |
| 1,2 0,10 × 8 | 24.000 | 650 | 0,01 | 0,01 | 24.000 | 440 | 0,005 | 0,01 | 24.000 | 340 | 0,008 | 0,008 |
| 1,2 0,10 × 10 | 24.000 | 500 | 0,008 | 0,008 | 24.000 | 350 | 0,005 | 0,005 | 24.000 | 275 | 0,005 | 0,005 |
| 1,2 0,12 × 2 | 40.000 | 900 | 0,03 | 0,3 | 40.000 | 900 | 0,03 | 0,3 | 35.000 | 700 | 0,03 | 0,3 |
| 1,2 0,12 × 3 | 40.000 | 900 | 0,03 | 0,3 | 40.000 | 900 | 0,03 | 0,3 | 35.000 | 700 | 0,03 | 0,3 |
| 1,2 0,12 × 4 | 40.000 | 900 | 0,03 | 0,3 | 40.000 | 900 | 0,03 | 0,3 | 35.000 | 700 | 0,03 | 0,3 |
| 1,2 0,12 × 5 | 40.000 | 900 | 0,03 | 0,3 | 40.000 | 900 | 0,03 | 0,3 | 35.000 | 700 | 0,03 | 0,3 |
| 1,2 0,12 × 6 | 40.000 | 800 | 0,03 | 0,3 | 40.000 | 800 | 0,03 | 0,3 | 35.000 | 600 | 0,03 | 0,3 |
| 1,5 0,15 × 2 | 30.000 | 900 | 0,04 | 0,5 | 30.000 | 900 | 0,04 | 0,5 | 25.000 | 800 | 0,04 | 0,5 |
| 1,5 0,15 × 3 | 30.000 | 900 | 0,04 | 0,5 | 30.000 | 900 | 0,04 | 0,5 | 25.000 | 800 | 0,04 | 0,5 |
| 1,5 0,15 × 4 | 30.000 | 900 | 0,04 | 0,5 | 30.000 | 900 | 0,04 | 0,5 | 25.000 | 800 | 0,04 | 0,5 |
| 1,5 0,15 × 5 | 30.000 | 900 | 0,04 | 0,5 | 30.000 | 900 | 0,04 | 0,5 | 25.000 | 800 | 0,04 | 0,5 |
| 1,5 0,15 × 6 | 30.000 | 900 | 0,04 | 0,4 | 30.000 | 800 | 0,04 | 0,4 | 25.000 | 700 | 0,04 | 0,4 |
| 1,5 0,15 × 7 | 30.000 | 800 | 0,04 | 0,4 | 30.000 | 800 | 0,04 | 0,4 | 25.000 | 700 | 0,04 | 0,4 |
| 1,5 0,15 × 8 | 30.000 | 800 | 0,04 | 0,4 | 30.000 | 800 | 0,04 | 0,4 | 25.000 | 700 | 0,04 | 0,4 |

Empfohlene Schnittwerte für CBN Eckenradiusfräser
Recommended cutting data for CBN corner radius end mills

30 6632

| Werkstoffgruppe Material group | 8.1 – 8.11 – 12.0 / 45-55 HRC Toolox – Hardox 400 – Stavax | | | | 8.2 – 12.1 / 55-60 HRC Hardox 500 – Vanadis4 superclean | | | | 8.3 / 60-70 HRC DC 53 – CPM 420V Pulverstahl / Powder steel | | | |
|-----------------------------------|---|-------------------|-----------|-------|--|-------------------|-----------|-------|--|-------------------|-----------|-------|
| | D1* r L3 | min ⁻¹ | Vf mm/min | ap mm | ae mm | min ⁻¹ | Vf mm/min | ap mm | ae mm | min ⁻¹ | Vf mm/min | ap mm |
| 1,5 0,20 – | 40.000 | 1.400 | 0,03 | 0,04 | 40.000 | 1.090 | 0,02 | 0,03 | 40.000 | 1.000 | 0,02 | 0,02 |
| 1,5 0,20 × 2 | 30.000 | 1.200 | 0,03 | 0,03 | 30.000 | 1.100 | 0,02 | 0,02 | 30.000 | 900 | 0,02 | 0,02 |
| 1,5 0,20 × 4 | 30.000 | 1.000 | 0,02 | 0,02 | 30.000 | 900 | 0,015 | 0,02 | 30.000 | 780 | 0,01 | 0,015 |
| 1,5 0,20 × 6 | 23.000 | 810 | 0,015 | 0,02 | 23.000 | 600 | 0,015 | 0,015 | 23.000 | 565 | 0,01 | 0,01 |
| 1,5 0,20 × 8 | 16.000 | 480 | 0,015 | 0,015 | 16.000 | 410 | 0,01 | 0,015 | 16.000 | 350 | 0,01 | 0,01 |
| 1,5 0,20 × 10 | 16.000 | 400 | 0,01 | 0,01 | 16.000 | 300 | 0,008 | 0,01 | 16.000 | 245 | 0,008 | 0,008 |
| 2,0 0,20 – | 40.000 | 1.500 | 0,04 | 0,04 | 40.000 | 1.280 | 0,03 | 0,03 | 40.000 | 1.010 | 0,02 | 0,03 |
| 2,0 0,20 × 2 | 40.000 | 1.400 | 0,03 | 0,03 | 40.000 | 1.200 | 0,02 | 0,03 | 40.000 | 1.150 | 0,05-0,10 | 0,5 |
| 2,0 0,20 × 3 | 20.000 | 900 | 0,08-0,15 | 0,6 | 20.000 | 900 | 0,06-0,12 | 0,5 | 15.000 | 800 | 0,05-0,10 | 0,5 |
| 2,0 0,20 × 4 | 30.000 | 1.200 | 0,03 | 0,03 | 30.000 | 900 | 0,025 | 0,025 | 30.000 | 800 | 0,02 | 0,02 |
| 2,0 0,20 × 5 | 20.000 | 900 | 0,08-0,15 | 0,6 | 20.000 | 900 | 0,06-0,12 | 0,5 | 15.000 | 800 | 0,05-0,10 | 0,5 |
| 2,0 0,20 × 6 | 30.000 | 1.000 | 0,025 | 0,03 | 30.000 | 900 | 0,02 | 0,02 | 30.000 | 800 | 0,015 | 0,02 |
| 2,0 0,20 × 7 | 20.000 | 900 | 0,08-0,15 | 0,6 | 20.000 | 900 | 0,06-0,12 | 0,5 | 15.000 | 600 | 0,05-0,10 | 0,4 |
| 2,0 0,20 × 8 | 30.000 | 980 | 0,02 | 0,03 | 30.000 | 800 | 0,015 | 0,015 | 30.000 | 800 | 0,01 | 0,01 |
| 2,0 0,20 × 9 | 20.000 | 700 | 0,08-0,15 | 0,5 | 20.000 | 700 | 0,06-0,12 | 0,4 | 15.000 | 600 | 0,05-0,10 | 0,4 |
| 2,0 0,20 × 10 | 25.000 | 600 | 0,01 | 0,02 | 25.000 | 600 | 0,01 | 0,015 | 25.000 | 600 | 0,01 | 0,01 |
| 2,0 0,20 × 12 | 25.000 | 600 | 0,08-0,15 | 0,4 | 25.000 | 600 | 0,06-0,12 | 0,3 | 25.000 | 500 | 0,05-0,10 | 0,3 |
| 3,0 0,30 × 6 | 40.000 | 1.300 | 0,03 | 0,03 | 40.000 | 1.100 | 0,02 | 0,03 | 40.000 | 960 | 0,02 | 0,03 |
| 3,0 0,30 × 10 | 21.000 | 1.000 | 0,02 | 0,03 | 21.000 | 800 | 0,02 | 0,02 | 21.000 | 700 | 0,01 | 0,02 |
| 3,0 0,30 × 16 | 16.000 | 600 | 0,02 | 0,03 | 16.000 | 500 | 0,01 | 0,02 | 16.000 | 450 | 0,01 | 0,01 |
| 3,0 0,30 × 20 | 12.000 | 450 | 0,02 | 0,03 | 12.000 | 450 | 0,01 | 0,02 | 12.000 | 350 | 0,01 | 0,01 |
| 4,0 0,50 × 6 | 40.000 | 1.400 | 0,03 | 0,04 | 40.000 | 1.120 | 0,03 | 0,03 | 40.000 | 1.000 | 0,02 | 0,03 |
| 4,0 0,50 × 10 | 21.000 | 1.100 | 0,02 | 0,03 | 21.000 | 850 | 0,02 | 0,02 | 21.000 | 750 | 0,01 | 0,02 |
| 4,0 0,50 × 16 | 16.000 | 700 | 0,01 | 0,02 | 21.000 | 560 | 0,01 | 0,02 | 16.000 | 480 | 0,01 | 0,01 |
| 6,0 | 16.000-50.000 | 740-6.000 | 0,05 | 0,06 | 13.000-50.000 | 590-4.000 | 0,05 | 0,06 | 11.000-50.000 | 390-3.000 | 0,05 | 0,06 |



Empfohlene Schnittwerte für Karnasch HPC- und Alu-Fräser
Recommended cutting data for Karnasch high performance alu end mills

30 6228

| Werkstoffgruppe Material group | 9.1 AL Mg 1 | | 9.2 AL Cu Bi Pb | | 9.3 AL Si 6 | | 10.1 / 10.2 Cu Zn 39 Pb / Cu Zn 30 | | 10.3 E Cu 57 | | 11.1 PMMA | |
|-----------------------------------|----------------|-----------|--------------------|-----------|----------------|-----------|---------------------------------------|-----------|-----------------|-----------|--------------|-----------|
| | D1* L3 | Vc mm/min | fz/mm | Vc mm/min | fz/mm | Vc mm/min | fz/mm | Vc mm/min | fz/mm | Vc mm/min | fz/mm | Vc mm/min |
| 2,0 6 | 500 | 0,020 | 500 | 0,025 | 240 | 0,020 | 250 | 0,020 | 200 | 0,020 | 500 | 0,020 |
| 3,0 10 | 500 | 0,030 | 500 | 0,035 | 240 | 0,030 | 250 | 0,020 | 200 | 0,020 | 500 | 0,030 |
| 4,0 14 | 500 | 0,040 | 500 | 0,030 | 240 | 0,020 | 250 | 0,020 | 200 | 0,020 | 500 | 0,040 |
| 5,0 16 | 500 | 0,040 | 500 | 0,040 | 240 | 0,025 | 250 | 0,030 | 200 | 0,025 | 500 | 0,040 |
| 6,0 20 | 500 | 0,050 | 500 | 0,050 | 240 | 0,040 | 250 | 0,040 | 200 | 0,030 | 500 | 0,050 |
| 6,0 30 | 400 | 0,050 | 400 | 0,050 | 200 | 0,040 | 200 | 0,040 | 180 | 0,030 | 400 | 0,050 |
| 6,0 40 | 300 | 0,050 | 300 | 0,050 | 160 | 0,040 | 150 | 0,040 | 160 | 0,030 | 300 | 0,050 |
| 8,0 35 | 500 | 0,060 | 500 | 0,060 | 240 | 0,050 | 250 | 0,040 | 200 | 0,040 | 500 | 0,060 |
| 8,0 45 | 400 | 0,060 | 400 | 0,060 | 200 | 0,050 | 200 | 0,040 | 180 | 0,040 | 400 | 0,060 |
| 8,0 55 | 300 | 0,060 | 300 | 0,060 | 160 | 0,050 | 150 | 0,040 | 160 | 0,040 | 300 | 0,060 |
| 10,0 35 | 500 | 0,065 | 500 | 0,065 | 240 | 0,060 | 250 | 0,050 | 200 | 0,050 | 500 | 0,065 |
| 10,0 45 | 400 | 0,065 | 400 | 0,065 | 200 | 0,060 | 200 | 0,050 | 180 | 0,050 | 400 | 0,065 |
| 10,0 55 | 300 | 0,065 | 300 | 0,065 | 160 | 0,060 | 150 | 0,050 | 160 | 0,050 | 300 | 0,065 |
| 12,0 35 | 500 | 0,070 | 500 | 0,070 | 240 | 0,070 | 250 | 0,060 | 200 | 0,060 | 500 | 0,070 |
| 12,0 55 | 400 | 0,070 | 400 | 0,070 | 200 | 0,070 | 200 | 0,060 | 180 | 0,060 | 400 | 0,070 |
| 12,0 70 | 300 | 0,070 | 300 | 0,070 | 160 | 0,070 | 150 | 0,060 | 160 | 0,060 | 300 | 0,070 |

ae = Ø < 4 mm max 1,0 × D ae = Ø > 4 mm max 1,0 × D
ap = Ø < 4 mm max 0,5 × D ap = Ø > 4 mm max 1,0 × D



| Werkstoffgruppe Material group | d1 | L _s | 8.1 – 8.11 – 12.0 / 45-55 HRC Toolox – Hardox 400 – Stavax | | | | 8.2 – 12.1 / 55-60 HRC Hardox 500 – Vanadis4 superclean | | | | 8.3 / 60-70 HRC DC 53 – CPM 420V Pulverstahl / Powder steel | | | |
|-----------------------------------|-------|----------------|---|-----------|-------|-------|--|-----------|-------|-------|--|-----------|-------|-------|
| | | | min ⁻¹ | Vf mm/min | ap mm | ae mm | min ⁻¹ | Vf mm/min | ap mm | ae mm | min ⁻¹ | Vf mm/min | ap mm | ae mm |
| 1 | 0,2 x | - | 50.000 | 550 | 0,005 | 0,005 | 50.000 | 440 | 0,005 | 0,005 | 50.000 | 330 | 0,003 | 0,003 |
| | 0,2 x | 0,6 | 50.000 | 500 | 0,005 | 0,005 | 50.000 | 400 | 0,005 | 0,005 | 50.000 | 300 | 0,003 | 0,003 |
| | 0,2 x | 1,2 | 50.000 | 300 | 0,005 | 0,005 | 50.000 | 250 | 0,005 | 0,005 | 50.000 | 120 | 0,003 | 0,003 |
| | 0,3 x | - | 50.000 | 850 | 0,005 | 0,005 | 50.000 | 500 | 0,004 | 0,005 | 50.000 | 380 | 0,003 | 0,005 |
| | 0,3 x | 1,0 | 50.000 | 800 | 0,005 | 0,005 | 50.000 | 450 | 0,005 | 0,005 | 50.000 | 350 | 0,003 | 0,005 |
| | 0,3 x | 2,0 | 50.000 | 500 | 0,005 | 0,005 | 50.000 | 300 | 0,005 | 0,005 | 50.000 | 250 | 0,003 | 0,005 |
| 2 | 0,4 x | - | 50.000 | 1.250 | 0,005 | 0,010 | 50.000 | 820 | 0,005 | 0,010 | 50.000 | 650 | 0,005 | 0,005 |
| | 0,4 x | 1,0 | 50.000 | 1.200 | 0,005 | 0,010 | 50.000 | 800 | 0,005 | 0,010 | 50.000 | 600 | 0,005 | 0,005 |
| | 0,4 x | 1,5 | 50.000 | 1.000 | 0,005 | 0,010 | 50.000 | 710 | 0,005 | 0,010 | 50.000 | 500 | 0,005 | 0,005 |
| | 0,4 x | 2,0 | 50.000 | 600 | 0,005 | 0,010 | 50.000 | 600 | 0,005 | 0,010 | 50.000 | 400 | 0,005 | 0,005 |
| | 0,4 x | 3,0 | 50.000 | 400 | 0,005 | 0,010 | 50.000 | 400 | 0,005 | 0,010 | 50.000 | 300 | 0,005 | 0,005 |
| | 0,4 x | 4,0 | 50.000 | 200 | 0,005 | 0,010 | 50.000 | 200 | 0,005 | 0,010 | 50.000 | 200 | 0,005 | 0,005 |
| | 0,4 x | 5,0 | 50.000 | 180 | 0,005 | 0,008 | 50.000 | 180 | 0,004 | 0,007 | 50.000 | 180 | 0,004 | 0,005 |
| | 0,4 x | 6,0 | 50.000 | 180 | 0,003 | 0,005 | 50.000 | 180 | 0,003 | 0,004 | 50.000 | 180 | 0,003 | 0,003 |
| 3 | 0,5 x | 1,0 | 50.000 | 1.600 | 0,010 | 0,010 | 50.000 | 1.300 | 0,010 | 0,010 | 50.000 | 900 | 0,005 | 0,010 |
| | 0,5 x | 1,5 | 50.000 | 1.250 | 0,010 | 0,010 | 50.000 | 1.050 | 0,010 | 0,010 | 50.000 | 800 | 0,005 | 0,009 |
| | 0,5 x | 2,0 | 50.000 | 900 | 0,010 | 0,010 | 50.000 | 800 | 0,010 | 0,010 | 50.000 | 700 | 0,005 | 0,008 |
| | 0,5 x | 3,0 | 50.000 | 700 | 0,010 | 0,010 | 50.000 | 600 | 0,010 | 0,010 | 50.000 | 400 | 0,005 | 0,008 |
| | 0,5 x | 4,0 | 50.000 | 500 | 0,010 | 0,010 | 50.000 | 400 | 0,010 | 0,010 | 50.000 | 200 | 0,005 | 0,008 |
| | 0,5 x | 5,0 | 50.000 | 300 | 0,010 | 0,010 | 50.000 | 200 | 0,010 | 0,010 | 50.000 | 100 | 0,005 | 0,008 |
| | 0,5 x | 6,0 | 50.000 | 250 | 0,005 | 0,005 | 50.000 | 150 | 0,005 | 0,005 | 50.000 | 100 | 0,003 | 0,005 |
| | 0,5 x | 8,0 | 50.000 | 200 | 0,003 | 0,005 | 50.000 | 100 | 0,003 | 0,005 | 50.000 | 100 | 0,003 | 0,003 |
| 4 | 0,6 x | - | 50.000 | 2.300 | 0,020 | 0,020 | 50.000 | 1.890 | 0,015 | 0,015 | 50.000 | 1.520 | 0,010 | 0,010 |
| | 0,6 x | 1,0 | 50.000 | 2.180 | 0,020 | 0,020 | 50.000 | 1.760 | 0,010 | 0,010 | 50.000 | 1.490 | 0,010 | 0,010 |
| | 0,6 x | 1,5 | 50.000 | 2.000 | 0,010 | 0,020 | 50.000 | 1.580 | 0,010 | 0,010 | 50.000 | 1.100 | 0,010 | 0,010 |
| | 0,6 x | 2,0 | 50.000 | 1.800 | 0,010 | 0,020 | 50.000 | 1.400 | 0,010 | 0,010 | 50.000 | 1.100 | 0,010 | 0,010 |
| | 0,6 x | 3,0 | 40.000 | 1.600 | 0,010 | 0,020 | 40.000 | 1.200 | 0,010 | 0,010 | 40.000 | 900 | 0,010 | 0,010 |
| | 0,6 x | 4,0 | 30.000 | 1.200 | 0,010 | 0,010 | 30.000 | 900 | 0,010 | 0,010 | 30.000 | 700 | 0,005 | 0,005 |
| | 0,6 x | 5,0 | 30.000 | 800 | 0,010 | 0,010 | 30.000 | 700 | 0,005 | 0,010 | 30.000 | 500 | 0,005 | 0,005 |
| | 0,6 x | 6,0 | 30.000 | 600 | 0,010 | 0,010 | 30.000 | 500 | 0,005 | 0,005 | 30.000 | 300 | 0,005 | 0,005 |
| | 0,6 x | 8,0 | 30.000 | 400 | 0,003 | 0,004 | 30.000 | 300 | 0,003 | 0,003 | 30.000 | 200 | 0,002 | 0,002 |
| | 0,6 x | 10,0 | 30.000 | 300 | 0,003 | 0,004 | 30.000 | 200 | 0,003 | 0,003 | 30.000 | 100 | 0,002 | 0,002 |
| 5 | 0,8 x | - | 50.000 | 2.600 | 0,020 | 0,030 | 50.000 | 1.980 | 0,020 | 0,020 | 50.000 | 1.720 | 0,010 | 0,020 |
| | 0,8 x | 1,0 | 50.000 | 2.300 | 0,020 | 0,030 | 50.000 | 1.740 | 0,020 | 0,020 | 50.000 | 1.510 | 0,010 | 0,020 |
| | 0,8 x | 1,5 | 50.000 | 2.150 | 0,020 | 0,030 | 50.000 | 1.620 | 0,020 | 0,020 | 50.000 | 1.400 | 0,010 | 0,020 |
| | 0,8 x | 2,0 | 50.000 | 2.000 | 0,020 | 0,030 | 50.000 | 1.500 | 0,020 | 0,020 | 50.000 | 1.300 | 0,010 | 0,010 |
| | 0,8 x | 3,0 | 50.000 | 1.800 | 0,020 | 0,030 | 50.000 | 1.200 | 0,020 | 0,020 | 50.000 | 1.100 | 0,020 | 0,020 |
| | 0,8 x | 4,0 | 40.000 | 1.500 | 0,010 | 0,030 | 40.000 | 1.000 | 0,020 | 0,020 | 40.000 | 900 | 0,010 | 0,020 |
| | 0,8 x | 5,0 | 30.000 | 1.200 | 0,010 | 0,020 | 30.000 | 800 | 0,010 | 0,020 | 30.000 | 700 | 0,010 | 0,020 |
| | 0,8 x | 6,0 | 30.000 | 900 | 0,010 | 0,010 | 30.000 | 700 | 0,010 | 0,010 | 30.000 | 600 | 0,010 | 0,010 |
| | 0,8 x | 7,0 | 30.000 | 700 | 0,010 | 0,010 | 30.000 | 600 | 0,005 | 0,010 | 30.000 | 500 | 0,005 | 0,008 |
| | 0,8 x | 8,0 | 30.000 | 500 | 0,005 | 0,008 | 30.000 | 500 | 0,005 | 0,008 | 30.000 | 400 | 0,005 | 0,005 |
| | 0,8 x | 10,0 | 30.000 | 400 | 0,005 | 0,005 | 30.000 | 400 | 0,005 | 0,004 | 30.000 | 300 | 0,004 | 0,004 |
| 6 | 1,0 x | - | 50.000 | 3.000 | 0,050 | 0,050 | 50.000 | 2.700 | 0,030 | 0,050 | 50.000 | 2.500 | 0,020 | 0,030 |
| | 1,0 x | 1,5 | 50.000 | 2.900 | 0,050 | 0,050 | 50.000 | 2.600 | 0,030 | 0,050 | 50.000 | 2.400 | 0,020 | 0,030 |
| | 1,0 x | 2,0 | 50.000 | 2.800 | 0,050 | 0,050 | 50.000 | 2.500 | 0,030 | 0,050 | 50.000 | 2.300 | 0,020 | 0,030 |
| | 1,0 x | 3,0 | 50.000 | 2.700 | 0,050 | 0,050 | 50.000 | 2.200 | 0,030 | 0,050 | 50.000 | 2.000 | 0,020 | 0,030 |
| | 1,0 x | 4,0 | 45.000 | 2.400 | 0,030 | 0,050 | 45.000 | 2.400 | 0,020 | 0,030 | 45.000 | 1.500 | 0,020 | 0,020 |
| | 1,0 x | 5,0 | 40.000 | 2.000 | 0,020 | 0,050 | 40.000 | 2.000 | 0,020 | 0,030 | 40.000 | 1.200 | 0,010 | 0,020 |
| | 1,0 x | 6,0 | 30.000 | 1.500 | 0,020 | 0,030 | 30.000 | 1.400 | 0,010 | 0,020 | 30.000 | 1.000 | 0,010 | 0,010 |
| | 1,0 x | 7,0 | 25.000 | 1.400 | 0,010 | 0,030 | 25.000 | 1.200 | 0,010 | 0,020 | 25.000 | 900 | 0,010 | 0,010 |
| | 1,0 x | 8,0 | 20.000 | 1.200 | 0,010 | 0,030 | 20.000 | 1.000 | 0,010 | 0,020 | 20.000 | 800 | 0,010 | 0,010 |
| | 1,0 x | 9,0 | 15.000 | 1.000 | 0,010 | 0,020 | 15.000 | 800 | 0,005 | 0,010 | 15.000 | 700 | 0,005 | 0,008 |
| | 1,0 x | 10,0 | 12.000 | 800 | 0,010 | 0,020 | 12.000 | 700 | 0,005 | 0,008 | 12.000 | 600 | 0,005 | 0,005 |
| | 1,0 x | 12,0 | 12.000 | 600 | 0,010 | 0,020 | 12.000 | 500 | 0,005 | 0,006 | 12.000 | 400 | 0,005 | 0,005 |
| | 1,0 x | 16,0 | 12.000 | 400 | 0,010 | 0,020 | 12.000 | 300 | 0,005 | 0,006 | 12.000 | 200 | 0,005 | 0,005 |
| 7 | 1,2 x | - | 48.000 | 2.800 | 0,050 | 0,050 | 48.000 | 2.400 | 0,030 | 0,050 | 48.000 | 2.300 | 0,020 | 0,030 |
| | 1,2 x | 1,5 | 48.000 | 2.600 | 0,050 | 0,050 | 48.000 | 2.600 | 0,030 | 0,050 | 48.000 | 2.400 | 0,020 | 0,030 |
| | 1,2 x | 2,0 | 48.000 | 2.500 | 0,050 | 0,050 | 48.000 | 2.500 | 0,030 | 0,050 | 48.000 | 2.300 | 0,020 | 0,030 |



Empfohlene Schnittdaten für Karnasch CBN-Radiusfräser
Recommended cutting data for Karnasch CBN ball nose mills

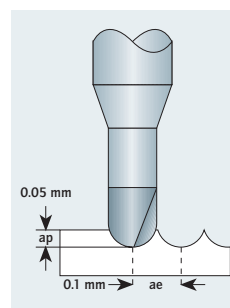
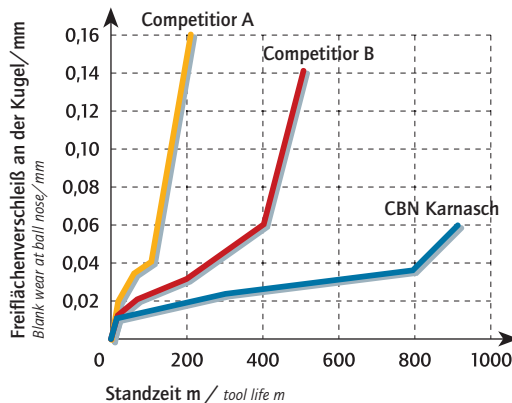
30 6633

| Werkstoffgruppe Material group | d1 | l3 | 8.1 – 8.11 – 12.0 / 45-55 HRC Toolox – Hardox 400 – Stavax | | | | 8.2 – 12.1 / 55-60 HRC Hardox 500 – Vanadis4 superclean | | | | 8.3 / 60-70 HRC DC 53 – CPM 420V Pulverstahl / Powder steel | | | |
|-----------------------------------|------|--------|---|-----------|-------|--------|--|-----------|-------|--------|--|-----------|-------|-------|
| | | | min ⁻¹ | Vf mm/min | ap mm | ae mm | min ⁻¹ | Vf mm/min | ap mm | ae mm | min ⁻¹ | Vf mm/min | ap mm | ae mm |
| 1,2 x | 3,0 | 45.000 | 2.400 | 0,030 | 0,050 | 45.000 | 2.400 | 0,020 | 0,030 | 45.000 | 2.000 | 0,020 | 0,020 | |
| 1,2 x | 4,0 | 42.000 | 2.300 | 0,020 | 0,050 | 42.000 | 2.300 | 0,020 | 0,030 | 42.000 | 1.500 | 0,010 | 0,020 | |
| 1,2 x | 5,0 | 40.000 | 2.200 | 0,020 | 0,050 | 40.000 | 2.000 | 0,020 | 0,030 | 40.000 | 1.200 | 0,010 | 0,020 | |
| 1,2 x | 6,0 | 38.000 | 2.100 | 0,020 | 0,030 | 38.000 | 1.600 | 0,010 | 0,020 | 38.000 | 1.000 | 0,010 | 0,010 | |
| 1,2 x | 7,0 | 35.000 | 2.000 | 0,020 | 0,030 | 35.000 | 1.500 | 0,010 | 0,020 | 35.000 | 900 | 0,010 | 0,010 | |
| 1,2 x | 8,0 | 32.000 | 1.800 | 0,020 | 0,030 | 32.000 | 1.200 | 0,010 | 0,020 | 32.000 | 800 | 0,010 | 0,010 | |
| 1,2 x | 10,0 | 30.000 | 1.500 | 0,010 | 0,020 | 30.000 | 800 | 0,005 | 0,010 | 30.000 | 700 | 0,005 | 0,008 | |
| 1,2 x | 12,0 | 28.000 | 1.000 | 0,010 | 0,010 | 28.000 | 700 | 0,005 | 0,008 | 28.000 | 500 | 0,005 | 0,005 | |
| 1,2 x | 16,0 | 28.000 | 1.000 | 0,007 | 0,007 | 28.000 | 700 | 0,005 | 0,005 | 28.000 | 500 | 0,003 | 0,003 | |
| 1,5 x | - | 40.000 | 2.600 | 0,040 | 0,040 | 40.000 | 2.180 | 0,030 | 0,030 | 40.000 | 1.630 | 0,020 | 0,030 | |
| 1,5 x | 2,0 | 40.000 | 2.300 | 0,040 | 0,040 | 40.000 | 1.920 | 0,030 | 0,030 | 40.000 | 1.530 | 0,020 | 0,030 | |
| 1,5 x | 3,0 | 40.000 | 2.100 | 0,030 | 0,030 | 40.000 | 1.700 | 0,025 | 0,025 | 40.000 | 1.380 | 0,020 | 0,020 | |
| 1,5 x | 4,0 | 40.000 | 2.000 | 0,030 | 0,030 | 40.000 | 1.700 | 0,025 | 0,025 | 40.000 | 1.300 | 0,020 | 0,020 | |
| 1,5 x | 6,0 | 40.000 | 2.000 | 0,030 | 0,030 | 40.000 | 1.700 | 0,025 | 0,025 | 40.000 | 1.200 | 0,010 | 0,020 | |
| 1,5 x | 8,0 | 35.000 | 2.000 | 0,020 | 0,030 | 35.000 | 1.700 | 0,010 | 0,025 | 35.000 | 1.100 | 0,010 | 0,010 | |
| 1,5 x | 10,0 | 32.000 | 1.500 | 0,020 | 0,020 | 32.000 | 1.200 | 0,010 | 0,020 | 32.000 | 800 | 0,005 | 0,010 | |
| 1,5 x | 12,0 | 28.000 | 1.200 | 0,010 | 0,020 | 28.000 | 1.000 | 0,010 | 0,010 | 28.000 | 600 | 0,005 | 0,008 | |
| 1,5 x | 14,0 | 25.000 | 900 | 0,010 | 0,010 | 25.000 | 650 | 0,010 | 0,005 | 25.000 | 550 | 0,005 | 0,005 | |
| 1,5 x | 15,0 | 25.000 | 800 | 0,010 | 0,010 | 25.000 | 700 | 0,010 | 0,005 | 25.000 | 500 | 0,005 | 0,005 | |
| 1,5 x | 16,0 | 25.000 | 600 | 0,010 | 0,005 | 25.000 | 500 | 0,005 | 0,005 | 25.000 | 350 | 0,002 | 0,002 | |
| 1,5 x | 18,0 | 25.000 | 300 | 0,010 | 0,005 | 25.000 | 200 | 0,005 | 0,005 | 25.000 | 100 | 0,002 | 0,002 | |
| 2,0 x | - | 50.000 | 6.000 | 0,100 | 0,100 | 50.000 | 5.000 | 0,100 | 0,100 | 50.000 | 4.500 | 0,070 | 0,070 | |
| 2,0 x | 2,0 | 50.000 | 5.000 | 0,100 | 0,100 | 50.000 | 4.500 | 0,100 | 0,100 | 50.000 | 4.000 | 0,070 | 0,070 | |
| 2,0 x | 3,0 | 50.000 | 4.000 | 0,100 | 0,100 | 50.000 | 4.000 | 0,070 | 0,070 | 50.000 | 3.500 | 0,050 | 0,050 | |
| 2,0 x | 4,0 | 50.000 | 4.000 | 0,100 | 0,100 | 50.000 | 4.000 | 0,050 | 0,050 | 50.000 | 3.000 | 0,030 | 0,050 | |
| 2,0 x | 5,0 | 50.000 | 4.000 | 0,100 | 0,100 | 50.000 | 3.800 | 0,050 | 0,050 | 50.000 | 2.800 | 0,030 | 0,050 | |
| 2,0 x | 6,0 | 40.000 | 4.000 | 0,050 | 0,080 | 40.000 | 3.500 | 0,030 | 0,030 | 40.000 | 2.500 | 0,020 | 0,030 | |
| 2,0 x | 8,0 | 35.000 | 3.000 | 0,030 | 0,050 | 35.000 | 2.500 | 0,020 | 0,030 | 35.000 | 1.800 | 0,010 | 0,020 | |
| 2,0 x | 10,0 | 25.000 | 2.000 | 0,020 | 0,030 | 25.000 | 1.500 | 0,010 | 0,030 | 25.000 | 1.200 | 0,010 | 0,020 | |
| 2,0 x | 12,0 | 20.000 | 1.500 | 0,020 | 0,030 | 20.000 | 1.200 | 0,010 | 0,030 | 20.000 | 1.000 | 0,010 | 0,020 | |
| 2,0 x | 15,0 | 18.000 | 1.000 | 0,010 | 0,020 | 18.000 | 900 | 0,010 | 0,020 | 18.000 | 800 | 0,010 | 0,010 | |
| 2,0 x | 18,0 | 15.000 | 800 | 0,010 | 0,010 | 15.000 | 800 | 0,010 | 0,010 | 15.000 | 600 | 0,008 | 0,008 | |
| 2,0 x | 20,0 | 12.000 | 600 | 0,008 | 0,008 | 12.000 | 500 | 0,008 | 0,008 | 12.000 | 400 | 0,005 | 0,005 | |
| 3,0 x | 5,0 | 40.000 | 5.000 | 0,150 | 0,150 | 40.000 | 4.000 | 0,100 | 0,100 | 40.000 | 3.000 | 0,080 | 0,080 | |
| 3,0 x | 8,0 | 30.000 | 4.000 | 0,100 | 0,100 | 30.000 | 3.000 | 0,080 | 0,080 | 30.000 | 2.000 | 0,060 | 0,060 | |
| 3,0 x | 10,0 | 22.000 | 3.000 | 0,050 | 0,050 | 22.000 | 2.000 | 0,040 | 0,040 | 22.000 | 1.500 | 0,040 | 0,040 | |
| 3,0 x | 15,0 | 15.000 | 1.500 | 0,030 | 0,050 | 15.000 | 1.000 | 0,030 | 0,030 | 15.000 | 1.000 | 0,030 | 0,030 | |
| 3,0 x | 20,0 | 10.000 | 1.000 | 0,010 | 0,020 | 10.000 | 800 | 0,020 | 0,020 | 10.000 | 800 | 0,020 | 0,020 | |



Vergleichstest / Benchmark test

- Wettbewerb A: Vollhartmetall
Competitor A: carbide
- Wettbewerb B: CBN
Competitor B: CBN
- CBN-Karnasch 30.6633
CBN-Karnasch 30.6633



| | |
|--------------------|---|
| Art. 30.6633 | CBN Ø 2,0 x l3 = 4 |
| Werkstoff/material | SKD11 (62HRC) |
| Drehzahl/speed | 20,000 min ⁻¹ (40m/min) |
| Vorschub/feed | 1,700 mm/min |
| Kühlung/Coolant | Luft / air |
| Maschine/machine | Vertikal BAZ / HSK-E32 Vertical machining center / HSK-E32 |



| Werkstoffgruppe Material group | Werkstoff/Material | | d1 = 2 mm | d1 = 3 mm | d1 = 4 mm | d1 = 5 mm | d1 = 6 mm | d1 = 8 mm | d1 = 10 mm | d1 = 12 mm | |
|-----------------------------------|---|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|---------|
| 4.1 | 3.7024-3.7025 3.7034-3.7035 3.7055-3.7064 Reintitan / Pure Titanium | ae mm | ae 1 | ae 1,5 | ae 2 | ae 2,5 | ae 3 | ae 4 | ae 5 | ae 6 | |
| | | ap mm | ap 0,25 | ap 0,3 | ap 0,5 | ap 1,25 | ap 1,5 | ap 2 | ap 2,5 | ap 3 | |
| | | Vc m/min. | vc 217 | vc 170 | vc 170 | vc 162 | vc 172 | vc 163 | vc 163 | vc 185 | vc 207 |
| | | n min ⁻¹ | n 34.500 | n 18.100 | n 13.500 | n 10.300 | n 9.100 | n 6.500 | n 5.900 | n 5.900 | n 5.500 |
| | | fz mm | fz 0,015 | fz 0,03 | fz 0,04 | fz 0,02 | fz 0,025 | fz 0,05 | fz 0,06 | fz 0,06 | fz 0,07 |
| | | Vf mm/min. | vf 2.070 | vf 2.172 | vf 2.160 | vf 824 | vf 910 | vf 1.300 | vf 1.416 | vf 1.540 | |
| 4.2 | 3.7105-3.7115 3.7124-3.7184 Titan / Titanium < 900 N/mm ² | ae mm | ae 1 | ae 1,5 | ae 2 | ae 2,5 | ae 3 | ae 4 | ae 5 | ae 6 | |
| | | ap mm | ap 0,25 | ap 0,3 | ap 0,5 | ap 1,25 | ap 1,5 | ap 2 | ap 2,5 | ap 3 | |
| | | Vc m/min. | vc 60 | vc 60 | vc 60 | vc 60 | vc 63 | vc 60 | vc 69 | vc 75 | |
| | | n min ⁻¹ | n 9.600 | n 6.400 | n 4.800 | n 3.800 | n 3.350 | n 2.400 | n 2.200 | n 2.000 | |
| | | fz mm | fz 0,01 | fz 0,025 | fz 0,03 | fz 0,015 | fz 0,02 | fz 0,03 | fz 0,04 | fz 0,05 | |
| | | Vf mm/min. | vf 384 | vf 640 | vf 576 | vf 228 | vf 268 | vf 288 | vf 352 | vf 400 | |
| 4.3 | 3.7154-3.7164 3.7124 Titan / Titanium > 900 N/mm ² | ae mm | ae 1 | ae 1,5 | ae 2 | ae 2,5 | ae 3 | ae 4 | ae 5 | ae 6 | |
| | | ap mm | ap 0,25 | ap 0,3 | ap 0,5 | ap 1,25 | ap 1,5 | ap 2 | ap 2,5 | ap 3 | |
| | | Vc m/min. | vc 47 | vc 48 | vc 48 | vc 46 | vc 49 | vc 48 | vc 53 | vc 60 | |
| | | n min ⁻¹ | n 7.500 | n 5.100 | n 3.800 | n 2.900 | n 2.600 | n 1.900 | n 1.700 | n 1.600 | |
| | | fz mm | fz 0,01 | fz 0,025 | fz 0,03 | fz 0,015 | fz 0,02 | fz 0,03 | fz 0,04 | fz 0,05 | |
| | | Vf mm/min. | vf 300 | vf 510 | vf 456 | vf 174 | vf 208 | vf 228 | vf 272 | vf 320 | |
| 5.1 | 1.3911-1.3926 1.3927 Nickel 100% | ae mm | ae 1 | ae 1,5 | ae 2 | ae 2,5 | ae 3 | ae 4 | ae 5 | ae 6 | |
| | | ap mm | ap 0,25 | ap 0,3 | ap 0,5 | ap 1,25 | ap 1,5 | ap 2 | ap 2,5 | ap 3 | |
| | | Vc m/min. | vc 248 | vc 248 | vc 248 | vc 242 | vc 258 | vc 246 | vc 280 | vc 313 | |
| | | n min ⁻¹ | n 39.400 | n 26.400 | n 19.700 | n 15.400 | n 13.700 | n 9.800 | n 8.900 | n 8.300 | |
| | | fz mm | fz 0,01 | fz 0,025 | fz 0,04 | fz 0,02 | fz 0,025 | fz 0,05 | fz 0,06 | fz 0,07 | |
| | | Vf mm/min. | vf 1.576 | vf 2.640 | vf 3.152 | vf 1.232 | vf 1.370 | vf 1.960 | vf 2.136 | vf 2.324 | |
| 5.2 | 1.3912-1.3981 Nickellegierung / Nickel alloy < 900 N/mm ² | ae mm | ae 1 | ae 1,5 | ae 2 | ae 2,5 | ae 3 | ae 4 | ae 5 | ae 6 | |
| | | ap mm | ap 0,25 | ap 0,3 | ap 0,5 | ap 1,25 | ap 1,5 | ap 2 | ap 2,5 | ap 3 | |
| | | Vc m/min. | vc 50 | vc 50 | vc 50 | vc 49 | vc 53 | vc 50 | vc 57 | vc 64 | |
| | | n min ⁻¹ | n 7.900 | n 5.300 | n 4.000 | n 3.100 | n 2.800 | n 2.000 | n 1.800 | n 1.700 | |
| | | fz mm | fz 0,01 | fz 0,025 | fz 0,03 | fz 0,015 | fz 0,02 | fz 0,03 | fz 0,04 | fz 0,05 | |
| | | Vf mm/min. | vf 316 | vf 530 | vf 480 | vf 186 | vf 224 | vf 240 | vf 288 | vf 340 | |
| 5.3 | 1.3913-1.3915-1.3916 1.3917-1.3918-1.3920 1.3921-1.3922-1.3923 1.3924-1.3928-2.4360 2.4375-2.4602-2.4630 2.4631-2.4634-2.4636 2.4642-2.4650-2.4654 2.4662-2.4665-2.4668 2.4669-2.4672-2.4674 2.4676-2.4816-2.4851 2.4856-2.4858-2.4916 2.4973-2.4983 Nickellegierung / Nickel alloy > 900 N/mm ² | ae mm | ae 1 | ae 1,5 | ae 2 | ae 2,5 | ae 3 | ae 4 | ae 5 | ae 6 | |
| | | ap mm | ap 0,25 | ap 0,3 | ap 0,5 | ap 1,25 | ap 1,5 | ap 2 | ap 2,5 | ap 3 | |
| | | Vc m/min. | vc 29 | vc 29 | vc 29 | vc 28 | vc 30 | vc 30 | vc 35 | vc 38 | |
| | | n min ⁻¹ | n 4.600 | n 3.100 | n 2.300 | n 1.800 | n 1.600 | n 1.200 | n 1.100 | n 1.000 | |
| | | fz mm | fz 0,01 | fz 0,025 | fz 0,03 | fz 0,015 | fz 0,02 | fz 0,03 | fz 0,04 | fz 0,05 | |
| | | Vf mm/min. | vf 184 | vf 310 | vf 276 | vf 108 | vf 128 | vf 144 | vf 176 | vf 200 | |
| | 2.4633 Nickellegierung / Nickel alloy > 900 N/mm ² | ae mm | ae 1 | ae 1,5 | ae 2 | ae 2,5 | ae 3 | ae 4 | ae 5 | ae 6 | |
| | | ap mm | ap 0,25 | ap 0,3 | ap 0,5 | ap 1,25 | ap 1,5 | ap 2 | ap 2,5 | ap 3 | |
| | | Vc m/min. | vc 20 | vc 20 | vc 20 | vc 20 | vc 21 | vc 20 | vc 24 | vc 26 | |
| | | n min ⁻¹ | n 3.200 | n 2.150 | n 1.600 | n 1.300 | n 1.100 | n 800 | n 750 | n 700 | |
| | | fz mm | fz 0,01 | fz 0,025 | fz 0,03 | fz 0,015 | fz 0,02 | fz 0,03 | fz 0,04 | fz 0,05 | |
| | | Vf mm/min. | vf 128 | vf 215 | vf 192 | vf 78 | vf 88 | vf 96 | vf 120 | vf 140 | |
| | 2.4670-2.4672 2.4674 Nickellegierung / Nickel alloy > 900 N/mm ² | ae mm | ae 1 | ae 1,5 | ae 2 | ae 2,5 | ae 3 | ae 4 | ae 5 | ae 6 | |
| | | ap mm | ap 0,25 | ap 0,3 | ap 0,5 | ap 1,25 | ap 1,5 | ap 2 | ap 2,5 | ap 3 | |
| | | Vc m/min. | vc 26 | vc 26 | vc 26 | vc 25 | vc 28 | vc 25 | vc 30 | vc 34 | |
| | | n min ⁻¹ | n 4.100 | n 2.800 | n 2.100 | n 1.600 | n 1.500 | n 1.000 | n 950 | n 900 | |
| | | fz mm | fz 0,01 | fz 0,025 | fz 0,03 | fz 0,015 | fz 0,02 | fz 0,03 | fz 0,04 | fz 0,05 | |
| | | Vf mm/min. | vf 164 | vf 280 | vf 252 | vf 96 | vf 120 | vf 120 | vf 152 | vf 180 | |



Empfohlene Richtwerte für 3D-Radiusfräser "FOURWIN"
Recommended cutting data for solid carbide 3D-ball nose end mill "FOURWIN"

TITAN

Schlichten
Finishing

30 7485

| Werkstoffgruppe Material group | Werkstoff/Material | | d1 = 2 mm | d1 = 3 mm | d1 = 4 mm | d1 = 5 mm | d1 = 6 mm | d1 = 8 mm | d1 = 10 mm | d1 = 12 mm |
|---|---|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|
| 4.1 | 3.7024-3.7025 3.7034-3.7035 3.7055-3.7064 Reintitan / Pure Titanium | ae mm | ae 0,2 | ae 0,3 | ae 0,4 | ae 0,5 | ae 0,6 | ae 0,8 | ae 1 | ae 1,2 |
| | | ap mm | ap 0,05 | ap 0,075 | ap 0,1 | ap 0,125 | ap 0,15 | ap 0,2 | ap 0,25 | ap 0,3 |
| | | Vc m/min. | vc 302 | vc 291 | vc 303 | vc 317 | vc 337 | vc 322 | vc 364 | vc 407 |
| | | n min ⁻¹ | n 48.100 | n 30.900 | n 24.100 | n 20.200 | n 17.900 | n 12.800 | n 11.600 | n 10.800 |
| | | fz mm | fz 0,05 | fz 0,08 | fz 0,115 | fz 0,07 | fz 0,1 | fz 0,16 | fz 0,18 | fz 0,2 |
| | | Vf mm/min. | vf 9.620 | vf 9.888 | vf 11.086 | vf 5.656 | vf 7.160 | vf 8.192 | vf 8.352 | vf 8.640 |
| 4.2 | 3.7105-3.7115 3.7124-3.7184 Titan / Titanium < 900 N/mm ² | ae mm | ae 0,2 | ae 0,3 | ae 0,4 | ae 0,5 | ae 0,6 | ae 0,8 | ae 1 | ae 1,2 |
| | | ap mm | ap 0,05 | ap 0,075 | ap 0,1 | ap 0,125 | ap 0,15 | ap 0,2 | ap 0,25 | ap 0,3 |
| | | Vc m/min. | vc 121 | vc 117 | vc 121 | vc 127 | vc 136 | vc 128 | vc 148 | vc 162 |
| | | n min ⁻¹ | n 19.200 | n 12.400 | n 9.600 | n 8.100 | n 7.200 | n 5.100 | n 4.700 | n 4.300 |
| | | fz mm | fz 0,045 | fz 0,08 | fz 0,1 | fz 0,055 | fz 0,07 | fz 0,12 | fz 0,15 | fz 0,19 |
| | | Vf mm/min. | vf 3.456 | vf 3.968 | vf 3.840 | vf 1.782 | vf 2.016 | vf 2.448 | vf 2.820 | vf 3.268 |
| 4.3 | 3.7154-3.7164 3.7124 Titan / Titanium > 900 N/mm ² | ae mm | ae 0,2 | ae 0,3 | ae 0,4 | ae 0,5 | ae 0,6 | ae 0,8 | ae 1 | ae 1,2 |
| | | ap mm | ap 0,05 | ap 0,075 | ap 0,1 | ap 0,125 | ap 0,15 | ap 0,2 | ap 0,25 | ap 0,3 |
| | | Vc m/min. | vc 94 | vc 91 | vc 94 | vc 99 | vc 106 | vc 101 | vc 113 | vc 128 |
| | | n min ⁻¹ | n 15.000 | n 9.600 | n 7.500 | n 6.300 | n 5.600 | n 4.000 | n 3.600 | n 3.400 |
| | | fz mm | fz 0,045 | fz 0,08 | fz 0,1 | fz 0,055 | fz 0,07 | fz 0,12 | fz 0,15 | fz 0,19 |
| | | Vf mm/min. | vf 2.700 | vf 3.072 | vf 3.000 | vf 1.386 | vf 1.568 | vf 1.920 | vf 2.160 | vf 2.584 |
| 5.1 | 1.3911-1.3926 1.3927 Nickel 100% | ae mm | ae 0,2 | ae 0,3 | ae 0,4 | ae 0,5 | ae 0,6 | ae 0,8 | ae 1 | ae 1,2 |
| | | ap mm | ap 0,05 | ap 0,075 | ap 0,1 | ap 0,125 | ap 0,15 | ap 0,2 | ap 0,25 | ap 0,3 |
| | | Vc m/min. | vc 415 | vc 401 | vc 415 | vc 435 | vc 464 | vc 440 | vc 503 | vc 566 |
| | | n min ⁻¹ | n 66.000 | n 42.500 | n 33.000 | n 27.700 | n 2.4600 | n 17.500 | n 16.000 | n 15.000 |
| | | fz mm | fz 0,05 | fz 0,08 | fz 0,115 | fz 0,07 | fz 0,1 | fz 0,16 | fz 0,18 | fz 0,2 |
| | | Vf mm/min. | vf 13.200 | vf 13.600 | vf 15.180 | vf 7.756 | vf 9.840 | vf 11.200 | vf 11.520 | vf 12.000 |
| 5.2 | 1.3912-1.3981 Nickellegierung / Nickel alloy < 900 N/mm ² | ae mm | ae 0,2 | ae 0,3 | ae 0,4 | ae 0,5 | ae 0,6 | ae 0,8 | ae 1 | ae 1,2 |
| | | ap mm | ap 0,05 | ap 0,075 | ap 0,1 | ap 0,125 | ap 0,15 | ap 0,2 | ap 0,25 | ap 0,3 |
| | | Vc m/min. | vc 91 | vc 88 | vc 91 | vc 96 | vc 102 | vc 98 | vc 110 | vc 124 |
| | | n min ⁻¹ | n 14.500 | n 9.300 | n 7.200 | n 6.100 | n 5.400 | n 3.900 | n 3.500 | n 3.300 |
| | | fz mm | fz 0,045 | fz 0,08 | fz 0,1 | fz 0,055 | fz 0,07 | fz 0,12 | fz 0,15 | fz 0,19 |
| | | Vf mm/min. | vf 2.610 | vf 2.976 | vf 2.880 | vf 1.342 | vf 1.512 | vf 1.872 | vf 2.100 | vf 2.508 |
| 5.3 | 1.3913-1.3915-1.3916 1.3917-1.3918-1.3920 1.3921-1.3922-1.3923 1.3924-1.3928-2.4360 2.4375-2.4602-2.4630 2.4631-2.4634-2.4636 2.4642-2.4650-2.4654 2.4662-2.4665-2.4668 2.4669-2.4672-2.4674 2.4676-2.4816-2.4851 2.4856-2.4858-2.4916 2.4973-2.4983 Nickellegierung / Nickel alloy > 900 N/mm ² | ae mm | ae 0,2 | ae 0,3 | ae 0,4 | ae 0,5 | ae 0,6 | ae 0,8 | ae 1 | ae 1,2 |
| | | ap mm | ap 0,05 | ap 0,075 | ap 0,1 | ap 0,125 | ap 0,15 | ap 0,2 | ap 0,25 | ap 0,3 |
| | | Vc m/min. | vc 53 | vc 51 | vc 53 | vc 55 | vc 59 | vc 58 | vc 63 | vc 72 |
| | | n min ⁻¹ | n 8.400 | n 5.400 | n 4.200 | n 3.500 | n 3.100 | n 2.300 | n 2.000 | n 1.900 |
| | | fz mm | fz 0,045 | fz 0,08 | fz 0,1 | fz 0,055 | fz 0,07 | fz 0,12 | fz 0,15 | fz 0,19 |
| | | Vf mm/min. | vf 1.512 | vf 1.728 | vf 1.680 | vf 770 | vf 868 | vf 1.104 | vf 1.200 | vf 1.444 |
| | 2.4633 Nickellegierung / Nickel alloy > 900 N/mm ² | ae mm | ae 0,2 | ae 0,3 | ae 0,4 | ae 0,5 | ae 0,6 | ae 0,8 | ae 1 | ae 1,2 |
| | | ap mm | ap 0,05 | ap 0,075 | ap 0,1 | ap 0,125 | ap 0,15 | ap 0,2 | ap 0,25 | ap 0,3 |
| | | Vc m/min. | vc 37 | vc 36 | vc 38 | vc 39 | vc 42 | vc 40 | vc 44 | vc 49 |
| | | n min ⁻¹ | n 5.900 | n 3.800 | n 3.000 | n 2.500 | n 2.200 | n 1.600 | n 1.400 | n 1.300 |
| | | fz mm | fz 0,045 | fz 0,08 | fz 0,1 | fz 0,055 | fz 0,07 | fz 0,12 | fz 0,15 | fz 0,19 |
| | | Vf mm/min. | vf 1.062 | vf 1.216 | vf 1.200 | vf 550 | vf 616 | vf 768 | vf 840 | vf 988 |
| 2.4670-2.4672 2.4674 Nickellegierung / Nickel alloy > 900 N/mm ² | ae mm | ae 0,2 | ae 0,3 | ae 0,4 | ae 0,5 | ae 0,6 | ae 0,8 | ae 1 | ae 1,2 | |
| | ap mm | ap 0,05 | ap 0,075 | ap 0,1 | ap 0,125 | ap 0,15 | ap 0,2 | ap 0,25 | ap 0,3 | |
| | Vc m/min. | vc 48 | vc 46 | vc 48 | vc 50 | vc 53 | vc 50 | vc 57 | vc 64 | |
| | n min ⁻¹ | n 7.600 | n 4.800 | n 3.800 | n 3.200 | n 2.800 | n 2.000 | n 1.800 | n 1.700 | |
| | fz mm | fz 0,045 | fz 0,08 | fz 0,1 | fz 0,055 | fz 0,07 | fz 0,12 | fz 0,15 | fz 0,19 | |
| | Vf mm/min. | vf 1.368 | vf 1.568 | vf 1.520 | vf 704 | vf 784 | vf 960 | vf 1.080 | vf 1.292 | |

1



2



3



4



5



6



7



8



9



Index

| Werkstoffgruppe Material group | Werkstoff/Material | | d1 = 2 mm | d1 = 3 mm | d1 = 4 mm | d1 = 5 mm | d1 = 6 mm | d1 = 8 mm | d1 = 10 mm | d1 = 12 mm |
|-----------------------------------|---|---|---|--|--|---|--|--|--|--|
| 2.1 | 1.4104 Rostfreier Stahl, geschwefelt / Stainless steel | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 1 ap 0,25 vc 82 n 13.100 fz 0,01 vf 524 | ae 1,5 ap 0,3 vc 82 n 8.700 fz 0,025 vf 870 | ae 2 ap 0,5 vc 83 n 6.600 fz 0,03 vf 792 | ae 2,5 ap 1,25 vc 82 n 5.200 fz 0,015 vf 312 | ae 3 ap 1,5 vc 87 n 4.600 fz 0,015 vf 276 | ae 4 ap 2 vc 83 n 3.300 fz 0,02 vf 264 | ae 5 ap 2,5 vc 94 n 3.000 fz 0,04 vf 480 | ae 6 ap 3 vc 106 n 2.800 fz 0,05 vf 560 |
| | 1.4305 Rostfreier Stahl, geschwefelt / Stainless steel | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 1 ap 0,25 vc 99 n 15.800 fz 0,01 vf 632 | ae 1,5 ap 0,3 vc 99 n 10.500 fz 0,025 vf 1050 | ae 2 ap 0,5 vc 99 n 7.900 fz 0,03 vf 948 | ae 2,5 ap 1,25 vc 97 n 6.200 fz 0,015 vf 372 | ae 3 ap 1,5 vc 104 n 5.500 fz 0,02 vf 440 | ae 4 ap 2 vc 98 n 3.900 fz 0,025 vf 312 | ae 5 ap 2,5 vc 113 n 3.600 fz 0,04 vf 576 | ae 6 ap 3 vc 124 n 3.300 fz 0,05 vf 660 |
| 2.2 | 1.4110-1.4112-1.4192 1.4319-1.4404-1.4406 1.4408-1.4429-1.4435 1.4436-1.4438-1.4439 1.4441-1.4452-1.4528 1.4541-1.4542-1.4545 1.4546-1.4550-1.4552 1.4568-1.4718-1.4724 1.4731-1.4742-1.4760 1.4762-1.4828-1.4871 1.4873-1.4912-1.4961 Rostfrei-austenitisch / Stainless steel- austenitic | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 1 ap 0,25 vc 66 n 10.500 fz 0,01 vf 420 | ae 1,5 ap 0,3 vc 66 n 7.000 fz 0,025 vf 700 | ae 2 ap 0,5 vc 67 n 5.300 fz 0,03 vf 636 | ae 2,5 ap 1,25 vc 64 n 4.100 fz 0,015 vf 246 | ae 3 ap 1,5 vc 70 n 3.700 fz 0,015 vf 222 | ae 4 ap 2 vc 65 n 2.600 fz 0,02 vf 208 | ae 5 ap 2,5 vc 75 n 2.400 fz 0,04 vf 384 | ae 6 ap 3 vc 83 n 2.200 fz 0,05 vf 440 |
| | 1.4301-1.4306 1.4308-1.4310 1.4311-1.4312 Rostfrei-austenitisch / Stainless steel- austenitic | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 1 ap 0,25 vc 79 n 12.600 fz 0,01 vf 504 | ae 1,5 ap 0,3 vc 79 n 8.400 fz 0,025 vf 840 | ae 2 ap 0,5 vc 79 n 6.300 fz 0,03 vf 756 | ae 2,5 ap 1,25 vc 79 n 5.000 fz 0,015 vf 300 | ae 3 ap 1,5 vc 83 n 4.400 fz 0,015 vf 264 | ae 4 ap 2 vc 80 n 3.200 fz 0,02 vf 256 | ae 5 ap 2,5 vc 91 n 2.900 fz 0,04 vf 464 | ae 6 ap 3 vc 102 n 2.700 fz 0,05 vf 540 |
| | 1.4303 Rostfrei-austenitisch / Stainless steel- austenitic | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 1 ap 0,25 vc 73 n 11.600 fz 0,01 vf 464 | ae 1,5 ap 0,3 vc 73 n 7.800 fz 0,025 vf 780 | ae 2 ap 0,5 vc 73 n 5.800 fz 0,03 vf 696 | ae 2,5 ap 1,25 vc 72 n 4.600 fz 0,015 vf 276 | ae 3 ap 1,5 vc 75 n 4.000 fz 0,015 vf 240 | ae 4 ap 2 vc 73 n 2.900 fz 0,02 vf 232 | ae 5 ap 2,5 vc 82 n 2.600 fz 0,04 vf 416 | ae 6 ap 3 vc 91 n 2.400 fz 0,05 vf 480 |
| | 1.4571-1.4580 1.4581-1.4583 Rostfrei-austenitisch / Stainless steel- austenitic | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 1 ap 0,25 vc 60 n 6.500 fz 0,01 vf 380 | ae 1,5 ap 0,3 vc 60 n 6.400 fz 0,025 vf 640 | ae 2 ap 0,5 vc 60 n 4.800 fz 0,03 vf 576 | ae 2,5 ap 1,25 vc 58 n 3.700 fz 0,015 vf 222 | ae 3 ap 1,5 vc 62 n 3.300 fz 0,015 vf 198 | ae 4 ap 2 vc 60 n 2.400 fz 0,02 vf 192 | ae 5 ap 2,5 vc 69 n 2.200 fz 0,04 vf 352 | ae 6 ap 3 vc 75 n 2.000 fz 0,05 vf 400 |
| | 1.4833-1.4841 1.4842-1.4845 1.4864-1.4941 Rostfrei-austenitisch / Stainless steel- austenitic | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 1 ap 0,25 vc 50 n 10.600 fz 0,01 vf 424 | ae 1,5 ap 0,3 vc 50 n 5.750 fz 0,025 vf 575 | ae 2 ap 0,5 vc 50 n 4.000 fz 0,015 vf 240 | ae 2,5 ap 1,25 vc 52 n 3.300 fz 0,015 vf 198 | ae 3 ap 1,5 vc 57 n 3.000 fz 0,015 vf 180 | ae 4 ap 2 vc 78 n 3.100 fz 0,03 vf 372 | ae 5 ap 2,5 vc 60 n 1.900 fz 0,04 vf 304 | ae 6 ap 3 vc 68 n 1.800 fz 0,05 vf 360 |
| | 1.4000-1.4001 1.4002-1.4005 1.4006-1.4008 1.4016-1.4021 1.4028-1.4031 1.4034-1.4125 1.4313-1.4460 1.4462-1.4510 1.4511-1.4512 1.4521 Rostfrei-austenitisch, ferritisch, martensitisch / Stainless steel- austenitic, ferritic, martensitic | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 1 ap 0,25 vc 54 n 8.600 fz 0,01 vf 344 | ae 1,5 ap 0,3 vc 54 n fz 0,025 vf | ae 2 ap 0,5 vc 54 n 4.300 fz 0,025 vf 430 | ae 2,5 ap 1,25 vc 53 n 3.400 fz 0,015 vf 204 | ae 3 ap 1,5 vc 57 n 3.000 fz 0,015 vf 180 | ae 4 ap 2 vc 55 n 2.200 fz 0,02 vf 176 | ae 5 ap 2,5 vc 63 n 2.000 fz 0,04 vf 320 | ae 6 ap 3 vc 68 n 1.800 fz 0,05 vf 360 |
| 2.3 | 1.4558-1.4563 1.4854-1.4958 1.4977-1.4980 1.4563-1.4876 1.4958-1.4980 Chrom-Nickel- Legierung, hochfest > 1250 N/mm ² / Chrome-Nickel high strength alloy > 1250 N/mm ² | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 1 ap 0,25 vc 36 n 5.700 fz 0,01 vf 228 | ae 1,5 ap 0,3 vc 36 n 3.800 fz 0,02 vf 304 | ae 2 ap 0,5 vc 36 n 2.900 fz 0,025 vf 290 | ae 2,5 ap 1,25 vc 36 n 2.300 fz 0,015 vf 138 | ae 3 ap 1,5 vc 38 n 2.000 fz 0,015 vf 120 | ae 4 ap 2 vc 35 n 1.400 fz 0,02 vf 112 | ae 5 ap 2,5 vc 41 n 1.300 fz 0,03 vf 156 | ae 6 ap 3 vc 45 n 1.200 fz 0,05 vf 240 |
| 2.4 | 1.4558-1.4563 1.4854-1.4958 1.4977-1.4980 1.4563-1.4876 1.4958-1.4980 Chrom-Nickel- Legierung, hochfest > 1250 N/mm ² / Chrome-Nickel high strength alloy > 1250 N/mm ² | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 1 ap 0,25 vc 36 n 5.700 fz 0,01 vf 228 | ae 1,5 ap 0,3 vc 36 n 3.800 fz 0,02 vf 304 | ae 2 ap 0,5 vc 36 n 2.900 fz 0,025 vf 290 | ae 2,5 ap 1,25 vc 36 n 2.300 fz 0,015 vf 138 | ae 3 ap 1,5 vc 38 n 2.000 fz 0,015 vf 120 | ae 4 ap 2 vc 35 n 1.400 fz 0,02 vf 112 | ae 5 ap 2,5 vc 41 n 1.300 fz 0,03 vf 156 | ae 6 ap 3 vc 45 n 1.200 fz 0,05 vf 240 |



Empfohlene Richtwerte für VHM-3D-Radiusfräser "FOURWIN"
Recommended cutting data for solid carbide 3D-ball nose end mill "FOURWIN"

INOX

Schlichten
Finishing

30 7487

| Werkstoffgruppe Material group | Werkstoff/Material | | d1 = 2 mm | d1 = 3 mm | d1 = 4 mm | d1 = 5 mm | d1 = 6 mm | d1 = 8 mm | d1 = 10 mm | d1 = 12 mm |
|-----------------------------------|---|---|---|---|--|--|---|--|---|--|
| 2.1 | 1.4104 Rostfreier Stahl, geschwefelt / Stainless steel | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 0,05 vc 138 n 22.000 fz 0,045 vf 3.960 | ae 0,3 ap 0,075 vc 134 n 14.200 fz 0,08 vf 4.544 | ae 0,4 ap 0,1 vc 138 n 11.000 fz 0,1 vf 4.400 | ae 0,5 ap 0,125 vc 145 n 9.200 fz 0,055 vf 2.024 | ae 0,6 ap 0,15 vc 145 n 8.200 fz 0,07 vf 2.296 | ae 0,8 ap 0,2 vc 148 n 5.900 fz 0,12 vf 2.832 | ae 1 ap 0,25 vc 167 n 5.300 fz 0,15 vf 3.180 | ae 1,2 ap 0,3 vc 188 n 5.000 fz 0,19 vf 3.800 |
| | 1.4305 Rostfreier Stahl, geschwefelt / Stainless steel | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 0,05 vc 166 n 26.400 fz 0,045 vf 4.752 | ae 0,3 ap 0,075 vc 160 n 17.000 fz 0,08 vf 5.440 | ae 0,4 ap 0,1 vc 166 n 13.200 fz 0,1 vf 5.280 | ae 0,5 ap 0,125 vc 174 n 11.100 fz 0,055 vf 2.442 | ae 0,6 ap 0,15 vc 185 n 9.800 fz 0,07 vf 2.744 | ae 0,8 ap 0,2 vc 176 n 7.000 fz 0,12 vf 3.360 | ae 1 ap 0,25 vc 201 n 6.400 fz 0,15 vf 3.840 | ae 1,2 ap 0,3 vc 222 n 5.900 fz 0,19 vf 4.484 |
| 2.2 | 1.4110-1.4112-1.4192 1.4319-1.4404-1.4406 1.4408-1.4429-1.4435 1.4436-1.4438-1.4439 1.4441-1.4452-1.4528 1.4541-1.4542-1.4545 1.4546-1.4550-1.4552 1.4568-1.4718-1.4724 1.4731-1.4742-1.4760 1.4762-1.4828-1.4871 1.4873-1.4912-1.4961 Rostfrei-austenitisch / Stainless steel- austenitic | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 0,05 vc 111 n 17.600 fz 0,045 vf 3.168 | ae 0,3 ap 0,075 vc 107 n 11.300 fz 0,08 vf 3.616 | ae 0,4 ap 0,1 vc 111 n 8.800 fz 0,1 vf 3.520 | ae 0,5 ap 0,125 vc 116 n 7.400 fz 0,055 vf 1.628 | ae 0,6 ap 0,15 vc 124 n 6.600 fz 0,07 vf 1.848 | ae 0,8 ap 0,2 vc 118 n 4.700 fz 0,12 vf 2.256 | ae 1 ap 0,25 vc 135 n 4.300 fz 0,15 vf 2.580 | ae 1,2 ap 0,3 vc 151 n 4.000 fz 0,19 vf 3.040 |
| | 1.4301-1.4306 1.4308-1.4310 1.4311-1.4312 Rostfrei-austenitisch / Stainless steel- austenitic | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 0,05 vc 133 n 21.100 fz 0,045 vf 3.798 | ae 0,3 ap 0,075 vc 128 n 13.600 fz 0,08 vf 4.352 | ae 0,4 ap 0,1 vc 133 n 10.600 fz 0,1 vf 4.240 | ae 0,5 ap 0,125 vc 140 n 8.900 fz 0,055 vf 1.958 | ae 0,6 ap 0,15 vc 149 n 7.900 fz 0,07 vf 2.212 | ae 0,8 ap 0,2 vc 141 n 5.600 fz 0,12 vf 2.688 | ae 1 ap 0,25 vc 160 n 5.100 fz 0,15 vf 3.060 | ae 1,2 ap 0,3 vc 181 n 4.800 fz 0,19 vf 3.648 |
| | 1.4303 Rostfrei-austenitisch / Stainless steel- austenitic | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 0,05 vc 122 n 19.400 fz 0,045 vf 3.492 | ae 0,3 ap 0,075 vc 118 n 12.500 fz 0,08 vf 4.000 | ae 0,4 ap 0,1 vc 122 n 9.700 fz 0,1 vf 3.880 | ae 0,5 ap 0,125 vc 127 n 8.100 fz 0,055 vf 1.782 | ae 0,6 ap 0,15 vc 136 n 7.200 fz 0,07 vf 2.016 | ae 0,8 ap 0,2 vc 131 n 5.200 fz 0,12 vf 2.496 | ae 1 ap 0,25 vc 148 n 4.700 fz 0,15 vf 2.820 | ae 1,2 ap 0,3 vc 166 n 4.400 fz 0,19 vf 3.344 |
| | 1.4571-1.4580 1.4581-1.4583 Rostfrei-austenitisch / Stainless steel- austenitic | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 0,05 vc 100 n 15.900 fz 0,045 vf 2.862 | ae 0,3 ap 0,075 vc 96 n 10.200 fz 0,08 vf 3.264 | ae 0,4 ap 0,1 vc 101 n 8.000 fz 0,1 vf 3.200 | ae 0,5 ap 0,125 vc 105 n 6.700 fz 0,055 vf 1.474 | ae 0,6 ap 0,15 vc 111 n 5.900 fz 0,07 vf 1.652 | ae 0,8 ap 0,2 vc 106 n 4.200 fz 0,12 vf 2.016 | ae 1 ap 0,25 vc 119 n 3.800 fz 0,15 vf 2.280 | ae 1,2 ap 0,3 vc 136 n 3.600 fz 0,19 vf 2.736 |
| | 1.4833-1.4841 1.4842-1.4845 1.4864-1.4941 Rostfrei-austenitisch / Stainless steel- austenitic | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 0,05 vc 89 n 14.100 fz 0,045 vf 2.538 | ae 0,3 ap 0,075 vc 86 n 9.100 fz 0,08 vf 2.912 | ae 0,4 ap 0,1 vc 89 n 7.100 fz 0,1 vf 2.840 | ae 0,5 ap 0,125 vc 93 n 5.900 fz 0,055 vf 1.298 | ae 0,6 ap 0,15 vc 100 n 5.300 fz 0,07 vf 1.484 | ae 0,8 ap 0,2 vc 96 n 3.800 fz 0,12 vf 1.824 | ae 1 ap 0,25 vc 107 n 3.400 fz 0,15 vf 2.040 | ae 1,2 ap 0,3 vc 121 n 3.200 fz 0,19 vf 2.432 |
| | 1.4000-1.4001 1.4002-1.4005 1.4006-1.4008 1.4016-1.4021 1.4028-1.4031 1.4034-1.4125 1.4313-1.4460 1.4462-1.4510 1.4511-1.4512 1.4521 Rostfrei-austenitisch, ferritisch, martensitisch / Stainless steel- austenitic, ferritic, martensitic | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 0,05 vc 91 n 14.400 fz 0,045 vf 2.592 | ae 0,3 ap 0,075 vc 87 n 9.200 fz 0,08 vf 2.944 | ae 0,4 ap 0,1 vc 91 n 7.200 fz 0,1 vf 2.880 | ae 0,5 ap 0,125 vc 94 n 6.000 fz 0,055 vf 1.320 | ae 0,6 ap 0,15 vc 102 n 5.400 fz 0,07 vf 1.512 | ae 0,8 ap 0,2 vc 97 n 3.850 fz 0,12 vf 1.848 | ae 1 ap 0,25 vc 110 n 3.500 fz 0,15 vf 2.100 | ae 1,2 ap 0,3 vc 121 n 3.200 fz 0,19 vf 2.432 |
| 2.3 | 1.4558-1.4563 1.4854-1.4958 1.4977-1.4980 1.4563-1.4876 1.4958-1.4980 Chrom-Nickel- Legierung, hochfest > 1250 N/mm ² / Chrome-Nickel high strength alloy > 1250 N/mm ² | ae mm ap mm Vc m/min. n min ⁻¹ fz mm Vf mm/min. | ae 0,2 ap 0,05 vc 60 n 9.500 fz 0,045 vf 1.710 | ae 0,3 ap 0,075 vc 58 n 6.100 fz 0,08 vf 1.952 | ae 0,4 ap 0,1 vc 60 n 4.800 fz 0,1 vf 1.920 | ae 0,5 ap 0,125 vc 63 n 4.000 fz 0,055 vf 880 | ae 0,6 ap 0,15 vc 66 n 3.500 fz 0,07 vf 980 | ae 0,8 ap 0,2 vc 63 n 2.500 fz 0,12 vf 1.200 | ae 1 ap 0,25 vc 72 n 2.300 fz 0,15 vf 1.380 | ae 1,2 ap 0,3 vc 83 n 2.200 fz 0,19 vf 1.672 |
| 2.4 | | | | | | | | | | |



30 7431

Nutfräsen

30 7432

Slot milling

Empfohlene Richtwerte zu Vollhartmetallfräsern für exotisches Material

Recommended cutting data for solid carbide mills for exotic materials

| Werkstoffgruppe Material group | Werkstoff Material | | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 |
|-----------------------------------|--|-----------|-------|-------|-------|-------|------|-------|-------|------|------|
| 1.5 | X36CrMo17 1.2316 < 1.000 N/mm ² | Vc m/min. | 70 | 70 | 70 | 75 | 75 | 75 | 80 | 80 | 80 |
| | | fz mm | 0,01 | 0,01 | 0,01 | 0,015 | 0,02 | 0,025 | 0,035 | 0,05 | 0,06 |
| | | ae mm | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 | 25 |
| | | ap mm | 3 | 5 | 9 | 12 | 15 | 18 | 24 | 30 | 30 |
| 1.6 | S6-5-2 1.3343 < 1.400 N/mm ² | Vc m/min. | 90 | 90 | 90 | 90 | 92 | 95 | 100 | 100 | 100 |
| | | fz mm | 0,01 | 0,01 | 0,02 | 0,025 | 0,03 | 0,04 | 0,07 | 0,09 | 0,1 |
| | | ae mm | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 | 25 |
| | | ap mm | 3 | 5 | 5 | 6 | 8 | 9 | 12 | 15 | 15 |
| 2.3 | X6Cr13 1.4000 < 700 N/mm ² | Vc m/min. | 50 | 50 | 50 | 53 | 55 | 55 | 55 | 55 | 55 |
| | | fz mm | 0,015 | 0,015 | 0,015 | 0,02 | 0,03 | 0,04 | 0,03 | 0,04 | 0,05 |
| | | ae mm | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 | 25 |
| | | ap mm | 2 | 3 | 5 | 6 | 8 | 9 | 24 | 30 | 30 |
| 2.3 | X38Cr13 1.4031 < 700 N/mm ² | Vc m/min. | 50 | 50 | 50 | 53 | 55 | 55 | 55 | 55 | 55 |
| | | fz mm | 0,01 | 0,01 | 0,015 | 0,02 | 0,03 | 0,04 | 0,03 | 0,04 | 0,05 |
| | | ae mm | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 | 25 |
| | | ap mm | 3 | 5 | 5 | 6 | 8 | 9 | 24 | 30 | 30 |

| Werkstoffgruppe Material group | Werkstoff Material | | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 |
|-----------------------------------|--|-----------|------|------|------|-------|------|-------|------|-------|------|
| 2.2 | X2CrNiMo17.13.2 1.4404 < 1.100 N/mm ² | Vc m/min. | 60 | 60 | 55 | 60 | 60 | 60 | 60 | 60 | 70 |
| | | fz mm | 0,01 | 0,01 | 0,01 | 0,02 | 0,02 | 0,025 | 0,03 | 0,04 | 0,05 |
| | | ae mm | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 | 25 |
| | | ap mm | 2 | 5 | 4 | 4 | 8 | 9 | 12 | 30 | 30 |
| 5.3 | Monel 400 Inconel 718 2.4668 | Vc m/min. | 25 | 25 | 25 | 26 | 28 | 28 | 29 | 29 | 30 |
| | | fz mm | 0,02 | 0,02 | 0,01 | 0,015 | 0,02 | 0,025 | 0,04 | 0,045 | 0,05 |
| | | ae mm | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 | 25 |
| | | ap mm | 2 | 5 | 9 | 12 | 15 | 18 | 24 | 30 | 30 |
| 4.1 | Ti 3.7024 < 800 N/mm ² | Vc m/min. | 120 | 115 | 100 | 100 | 110 | 120 | 120 | 115 | 120 |
| | | fz mm | 0,03 | 0,02 | 0,03 | 0,03 | 0,04 | 0,05 | 0,04 | 0,05 | 0,05 |
| | | ae mm | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 | 25 |
| | | ap mm | 2 | 5 | 5 | 6 | 8 | 9 | 24 | 30 | 30 |
| 4.3 | TiAl6V4 9.7164 < 1.200 N/mm ² | Vc m/min. | 40 | 40 | 40 | 45 | 45 | 45 | 45 | 45 | 45 |
| | | fz mm | 0,02 | 0,01 | 0,01 | 0,015 | 0,03 | 0,03 | 0,04 | 0,05 | 0,05 |
| | | ae mm | 4 | 5 | 6 | 8 | 10 | 12 | 16 | 20 | 25 |
| | | ap mm | 2 | 5 | 9 | 10 | 10 | 12 | 16 | 20 | 30 |

30 7431

Umfangfräsen

30 7432

Side milling

| Werkstoffgruppe Material group | Werkstoff Material | | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 |
|-----------------------------------|--|-----------|------|------|------|------|------|------|------|------|------|
| 1.5 | X36CrMo17 1.2316 < 1.000 N/mm ² | Vc m/min. | 100 | 110 | 130 | 130 | 130 | 140 | 140 | 140 | 140 |
| | | fz mm | 0,03 | 0,03 | 0,03 | 0,06 | 0,07 | 0,08 | 0,1 | 0,11 | 0,11 |
| | | ae mm | 0,4 | 0,5 | 0,6 | 0,8 | 1 | 1,2 | 1,6 | 2 | 2,5 |
| | | ap mm | 8 | 10 | 12 | 16 | 20 | 24 | 32 | 40 | 40 |
| 1.6 | S6-5-2 1.3343 < 1.400 N/mm ² | Vc m/min. | 120 | 140 | 150 | 150 | 155 | 155 | 165 | 175 | 175 |
| | | fz mm | 0,04 | 0,04 | 0,04 | 0,08 | 0,1 | 0,11 | 0,13 | 0,14 | 0,16 |
| | | ae mm | 0,4 | 0,5 | 0,6 | 0,8 | 1 | 1,2 | 1,6 | 2 | 2,5 |
| | | ap mm | 8 | 10 | 12 | 16 | 20 | 24 | 32 | 40 | 40 |
| 2.3 | X6Cr13 1.4000 < 700 N/mm ² | Vc m/min. | 80 | 85 | 90 | 90 | 90 | 90 | 100 | 100 | 100 |
| | | fz mm | 0,03 | 0,03 | 0,03 | 0,05 | 0,06 | 0,07 | 0,1 | 0,11 | 0,12 |
| | | ae mm | 0,4 | 0,5 | 0,6 | 0,8 | 1 | 1,2 | 1,6 | 2 | 2,5 |
| | | ap mm | 8 | 10 | 12 | 16 | 20 | 24 | 32 | 40 | 40 |
| 2.3 | X38Cr13 1.4031 < 700 N/mm ² | Vc m/min. | 80 | 85 | 95 | 95 | 95 | 95 | 100 | 100 | 100 |
| | | fz mm | 0,03 | 0,03 | 0,03 | 0,05 | 0,06 | 0,07 | 0,1 | 0,11 | 0,12 |
| | | ae mm | 0,4 | 0,5 | 0,6 | 0,8 | 1 | 1,2 | 1,6 | 2 | 2,5 |
| | | ap mm | 8 | 10 | 12 | 16 | 20 | 24 | 32 | 40 | 40 |

| Werkstoffgruppe Material group | Werkstoff Material | | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 | Ø 25 |
|-----------------------------------|--|-----------|-------|------|------|------|------|------|------|------|------|
| 2.2 | X2CrNiMo17.13.2 1.4404 < 1.100 N/mm ² | Vc m/min. | 95 | 90 | 95 | 95 | 95 | 95 | 100 | 100 | 100 |
| | | fz mm | 0,045 | 0,03 | 0,03 | 0,05 | 0,06 | 0,07 | 0,1 | 0,11 | 0,12 |
| | | ae mm | 0,2 | 0,5 | 0,6 | 0,8 | 1 | 1,2 | 1,6 | 2 | 2,5 |
| | | ap mm | 8 | 10 | 12 | 16 | 20 | 24 | 32 | 40 | 40 |
| 5.3 | Monel 400 Inconel 718 2.4668 | Vc m/min. | 50 | 50 | 50 | 55 | 55 | 55 | 60 | 60 | 60 |
| | | fz mm | 0,03 | 0,03 | 0,03 | 0,05 | 0,06 | 0,07 | 0,1 | 0,11 | 0,12 |
| | | ae mm | 0,04 | 0,05 | 0,6 | 0,8 | 1 | 1,2 | 1,6 | 2 | 2,5 |
| | | ap mm | 8 | 10 | 12 | 16 | 20 | 24 | 32 | 40 | 40 |
| 4.1 | Ti 3.7024 < 800 N/mm ² | Vc m/min. | 100 | 100 | 120 | 130 | 130 | 130 | 140 | 140 | 145 |
| | | fz mm | 0,03 | 0,03 | 0,03 | 0,05 | 0,06 | 0,07 | 0,1 | 0,11 | 0,12 |
| | | ae mm | 0,4 | 0,5 | 0,6 | 0,8 | 1 | 1,2 | 1,6 | 2 | 2,5 |
| | | ap mm | 8 | 10 | 12 | 16 | 20 | 24 | 32 | 40 | 40 |
| 4.3 | TiAl6V4 9.7164 < 1.200 N/mm ² | Vc m/min. | 90 | 100 | 100 | 105 | 105 | 110 | 110 | 110 | 115 |
| | | fz mm | 0,04 | 0,04 | 0,03 | 0,05 | 0,06 | 0,07 | 0,09 | 0,11 | 0,12 |
| | | ae mm | 0,4 | 0,5 | 0,6 | 0,8 | 1 | 1,2 | 1,6 | 2 | 2,5 |
| | | ap mm | 8 | 10 | 12 | 16 | 20 | 24 | 32 | 40 | 40 |

TESTERGEBNISSE

HPC-Fräsen/Milling

10,0 Ø × 13 = 25 / Z=4 · Art. 30.7431

Material: 1.4305 – X8CrNiS18-9 – 750 N/mm²
Nutenfräsen/Slot milling
Vc = 120 m/min.
fz = 0,05 mm
U/min. = 3800 min⁻¹
ae = 10 mm
ap = 10 mm

HPC-Fräsen/Milling

10,0 Ø × 13 = 25 / Z=4 · Art. 30.7431

Material: 1.4305 X8CrNiS18-9 – 750 N/mm²
Umfangfräsen/Circumference milling
Vc = 120 m/min.
fz = 0,05 mm
ae = 15,0 mm
ap = 5,0 mm

HPC-Fräsen/Milling

10,0 Ø × 13 = 25 / Z=4 · Art. 30.7421

Material: 1.4571 – <700 N/mm²
Umfangfräsen/Circumference milling
Vc = 100 m/min.
fz = 0,04 mm
ae = 1,0 mm
ap = 15,0 mm

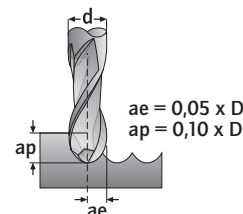
30 6217

Richtwerte für den Einsatz von Karnasch Vollhartmetall-Fräsern für HSC- Bearbeitung

Recommended cutting data for Karnasch solid carbide end mills high speed cutting

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit Strength N/mm ² | n/Vf | Ø 1,0 | Ø 2,0 | Ø 3,0 | Ø 4,0 | Ø 6,0 | Ø 8,0 | Ø 10,0 | Ø 12,0 |
|-----------------------------------|-----------------------------------|---|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| 9.1 | Al Mg 1 | < 250 | n/min ¹ | 65.000 | 58.000 | 50.000 | 45.000 | 36.000 | 28.000 | 24.000 | 21.000 |
| | | | mm/min | 1.000 | 2.400 | 4.000 | 4.000 | 4.200 | 4.100 | 4.000 | 3.800 |
| 9.2 | Al Mg Si 1 | < 350 | n/min ¹ | 62.000 | 54.000 | 48.000 | 47.000 | 34.000 | 25.000 | 21.000 | 20.000 |
| | | | mm/min | 1.200 | 2.200 | 3.000 | 3.800 | 4.100 | 4.000 | 4.000 | 3.500 |
| 9.3 - 9.4 - 9.5 | GDA Si 12 (Cu) G-Al Cu 4 Ti Mg | < 350 | n/min ¹ | 19.000 | 14.000 | 12.000 | 11.000 | 8.000 | 6.000 | 4.800 | 3.500 |
| | | | mm/min | 400 | 600 | 700 | 900 | 1.000 | 1.000 | 1.000 | 1.000 |
| 10.3 | E - Cu 58 | < 350 | n/min ¹ | 25.000 | 19.000 | 16.000 | 14.000 | 11.000 | 8.500 | 6.500 | 5.000 |
| | | | mm/min | 400 | 600 | 700 | 900 | 1.000 | 1.000 | 1.000 | 1.000 |

- Falls diese Drehzahlen nicht vorhanden sind, ist die maximal mögliche Drehzahl zu wählen und die Vorschübe anzupassen.
When using low speed machines, use the maximum speed and adjust the feed rate.
- Beim Trockenfräsen Vc und fz auf 70% der Schnittwerte reduzieren.
In dry milling (recommended air blow), reduce the rotation and feed to 70% to table values.
- Bei aufkommenden Vibrationen, Schnittwerte anpassen.
Adjust milling condition, when unusual vibration, different sound occur by cutting.
- Als Spannmittel empfehlen wir die Schrumpftechnik.
We recommend as a clamping device the shrinking technique.



Empfohlene Schnittdaten für DIAMANT-beschichtete Fräswerkzeuge / HSC-Bearbeitung
Recommended cutting data for diamond coated solid carbide end mills HSC

Schruppen
roughing

30 6560

| Werkstoff Material | HSK 40 – HSK 32 – SK 40 | | | | | | | |
|-----------------------|----------------------------|-----------|-----------------|------------------------|----------|----------|----------|---------------|
| | Schruppen roughing ▼ | d1 x l3 | Vc m/min | n min ⁻¹ | ap mm | ae mm | fz mm | Vf mm/min. |
| Graphit / Graphite | 6,0 x 30 | 480 - 600 | 25.500 - 32.000 | ≈ 6 | ≈ 4,0 | 0,09 | ≈ 11.000 | ≈ 28,0 |
| | | 400 - 500 | 21.000 - 26.000 | | ≈ 2,5 | | ≈ 6.500 | ≈ 9,0 |
| | 8,0 x 30 | 480 - 600 | 19.000 - 24.000 | ≈ 8 | ≈ 6,0 | 0,12 | ≈ 11.000 | ≈ 55,0 |
| | | 400 - 500 | 16.000 - 20.000 | | ≈ 3,5 | | ≈ 6.500 | ≈ 20,0 |
| | | 300 - 400 | 12.000 - 18.000 | | ≈ 2,0 | | ≈ 4.300 | ≈ 7,0 |
| | 10,0 x 30 | 480 - 600 | 15.000 - 19.000 | ≈ 10 | ≈ 8,0 | 0,15 | ≈ 11.500 | ≈ 91,0 |
| | | 450 - 550 | 14.000 - 17.000 | | ≈ 7,5 | | ≈ 8.000 | ≈ 66,0 |
| | | 400 - 500 | 13.000 - 16.000 | | ≈ 5,0 | | ≈ 6.800 | ≈ 32,0 |
| | 12,0 x 45 | 450 - 550 | 12.000 - 14.000 | ≈ 12 | ≈ 10,0 | 0,18 | ≈ 10.000 | ≈ 120,0 |
| | | 400 - 500 | 10.500 - 13.000 | | ≈ 6,0 | | ≈ 7.500 | ≈ 54,0 |

Empfohlene Schnittdaten für DIAMANT-beschichtete Fräswerkzeuge / HSC-Bearbeitung
Recommended cutting data for diamond coated solid carbide end mills HSC

Schlichten
finishing
▼▼▼

30 6560

| Werkstoff Material | HSK 40 – HSK 32 – SK 40 | | | | | | | |
|-----------------------|--------------------------------|-----------|-----------------|------------------------|-----------|----------|----------|---------------|
| | Schlichten finishing ▼▼▼ | d1 x l3 | Vc m/min | n min ⁻¹ | ap mm | ae mm | fz mm | Vf mm/min. |
| Graphit / Graphite | 6,0 x 30 | 560 - 700 | 29.000 - 37.000 | ≈ 6 | 0,3 - 0,9 | 0,09 | ≈ 13.000 | |
| | | 470 - 600 | 25.000 - 31.000 | | 0,3 - 0,9 | | ≈ 11.000 | |
| | 8,0 x 30 | 560 - 700 | 22.000 - 28.000 | ≈ 8 | 0,4 ≈ 1,2 | 0,12 | ≈ 13.000 | |
| | | 470 - 600 | 19.000 - 23.500 | | 0,4 ≈ 1,2 | | ≈ 11.000 | |
| | | 400 - 500 | 15.500 - 19.500 | | 0,4 ≈ 1,2 | | ≈ 9.500 | |
| | 10,0 x 30 | 560 - 700 | 18.000 - 22.000 | ≈ 10 | 0,4 ≈ 1,5 | 0,15 | ≈ 13.000 | |
| | | 500 - 600 | 15.700 - 19.000 | | 0,4 ≈ 1,5 | | ≈ 11.500 | |
| | | 480 - 600 | 15.000 - 19.000 | | 0,4 ≈ 1,5 | | ≈ 11.000 | |
| | 12,0 x 45 | 500 - 600 | 13.000 - 15.500 | ≈ 12 | 0,4 ≈ 1,8 | 0,18 | ≈ 11.000 | |
| | | 480 - 550 | 12.500 - 14.300 | | 0,4 ≈ 1,8 | | ≈ 10.000 | |

Empfohlene Schnittdaten für DIAMANT-beschichtete Fräswerkzeuge / HSC-Bearbeitung
Recommended cutting data for diamond coated solid carbide end mills HSC

Schruppen
roughing
▼

30 6560

| Werkstoff Material | HSK 63 – HSK 50 – SK 40 | | | | | | | | |
|-----------------------|----------------------------|-----------|----------------|------------------------|----------|----------|----------|---------------|--|
| | Schruppen roughing ▼ | d1 x l3 | Vc m/min | n min ⁻¹ | ap mm | ae mm | fz mm | Vf mm/min. | Q cm ³ / min. ¹ |
| Graphit / Graphite | 6,0 x 30 | 150 - 190 | 8.000 - 10.000 | ≈ 3,0 | ≈ 4,0 | 0,09 | ≈ 3.500 | ≈ 42,0 | |
| | | 130 - 160 | 6.500 - 8.500 | | ≈ 1,6 | | ≈ 2,5 | ≈ 2.100 | ≈ 9,0 |
| | 8,0 x 30 | 150 - 190 | 6.000 - 7.500 | ≈ 4,0 | ≈ 6,0 | 0,12 | ≈ 3.600 | ≈ 87,0 | |
| | | 130 - 160 | 5.000 - 6.500 | | ≈ 2,2 | | ≈ 3,5 | ≈ 2.100 | ≈ 18,0 |
| | | 110 - 130 | 4.100 - 5.100 | | ≈ 1,5 | | ≈ 2,5 | ≈ 1.020 | ≈ 6,0 |
| | 10,0 x 30 | 150 - 190 | 4.800 - 6.000 | ≈ 5,0 | ≈ 8,0 | 0,15 | ≈ 3.600 | ≈ 144,0 | |
| | | 130 - 170 | 4.400 - 5.500 | | ≈ 4,0 | | ≈ 6,0 | ≈ 2.800 | ≈ 70,0 |
| | | 120 - 160 | 4.100 - 5.100 | | ≈ 3,0 | | ≈ 4,5 | ≈ 2.100 | ≈ 30,0 |
| | 12,0 x 45 | 140 - 180 | 3.600 - 4.700 | ≈ 6,0 | ≈ 9,0 | 0,20 | ≈ 3.800 | ≈ 152,0 | |
| | | 110 - 130 | 2.800 - 3.400 | | ≈ 4,0 | | ≈ 6,0 | ≈ 2.000 | ≈ 82,0 |

Empfohlene Schnittdaten für DIAMANT-beschichtete Fräswerkzeuge / HSC-Bearbeitung
Recommended cutting data for diamond coated solid carbide end mills HSC

Schlichten
finishing
▼▼▼

30 6560

| Werkstoff Material | HSK 63 – HSK 50 – SK 40 | | | | | | | | |
|-----------------------|--------------------------------|------------------------------------|--------------------------|------------------------|-------------|----------|-------------|---------------|--|
| | Schlichten finishing ▼▼▼ | Schlichten Finishing d1 x l3 | Vc m/min ¹ | n min ⁻¹ | ap mm | ae mm | fz mm | Vf mm/min. | Q cm ³ / min. ¹ |
| Graphit / Graphite | 6,0 x 30 | 150 - 190 | 8.000 - 10.000 | ≈ 3,0 | 0,3 - 0,9 | 0,08 | ≈ 4.000 | | |
| | | 130 - 160 | 6.800 - 8.500 | | ≈ 1,6 | | 0,3 - 0,9 | ≈ 2.700 | |
| | 8,0 x 30 | 150 - 190 | 6.000 - 7.500 | ≈ 4,0 | 0,4 - 1,2 | 0,12 | ≈ 3.600 | | |
| | | 130 - 160 | 5.000 - 6.500 | | ≈ 2,2 | | 0,4 - 1,2 | ≈ 3.100 | |
| | | 110 - 130 | 4.100 - 5.100 | | ≈ 1,5 | | 0,4 - 1,2 | ≈ 2.400 | |
| | 10,0 x 30 | 150 - 190 | 4.800 - 6.000 | ≈ 5,0 | ≈ 0,5 - 1,5 | 0,15 | ≈ 3.600 | | |
| | | 130 - 170 | 4.400 - 5.500 | | ≈ 4,0 | | ≈ 0,5 - 1,5 | ≈ 3.300 | |
| | | 120 - 160 | 4.100 - 5.100 | | ≈ 3,0 | | ≈ 0,5 - 1,5 | ≈ 3.000 | |
| | 12,0 x 45 | 140 - 180 | 3.600 - 4.700 | ≈ 6,0 | ≈ 0,6 - 1,8 | 0,18 | ≈ 3.400 | | |
| | | 110 - 130 | 2.800 - 3.400 | | ≈ 4,0 | | ≈ 0,6 - 1,8 | ≈ 2.400 | |

1



2



3



4



5



6



7



8



9



Index

30 6432

Empfohlene Richtwerte für HPC-Schruppen Extrem Rapid Cutter Stahl -GG-GGG-GTW-GTS Recommended cutting data for HPC-roughing extreme rapid cutter steel -GG-GGG-GTW-GTS

| Werkstoff Material | | | Ø 3 | Ø 4 | Ø 5 | Ø 6 | Ø 8 | Ø 10 | Ø 12 | Ø 16 | Ø 20 |
|-----------------------|------------------|---------------------|--------|--------|--------|--------|-------|-------|-------|-------|-------|
| 1.1 / 1.2 | < 800 N/mm² | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 20,0 |
| | | ap mm | 1,5 | 2,0 | 2,5 | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 |
| | | Vc m/min. | 180 | 190 | 210 | 210 | 210 | 210 | 215 | 225 | 230 |
| | | n min ⁻¹ | 9.500 | 15.000 | 13.500 | 11.000 | 8.300 | 6.700 | 5.700 | 4.500 | 3.600 |
| | | fz mm | 0,016 | 0,021 | 0,025 | 0,022 | 0,042 | 0,055 | 0,065 | 0,082 | 0,10 |
| | | Vf m/min. | 1.260 | 1.60 | 1.000 | 960 | 1.400 | 1.500 | 1.450 | 1.500 | 1.480 |
| 1.3 | < 1.100 N/mm² | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 20,0 |
| | | ap mm | 1,5 | 2,0 | 2,5 | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 |
| | | Vc m/min. | 175 | 185 | 190 | 200 | 200 | 205 | 205 | 220 | 200 |
| | | n min ⁻¹ | 8.800 | 14.500 | 12.200 | 10.500 | 8.000 | 6.500 | 5.500 | 4.300 | 3.200 |
| | | fz mm | 0,011 | 0,016 | 0,023 | 0,022 | 0,042 | 0,054 | 0,064 | 0,083 | 0,10 |
| | | Vf m/min. | 830 | 930 | 830 | 900 | 1.350 | 1.400 | 1.400 | 1.440 | 1.300 |
| 1.4 | < 1.300 N/mm² | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 20,0 |
| | | ap mm | 1,5 | 2,0 | 2,5 | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 |
| | | Vc m/min. | 135 | 157 | 160 | 170 | 170 | 175 | 175 | 185 | 190 |
| | | n min ⁻¹ | 14.500 | 12.500 | 10.300 | 9.000 | 6.800 | 5.600 | 4.700 | 3.700 | 3.000 |
| | | fz mm | 0,011 | 0,015 | 0,023 | 0,022 | 0,042 | 0,054 | 0,064 | 0,083 | 0,100 |
| | | Vf m/min. | 630 | 750 | 940 | 790 | 1.160 | 1.200 | 1.190 | 1.200 | 1.200 |
| 7.1 GG | < 325 N/mm² | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 20,0 |
| | | ap mm | 1,5 | 2,0 | 2,5 | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 |
| | | Vc m/min. | 140 | 150 | 160 | 160 | 160 | 165 | 165 | 175 | 175 |
| | | n min ⁻¹ | 15.000 | 11.500 | 10.400 | 8.400 | 6.400 | 5.200 | 4.400 | 3.500 | 2.800 |
| | | fz mm | 0,013 | 0,019 | 0,025 | 0,022 | 0,042 | 0,054 | 0,064 | 0,080 | 0,100 |
| | | Vf m/min. | 780 | 870 | 1.040 | 740 | 1.050 | 1.130 | 1.100 | 1.100 | 1.140 |
| 7.3 GGG | < 700 N/mm² | ae mm | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 | 12,0 | 16,0 | 20,0 |
| | | ap mm | 1,5 | 2,0 | 2,5 | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10,0 |
| | | Vc m/min. | 140 | 150 | 150 | 160 | 160 | 165 | 165 | 175 | 175 |
| | | n min ⁻¹ | 15.000 | 11.700 | 9.600 | 8.400 | 6.400 | 5.200 | 4.400 | 3.500 | 2.800 |
| | | fz mm | 0,011 | 0,015 | 0,017 | 0,022 | 0,042 | 0,054 | 0,064 | 0,080 | 0,100 |
| | | Vf m/min. | 660 | 700 | 650 | 740 | 1.100 | 1.100 | 1.110 | 1.150 | 1.140 |

ap = 100%
Beispiel/Example: Ø 20,0 x 55 (ap = 55 mm - ae = 5,0 mm)

Die Vorschubwerte Vf lassen sich bei optimalen Voraussetzungen um 50% erhöhen.
(Stabile Maschine, Vibrationsfreie Werkzeug und Materialspannung, Kühlmittel)

The feed rate Vf can be increased by 50% under optimale conditions.
(Stabil machines, vibration-free tool and material clamping, coolant)

30 6572

30 6574

Empfohlene Schnittdaten für DIAMANT-beschichtete Schrappfräser / HSC-Bearbeitung Recommended cutting data for diamond coated solid carbide end mills HSC

30 6573

| Werkstoff Material | Schruppen Roughing d1 x l2 | Z | Vc m/min. | 1 | | 2 | | n min ⁻¹ | Vf mm/min. | fz mm |
|-----------------------|----------------------------------|-----|--------------|----------|----------|----------|-------|------------------------|---------------|----------|
| | | | | ap=100% | ae | ap=50% | ae | | | |
| Graphit / Graphite | 3,0 x 10 | 3 | 400 | 0,5 x D | | 1,0 x D | | 42.000 | 9.000 | 0,07 |
| | 3,0 x 20 | 3 | 350 | 0,25 x D | | 0,5 x D | | 37.000 | 7.800 | 0,07 |
| | 3,0 x 30 | 3 | 300 | 0,15 x D | | 0,25 x D | | 32.000 | 6.700 | 0,07 |
| | 3,0 x 35 | 3 | 250 | 0,10 x D | | 0,15 x D | | 27.000 | 5.600 | 0,07 |
| | 4,0 x 10 | 3 | 400 | 0,5 x D | | 1,0 x D | | 32.000 | 7.500 | 0,08 |
| | 4,0 x 20 | 3 | 350 | 0,25 x D | | 0,5 x D | | 28.000 | 6.700 | 0,08 |
| | 4,0 x 30 | 3 | 300 | 0,15 x D | | 0,25 x D | | 24.000 | 5.800 | 0,08 |
| | 4,0 x 40 | 3 | 250 | 0,10 x D | | 0,15 x D | | 20.000 | 4.800 | 0,08 |
| | 5,0 x 20 | 3 | 350 | 0,5 x D | | 1,0 x D | | 22.000 | 6.600 | 0,10 |
| | 5,0 x 30 | 3 | 300 | 0,25 x D | | 0,5 x D | | 19.000 | 5.700 | 0,10 |
| | 5,0 x 40 | 3 | 250 | 0,15 x D | | 0,25 x D | | 16.000 | 4.800 | 0,10 |
| | 6,0 x 30 | 3 | 300 | 0,5 x D | | 1,0 x D | | 16.000 | 5.700 | 0,12 |
| | 6,0 x 40 | 3 | 250 | 0,25 x D | | 0,5 x D | | 13.500 | 4.800 | 0,12 |
| | 8,0 x 30 | 3 | 300 | 0,5 x D | | 1,0 x D | | 12.000 | 4.700 | 0,13 |
| | 8,0 x 40 | 3 | 250 | 0,25 x D | | 0,5 x D | | 10.000 | 4.000 | 0,13 |
| | 10,0 x 20 | 4 | 300 | 0,75 x D | | 1,0 x D | | 9.500 | 6.100 | 0,16 |
| | 10,0 x 30 | 4 | 250 | 0,25 x D | | 0,5 x D | | 8.000 | 5.100 | 0,16 |
| | 10,0 x 60 | 4 | 220 | 0,15 x D | | 0,25 x D | | 7.000 | 4.500 | 0,16 |
| | 12,0 x 45 | 4 | 250 | 0,25 x D | | 0,5 x D | | 6.700 | 5.800 | 0,22 |
| | 12,0 x 75 | 4 | 200 | 0,15 x D | | 0,25 x D | | 5.400 | 4.700 | 0,22 |
| 16,0 x 45 | 4 | 250 | 0,25 x D | | 0,5 x D | | 5.000 | 4.800 | 0,24 | |
| 16,0 x 75 | 4 | 200 | 0,15 x D | | 0,25 x D | | 4.000 | 3.800 | 0,24 | |
| 20,0 x 55 | 4 | 250 | 0,25 x D | | 0,5 x D | | 4.000 | 4.000 | 0,25 | |
| 20,0 x 75 | 4 | 220 | 0,10 x D | | 0,15 x D | | 3.500 | 3.500 | 0,25 | |
| 20,0 x 110 | 4 | 200 | 0,05 x D | | 0,75 x D | | 3.200 | 3.200 | 0,25 | |

1 ap = 100%
Beispiel/Example: Ø 20,0 x 55 (ap = 55 mm - ae = 5,0 mm)

2 ap = 50%
Beispiel/Example: Ø 20,0 x 55 (ap = 28 mm - ae = 10,0 mm)

Empfohlene Schnittdaten für High-Performance Schafffräser
Recommended cutting data for solid carbide high-performance end mills

TITAN

Nutfräsen
Slot milling

30 7428

| Werkstoffgruppe Material group | Werkstoff/Material | | Ø 6 r=0,1-0,5-1,0 | Ø 8 r=0,2-0,5-1,0 | Ø 10 r=0,2-0,5-1,0 | Ø 12 r=0,2-0,5-1,0 | Ø 16 r=0,5-1,0-2,0 | Ø 20 r=0,5-1,0-2,0 |
|-----------------------------------|---|---------------------|----------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 4.1 | 3.7024 - 3.7034 3.7064 - 3.7065 3.7025 - 3.7035 3.7055 Grade1 - Grade2 Grade3 - Grade4 | ae mm | ae 6 | ae 8 | ae 10 | ae 12 | ae 16 | ae 20 |
| | | ap mm | ap 6 | ap 8 | ap 10 | ap 12 | ap 16 | ap 20 |
| | | Vc m/min. | Vc 150 | Vc 150 | Vc 165 | Vc 165 | Vc 150 | Vc 150 |
| | | n min ⁻¹ | n 7.960 | n 5.970 | n 5.260 | n 5.260 | n 3.000 | n 2.400 |
| | | fz mm | fz 0,02 | fz 0,03 | fz 0,04 | fz 0,04 | fz 0,07 | fz 0,08 |
| | | Vf mm/min. | Vf 637 | Vf 716 | Vf 842 | Vf 842 | Vf 840 | Vf 768 |
| 4.2 | 3.7105 - 3.7115 3.7124 - 3.7184 Grade12 | ae mm | ae 6 | ae 8 | ae 10 | ae 12 | ae 16 | ae 20 |
| | | ap mm | ap 6 | ap 8 | ap 10 | ap 12 | ap 16 | ap 20 |
| | | Vc m/min. | Vc 60 | Vc 60 | Vc 60 | Vc 60 | Vc 70 | Vc 70 |
| | | n min ⁻¹ | n 3.180 | n 2.390 | n 1.900 | n 1.600 | n 1.400 | n 1.120 |
| | | fz mm | fz 0,03 | fz 0,04 | fz 0,045 | fz 0,05 | fz 0,06 | fz 0,07 |
| | | Vf mm/min. | Vf 382 | Vf 382 | Vf 342 | Vf 320 | Vf 336 | Vf 314 |
| 4.3 | 3.7154 - 3.7164 3.7165 - 3.7174 Grade5 | ae mm | ae 6 | ae 8 | ae 10 | ae 12 | ae 16 | ae 20 |
| | | ap mm | ap 6 | ap 8 | ap 10 | ap 12 | ap 16 | ap 20 |
| | | Vc m/min. | Vc 50 | Vc 50 | Vc 50 | Vc 50 | Vc 55 | Vc 55 |
| | | n min ⁻¹ | n 2.660 | n 1.990 | n 1.600 | n 1.330 | n 1.100 | n 880 |
| | | fz mm | fz 0,025 | fz 0,025 | fz 0,04 | fz 0,06 | fz 0,06 | fz 0,06 |
| | | Vf mm/min. | Vf 266 | Vf 199 | Vf 256 | Vf 319 | Vf 264 | Vf 211 |

Empfohlene Schnittdaten für High-Performance Schafffräser
Recommended cutting data for solid carbide high-performance end mills

TITAN

Umfangfräsen
Side milling

30 7428

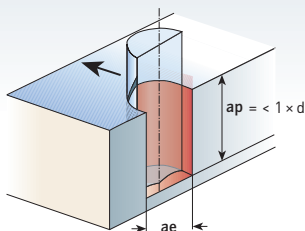
| Werkstoffgruppe Material group | Werkstoff/Material | | Ø 6 r=0,1-0,5-1,0 | Ø 8 r=0,2-0,5-1,0 | Ø 10 r=0,2-0,5-1,0 | Ø 12 r=0,2-0,5-1,0 | Ø 16 r=0,5-1,0-2,0 | Ø 20 r=0,5-1,0-2,0 |
|-----------------------------------|---|---------------------|----------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 4.1 | 3.7024 - 3.7034 3.7064 - 3.7065 3.7025 - 3.7035 3.7055 Grade1 - Grade2 Grade3 - Grade4 | ae mm | ae 0,6 | ae 0,8 | ae 1,0 | ae 1,2 | ae 1,6 | ae 2,0 |
| | | ap mm | ap 9 | ap 12 | ap 15 | ap 18 | ap 24 | ap 30 |
| | | Vc m/min. | Vc 310 | Vc 320 | Vc 330 | Vc 330 | Vc 350 | Vc 350 |
| | | n min ⁻¹ | n 16.500 | n 12.800 | n 10.500 | n 8.800 | n 7.000 | n 5.600 |
| | | fz mm | fz 0,05 | fz 0,1 | fz 0,12 | fz 0,13 | fz 0,15 | fz 0,16 |
| | | Vf mm/min. | Vf 3.300 | Vf 5.120 | Vf 5.040 | Vf 4.576 | Vf 4.200 | Vf 3.584 |
| 4.2 | 3.7105 - 3.7115 3.7124 - 3.7184 Grade12 | ae mm | ae 0,6 | ae 0,8 | ae 1,0 | ae 1,2 | ae 1,6 | ae 2,0 |
| | | ap mm | ap 9 | ap 12 | ap 15 | ap 18 | ap 24 | ap 30 |
| | | Vc m/min. | Vc 140 | Vc 145 | Vc 150 | Vc 150 | Vc 155 | Vc 160 |
| | | n min ⁻¹ | n 7.430 | n 5.770 | n 4.780 | n 3.980 | n 3.090 | n 2.550 |
| | | fz mm | fz 0,05 | fz 0,06 | fz 0,075 | fz 0,09 | fz 0,11 | fz 0,13 |
| | | Vf mm/min. | Vf 1.486 | Vf 1.385 | Vf 1.434 | Vf 1.433 | Vf 1.360 | Vf 1.326 |
| 4.3 | 3.7154 - 3.7164 3.7165 - 3.7174 Grade5 | ae mm | ae 0,6 | ae 0,8 | ae 1,0 | ae 1,2 | ae 1,6 | ae 2,0 |
| | | ap mm | ap 9 | ap 12 | ap 15 | ap 18 | ap 24 | ap 30 |
| | | Vc m/min. | Vc 110 | Vc 110 | Vc 115 | Vc 115 | Vc 120 | Vc 120 |
| | | n min ⁻¹ | n 5.840 | n 4.380 | n 3.660 | n 3.050 | n 2.390 | n 1.910 |
| | | fz mm | fz 0,04 | fz 0,06 | fz 0,07 | fz 0,09 | fz 0,11 | fz 0,13 |
| | | Vf mm/min. | Vf 934 | Vf 1.051 | Vf 1.025 | Vf 1.098 | Vf 1.052 | Vf 993 |



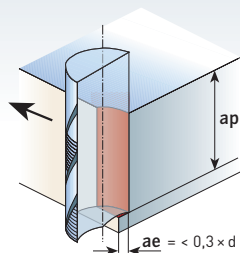
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Empfohlene Schnittdaten für VHM • Alu-Highspeed • Fräser HSC
Recommended cutting data for solid carbide • alu-highspeed • end mills HSC

Nuten/Schruppen
Slot milling/Roughing



Umfangfräsen/Schlichten
Circumference milling/Finishing



Die Schnittwerte gelten für:
 $ap = 1 \times D$ $ae = 0,3 \times D$
 Bei anderen Spanungsquerschnitten
 Schnittwerte entsprechend anpassen.
 Bei extra langer Ausführung sind die
 Schnittwerte um 50 % zu reduzieren

Cutting data refers to:
 $ap = 1 \times D$ $ae = 0,3 \times D$
 For different cutting volumes, adjust
 cutting data correspondingly.
 For extra long design reduce cutting
 data by approximately 50 %.

| Werkstoffgruppe Material group | Werkstoff / Material | Vc Schnittgeschwindigkeit · m/min. Cutting speed | Fräserdurchmesser/Dimension D in mm | | | | | | | |
|-----------------------------------|---|---|--|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | | | 1-2 | 3-4 | 5-6 | 8 | 10 | 12 | 16 | 20 |
| | | | Vorschub pro Zahn/Feed per tooth fz mm | | | | | | | |
| 9.1 9.2 | Aluminium/aluminum – Knetlegierung nicht gehärtet – Magnesium Knetlegierung | 500 - 2000 | 0,01 -0,04 | 0,03 -0,05 | 0,04 -0,08 | 0,06 -0,12 | 0,07 -0,15 | 0,08 -0,18 | 0,10 -0,20 | 0,12 -0,25 |
| | – wrought alloy, unhardened – magnesium wrought alloy | | | | | | | | | |
| 9.1 9.2 | Aluminium/aluminum – Knetlegierung ausgehärtet – Gusslegierung bis 6% Si | 300 - 1000 | 0,01 -0,04 | 0,03 -0,05 | 0,04 -0,08 | 0,06 -0,12 | 0,07 -0,15 | 0,08 -0,18 | 0,10 -0,20 | 0,12 -0,25 |
| | – wrought alloy, hardend – casting alloy up to 6% Si | | | | | | | | | |
| 9.3 9.4 | Aluminium/aluminum – Gusslegierung über 6% Si | 200 - 600 | 0,005 -0,03 | 0,02 -0,04 | 0,03 -0,06 | 0,04 -0,08 | 0,05 -0,10 | 0,06 -0,12 | 0,08 -0,15 | 0,10 -0,20 |
| | – casting alloy over 6% Si | | | | | | | | | |
| 10.1 | Kupfer/chopper – unlegiert – Knetlegierung nicht ausgehärtet | 120 - 300 | 0,005 -0,03 | 0,02 -0,04 | 0,03 -0,06 | 0,04 -0,08 | 0,05 -0,10 | 0,06 -0,12 | 0,08 -0,15 | 0,10 -0,20 |
| | – Knetlegierung ausgehärtet – unalloyed – wrought alloy, unhardened – wrought alloy, hardend | | | | | | | | | |
| 10.2 10.3 | Messing/brass – Cu/Zn kurz- und langspanend – Bronze CuSn kurz- und langspanend | 100 - 600 | 0,005 -0,03 | 0,01 -0,04 | 0,02 -0,06 | 0,03 -0,08 | 0,05 -0,10 | 0,06 -0,15 | 0,08 -0,18 | 0,08 -0,20 |
| | – CuZn short- and long-chipping – bronze, CuSn short- and long-chipping Faserverstärkte Kunststoffe z.B. Kohlefaser fiber reinforced plastic e.g. carbon fibre | | | | | | | | | |
| 11.1 11.2 11.4 | Kunststoffe – Thermoplast, Duroplast | 160 - 500 | 0,005 -0,03 | 0,01 -0,04 | 0,02 -0,06 | 0,03 -0,08 | 0,05 -0,10 | 0,06 -0,12 | 0,08 -0,15 | 0,10 -0,20 |
| | plastics – thermoplastic, duroplastic | | | | | | | | | |

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Empfohlene Schnittdaten für Einzahnfräser
Recommended cutting data for one-tooth end mill

| Werkstoffgruppe Material group | | 0,1 - 2,0 | 3,0 - 6,0 | 8,0 - 12,0 |
|-----------------------------------|--------------------------------------|---------------|---------------|-------------|
| 9.1, 9.2, 10.2 | Aluminium, Messing / Aluminum, brass | 2.000 - 4.000 | 1.000 - 3.600 | 900 - 2.000 |
| 10.1 - 10.3 | Kupfer / Copper | 1.000 - 1.500 | 800 - 1.200 | 500 - 800 |

$$fz = 0,01 \times d1$$

Richtwerte für den Einsatz der KARNASCH VHM-Hochleistungsbohrer mit Innenkühlung ab Ø 0,8 – Ø 2,9
Recommended cutting data for solid carbide twist drill, with interior cooling supply

22 0322

Wir empfehlen eine Pilotbohrung bei überlangen Werkzeugen mit 18xD. Verwenden Sie für diese Pilotbohrung die Art.-Nr. 22 0321 ohne Innenkühlung. Alternativ Art.-Nr. 22 0322 mit Innenkühlung in den kürzesten lieferbaren Ausführung. Diese Pilotbohrer sind mit der Durchmessertoleranz m7 auf die überlangen Werkzeuge mit tol. h7 abgestimmt. Empfohlene Bohrtiefe der Pilotbohrung 3-5xD. Kühlmitteldruck 30-80 bar.

We recommended a pilot drilling for the excess length tools art.-no. 22 0322 - 18xD. Please use for the pilot drilling our art.-no. 22 0321 without interior cooling. Alternative art.-no. 22 0322 with interior cooling in the shortest l3 version. These pilot drills are, with the diameter tolerance m7, to the excess length tools with tolerance h7 coordinated. Recommended drilling depth of the pilot borehole 3-5xD. Coolant pressure 30-80 bar.

| | | | |
|-----|-----|------|------|
| KFv | 6xD | 12xD | 18xD |
| | 0,8 | 0,6 | 0,4 |

Die in den Schnittwerttabellen enthaltenen Richtwerte gelten nur beim Einsatz von Schrumpf- oder Hydrodehnspannfuttern.
The indicated cutting data in our guideline table are valid for use in shrinking or hydraulic expansion chuck.

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit / Strength Härte / Hardness | Schnittgeschwindigkeit Vc (m/min) / Cutting Speed Vc (m/min) | Vorschub pro Umdrehung (mm) bezogen auf Bohrerdurchmesserbereich / Feed per revolution (mm) based on drill diameter range | |
|-----------------------------------|--|--|---|--|--|
| | | | | 1,0 - 2,9 Ø | |
| 1.1 - 1.2 1.3 | St37, St42, C22, GS38 | <600 N/mm ² | 100-120 | 0,07 - 0,15 | |
| | St50, St60, C35, GS52 | <700 N/mm ² | 85-105 | 0,07 - 0,15 | |
| | St70, C45, GS62 | >700 N/mm ² | 75-90 | 0,05 - 0,12 | |
| 1.4 - 1.5 2.1 - 2.2 - 3.1 | 16MnCr45, 42CrMo4, 50CrNi13, C60 | <900 N/mm ² | 65-85 | 0,06 - 0,12 | |
| | 90 MnCrV8, 100Cr6 | <1000 N/mm ² | 50-70 | 0,05 - 0,12 | |
| | X210Cr12, 34 CrAlNi7 X12Cr Nis 18 8 X10CrNiNb 18 9 | >1000 N/mm ² | 40-60 35-60 35-60 | 0,05 - 0,12 0,04 - 0,08 0,04 - 0,08 | |
| 4.1 - 4.2 4.3 | GG 20, GGG40, GTS45 | <200 HB | 85-105 | 0,15 - 0,25 | |
| | GG30, GGG60, GTW40 | <250 HB | 75-90 | 0,15 - 0,25 | |
| | GG40, GGG70, GTS70 | >250 HB | 65-80 | 0,15 - 0,25 | |
| 8.4 | | 350-450 HB | 40-70 | 0,06 - 0,12 | |

Die angegebenen Richtwerte für die Schnittgeschwindigkeit Vc sind je nach Bohrtiefe bezogen auf den Durchmesser mit dem Korrekturfaktor KFv zu multiplizieren.
The indicated standard values for the cutting speed Vc depends on drilling depth related to the diameter to multiply by the correction factor KFv.

Richtwerte für den Einsatz der KARNASCH VHM-Hochleistungsbohrer mit Innenkühlung ab Ø 2,0 – Ø 2,95 24xD – 30xD
Recommended cutting data for solid carbide twist drill, with interior cooling supply

22 0322

Kühlschmierung

Um optimale Ergebnisse zu erzielen, empfehlen wir Hochleistungs-Schneidöl zu verwenden. Alternativ kann eine Emulsion mit EP-Zusätzen verwendet werden.

Cooling:

We recommend to use a high performance cutting oil to achieve a good performance. You can use as an alternative emulsions with EP-contens.

Filterqualität:

Eine sehr gute Filterqualität ist bei kleinen Durchmessern unerlässlich. Die Filter sollten die folgende Qualität haben:
Filter <0,01 mm für Bohrer <1 mm
Filter <0,02 mm für Bohrer >1 mm

Quality of the filtersystem:

A very good filtersystem is necessary by using such small diameter. The filter should have the following quality:
Filter <0,01 mm for drill Ø <1 mm
Filter >0,02 mm for drill Ø >1 mm

Entspänen:

In einigen Fällen ist ein entspänen notwendig. Dies ist abhängig vom Werkstoff. Als Richtlinie empfehlen wir:
bis 6xD Bohrtiefe: Kein entspänen
bis 10xD Bohrtiefe: 0 - 2 mal entspänen
bis 18xD Bohrtiefe: 0 - 4 mal entspänen
bis 24xD Bohrtiefe: 0 - 6 mal entspänen
bis 30xD Bohrtiefe: 0 - 8 mal entspänen

Zum entspänen sollte der Karnasch-Bohrer ganz aus der Bohrung gefahren werden.

| Werkstoffe Work Material | Werkstoffgruppe Material Group | Festigkeit in N/mm Strength in N/mm | Ø 2.00-2.95 | |
|--|-----------------------------------|---|--|--------------------------------------|
| | | | Schnittgeschwindigkeit / Cutting Speed (m/min) | Vorschub (mm/U) Feed (mm/rev) |
| Baustahl Mild Steel | 1.1 | ≤ 600 | 60 [50-70] | 0.10 [0.08-0.12] |
| Kohlenstoffstahl Legierter Stahl Carbon Steel Alloy Steel | 1.2-2.1-2.2 2.2-2.3-2.5-2.6 | 600-950 950-1.200 | 50 [40-60] 50 [40-60] | 0.09 [0.06-0.12] 0.07 [0.05-0.10] |
| Edelstahl Stainless Steel | 3.1 | 680 | 30 [20-40] | 0.06 [0.04-0.08] |
| Guss Cast Iron | 7.1-7.2 | ≤ 105 HB | 50 [40-60] | 0.09 [0.06-0.12] |
| Kugelgraphitguss Ductile Cast Iron | 7.4 | ≤ 133 HB | 50 [40-60] | 0.07 [0.05-0.10] |
| Wärmefeste Legierungen Heat Resistant Alloy | 31-32 | ≤ 280 HB | 15 [10-20] | 0.03 [0.01-0.05] |

Chip removal:

In some cases it is necessary to remove the chips. This depends to the material: We recommend as a guideline:
depth to 6xD: no peckings
depth to 10xD: 0 - 2 peckings
depth to 18xD: 0 - 4 peckings
depth to 24xD: 0 - 6 peckings
depth to 30xD: 0 - 8 peckings

The Karnasch drill should be withdrawn completely from the drill hole for pecking.

Praxistest Miniboherer Vollhartmetall mit Innenkühlung

Practical test for solid carbide micro drills with interior cooling supply

22 0322

12 x D Bohren ab 0,8 mm mit Innenkühlung ist nicht jedermann's Sache!

Als Vorreiter in Sachen HSC-Bohren mit Bohrtiefen über 5 x D haben wir uns in der Branche einen Namen gemacht. Weltweit haben wir bei unzähligen Kunden die Bearbeitungszeiten um bis zu 600% reduziert und gleichzeitig die Prozesssicherheit und Standzeit um ein vielfaches erhöhen können.

Das neueste Produkt sind MINI-Vollhartmetallbohrer ab 0,8 mm mit Innenkühlung mit einer Bohrtiefe von 18 x D. Der Wettbewerbsdruck unserer Kunden in der weltweit zunehmenden Globalisierung hat uns dazu bewegen diesen Schritt zu gehen. Diese HSC-Miniboherer mit Innenkühlung 6 x D und 12 x D können in den Abmessungen 1,0 mm bis 2,9 mm um 0,1 mm steigend ab Lager geliefert werden.

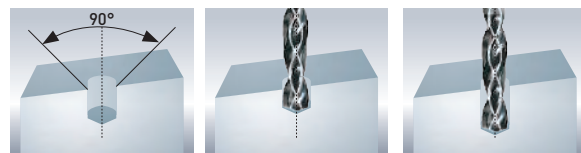
Ab 3,0 mm bis 20,0 mm können Sie auf das bestehende Programm in 3 x D / 5 x D / 8 x D / 12 x D zurückgreifen.

12 x D drilling starting from 0,8 mm with interior cooling supply isn't everyone's thing.

As pioneer in HSC-drills with drilling depths over 5 x D our reputation is well known all over the world. Productive time of our customer decreased up to 600%. Increased process security and cutting-edge live at the same time.

The latest products are Mini-solid carbide drills, starting from 0,8 mm with interior cooling supply with drilling depth up to 12 x D. The competition-pressure from our customers in the worldwide increasing globalization forced us into this direction. These HSC-Mini drills with interior cooling supply 6 x D and 18 x D can be supplied in the dimensions 1,0 mm to 2,9 mm in 0,1 mm steps from stock.

From 3,0 mm to 20,0 mm see our existing program in 3 x D, 5 x D, 8 x D, 12 x D.



Karnasch Pilotbohrer Art. 22 0321

Bohrer geführt in Pilotbohrung

Kein messbarer Überhang zur Pilotbohrung

Karnasch pilot drill Art. 22 0321

Drill guided in pilot hole

No gouged step

| Werkstoffe Work Material | Ø mm | Bohrtiefe Drilling depth mm | Vc m/min | n U/mm | f mm/U | Vf mm/min |
|-------------------------------|------|-----------------------------------|-------------|-----------|-----------|--------------|
| C 45 | 1,0 | 10 | 60 | 18.800 | 0,05 | 950 |
| C 45 | 1,0 | 10 | 60 | 18.800 | 0,10 | 1.880 |
| X 5 Cr Ni Cu Nb 16 - 4 | 2,0 | 24 | 42 | 6.600 | 0,08 | 530 |
| X 5 Cr Ni Mo 17122 | 2,0 | 20 | 65 | 10.300 | 0,12 | 1.230 |
| 99% Titan [Dentalimplantat] | 2,5 | 25 | 30 | 3.800 | 0,015 | 57 |
| 99% Titanium [Dental implant] | 2,9 | 30 | 75 | 8.200 | 0,09 | 740 |
| 42 Cr Mo 4 | 2,9 | 30 | 75 | 8.200 | 0,09 | 740 |
| Inconel 718 | 2,2 | 13 | 12 | 1.700 | 0,05 | 85 |



| Werkstoffe Work Material | Werkstoff- gruppe Material Group | Festigkeit / Strength [N/mm ²] Härte / Hardness HB | Beispiele / Examples | Schnittgeschwindigkeit/ Cutting speed v _c [m/min] | | Empfohlener Vorschub f [mm/U] für Durchmesserbereiche Recommended feed rate (mm per rev.) based diameter range | | | | |
|--|---|---|--|---|---------|---|-----------|-----------|-----------|-----------|
| | | | | 22 0404 | 22 0530 | 3-5 mm | 5-8 mm | 8-12 mm | 12-16 mm | 16-20 mm |
| Unlegierte Stähle, Stahlguss Unalloyed steel, cast iron | 1.1-1.2 | ≤ 600 N/mm ² | St37, St42, C22, GS38 | 75-95 | | 0,08-0,14 | 0,12-0,20 | 0,15-0,25 | 0,16-0,28 | 0,20-0,32 |
| | 2.1-2.2 | ≤ 700 N/mm ² | St50, St60, C45, GS62 | 65-85 | | 0,08-0,14 | 0,12-0,20 | 0,15-0,25 | 0,16-0,28 | 0,20-0,32 |
| | 3-4-5 | > 700 N/mm ² | St70, C70 | 60-80 | | 0,08-0,15 | 0,12-0,22 | 0,15-0,28 | 0,16-0,30 | 0,20-0,33 |
| Legierte Stähle Alloyed steel | 6-7 | ≤ 900 N/mm ² | 16MnCr5, 90MnCrV8 | 50-70 | | 0,08-0,15 | 0,12-0,22 | 0,15-0,28 | 0,16-0,30 | 0,20-0,33 |
| | 8-9 | ≤ 1000 N/mm ² | 100Cr6, 42CrMo4 | 40-60 | | 0,08-0,12 | 0,10-0,15 | 0,11-0,20 | 0,12-0,24 | 0,14-0,25 |
| | 10-11 | > 1000 N/mm ² | X210Cr13, 34CrAlNi7 | 40-50 | | 0,08-0,12 | 0,10-0,15 | 0,11-0,20 | 0,12-0,24 | 0,14-0,25 |
| Inox / Stainless steel | 14.1-14.2 | | X5 CrNi 18 9 (V2A) | 40-60 | | 0,04-0,08 | 0,05-0,15 | 0,06-0,12 | 0,09-0,16 | 0,12-0,20 |
| Rost- und säurebeständige Stähle (Cr-Ni-legiert) Stainless steel (Cr-Ni alloys) | 14.3-14.4 | | X10 CrNiMoTi 18 10, G-X40 CrNi 27 4 | 40-50 | | 0,03-0,06 | 0,04-0,08 | 0,05-0,10 | 0,06-0,12 | 0,06-0,12 |
| Grauguss, legierter Grauguss Cast iron | 15-16 | ≤ 200 HB | GG10, GG15 | 80-110 | | 0,08-0,20 | 0,12-0,25 | 0,16-0,32 | 0,20-0,36 | 0,24-0,40 |
| | | ≤ 250 HB | GG20, GG25, GTW40 | 70-100 | | 0,08-0,15 | 0,10-0,20 | 0,12-0,28 | 0,16-0,32 | 0,20-0,36 |
| | | > 250 HB | GG30, GG40, GTS70 | 60-80 | | 0,08-0,15 | 0,10-0,20 | 0,12-0,28 | 0,16-0,32 | 0,20-0,36 |
| Sphäroguss, Vermikularguss, Temperguss Ductile cast iron, Vermicular cast iron, malleable cast iron | 17-18 | ≤ 600 N/mm ² | GGG40, GGG50 | 65-80 | | 0,08-0,15 | 0,10-0,20 | 0,16-0,28 | 0,24-0,32 | 0,28-0,40 |
| | | > 600 N/mm ² | GGG60, GGG70, GGV | 60-75 | | 0,06-0,12 | 0,08-0,15 | 0,14-0,25 | 0,20-0,28 | 0,24-0,32 |
| Aluminium (<10% Si) | 21-22 | | GD-ALSi9Cu3, ALSi7Mg0,6 | | 100-250 | 0,08-0,20 | 0,12-0,28 | 0,20-0,36 | 0,24-0,40 | 0,28-0,44 |
| Aluminium (>10% Si) | 23-24 25.1 | | GD-ALSi12[Cu], ALSi17Cu4Mg (Alusil) | | 100-160 | 0,08-0,20 | 0,12-0,28 | 0,20-0,36 | 0,24-0,40 | 0,28-0,44 |
| Kupfer Copper | 26-27-28 | | G-CuZn15, CuZn37, CuSn8 | | 100-200 | 0,08-0,20 | 0,12-0,28 | 0,20-0,36 | 0,24-0,40 | 0,28-0,44 |
| Messing, Bronze Brass, Bronze | | | G-CuZn15, CuZn37, CuSn8 | | 100-180 | 0,08-0,20 | 0,12-0,28 | 0,20-0,36 | 0,24-0,40 | 0,28-0,44 |

| Neigung Werkstückoberfläche Inclination material surface | Korrekturfaktoren Kv für f [mm/U] beim Anbohren / Correction factor Kv for f [mm/U] during spot drilling | |
|---|--|--|
| | Kv 3xD | Kv 5xD |
| 15° | 0,5 | 0,25 |
| 30° | 0,4 | nicht empfehlenswert / not recommended |
| 45° | 0,25 | nicht empfehlenswert / not recommended |

- Beim Anbohren Vorschub f [mm/U] mit Korrekturfaktor Kv multiplizieren
- Anbohren mit reduziertem Vorschub bis Werkzeug auf 0,25xD im ganzen Ø schneidet
- Bei schrägem Anbohren: Zurückfahren mit doppeltem Vorschub f [mm/U]
- Nach dem Anbohren mit reduziertem Vorschub (Korrekturfaktor) wird mit dem Vorschub f [mm/U] gemäß Schnittdatenempfehlung ohne Korrekturfaktoren weitergebohrt.
- Auf ebenen Flächen (0°) empfehlen wir eine Pilotbohrung mit unserem VHM-Böhrer 22 0405 / 22 0406.

- Multiply the feed rate f [mm per rev.] with our correction factor Kv for spot drilling
- Spot drilling with reduced feed rate until tool is cutting with full diameter 0,25xD in depth.
- After spot drilling with a reduced feed rate (correction factor) you drill with the feed rate f [mm/U] according to the recommended cutting data.
- We recommend on flat surfaces (0°) a pilot hole with our solid carbide drill 22 0405 / 22 0406.

Testergebnis / Test result: Material 3.2315 Al Mg Si 1 / Bohrtiefe / Drilling depth 180 mm Ø 6

Bohrstrategie / Drilling strategy

Pilotbohrer / Pilot drill: Art. 22 0409 /
Ø 6,0 tol. m7 x 35 (5xD)

V_c = 280 m/min
n = 15000 min⁻¹
f = 0,2 mm/U
a_p = 2 x D (12 mm)

Emulsion/Kühlmitteldruck 70bar
Emulsion/cooling pressure 70bar

Bohrstrategie / Drilling strategy

Tieflochbohrer / Deep hole drill
Art. 22 0392 / Ø 6,0 tol. h7 x 180 (30xD)

V_c = 120 m/min
n = 6300 min⁻¹
f = 0,2 mm/U
a_p = 30 x D (180 mm)

Emulsion/Kühlmitteldruck 70bar
Emulsion/cooling pressure 70bar

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit / Strength N/mm ² | Schnittgeschwindigkeit V _c Cutting speed V _c [m/min] | Ø < 3 | Ø 3 - 6 | Ø 6 - 10 | Ø 10 - 12 |
|-----------------------------------|-----------------------|---|--|--------------|-------------|-------------|-------------|
| 9.1 | Al Mg 1 | < 250 | 180 - 230 | 0,05 - 0,160 | 0,20 - 0,30 | 0,30 - 0,60 | 0,30 - 0,60 |
| 9.2 | Al Mg Si 1 | < 350 | 150 - 200 | 0,05 - 0,160 | 0,20 - 0,30 | 0,30 - 0,60 | 0,30 - 0,60 |
| 9.3 | G Al Si 11 | < 250 | 140 - 180 | 0,08 - 0,200 | 0,25 - 0,45 | 0,20 - 0,40 | 0,20 - 0,40 |
| 9.4 | G Al Si 7 Mg | < 450 | 120 - 160 | 0,08 - 0,200 | 0,25 - 0,45 | 0,20 - 0,40 | 0,20 - 0,40 |

Vollhartmetall-Hochleistungs-Flachkopfböhrer 180°

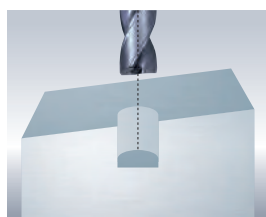
Durch die spezielle Geometrie des 180° Hochleistungs-Flachkopfböhrer können schwierigste Böhroperationen bei höchsten Standzeiten prozesssicher gebohrt werden. Durch die 4-Fasengeometrie werden optimale Rundheiten und Oberflächen in der Böhrung erzielt. Durch das Zusammenspiel der DMC-X2-Beschichtung, der polierten Spannuten und der optimierten Spannutengeometrie, wird ein sehr guter Spänetransport sichergestellt.

Solid Carbide High-Performance 180° shallow drills

It is possible to drill difficult drilling operations by a maximum tool life, through the special geometry of our 180° shallow drill. We realize an optimal roundness and surface quality of the hole, through our 4-chamfer geometry. Because of the interaction of our DMC-X2 coating, the polished flute and the optimized flute geometry, we ensure a smooth chip remove.

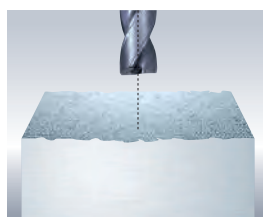
Einsatzmöglichkeiten der Karnasch Hochleistungs-Flachkopfböhrer 180°

Possible applications for the Karnasch 180° shallow drills



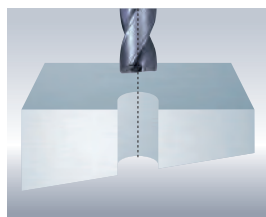
Anbohren auf schrägen Flächen 3xD bis 45° / 5xD bis 15°

Pilot drilling on bevel surfaces



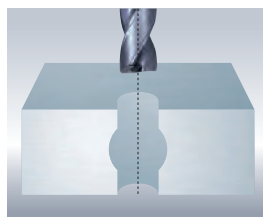
Anbohren auf unebenem Grund

Drilling on uneven surfaces



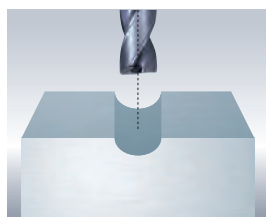
Bohrungen mit schrägem Bohrungsaustritt

Holes with irregular exit



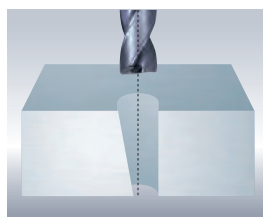
Bohrungen durch Querbohrungen

Drilling through cross holes



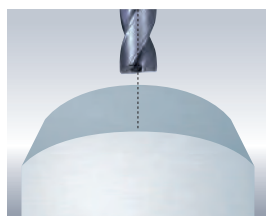
Bohren auf konkaven Flächen

Drilling in concave surfaces



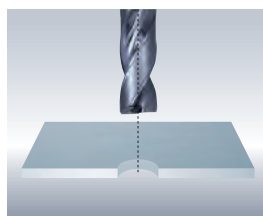
Bohren in konische Bohrungen

Drilling in conical holes



Anbohren auf konvexen Flächen

Drilling in convex surfaces



Bohrungen durch dünne Bleche

Drilling through thin sheets

1



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Index

Bohrstrategie von Karnasch – VHM-Bohrer bis 12 mm Durchmesser und über 18xD Auskräglänge l3 Drilling strategy from Karnasch – VHM drill bits up to 12 mm in diameter and in excess of 18xD protection length l3

Drehzahl in Abhängigkeit von Durchmesser und Auskräglänge l3

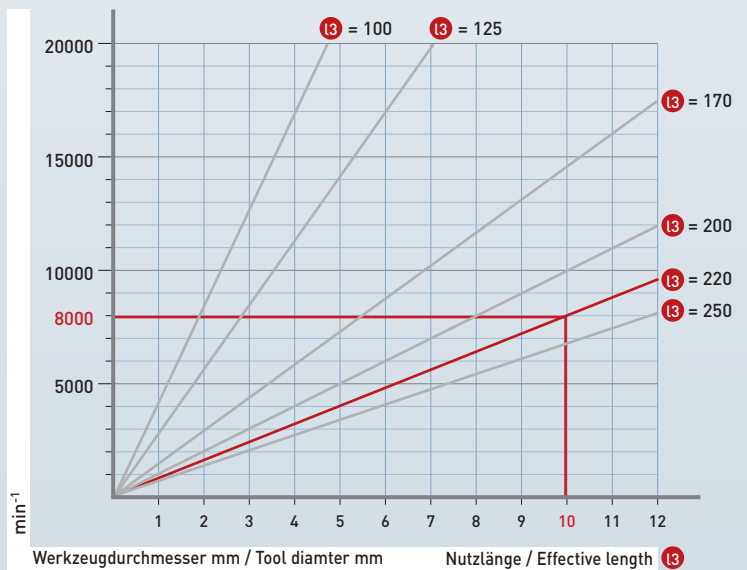
Überhöhte Drehzahlen können im Extremfall durch Zentrifugalkräfte zum Werkzeugbruch führen. Zu hohe Anfangsbeschleunigung sowie plötzliche Richtungsänderungen dieser überlangen schlanken Werkzeuge sind zu vermeiden.

Karnasch empfiehlt daher Drehzahlkritische Bereiche nicht zu überschreiten (siehe Tabelle).

The drill speed is dependent on the diameter and protection length l3

Excessive drill speeds could result in the tool breaking through the centrifugal force created. You should avoid drastically increasing the speed of the drill from the outset, as well as abruptly changing the direction of these long, slender tools.

Karnasch therefore recommends that you do not exceed the critical speed ranges (see the tables).

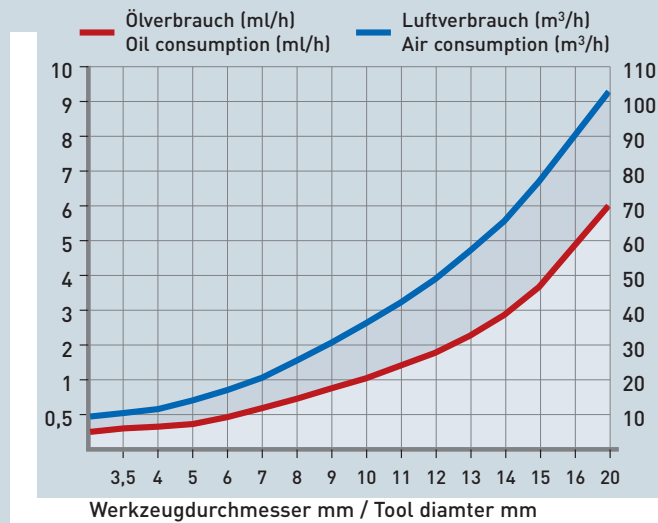


Beispiel / Example:

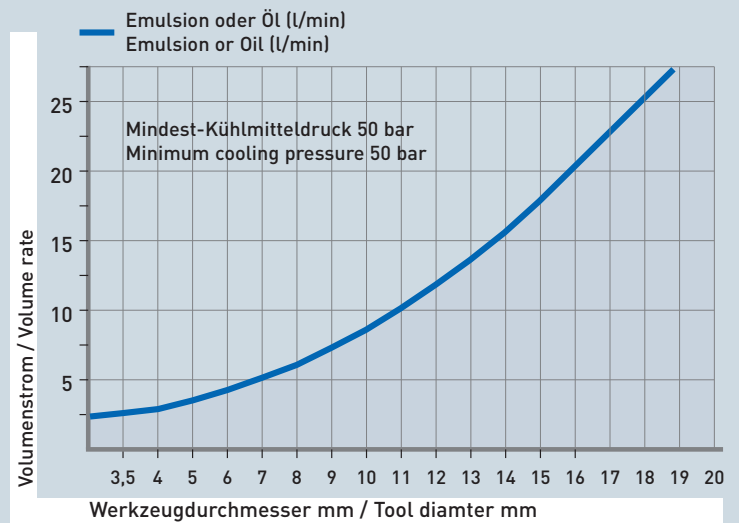
Durchmesser / Diameter d1 = 10 mm
Nutzlänge / Effective length l3 = 220 mm
Drehzahlkritischer Bereich / Critical rpm range max. 8000 min⁻¹

Information zum Einsatz der Karnasch VHM-Hochleistungsbohrer mit Innenkühlung <40xD Information for the use of Karnasch solid carbide drills l3 with interior cooling supply <40xD

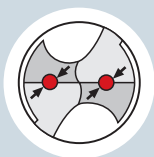
Kühlschmierstoffmengen bei der MMKS-Bearbeitung Cooling quantity with minimal quantity lubrication



Kühlschmierstoffmengen bei konventioneller Kühlung Cooling quantity with conventional cooling



Kühlmittel-Durchflussmenge / Emulsion Coolant flow rate / Emulsion



| d1 | d2 | Ø | 10 Bar | 20 Bar | 30 Bar | 40 Bar | 50 Bar | 60 Bar |
|----|-------------|------|--------|--------|--------|--------|--------|--------|
| 6 | 3,0 - 6,0 | 0,20 | 0,6 | 0,9 | 1,1 | 1,3 | 1,4 | 1,6 |
| 6 | 3,0 - 6,0 | 0,50 | 1,6 | 2,3 | 2,8 | 3,2 | 3,6 | 3,9 |
| 8 | 6,1 - 8,0 | 1,00 | 3,2 | 4,5 | 5,5 | 6,4 | 7,1 | 7,8 |
| 10 | 8,1 - 10,0 | 1,40 | 4,5 | 6,3 | 7,7 | 8,9 | 10,0 | 11,0 |
| 12 | 10,1 - 12,0 | 1,60 | 5,1 | 7,2 | 8,9 | 10,2 | 11,4 | 12,5 |
| 14 | 12,1 - 14,0 | 2,00 | 6,4 | 9,0 | 11,1 | 12,8 | 14,3 | 15,6 |
| 16 | 14,1 - 16,0 | 2,50 | 8,0 | 11,3 | 13,8 | 16,0 | 17,9 | 19,6 |
| 18 | 16,1 - 18,0 | 2,80 | 8,9 | 12,6 | 15,5 | 17,9 | 20,0 | 21,9 |
| 20 | 18,1 - 20,0 | 3,00 | 9,6 | 13,5 | 16,6 | 19,2 | 21,4 | 23,5 |
| 25 | 20,1 - 25,0 | 3,00 | 9,6 | 13,5 | 16,6 | 19,2 | 21,4 | 23,5 |
| 32 | 25,1 - 32,0 | 3,00 | 9,6 | 13,5 | 16,6 | 19,2 | 21,4 | 23,5 |

Richtwerte für den Einsatz von KARNASCH VHM-Hochleistungsbohrern mit Innenkühlung <40xD
Recommended cutting conditions for Karnasch solid carbide drills <40xD

22 0390

Wir empfehlen bei diesen High-Speed-Tieflochbohrern der Serie 22 0390 eine Pilotbohrung vorzunehmen. Verwenden Sie bevorzugt ein Werkzeug mit 3xD Bohrtiefe (22 0405) oder alternativ bis 5xD Bohrtiefe mit Innenkühlung. Der Spitzwinkel von 140° sowie die Durchmesserstoleranz m7 sind darauf abgestimmt. Ein Mindestkühlmitteldruck von 30 bar ist ausreichend. <20xD über 20xD 50 bar.

Jetzt mit 22 0390 anbohren (ca. 1-2xD) mit reduzierter Vorschub- und Schnittgeschwindigkeit ca. 40-50% der empfohlenen Werte. Danach ohne Unterbrechung die Vorschub- und Schnittgeschwindigkeit auf die empfohlenen Richtwerte erhöhen. Diese Bohrstrategie sollte ohne lüften oder Vorschubunterbrechung erfolgen.

Nach Erreichen der Bohrtiefe ist die Drehzahl auf ca. 30% zu reduzieren, um aus der Bohrung heraus zu fahren. Auch ein Stillstand der Spindel kann im Extremfall von Vorteil sein. Unser Nachschleifservice garantiert Ihnen kurze Lieferzeiten mit 100% Standzeitgarantie.

We recommend that you drill a pilot hole when using series 22 0390 high-speed, deep hole drill bits. Preferentially you should use a tool with 3xD drilling depth (22 0405), or alternatively up to 5xD drilling depth with internal cooling. The point angle of 140° as well as the diameter tolerance m7 are aligned. A minimum coolant pressure of 20-30 bar is sufficient.

Now drill using the 22 0390 series (approx. 1-2xD), with a reduced feed rating and cutting speed of approx. 40-50% of the recommended value. Then increase the feed rating and the cutting speed, without interruption, to the recommended benchmarks. The drilling strategy should be conducted without ventilation of interrupting the feed rate.

After reaching the desired drilling depth, the drill speed should be reduced to approx. 30% in order to extract the drill from the hole. The drill being completely still can be an advantage in extreme cases. Our regrinding service ensures short delivery times and a 100% lifetime guarantee.

| Werkstoffgruppe Material group | Beispiele DIN-EN Example DIN-EN | Schnittgeschwindigkeit Vc m/min Cutting speed Vc m/min | Vorschub pro Umdrehung (mm/U) bezogen auf den Bohrdurchmesser Recommended feed rate (mm per rev.) based diameter range | | | | | | | |
|------------------------------------|---|---|---|------|------|------|------|------|------|------|
| | | | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 | 10 | 12 | |
| 1.1 | 115 Mn Pb 30 46 S 20 60 S 20 115 Mn 37 46 Pb 20 | Vc 80 - 110 | Min. | 0,08 | 0,12 | 0,14 | 0,16 | 0,20 | 0,25 | 0,27 |
| | | | Max. | 0,15 | 0,18 | 0,20 | 0,25 | 0,30 | 0,35 | 0,40 |
| 1.2 | C22 C45 C60 C30E C45E C 60 E 100 Cr Mn 6 43 Cr Mo 4 | Vc 80 - 100 | Min. | 0,08 | 0,12 | 0,14 | 0,16 | 0,20 | 0,25 | 0,27 |
| | | | Max. | 0,15 | 0,18 | 0,20 | 0,25 | 0,30 | 0,35 | 0,40 |
| 1.3 | 50 Mn Si 3 36 Ni Cr 6 38 Cr 2 28 Cr 4 41 Cr 4 42 Cr Mo 4 | Vc 80 - 100 | Min. | 0,08 | 0,12 | 0,14 | 0,16 | 0,20 | 0,25 | 0,27 |
| | | | Max. | 0,15 | 0,18 | 0,20 | 0,25 | 0,30 | 0,35 | 0,40 |
| 2.1 2.2 | 1.5752 / 14 Ni Cr 14 1.7043 / 38 Cr 4 1.7131 / 16 Mn Cr 5 1.7264 / 20 Cr Mo 5 | Vc 70 - 90 | Min. | 0,08 | 0,12 | 0,14 | 0,16 | 0,20 | 0,25 | 0,27 |
| | | | Max. | 0,15 | 0,18 | 0,20 | 0,25 | 0,30 | 0,35 | 0,40 |
| 2.2 | 1.8540 / 34 Cr Al 6 1.8519 / 31 Cr MoV 9 1.8550 / 34 Cr Al Ni 7 | Vc 70 - 90 | Min. | 0,08 | 0,10 | 0,11 | 0,12 | 0,15 | 0,18 | 0,20 |
| | | | Max. | 0,16 | 0,18 | 0,20 | 0,25 | 0,30 | 0,35 | 0,40 |
| 2.1 | 1.1750 / C75W 1.2067 / 102 Cr 6 1.2080 / X210 Cr 12 1.2083 / X42 Cr 13 1.2343 / X38 Cr Mo V5 1.2419 / 105 WCr 6 1.2767 / X45Ni Cr Mo 4 | Vc 60 - 80 | Min. | 0,08 | 0,10 | 0,11 | 0,12 | 0,15 | 0,18 | 0,20 |
| | | | Max. | 0,16 | 0,18 | 0,20 | 0,25 | 0,30 | 0,35 | 0,40 |
| 7.1 7.2 | 0.6010 / EN-GJL-100 (GG10) 0.6020 / EN-GJL-200 (GG20) 0.6025 / EN-GJL-250 (GG25) 0.6030 / EN-GJL-300 (GG30) 0.6035 / EN-GJL-350 (GG35) 0.6040 / EN-GJL-400 (GG40) 0.7040 / GGG 40 | Vc 90 - 120 | Min. | 0,12 | 0,15 | 0,16 | 0,20 | 0,25 | 0,28 | 0,30 |
| | | | Max. | 0,16 | 0,18 | 0,20 | 0,25 | 0,32 | 0,38 | 0,40 |
| 7.3 7.4 7.5 7.6 | 0.7050 / EN-GJS-500-7 (GGG50) 0.7070 / EN-GJS-700-2 (GGG70) 0.8035 / EN-GJMW-350-4 (GTW35) 0.8170 / EN-GJMW-700-2 (GTS70) | Vc 80 - 100 | Min. | 0,12 | 0,15 | 0,16 | 0,20 | 0,25 | 0,28 | 0,30 |
| | | | Max. | 0,16 | 0,18 | 0,20 | 0,25 | 0,32 | 0,38 | 0,40 |
| 7.3 | EN-GJV250 (GGV25) EN-GJV350 (GGV35) EN-GJV400 (GGV40) EN-GJV500 (GGV50) Si Mo 6 | Vc 80 - 100 | Min. | 0,12 | 0,15 | 0,16 | 0,20 | 0,25 | 0,28 | 0,30 |
| | | | Max. | 0,16 | 0,18 | 0,20 | 0,25 | 0,32 | 0,38 | 0,40 |
| ADI 800 - 1400 N | EN-GJS-800-8 (ADI800) EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200) EN-GJS-1400-1 (ADI1400) | Vc 70 - 90 | Min. | 0,10 | 0,12 | 0,13 | 0,16 | 0,20 | 0,22 | 0,25 |
| | | | Max. | 0,12 | 0,15 | 0,16 | 0,20 | 0,25 | 0,28 | 0,30 |
| TOOLOX 33 HB 280-330/≈27-33 HRC | | Vc 40 - 50 | Min. | 0,08 | 0,10 | 0,15 | 0,18 | 0,20 | 0,22 | 0,25 |
| | | | Max. | 0,08 | 0,10 | 0,14 | 0,16 | 0,18 | 0,20 | 0,22 |
| TOOLOX 44 HB 410-475/≈41-47 HRC | | Vc 30 - 40 | Max. | 0,08 | 0,10 | 0,14 | 0,16 | 0,18 | 0,20 | 0,22 |

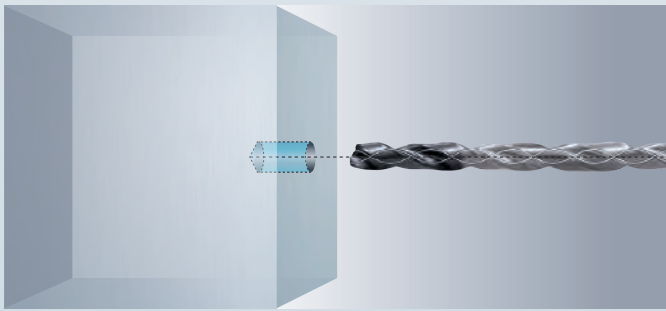


Sacklochbohrungen – Einsatzhinweise für Vollhartmetall-Hochleistungsbohrer < 40xD

Blind hole drilling – Application instruction for Solid carbide twist drill < 40xD

- 1 
- 2 
- 3 
- 4 
- 5 
- 6 
- 7 
- 8 
- 9 

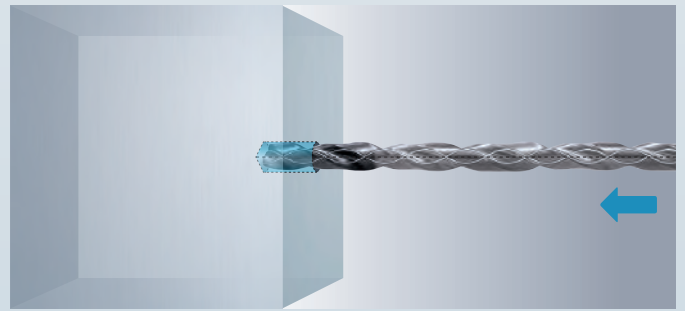
1 Pilotbohrung setzen Drilling a pilot hole



- 1 Für die Pilotbohrungen empfehlen wir den Einsatz der Karnasch Bohrer Art. Nr. 22 0402 oder 22 0405 in der jeweils kürzesten Ausführung.
- 2 Bitte stellen Sie eine präzise Pilotbohrung zwischen 1,5 und 2xD her, um einen einwandfreien Bohrprozess zu gewährleisten. (Passen Sie die Pilotbohrungstiefe der Länge Ihres Tieflochbohrers an)

- 1 We recommend to use our Karnasch solid carbide high performance twist drill 22 0402 or 22 0405 in the shortest version, to place a pilot hole.
- 2 Please drill a precision hole between 1,5xD and 2xD, to ensure a perfect drilling process.

2 Einfahren in die Pilotbohrung Enter into the pilote hole



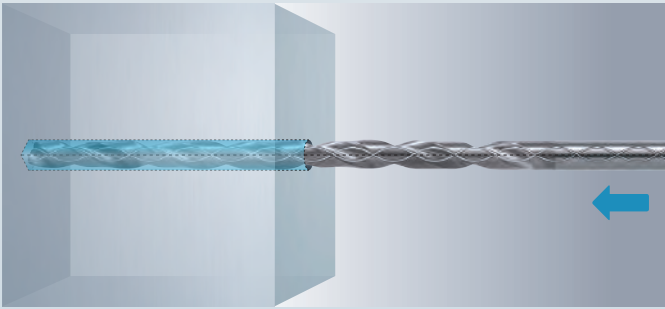
Dringen Sie mit niedriger Drehzahl und ohne Kühlmittel in die Pilotbohrung ein, bis 1 mm vor den Bohrungsgrund. (Max. 300 U/min und Vf = 1000 mm/min)

Enter the pilot hole with low speed and without internal colling supply before 1 mm of the hole ground (max. 300 min⁻¹ and Vf = 1000 mm/min).

Sacklochbohrungen – Einsatzhinweise für Vollhartmetall-Hochleistungsbohrer < 40xD

Blind hole drilling – Application instruction for Solid carbide twist drill < 40xD

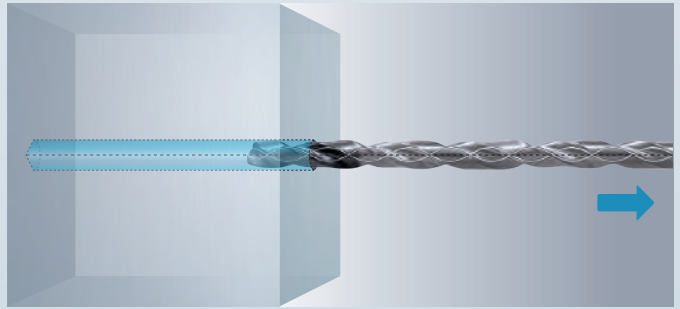
3 Tieflochbohren Deep hole drilling



Bohren Sie auf Ihre gewünschte Bohrtiefe.
Schnittdaten und Kühlmitteldruck auf Seite 1242 + 1245

Drill to the required depth. Cutting data and cooling pressure see on page 1242 + 1245

4 Herausfahren des Bohrers Retract the drill



- 1 Herausfahren bis zur Tiefe der Pilotbohrung mit $V_f = 2000 \text{ mm/min}$
- 2 Herausfahren des Bohrers aus der Pilotbohrung mit geringer Drehzahl und ohne Kühlmittel ($n = 300 \text{ U/min}$, $V_f = 2000 \text{ mm/min}$).

- 1 Retracting of the hole until the depth of the pilot hole with $V_f = 2000 \text{ mm/min}$.
- 2 Retracting from the pilot hole with low speed and without internal cooling supply ($n = 300 \text{ min}^{-1}$, $V_f = 2000 \text{ mm/min}$).

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Auf schräge Werkstücke bohren - Einsatzhinweise für Vollhartmetall-Hochleistungsbohrer < 40xD

Drilling on oblique work piece - Appliation instruction for Solid carbide twist drill < 40xD



1 Planbohren / Planfräsen "Face drilling / Face milling"



Bohren / Fräsen Sie eine ebene Fläche in das Werkstück mit einem Bohrer / Fräser des gleichen Durchmessers wie die der gewünschten Bohrung oder verwenden Sie unseren 180° Flachkopfbohrer Art. 22 0404.

Drill/Mill a flat surface on the work piece in the same dimension as the diameter of the hole should be or use our shallow drill 180° ref. 22 0404.



2 Pilotbohrung setzen Drilling a pilot hole



1 Für die Pilotbohrungen empfehlen wir den Einsatz der Karnasch Bohrer Art. Nr. 22 0402 oder 22 0405 in der jeweils kürzesten Ausführung.
2 Bitte stellen Sie eine präzise Pilotbohrung zwischen 1,5 und 2xD her, um einen einwandfreien Bohrprozess zu gewährleisten. (Passen Sie die Pilotbohrungstiefe der Länge Ihres Tieflochbohrers an)

1 We recommend to use our Karnasch solid carbide high performance twist drill 22 0402 or 22 0405 in the shortest version, to place a pilot hole.
2 Please drill a precision hole between 1,5xD and 2xD, to ensure a perfect drilling process.



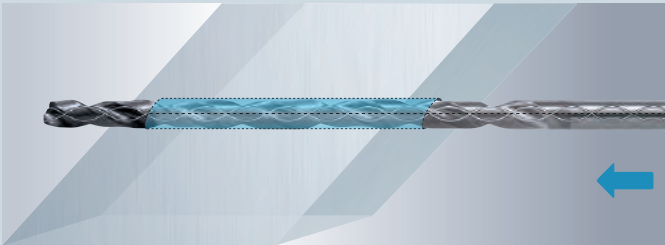
3 Einfahren in die Pilotbohrung
Enter into the pilote hole



Dringen Sie mit niedriger Drehzahl und ohne Kühlmittel in die Pilotbohrung ein, bis 1 mm vor den Bohrungsgrund. (Max. 300 U/min und Vf = 1000 mm/min)

Enter the pilot hole with low speed and without internal cooling supply before 1 mm of the hole ground (max. 300 min⁻¹ and Vf = 1000 mm/min).

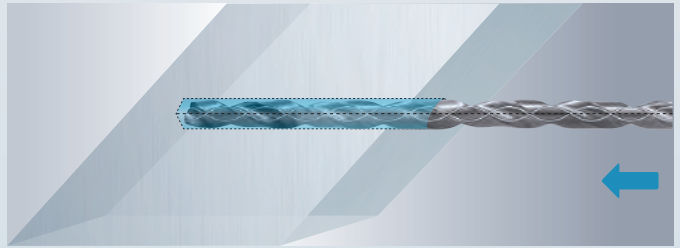
5 Durchgangsbohrung
Through hole drilling



- 1 Beim Austritt aus dem Werkstück kann die Schneidkante des Bohrers ausbrechen.
- 2 Verringern Sie den Vorschub auf $f = 0,05 \text{ mm/U} - 0,1 \text{ mm/U}$

- 1 The cutting edge could break if you have a angular faced drill exit.
- 2 Reduce the feed rate to $f = 0,05 \text{ mm/min} - 0,1 \text{ mm/min}$

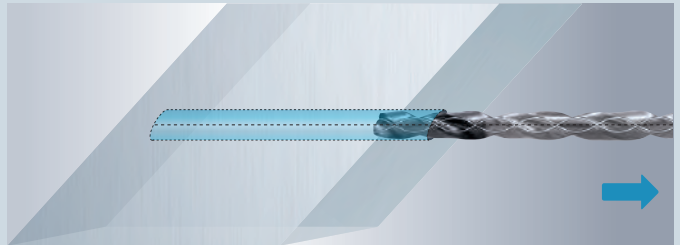
4 Tieflochbohren
Deep hole drilling



Bohren Sie auf Ihre gewünschte Bohrtiefe. Schnittdaten und Kühlmitteldruck auf Seite 1242 + 1245

Drill to the required depth. Cutting data and cooling preasure see on page 1242 + 1245

6 Herausfahren des Bohrers
Retract the drill



- 1 Herausfahren bis zur Tiefe der Pilotbohrung mit Vf = 2000 mm/min
- 2 Herausfahren des Bohrers aus der Pilotbohrung mit geringer Drehzahl und ohne Kühlmittel (n = 300 U/min, Vf = 2000 mm/min).

- 1 Retracting of the hole until the depth of the pilot hole with Vf = 2000 mm/min.
- 2 Retracting from the pilot hole with low speed and without internal cooling supply (n = 300 min⁻¹, Vf = 2000 mm/min.).



| Werkstoffgruppe Material group | Werkstoff / Material | Schnittgeschwindigkeit Cutting speed Vc m/min | Vorschub pro Umdrehung (mm/U) bezogen auf den Bohrdurchmesser Recommended feed rate (mm per rev.) based diameter range | | | |
|-----------------------------------|--|---|---|-------------|-------------|-------------|
| | | | 3 - 5 | 5 - 7 | 7 - 10 | 12 |
| 7.1 - 7.2 | 0.6010 / EN-GJL-100 (GG10) 0.6020 / EN-GJL-200 (GG20) 0.6025 / EN-GJL-250 (GG25) 0.6030 / EN-GJL-300 (GG30) 0.6035 / EN-GJL-350 (GG35) 0.6040 / EN-GJL-400 (GG40) | 90 - 120 | 0,02 - 0,05 | 0,04 - 0,10 | 0,10 - 0,15 | 0,12 - 0,20 |
| 7.3 - 7.4 - 7.5 - 7.6 | 0.7040 / GGG 40 0.7050 / EN-GJS-500-2 (GGG50) 0.7070 / EN-GJL-700-2 (GGG70) 0.8035 / EN-GJMW-350-4 (GTW35) 0.8170 / EN-GJMW-700-2 (GTS70) EN - GJV 250 (GGV 25) EN - GJV 350 (GGV 35) EN - GJV 400 (GGV 40) EN - GJV 500 (GGV 50) Si Mo 6 | 60 - 90 | 0,02 - 0,04 | 0,03 - 0,10 | 0,08 - 0,14 | 0,10 - 0,20 |

Beim Bohren mit Innenkühlung und einem Kühlmitteldruck von 50-60 bar ist eine Erhöhung des Vorschubes um 30-50% möglich.
It is possible to increase the feed rate up to 30-50% by drilling with interior cooling supply and a cooling pressure of 50-60 bar.

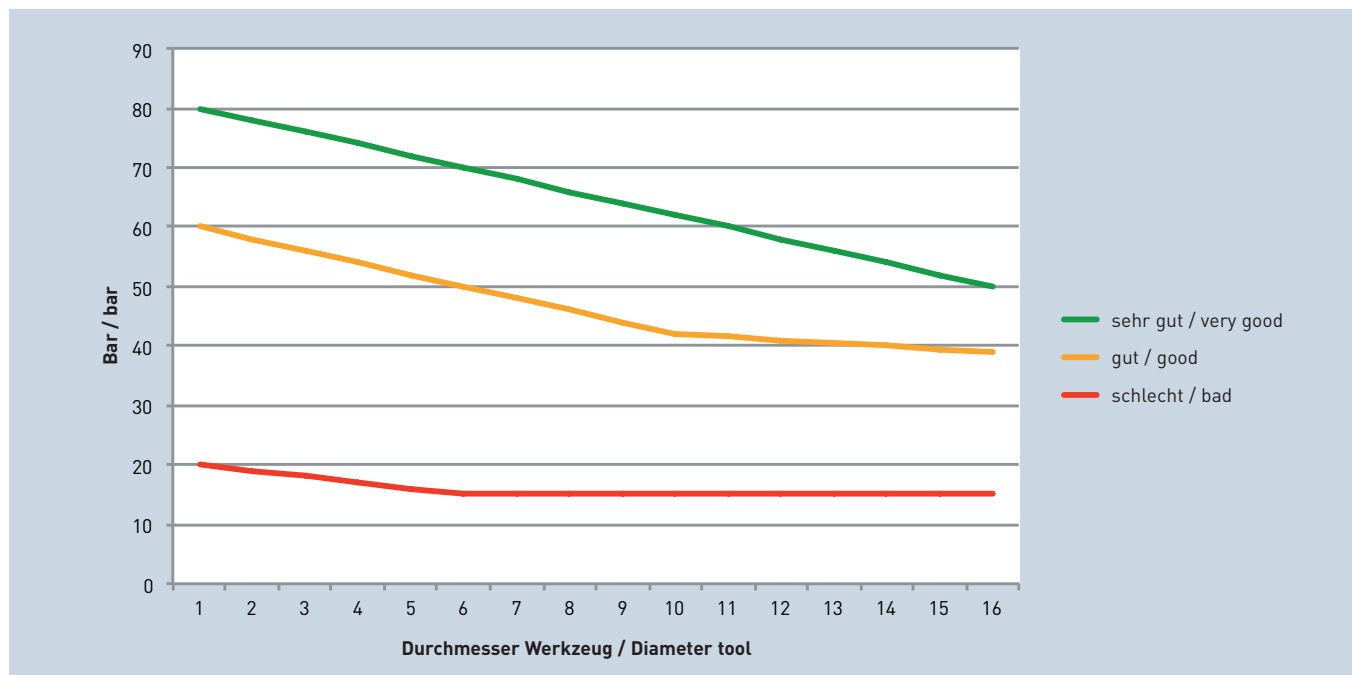
Kühlmitteldurchflussmenge für Bohrer mit verdrahter innerer Kühlmittelzufuhr Coolant flow for drills with twisted interior coolant supply

2 Schneiden, gedrahtete Ausführung. Durchflussmenge abhängig vom Druck (bar) und Durchmesser der Kühlmittelbohrungen. Karnasch VHM-Bohrer können drehend und nicht drehend auf allen modernen Werkzeugmaschinen zum Einsatz gebracht werden. Beim Bohren in drehende Werkstücke auf genaue Flucht vor Bohrer- und Werkstückzentrum achten.

2 cutting edges, spiral type. Flow is dependent on pressure (bar) and diameter of coolant holes. Karnasch solid carbide twist drill is used turning and non turning on all modern manufacturing machines. By drilling in turning parts please watch the corresponding centres of drill and part.

| Schaft shank | Bohrer Ø drill diameter | Kühlkanalbohrung coolant hole diameter | Durchflussmenge l/min. flow rate l/min. | | | |
|-----------------|----------------------------|---|--|--------|--------|--------|
| | | | 20 bar | 30 bar | 40 bar | 50 bar |
| 6 mm | 4,0 - 6,0 mm | 0,6 mm | 1,4 | 1,6 | 2,0 | 2,2 |
| 8 mm | 6,1 - 8,0 mm | 0,9 mm | 2,8 | 3,5 | 4,0 | 4,5 |
| 10 mm | 8,1 - 10,0 mm | 1,2 mm | 5,1 | 6,0 | 7,2 | 8,0 |
| 12 mm | 10,1 - 12,0 mm | 1,3 mm | 6,0 | 7,5 | 8,5 | 9,5 |
| 14 mm | 12,1 - 14,0 mm | 1,6 mm | 9,0 | 11,0 | 12,5 | 14,0 |
| 16 mm | 14,1 - 16,0 mm | 2,0 mm | 14,0 | 17,0 | 20,0 | 22,0 |
| 18 mm | 16,1 - 18,0 mm | 2,2 mm | 17,0 | 21,0 | 24,0 | 27,0 |
| 20 mm | 18,1 - 20,0 mm | 2,5 mm | 22,0 | 27,0 | 30,0 | 35,0 |

Kühlmitteldruck (bar) in Abhängigkeit vom Werkzeugdurchmesser/Bohren 3xD - 50xD Coolant pressure in dependence from the tool-diameter/drill 3xD - 50xD



Richtwerte für den Einsatz der Karnasch HSC-Micro-Drill ohne Innenkühlung Recommended cutting data for HSC-micro-drill, without interior cooling supply

22 0341

| Werkstoffgruppe Material group | Werkstoff Material | Schnittgeschwindigkeit / Cutting speed Vc (m/min) | Vorschub pro Umdrehung (mm/U) bezogen auf den Bohrdurchmesser Recommended feed rate (mm per rev.) based diameter range | | | | | | | |
|------------------------------------|---|---|---|-------|-------|-------|-------|-------|-------|-------|
| | | | 0,5 | 0,8 | 1,0 | 1,2 | 1,6 | 2,0 | 2,5 | 3,0 |
| 1.1 - 1.2 - 1.3 | St37, St42, C22, 653P St50, St 60, CK45, C35, 45Mn6 | 60 - 160 | <0,05 | <0,10 | <0,12 | <0,15 | <0,20 | <0,25 | <0,28 | <0,35 |
| 1.4 - 1.5 - 2.1 | 53MnSi4, 16MnCr5 90MnCrV8, 31NiCr14 CK60, 41CrAlMo7 | 50 - 120 | <0,02 | <0,04 | <0,06 | <0,14 | <0,25 | <0,28 | <0,30 | <0,35 |
| 2.1 | 100Cr6, 20MnCr5, 31CrMo12, 42CrMo4, 14CrNi14 | 50 - 100 | <0,02 | <0,06 | <0,08 | <0,12 | <0,16 | <0,20 | <0,22 | <0,25 |
| 3.1 - 3.2 | X210CrW12, X165CrMoV12, 75CrMoNi6, 56NiCrMoV7 | 30 - 60 | <0,02 | <0,07 | <0,12 | <0,15 | <0,20 | <0,25 | <0,28 | <0,30 |
| 7.1 - 7.2 - 7.3 7.4 - 7.5 - 7.6 | GG20 - GG 50 GGG40 - GGG70 GTW/GTS | < 150 | <0,05 | <0,15 | <0,20 | <0,25 | <0,30 | <0,35 | <0,40 | <0,45 |

Bei Bohrtiefen **über 4 × D** empfehlen wir die **"Soft Inn"** Strategie. Diese Bohrstrategie begünstigt den Späntransport und erhöht die Produktionssicherheit um ein vielfaches.

Kein Anzentrieren oder Führungsbohrungen. Dadurch reduzieren Sie Ihre **Produktionszeiten um ca. 15%** sowie die **Lagerkosten um 50%**.

- I. Die Toleranz der Bohrspindel sollte weniger als 0,002 mm betragen.
- II. Wir empfehlen für diese High-Tech-Produkte den Einsatz von Schrumpfhaltern.

We recommend for drilling depth of **more than 4 × D** our **"Soft Inn"** strategy. This drilling strategy supports the chip transport and enhance the product safety many times.

No centering or pilot hole. This reduces your **production time about 15%** as well the **storage costs about 50%**.

- I. The run out with a drill in a spindle should be less than 0,002 mm.
- II. The shrink fit system acts as an effective holder.

Wichtige Einsatzkriterien zu Karnasch VHM-Bohrern:

Wahl der geeigneten Spannmittel: Die erforderliche Spannung der Bohrer ist die Zylinderschaftaufnahme nach DIN 6535 Form HAK/HA. Hohe Rundlaufgüten und kraftschlüssige Spannungen weisen außerdem Dehnspannfutter sowie Schrumpfspannfutter auf. Bei optimaler Spannung der Werkzeuge sind hohe Fluchtungsgenauigkeiten und Oberflächengüten erzielbar. In vielen Fällen kann deshalb auf Reiboperationen verzichtet werden. Der **Rundlauffehler beim rotierenden Werkzeug sollte 0,015 mm nicht überschreiten.** Die Werkzeuge sind aufgrund ihrer geometrischen Auslegung und Eigensteifigkeit **zum Bohren ins Volle geeignet.** Arbeitsgänge wie **Anzentrieren, Vorbohren und Aufbohren sollten entfallen**, um beim Ansetzen der Werkzeuge eine Verlagerung der Rotationsachse zur Vorbohroperation auszuschließen. Ferner wird ein ungünstiger Eingriff der Bohrerspitze bei abweichendem Spitzenwinkel zum Vorbohrwerkzeug vermieden. Ist eine Anfasung erforderlich, sollte das Anfasen **nach der Bohroperation erfolgen.** Die in der **Schnittwerttabelle** angegebenen **Vorschubwerte sollten nicht unterschritten** werden, um einen kontrollierten Spanbruch (Kommaspan) zu erhalten. Bei zu kleinem Spanmittlenquerschnitt (Vorschub zu gering) wird zu wenig Wärme über den Span abgeführt, die Temperatur geht vermehrt in das Werkzeug über; dies führt zu Standzeitverlust.

Bei **unterbrochenem Schnitt**, z. B. Eintritt- und Austrittschrägen oder Querbohrungen, sollte in diesem Bereich mit **reduzierten Vorschubwerten gefahren werden.** Die Bohrer sind mit ausreichender **Kühlschmierung einzusetzen.** Zur Erzielung guter Bearbeitungsergebnisse sollten hochwertige halbsynthetische oder Emulsions Kühlschmierstoffe (min. 10% Öl) und EP-Zusätze verwendet werden. **Dadurch lassen sich längere Standzeiten sowie höhere Toleranzgenauigkeiten und Oberflächengüten erzielen.** Über 5 × D Bohrtiefe ist unter ungünstigen Gegebenheiten ein- oder mehrmaliges Ausspannen erforderlich. **Ab 8 × D sollte beim Anbohren der Vorschub um 50% verringert werden.** Bei VHM-Bohrern mit Innenkühlung sind 40 - 50 bar Kühlmitteldruck **notwendig um den optimalen Spänefluß zu gewährleisten!**

Important criteria for the use of Karnasch VHM drills

Selection of the appropriate means to achieve tension: The tension the drill requires is the cylinder shank seat in accordance with DIN 6535 Form HAK/HA. In addition to that high-precision true running and non-positive tensions show stress chuck and contraction chuck. With the tools having an optimum tension both high-precision true alignment and high quality surfaces can be achieved. In many cases there is therefore no need of friction operations. **The eccentricity of revolving tools should not exceed 0,015 mm.** Due to their geometrical layout and inherent stiffness the tools are qualified for drilling at maximum power. Working cycles such as pre-centering, pilot-drilling and boring open should not be carried out to avoid the rotational axis shifting to the pilot-drilling operation when the tools are put on. **Furthermore, an unfavourable intervention of this bits with the point angle deviating to the pilot-drilling tool is avoided.** Should chamfering be required, the chamfering is to be carried out after the drilling operation.

The advance values should not be lower than those specified in the cut value chart to achieve a controlled chip breakage. When the chip centre cross-section is too small (advance is insufficient) an insufficient quantity of heat is carried off trough the chip. The temperature penetrates more and more into the tool, resulting in loss of toll life. In case of an interrupted cut, e.g. approach inclinations and emersion inclinations of transverse drillings reduced advance values should be applied in this area. The drills are to be operated with sufficient cooling lubrication. To achieve good working results, high-quality half synthetic or emulsion cooling lubricants (min. 10 oil) and EP additives are to be used. **By that means a longer tool life as well as higher tolerance precisions and surface qualities can be achieved.** Given more than 5 × D drilling depth chamfering is required once or repeatedly under unfavourable conditions. **From 8 × D onwards the advance should be reduced by 50% when spot-drilling.** Solid carbide drills with interior cooling require 40 - 50 bar cooling agent pressure to ensure an optimum of chip flow.



2



3



4



5



6



7



8



9



22 0402 | 22 0403 | 22 0802
22 0419 | 22 0471

Richtwerte für den Einsatz der KARNASCH VHM-Hochleistungsbohrer ohne Innenkühlung Recommended cutting data for solid carbide twist drill, without interior cooling supply

Die angegebenen Richtwerte für die Schnittgeschwindigkeit V_c sind je nach Bohrtiefe bezogen auf den Durchmesser mit den untenstehenden Korrekturfaktoren KF_v zu multiplizieren.

The indicated standard values for the cutting speed V_c depends on drilling depth related to the diameter to multiply by the correction factor KF_v .

| | | | | |
|--------|-----|-----|-----|-----|
| KF_v | 1xD | 2xD | 3xD | 5xD |
| | 1,2 | 1,0 | 0,8 | 0,7 |

Die in den Schnittwerttabellen enthaltenen Richtwerte gelten nur beim Einsatz von Spannfuttern nach DIN 1835 Form E und Hydrodehnspannfutter.

The indicated cutting data in our guideline table are only valid for use of chucks according to DIN 1835 Form E and hydraulic expansion chucks.

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit N/mm ² Strength N/mm ² | Schnittgeschwindigkeit / Cutting speed V_c (m/min) | Vorschub pro Umdrehung (mm/U) bezogen auf den Bohrdurchmesser Recommended feed rate (mm per rev.) based on diameter range | | | | |
|-----------------------------------|-----------------------|--|--|--|-------|-------|--------|---------|
| | | | | ±10% | Ø 3-5 | Ø 5-8 | Ø 8-12 | Ø 12-16 |
| 1.1 | St 42-8 | < 450 | 80 | 0,18 | 0,24 | 0,30 | 0,35 | 0,40 |
| 1.2 | C 50 | < 650 | 70 | 0,18 | 0,24 | 0,30 | 0,35 | 0,40 |
| 2.1 | 51 Si 7 | < 600 | 65 | 0,15 | 0,21 | 0,27 | 0,30 | 0,35 |
| 2.2 | 26 Cr Mo 4 | < 950 | 50 | 0,15 | 0,21 | 0,27 | 0,30 | 0,35 |
| 2.3 | 100 WV4 | < 1100 | 40 | 0,15 | 0,21 | 0,27 | 0,30 | 0,35 |
| 2.6 | 31 Cr Mo V9 | < 1200 | 65 | 0,15 | 0,20 | 0,25 | 0,30 | 0,32 |
| 3.1 | X 42 Cr 13 | < 700 | 65 | 0,15 | 0,20 | 0,27 | 0,32 | 0,35 |
| 3.2 | S 29 28 | < 1400 | 35 | 0,08 | 0,12 | 0,15 | 0,20 | 0,25 |
| 7.1 | GG 15 | > 180 HB | 75 | 0,22 | 0,30 | 0,40 | 0,50 | 0,58 |
| 7.2 | GG 30 | > 350 HB | 70 | 0,22 | 0,30 | 0,40 | 0,50 | 0,58 |
| 7.7 | GGG 60 | > 200 HB | 70 | 0,20 | 0,25 | 0,35 | 0,40 | 0,45 |
| 7.6 | GTW 3504 | > 230 HB | 70 | 0,20 | 0,25 | 0,35 | 0,40 | 0,45 |
| 8.1 | Toolox 44 | 45-55 HRC | 30 | 0,08 | 0,09 | 0,10 | 0,12 | 0,14 |
| 8.11 | Toolox 33 | 800-1100 N/mm ² | 35 | 0,08 | 0,12 | 0,15 | 0,20 | 0,22 |
| 8.5 | HARDOX 400 | < 1200 | 40 | 0,03-0,06 | 0,06 | 0,08 | 0,10 | 0,12 |
| | HARDOX 450 | < 1400 | 35 | 0,03-0,06 | 0,06 | 0,08 | 0,10 | 0,12 |
| | HARDOX 500 | < 1550 | 30 | 0,02-0,05 | 0,06 | 0,06 | 0,08 | 0,10 |
| 8.6 | WELDOX 420/460 | < 550 | 50 | 0,04-0,07 | 0,08 | 0,10 | 0,12 | 0,15 |
| | WELDOX 500 | < 620 | 50 | 0,04-0,07 | 0,08 | 0,10 | 0,12 | 0,15 |
| | WELDOX 700 | < 860 | 50 | 0,04-0,07 | 0,08 | 0,10 | 0,12 | 0,15 |
| | WELDOX 900/960 | < 1040 | 40 | 0,03-0,06 | 0,08 | 0,10 | 0,12 | 0,13 |
| | WELDOX 1100 | < 1350 | 30 | 0,02-0,06 | 0,07 | 0,08 | 0,10 | 0,12 |

22 0405 | 22 0406 | 22 0806
22 0425 | 22 0473

Richtwerte für den Einsatz der KARNASCH VHM-Hochleistungsbohrer mit Innenkühlung Recommended cutting data for solid carbide twist drill, with interior cooling supply

Die angegebenen Richtwerte für die Schnittgeschwindigkeit V_c sind je nach Bohrtiefe bezogen auf den Durchmesser mit den untenstehenden Korrekturfaktoren KF_v zu multiplizieren.

The indicated standard values for the cutting speed V_c depends on drilling depth related to the diameter to multiply by the correction factor KF_v .

| | | | | | |
|--------|-----|-----|-----|-----|------|
| KF_v | 1xD | 3xD | 5xD | 8xD | 12xD |
| | 1,2 | 0,9 | 0,8 | 0,7 | 0,6 |

Die in den Schnittwerttabellen enthaltenen Richtwerte gelten nur beim Einsatz von Spannfuttern nach DIN 1835 Form E und Hydrodehnspannfutter.

The indicated cutting data in our guideline table are only valid for use of chucks according to DIN 1835 Form E and hydraulic expansion chucks.

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit N/mm ² Strength N/mm ² | Schnittgeschwindigkeit / Cutting speed V_c (m/min) | Vorschub pro Umdrehung (mm/U) bezogen auf den Bohrdurchmesser Recommended feed rate (mm per rev.) based on diameter range | | | | |
|-----------------------------------|-----------------------|--|--|--|-----------|-------|--------|---------|
| | | | | ±10% | Ø 3-5 | Ø 5-8 | Ø 8-12 | Ø 12-16 |
| 1.1 | St 42-8 | < 450 | 180 | 0,08-0,16 | 0,22 | 0,28 | 0,35 | 0,37 |
| 1.2 | C 50 | < 650 | 180 | 0,08-0,15 | 0,20 | 0,25 | 0,30 | 0,35 |
| 2.1 | 51 Si 7 | < 600 | 70 | 0,05-0,08 | 0,12 | 0,15 | 0,20 | 0,25 |
| 2.2 | 26 Cr Mo 4 | < 950 | 160 | 0,08-0,15 | 0,20 | 0,25 | 0,30 | 0,37 |
| 2.3 | 100 WV4 | < 1100 | 130 | 0,08-0,15 | 0,20 | 0,25 | 0,30 | 0,37 |
| 2.6 | 31 Cr Mo V9 | < 1200 | 160 | 0,08-0,15 | 0,20 | 0,26 | 0,32 | 0,37 |
| 3.1 | X 42 Cr 13 | < 700 | 130 | 0,08-0,15 | 0,20 | 0,26 | 0,32 | 0,37 |
| 3.2 | S 29 28 | < 1400 | 90 | 0,08-0,10 | 0,12 | 0,15 | 0,20 | 0,25 |
| 7.1 | GG 15 | > 180 HB | 150 | 0,14-0,25 | 0,30 | 0,40 | 0,45 | 0,50 |
| 7.2 | GG 30 | > 350 HB | 130 | 0,12-0,20 | 0,25 | 0,35 | 0,40 | 0,45 |
| 7.4 | GGG 60 | > 200 HB | 130 | 0,12-0,20 | 0,25 | 0,35 | 0,40 | 0,45 |
| 7.6 | GTW 3504 | > 230 HB | 100 | 0,04 | 0,06-0,10 | 0,12 | 0,15 | 0,20 |
| 8.1 | Toolox 44 | 45-55 HRC | 50 | 0,04-0,08 | 0,09 | 0,11 | 0,14 | 0,15 |
| 8.11 | Toolox 33 | 800-1100 N/mm ² | 60 | 0,05-0,10 | 0,12 | 0,15 | 0,20 | 0,22 |
| 8.5 | HARDOX 400 | < 1200 | 40 | 0,04-0,08 | 0,08 | 0,10 | 0,12 | 0,14 |
| | HARDOX 450 | < 1400 | 35 | 0,04-0,08 | 0,08 | 0,10 | 0,12 | 0,14 |
| | HARDOX 500 | < 1550 | 30 | 0,03-0,06 | 0,08 | 0,08 | 0,10 | 0,12 |
| 8.6 | WELDOX 420/460 | < 550 | 60 | 0,07-0,09 | 0,10 | 0,12 | 0,15 | 0,18 |
| | WELDOX 500 | < 620 | 60 | 0,07-0,09 | 0,10 | 0,12 | 0,15 | 0,18 |
| | WELDOX 700 | < 860 | 60 | 0,07-0,09 | 0,10 | 0,12 | 0,15 | 0,18 |
| | WELDOX 900/960 | < 1040 | 45 | 0,06-0,08 | 0,10 | 0,12 | 0,15 | 0,16 |
| | WELDOX 1100 | < 1350 | 35 | 0,04-0,08 | 0,08 | 0,10 | 0,12 | 0,14 |

Richtwerte für den Einsatz der KARNASCH VHM-Hochleistungsbohrer mit Innenkühlung
Recommended cutting data for solid carbide twist drill, with interior cooling supply

22 0409

Die angegebenen Richtwerte für die Schnittgeschwindigkeit Vc sind je nach Bohrtiefe bezogen auf den Durchmesser mit den untenstehenden Korrekturfaktoren Kfv zu multiplizieren.

| | | | | | |
|-----|-----|-----|-----|-----|------|
| Kfv | 1xD | 3xD | 5xD | 8xD | 12xD |
| | 1,2 | 0,9 | 0,8 | 0,7 | 0,6 |

Die in den Schnittwerttabellen enthaltenen Richtwerte gelten nur beim Einsatz von Schrumpfpund Hydrodehnspannfutter.

The indicated cutting date in our guideline tabel are valid for use in shrinking or hydraulic expansion chuck.

The indicated standard values for the cutting speed Vc depends on drilling depth related to the diameter to multiply by the correction factor Kfv.

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit / Strength Härte / Hardness | Schnittge- schwindigkeit / Cutting speed Vc (m/min) | Vorschub pro Umdrehung (mm/U) bezogen auf den Bohrdurchmesser Recommended feed rate (mm per rev.) based on diameter range | | | | |
|-----------------------------------|---|---|--|--|-------------|-------------|-------------|-------------|
| | | | | Ø 3-5 | Ø 5-8 | Ø 8-12 | Ø 12-16 | Ø 16-20 |
| 3.1 - 3.2 - 4.1 - 4.2 - 4.3 | X12CrNi18/8 X10CrNiNb18/9 | | 25 - 55 | 0,04 - 0,10 | 0,05 - 0,15 | 0,05 - 0,18 | 0,08 - 0,20 | 0,10 - 0,20 |
| 6.2 - 6.2 | | | 15 - 45 | 0,02 - 0,07 | 0,04 - 0,10 | 0,06 - 0,12 | 0,08 - 0,15 | 0,08 - 0,15 |
| 7.1 - 7.2 - 7.3 | GG 20, GGG40 GTS 45 | <200 HB | 80 - 130 | 0,10 - 0,25 | 0,15 - 0,30 | 0,20 - 0,40 | 0,25 - 0,45 | 0,30 - 0,50 |
| 7.4 | GG 30 GGG 50 GTW 40 | <250 HB | 70 - 115 | 0,10 - 0,20 | 0,12 - 0,25 | 0,15 - 0,35 | 0,20 - 0,40 | 0,25 - 0,45 |
| 7.5 - 7.6 | GG 40 GGG 70 GTS 70 | >250 HB | 60 - 100 | 0,10 - 0,20 | 0,12 - 0,25 | 0,15 - 0,35 | 0,20 - 0,40 | 0,25 - 0,45 |
| 9.3 | < 10% Si | | 100 - 400 | 0,10 - 0,25 | 0,15 - 0,35 | 0,25 - 0,45 | 0,30 - 0,50 | 0,35 - 0,55 |
| 9.4 - 9.5 | > 10% Si | | 90 - 300 | 0,10 - 0,25 | 0,15 - 0,35 | 0,25 - 0,45 | 0,30 - 0,50 | 0,35 - 0,55 |
| 10.2 10.2.1 | Kupfer / Copper Messing / Brass Bronze / Bronze | | 70 - 300 | 0,07 - 0,18 | 0,12 - 0,25 | 0,20 - 0,35 | 0,25 - 0,45 | 0,30 - 0,50 |
| | Inconel | | 15 - 35 | 0,02 - 0,07 | 0,04 - 0,10 | 0,06 - 0,12 | 0,08 - 0,15 | 0,08 - 0,18 |

Richtwerte für den Einsatz der KARNASCH VHM-Hochleistungsbohrer – Typ W ohne Innenkühlung
Recommended cutting data for solid carbide twist drill Typ W, without interior cooling supply

22 0360

| Werkstoffgruppe Material group | Werkstoff Material | Festigkeit Strength | 0,50 - 0,75 | 0,80 - 0,95 | 1,00 - 1,15 | 1,20 - 1,45 | 1,50 - 1,95 | 2,00 - 2,50 |
|-----------------------------------|--|-------------------------|--|--|--|--|--|--|
| 9.1 9.2 | Alu Alulegierungen Aluminum alloys | < 350 N/mm ² | n = 20.000 f = 0,05 step = 0,5 > 5xD | n = 20.000 f = 0,06 step = 0,8 > 5xD | n = 20.000 f = 0,08 step = 1,0 > 5xD | n = 18.000 f = 0,10 step = 1,2 > 5xD | n = 15.000 f = 0,11 step = 1,5 > 5xD | n = 12.000 f = 0,12 step = 2,0 > 5xD |
| 10.1 10.3 | Kupfer Kupferlegierungen Copper alloys | < 350 N/mm ² | n = 20.000 f = 0,05 step = 0,5 > 5xD | n = 20.000 f = 0,06 step = 0,8 > 5xD | n = 20.000 f = 0,08 step = 1,0 > 5xD | n = 18.000 f = 0,10 step = 1,2 > 5xD | n = 15.000 f = 0,11 step = 1,5 > 5xD | n = 12.000 f = 0,12 step = 2,0 > 5xD |
| 11.1 | Kunststoffe Duroplaste Thermoplaste | - | n = 20.000 f = 0,05 step = 1,0 > 5xD | n = 20.000 f = 0,06 step = 1,0 > 5xD | n = 20.000 f = 0,08 step = 1,5 > 5xD | n = 18.000 f = 0,10 step = 1,8 > 5xD | n = 15.000 f = 0,11 step = 2,0 > 5xD | n = 12.000 f = 0,12 step = 3,0 > 5xD |

Richtwerte für den Einsatz von Karnasch VHM Stack-Drills
Recommended cutting data for Karnasch solid carbide stack-drills

29 0200 29 0250
29 0210 29 0260

| Werkstoff Material | | Ø 3,0 - Ø 5,0 | Ø 5,1 - Ø 8,0 | Ø 8,1 - Ø 12,0 |
|--------------------------|----------|---------------|---------------|----------------|
| CFK / CFRP GFK / GFRP | Vc m/min | 70-160 | 70 - 160 | 70 - 160 |
| | f mm/U | 0,05 - 0,07 | 0,05 - 0,08 | 0,06 - 0,14 |
| Aluminium | Vc m/min | 50 - 450 | 50 - 450 | 50 - 450 |
| | f mm/U | 0,06 - 0,23 | 0,1 - 0,35 | 0,16 - 0,38 |
| Titan Titanium | Vc m/min | 10 - 55 | 10 - 55 | 10 - 55 |
| | f mm/U | 0,015 - 0,08 | 0,03 - 0,18 | 0,05 - 0,25 |



22 0526

Richtwerte für den Einsatz der KARNASCH PKD-Hochleistungs-Vierfasenbohrer mit Innenkühlung Recommended cutting data for PKD four-in-one drill, with interior cooling supply

Die angegebenen Richtwerte für die Schnittgeschwindigkeit V_c sind je nach Bohrtiefe bezogen auf den Durchmesser mit den untenstehenden Korrekturfaktoren KF_v zu multiplizieren.

The indicated standard values for the cutting speed V_c depends on drilling depth related to the diameter to multiply by the correction factor KF_v .

| | | | | | |
|--------|-----|-----|-----|-----|------|
| KF_v | 1xD | 3xD | 5xD | 8xD | 12xD |
| | 1,2 | 0,9 | 0,8 | 0,7 | 0,6 |

Die in den Schnittwerttabellen enthaltenen Richtwerte gelten nur beim Einsatz von Spannfuttern nach DIN 1835 Form E und Hydrodehnspannfutter.

The indicated cutting data in our guideline table are only valid for use of chucks according to DIN 1835 Form E and hydraulic expansion chucks.

| Werkstoffgruppe Material group | Werkstoff Material | Schnittgeschwindigkeit Cutting speed V_c (m/min) | Vorschub pro Umdrehung (mm/U) bezogen auf den Bohrdurchmesser Recommended feed rate (mm per rev.) based on diameter range | | | | |
|-----------------------------------|-----------------------|--|--|-----------|-----------|-----------|-----------|
| | | | 3-5 | 5-8 | 8-12 | 12-16 | 16-20 |
| 9.3 - 9.4 - 9.5 | < 10% Si | 200-600 | 0,10-0,25 | 0,15-0,35 | 0,25-0,45 | 0,30-0,50 | 0,35-0,55 |
| | > 10% Si | 150-400 | 0,10-0,25 | 0,15-0,35 | 0,25-0,45 | 0,30-0,50 | 0,35-0,55 |
| 10.2 10.2.1 | Kupfer / Copper | 200-400 | 0,07-0,18 | 0,12-0,25 | 0,20-0,35 | 0,25-0,45 | 0,30-0,50 |
| | Bronze / Bronze | 120-350 | 0,07-0,18 | 0,12-0,25 | 0,20-0,35 | 0,25-0,45 | 0,30-0,50 |
| | Messing / Brass | 100-300 | 0,07-0,18 | 0,12-0,25 | 0,20-0,35 | 0,25-0,45 | 0,30-0,50 |

22 0468

Richtwerte für den Einsatz von VHM-Bohren < 70 HRC Recommended cutting data for solid carbide twist drill, hardness of work materials >68 HRC

HINWEIS:
Gewindebohrer zur Hartbearbeitung HHC bis 63 HRC
Art.-Nr. 22 2025
Art.-Nr. 22 2215
Art.-Nr. 22 2239

INFORMATION:
Taps for machining hardened material until 63 HRC
Art.-Nr. 22 2025
Art.-Nr. 22 2215
Art.-Nr. 22 2239

| Werkstoffgruppe Material group | 8.1 50 - 55 HRC | | 8.2 56 - 62 HRC | | 8.3 63 - 70 HRC | |
|-----------------------------------|-----------------------|----------------------|-----------------------|----------------------|-----------------------|----------------------|
| | n=U/min. Vc=m/min. | Vf=mm/min. f=mm/U | n=U/min. Vc=m/min. | Vf=mm/min. f=mm/U | n=U/min. Vc=m/min. | Vf=mm/min. f=mm/U |
| 0,3 mm | 20.000 18,8 | 30 0,0015 | 20.000 18,8 | 26 0,0013 | 20.000 18,8 | 16 0,0008 |
| 0,4 mm | 18.000 22,6 | 40 0,0022 | 18.000 22,6 | 36 0,002 | 18.000 22,6 | 36 0,002 |
| 0,5 mm | 15.000 23,5 | 45 0,003 | 15.000 23,5 | 42 0,0028 | 15.000 23,5 | 37,5 0,0025 |
| 0,6 mm | 15.000 28,3 | 68 0,0045 | 15.000 28,3 | 68 0,0045 | 15.000 28,3 | 60 0,004 |
| 0,7 mm | 12.000 26,4 | 120 0,01 | 12.000 26,4 | 120 0,01 | 12.000 26,4 | 96 0,008 |
| 0,8 mm | 12.000 30 | 156 0,013 | 12.000 30 | 150 0,0125 | 12.000 30 | 144 0,012 |
| 0,9 mm | 10.000 28,3 | 200 0,02 | 10.000 28,3 | 200 0,02 | 10.000 28,3 | 180 0,018 |
| 1,0 mm | 10.000 31,4 | 200 0,02 | 10.000 31,4 | 200 0,02 | 10.000 31,4 | 180 0,018 |
| 1,1 mm | 7.000 24,2 | 140 0,02 | 7.000 24,2 | 140 0,02 | 7.000 24,2 | 126 0,018 |
| 1,2 mm | 6.600 24,9 | 132 0,02 | 6.600 24,9 | 132 0,02 | 6.600 24,9 | 118 0,018 |
| 1,3 mm | 6.100 24,9 | 122 0,02 | 6.100 24,9 | 122 0,02 | 6.100 24,9 | 110 0,018 |
| 1,4 mm | 5.700 25 | 114 0,02 | 5.700 25 | 114 0,02 | 5.700 25 | 102 0,018 |
| 1,5 mm | 5.300 25 | 106 0,02 | 5.300 25 | 106 0,02 | 5.300 25 | 95 0,018 |
| 1,6 mm | 5.000 25 | 100 0,02 | 5.000 25 | 100 0,02 | 5.000 25 | 90 0,018 |
| 1,8 mm | 4.400 25 | 88 0,02 | 4.400 25 | 88 0,02 | 4.400 25 | 79 0,018 |
| 1,9 mm | 4.200 25 | 84 0,02 | 4.200 25 | 84 0,02 | 4.200 25 | 76 0,018 |
| 2,0 mm | 4.000 25 | 80 0,02 | 4.000 25 | 80 0,02 | 4.000 25 | 72 0,018 |
| 2,6 mm | 2.500 15 > 25 | 100 0,03 > 0,05 | 1.700 10 > 15 | 65 0,03 > 0,05 | 1.300 7 > 12 | 40 0,02 > 0,04 |
| 3,0 mm | 2.100 15 > 25 | 85 0,03 > 0,05 | 1.400 10 > 15 | 55 0,03 > 0,05 | 1.050 7 > 12 | 30 0,02 > 0,04 |
| 3,5-4,2 mm | 1.600 15 > 25 | 60 0,03 > 0,05 | 1.050 10 > 15 | 40 0,03 > 0,05 | 800 7 > 12 | 23 0,02 > 0,04 |
| 4,5-5,3 mm | 1.300 15 > 25 | 60 0,04 > 0,06 | 800 10 > 15 | 40 0,04 > 0,06 | 630 7 > 12 | 25 0,03 > 0,05 |
| 5,5-6,0 mm | 1.050 15 > 25 | 75 0,06 > 0,08 | 700 10 > 15 | 40 0,05 > 0,07 | 530 7 > 12 | 26 0,04 > 0,06 |
| 7,1-7,3 mm | 900 15 > 25 | 60 0,06 > 0,08 | 600 10 > 15 | 35 0,05 > 0,07 | 460 7 > 12 | 22 0,04 > 0,06 |
| 8,0 mm | 800 15 > 25 | 60 0,06 > 0,09 | 520 10 > 15 | 33 0,05 > 0,08 | 400 7 > 12 | 20 0,04 > 0,06 |
| 9,0 mm | 700 15 > 25 | 50 0,06 > 0,09 | 460 10 > 15 | 30 0,05 > 0,08 | 360 7 > 12 | 18 0,04 > 0,06 |
| 10,0-10,5 mm | 640 15 > 25 | 50 0,06 > 0,1 | 420 10 > 15 | 30 0,05 > 0,09 | 330 7 > 12 | 17 0,04 > 0,07 |
| 11,0 mm | 580 15 > 25 | 45 0,06 > 0,1 | 380 10 > 15 | 25 0,05 > 0,09 | 300 7 > 12 | 15 0,04 > 0,07 |
| 11,9-12,0 mm | 520 15 > 25 | 48 0,06 > 0,12 | 350 10 > 15 | 25 0,05 > 0,10 | 270 7 > 12 | 15 0,04 > 0,08 |

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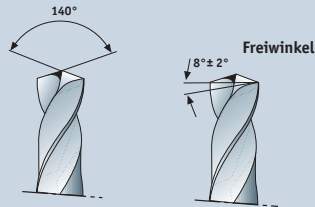
Index

Nachschleifanleitung für Karnasch VHM-Hochleistungsbohrer Regrinding informations for Karnasch solid carbide drills

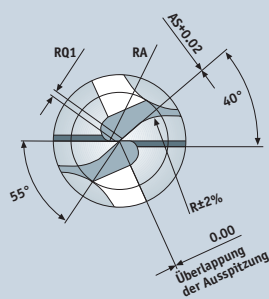
STAHL

| | | | |
|---------|---------|---------|---------|
| 22 0402 | 22 0403 | 22 0405 | 22 0406 |
| 22 0419 | 22 0425 | | |

1 Schneide



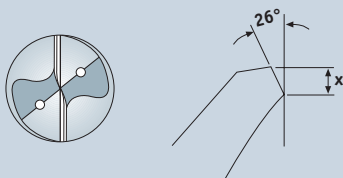
2 Ausspitzung



3 Mass der Restquerschneide

| Ø | RQ |
|-------------|------|
| 3,0 - 8,0 | 0,20 |
| 8,0 - 12,0 | 0,25 |
| 12,0 - 14,0 | 0,30 |
| 14,0 - 16,0 | 0,35 |
| 16,0 - 20,0 | 0,40 |

4 Hauptschneidenverrundung mit 25° Guss + Stahl = 0,05 - 0,1

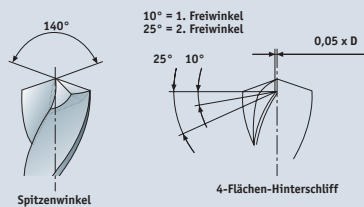


| Ø | x |
|-------------|------|
| 3,0 - 6,0 | 0,05 |
| 6,0 - 8,0 | 0,08 |
| 8,0 - 10,0 | 0,10 |
| 10,0 - 14,0 | 0,12 |
| 14,0 - 20,0 | 0,15 |

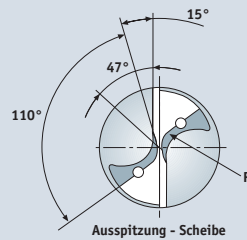
INOX

| | | | |
|---------|---------|--|--|
| 22 0407 | 22 0409 | | |
|---------|---------|--|--|

1 Schneide

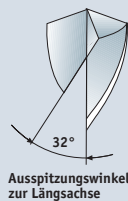


2 Ausspitzung-Scheibe



| Ø | R |
|-------------|-----|
| 3,0 - 6,0 | 0,5 |
| 6,0 - 10,0 | 0,8 |
| 10,0 - 12,0 | 1,0 |
| 12,0 - 16,0 | 1,2 |
| 16,0 - 20,0 | 1,4 |

3 Ausspitzungswinkel zur Längsachse

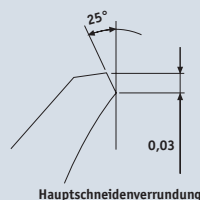


4 RQ = Restquerschneide

| Ø | RQ |
|-------------|------|
| 3,0 - 8,0 | 0,20 |
| 8,0 - 12,0 | 0,25 |
| 12,0 - 14,0 | 0,30 |
| 14,0 - 16,0 | 0,35 |
| 16,0 - 20,0 | 0,40 |

RQ=Restquerschneide

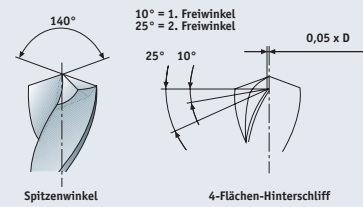
5 Hauptschneidenverrundung



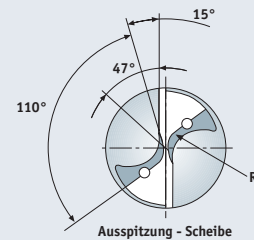
ALU

| | | | |
|---------|---------|--|--|
| 22 0411 | 22 0414 | | |
|---------|---------|--|--|

1 Schneide

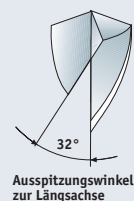


2 Ausspitzung-Scheibe



| Ø | R |
|-------------|-----|
| 3,0 - 6,0 | 0,5 |
| 6,0 - 10,0 | 0,8 |
| 10,0 - 12,0 | 1,0 |
| 12,0 - 16,0 | 1,2 |
| 16,0 - 20,0 | 1,4 |

3 Ausspitzungswinkel zur Längsachse

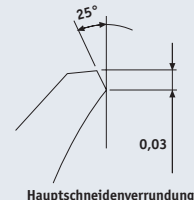


4 RQ = Restquerschneide

| Ø | RQ |
|-------------|------|
| 3,0 - 8,0 | 0,20 |
| 8,0 - 12,0 | 0,25 |
| 12,0 - 14,0 | 0,30 |
| 14,0 - 16,0 | 0,35 |
| 16,0 - 20,0 | 0,40 |

RQ=Restquerschneide

5 Hauptschneidenverrundung



Nachschleifanleitung für Karnasch VHM-Hochleistungsbohrer
 Regrinding informations for Karnasch solid carbide drills

GUSS

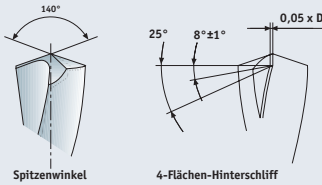
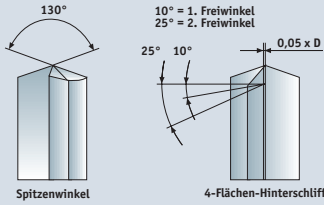
HHC

22 0418

22 0468

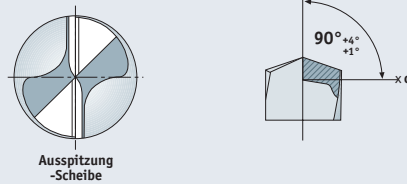
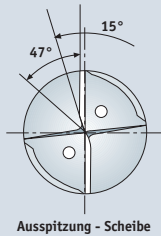
1 Schneide

1 Schneide



2 Ausspitzung-Scheibe

2 Ausspitzung-Scheibe



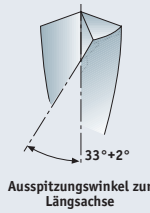
Ausspitzung - Scheibe

Ausspitzung - Scheibe

| Ø | R |
|-------------|-----|
| 3,0 - 6,0 | 0,5 |
| 6,0 - 10,0 | 0,8 |
| 10,0 - 12,0 | 1,0 |
| 12,0 - 16,0 | 1,2 |
| 16,0 - 20,0 | 1,4 |

3 Ausspitzungswinkel zur Längsachse

3 Ausspitzungswinkel zur Längsachse

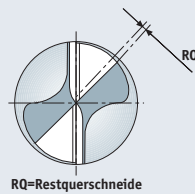


Ausspitzungswinkel zur Längsachse

Ausspitzungswinkel zur Längsachse

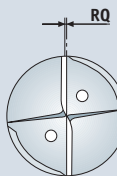
4 RQ = Restquerschnaide

4 RQ = Restquerschnaide



RQ=Restquerschnaide

| Ø | RQ |
|-------------|------|
| 3,0 - 8,0 | 0,20 |
| 8,0 - 12,0 | 0,25 |
| 12,0 - 14,0 | 0,30 |
| 14,0 - 16,0 | 0,35 |
| 16,0 - 20,0 | 0,40 |

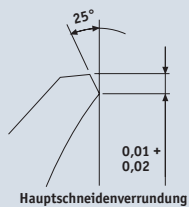


RQ=Restquerschnaide

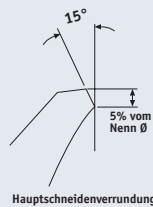
| Ø | RQ |
|-------------|------|
| 3,0 - 8,0 | 0,20 |
| 8,0 - 12,0 | 0,25 |
| 12,0 - 14,0 | 0,30 |
| 14,0 - 16,0 | 0,35 |
| 16,0 - 20,0 | 0,40 |

5 Hauptschneidenverrundung

5 Hauptschneidenverrundung



Hauptschneidenverrundung



Hauptschneidenverrundung



Empfohlene Schnittwerte für Vollhartmetall-Reibahlen / HSR Recommended cutting data for micro grain reamers / HSR

| Werkstoffgruppe material group | Festigkeit/Rigidity N/mm ² | Beschichtung / coating |
|-----------------------------------|--|---|
| | | Schnittgeschwindigkeit Vc in mm / cutting speed Vc in m/min |
| | | Werkstoffbeispiel / material example |
| 1.1 | bis 450 N/mm ² / up to 450 N/mm ² | C115, C22, Ck15, St37-3, 9SMn28, 9SMnPb28 |
| 1.2 | bis 650 N/mm ² / up to 650 N/mm ² | C35, C45, Ck25, Cf35, Ck45, Cf53, 15Mo3, 16Mo5 |
| 1.3 | bis 850 N/mm ² / up to 850 N/mm ² | St50-2, 16CrMo4, 16CrMo4, 16CrMo44, 12CrMo19 5 |
| 1.4 | bis 950 N/mm ² / up to 950 N/mm ² | St60-2, C55, C60, Ck55, Ck60, C105 W1 |
| 1.5 | bis 1100 N/mm ² / up to 1100 N/mm ² | St70-2, 49CrMo4, 42CrV6, 51CrMoV4 |
| 2.1 | bis 600 N/mm ² / up to 600 N/mm ² | 100Cr6, 51CrV4, 16MnCr5, 105WCr6, 42Cr4, 50NiCr13 |
| 2.2 | bis 950 N/mm ² / up to 950 N/mm ² | 100Cr2, 36NiCr6, 31NiCr14, GS-45, CrMoV10 4 |
| 2.3 | bis 1100 N/mm ² / up to 1100 N/mm ² | 41CrALMo7, 39CrMoV13 9 |
| 2.4 | bis 1300 N/mm ² / up to 1300 N/mm ² | 40CrMnMo7, X50CrMnNiNbN21 9, 35NiCr18 |
| 3.1 | bis 700 N/mm ² / up to 700 N/mm ² | X38CrMoV5 1, X40CrMoV5 1, X155CrVMo12 1 |
| 3.2 | bis 1150 N/mm ² / up to 1150 N/mm ² | S 12-1-4-5, S 10-4-3-10, S 6-5-2-5, S 6-5-2 |
| 4.1 | ferritisch/martensitisch / ferritic/martensitic | X 10 Cr 13 - X 15 Cr Ni Mn 188 |
| 4.2 | martensitisch / martensitic | G X 40 Cr Si 17 |
| 4.3 | austenitisch, austenitisch/ferritisch / austenitic, austenitic/ferritic | X 10 Cr Ni Mo Nb 1812 |
| 5.1 | Fe-Basis bis 650 N/mm ² / Fe-basis up to 650 N/mm ² | 1.4558, 1.4562, 1.4563, 1.4864, 1.4864 |
| 5.2 | Fe-Basis bis 750 N/mm ² / Fe-basis up to 750 N/mm ² | X 5 Ni Cr ALTi 3120 |
| 5.3 | Cr-Ni-Basis bis 800 N/mm ² / Cr-Ni-basis up to 800 N/mm ² | Monell 400, Hastelloy C-4, Nimonic 75, Inconel 625 |
| 5.4 | Cr-Ni-Basis bis 950 N/mm ² / Cr-Ni-basis up to 950 N/mm ² | Inconel X-750, Hastelloy B, Inconel 751 |
| 5.5 | Cr-Ni-Basis bis 1100 N/mm ² / Cr-Ni-basis up to 1100 N/mm ² | Monel K-500, Inconel 718 |
| 6.1 | Reintitan/Titanlegierungen bis 850 N/mm ² / pure titanium and titanium alloys up to 850 N/mm ² | Ti1, TiCu2, TiAl3V2.5, Ti1Pd |
| 6.2 | Titanlegierungen bis 1200 N/mm ² / titanium alloys up to 1200 N/mm ² | TiAl5Sn2, TiAl6V4, TiAl6V6Sn2, TiAl4Mo4Sn2 |
| 7.1 | Grauguss bis 180 HB / grey cast iron up to 180 HB | GG10, GG15 |
| 7.2 | Grauguss bis 260 HB / grey cast iron up to 260 HB | GG20, GG25, GG30, GG35, GG40 |
| 7.3 | Kugelgraphitguss bis 160 HB / modular cast iron up to 160 HB | GGG35, GGG40, GGG50 |
| 7.4 | Kugelgraphitguss bis 250 HB / modular cast iron up to 250 HB | GGG60, GGG70 |
| 7.5 | Temperguss bis 130 HB / malleable cast iron up to 130 HB | GTW-04, GTW-45, GTW-55, GTW-65, GTS-35, GTS-45 |
| 7.6 | Temperguss bis 230 HB / malleable cast iron up to 230 HB | GTW-35, GTS-55, GTS-65, GTS70 |
| 8.1 | 45-55 HRC / steel 45-55 HRC | Toolux 44 |
| 8.2 | 55-62 HRC / steel 55-62 HRC | |
| 8.3 | 60-67-70 HRC / steel 60-67-70 HRC | |
| 8.4 | Hartguss bis 48 HRC / hardened cast iron up to 48 HRC | G-X260NiCr4 2, G-X330NiCr4 2, G-X300CrNi9 5 2 |
| 8.1 | 45-55 HRC / steel 45-55 HRC | Toolux 44 |
| 8.2 | 55-60 HRC / steel 55-62 HRC | |
| 8.3 | 60-67-70 HRC / steel 60-67-70 HRC | |
| 8.4 | Hartguss bis 48 HRC / hardened cast iron up to 48 HRC | |
| 9.1 | Alu Knetlegierungen bis 250 N/mm ² / malleable alu alloy up to 250 N/mm ² | Al99.5, AlMg1 |
| 9.2 | Alu Knetlegierungen bis 350 N/mm ² / malleable alu alloy up to 350 N/mm ² | AlCuSiPb, G-AlCu5Ni1,5, AlZnMgCu0,5 |
| 9.3 | Alu-Gusslegierungen <= 12% Si bis 250 N/mm ² / cast alu alloy <= 12% Si up to 250 N/mm ² | G-ALSi9Mg, G-ALSi10Mg, G-ALSi10Mg(Cu), G-ALSi12 |
| 9.4 | Alu-Gusslegierungen <= 12% Si bis 300 N/mm ² / cast alu alloy <= 12% Si up to 300 N/mm ² | G-ALCu4TiMg, G-ALSi7Mg |
| 9.5 | Alu-Gusslegierungen <= 12% Si bis 450 N/mm ² / cast alu alloy <= 12% Si up to 450 N/mm ² | G-ALSi18Cu4, G-ALSi21CuNiMg |
| 9.6 | Magnesium / magnesium | MgMn2, CrMgAl8Zn1 |
| 10.1 | Kupfer - Automatenlegierung, Blei > 1% / copper machining alloys, Pb > 1 | G-CuSn7ZnPb, G-CuSn5ZnPb, G-CuPb10Sn |
| 10.2 | Bronze, Messing / bronze, brass | CuZn15, CuZn30, G-CuZn34Al2, CuCrZr, G-CuPb20Sn |
| 10.3 | Kupfer, Bleifreies Kupfer, Elektrolytkupfer / copper, lead-free copper, electrolytic copper | CuAl10Ni5Fe4, G-CuAl10Ni, G-CuSn10, G-CuSn12 |
| 11.1 | Thermoplaste / thermoplastics | Bakelit, Responal, Novodur, Pertinax |
| 11.2 | Duroplaste / duroplastics | |
| 11.3 | Faserverstärkte Kunststoffe / fibrous-reinforced plastics | CFK, GFK, AFK |

Reibzugabe in mm
Reaming allowance mm

| 22 1450 | | 22 1452 | | 22 1490 | | Vorschubgeschwindigkeit mm/U · Vorschubwerte sind Mittelwerte und können um ca. 35% nach oben und unten korrigiert werden Feed rate per revolution mm/rev · feed rates are average value and can be increased or reduced by 35% | | | | | | | |
|---------------------------|---------|---------------------------|----|---------------|-------------|--|--------------------|------------------|------------------|--|-------------------|-------------------------------|------------------------|
| unbeschichtet uncoated | | unbeschichtet uncoated | | FX-70 | | Ø 0,200 - 0,599 | Ø 0,600 - 0,396 | Ø 3,97 - 4,96 | Ø 4,97 - 7,96 | Ø 7,97 - 9,96 | Ø 9,97 - 12,03 | Kühlschmierstoff Lubricant | Kühlmitteldruck bar |
| Vc | | Vc | | Vc | | | | | | | | | |
| 100-130 | 70-90 | -- | -- | 0,003 - 0,008 | 0,10 - 0,15 | 0,30 - 0,40 | 0,40 - 0,60 | 0,50 - 0,65 | 0,60 - 0,90 | Schneidöl / oil Emulsion / emulsion mind. 12% / min. 12% | 30 - 60 | | |
| 90-120 | 60-80 | -- | -- | | 0,10 - 0,15 | | | | | | | | |
| 80-110 | 50-60 | -- | -- | | 0,10 - 0,15 | | | | | | | | |
| 70-90 | 40-70 | -- | -- | | 0,10 - 0,15 | | | | | | | | |
| 70-85 | 40-70 | -- | -- | | 0,10 - 0,15 | | | | | | | | |
| 70-80 | 50-60 | -- | -- | 0,003 - 0,008 | 0,10 - 0,15 | 0,30 - 0,40 | 0,40 - 0,60 | 0,50 - 0,65 | 0,60 - 0,90 | Schneidöl / oil Emulsion / emulsion mind. 12% / min. 12% | 30 - 60 | | |
| 70-80 | 50-60 | -- | -- | | 0,10 - 0,15 | | | | | | | | |
| 60-80 | 40-60 | -- | -- | | 0,10 - 0,15 | | | | | | | | |
| 60-80 | 40-60 | -- | -- | | 0,10 - 0,15 | | | | | | | | |
| 30-40 | 20-30 | -- | -- | 0,003 - 0,008 | 0,10 - 0,15 | 0,30 - 0,40 | 0,40 - 0,60 | 0,50 - 0,65 | 0,60 - 0,90 | Schneidöl / oil | 40 - 70 | | |
| 30-40 | 20-30 | -- | -- | | 0,10 - 0,15 | 0,25 - 0,35 | 0,30 - 0,45 | 0,40 - 0,50 | 0,45 - 0,60 | Schneidöl / oil | 40 - 70 | | |
| 20-30 | 20-30 | -- | -- | 0,002 - 0,006 | 0,10 - 0,12 | 0,25 - 0,35 | 0,30 - 0,45 | 0,40 - 0,50 | 0,45 - 0,60 | Schneidöl / oil | 30 - 60 | | |
| 20-30 | 20-30 | -- | -- | | 0,10 - 0,12 | | | | | | | | |
| 10-20 | 10-20 | -- | -- | | 0,10 - 0,12 | | | | | | | | |
| 20-30 | 20-30 | -- | -- | 0,002 - 0,005 | 0,06 - 0,08 | 0,20 - 0,30 | 0,25 - 0,35 | 0,30 - 0,40 | 0,35 - 0,45 | Schneidöl / oil | 30 - 60 | | |
| 20-30 | 20-30 | -- | -- | | 0,06 - 0,08 | | | | | | | | |
| 20-30 | 20-30 | -- | -- | | 0,06 - 0,08 | | | | | | | | |
| 20-30 | 20-30 | -- | -- | | 0,06 - 0,08 | | | | | | | | |
| 10-20 | 10-20 | -- | -- | 0,002 - 0,004 | 0,04 - 0,06 | 0,20 - 0,35 | 0,30 - 0,45 | 0,40 - 0,50 | 0,45 - 0,60 | Schneidöl / oil | 40 - 70 | | |
| -- | -- | -- | -- | | 0,04 - 0,06 | | | | | | | | |
| 40-70 | 30-50 | -- | -- | 0,005 - 0,01 | 0,08 - 0,15 | 0,50 - 0,65 | 0,60 - 0,75 | 0,70 - 0,85 | 0,80 - 0,95 | Schneidöl / oil Luft / air Emulsion / emulsion mind. 12%/min. 12% | 40 - 80 | | |
| 40-70 | 30-50 | -- | -- | | 0,08 - 0,15 | | | | | | | | |
| 40-70 | 30-50 | -- | -- | | 0,08 - 0,15 | | | | | | | | |
| 40-70 | 30-50 | -- | -- | | 0,08 - 0,15 | | | | | | | | |
| 40-70 | 30-50 | -- | -- | | 0,08 - 0,15 | | | | | | | | |
| 70-60 | 40-50 | -- | -- | | 0,08 - 0,15 | | | | | | | | |
| -- | -- | -- | -- | - | - | 0,02 - 0,06 | 0,06 - 0,10 | 0,10 - 0,15 | 0,15 - 0,20 | 20% Emulsion / emulsion | 60 - 80 | | |
| -- | -- | -- | -- | - | - | 0,02 - 0,06 | 0,06 - 0,10 | 0,10 - 0,15 | 0,15 - 0,20 | | | | |
| -- | -- | -- | -- | - | - | - | - | - | - | | | | |
| -- | -- | -- | -- | - | - | 0,05 - 0,10 | 0,08 - 0,15 | 0,15 - 0,20 | 0,20 - 0,25 | | | | |
| -- | -- | 25 | -- | - | - | 0,03 | 0,05 | 0,10 | 0,15 | 12% Emulsion | | | |
| -- | -- | 18 | -- | - | - | 0,03 | 0,05 | 0,10 | 0,15 | 12% Emulsion | | | |
| -- | -- | 12 | -- | - | - | 0,03 | 0,05 | 0,10 | 0,15 | 12% Emulsion | | | |
| -- | -- | 30 | -- | - | - | 0,05 | 0,08 | 0,15 | 0,20 | 12% Emulsion | | | |
| 180-250 | 100-120 | -- | -- | 0,004 - 0,012 | 0,12 - 0,16 | 0,50 - 0,65 | 0,60 - 0,75 | 0,70 - 0,85 | 0,80 - 0,95 | Petroleum/ Terpentinölersatz Schneidöl / oil Luft / air | 40 - 80 | | |
| 180-250 | 100-120 | -- | -- | | 0,12 - 0,16 | | | | | | | | |
| 180-250 | 100-120 | -- | -- | | 0,12 - 0,16 | | | | | | | | |
| 180-250 | 100-120 | -- | -- | | 0,12 - 0,16 | | | | | | | | |
| 180-250 | 100-120 | -- | -- | | 0,12 - 0,16 | | | | | | | | |
| 180-260 | 100-120 | -- | -- | 0,005 - 0,012 | 0,12 - 0,16 | 0,50 - 0,65 | 0,60 - 0,75 | 0,70 - 0,85 | 0,80 - 0,95 | Schneidöl / oil Emulsion 12% | 40 - 80 | | |
| 200-300 | 160-200 | -- | -- | | 0,12 - 0,16 | | | | | | | | |
| -- | -- | -- | -- | 0,008 - 0,015 | 0,12 - 0,16 | 0,50 - 0,65 | 0,60 - 0,75 | 0,70 - 0,85 | 0,80 - 0,95 | Luft/air | 40 - 80 | | |
| -- | -- | -- | -- | | 0,12 - 0,16 | | | | | | | | |
| -- | -- | -- | -- | | 0,12 - 0,16 | | | | | | | | |
| min. | | | | | 0,08 | 0,08 | 0,10 | 0,10 | 0,15 | | | | |
| mittel/middle | | | | | 0,10 | 0,12 | 0,15 | 0,20 | 0,20 | | | | |
| max. | | | | | 0,15 | 0,20 | 0,25 | 0,30 | 0,30 | | | | |



Problembehebung bei VHM-Reibahlen Practical solutions for carbide reaming problems

Wichtige Einsatzkriterien zu Karnasch Hochleistungsreibahlen mit Innenkühlung

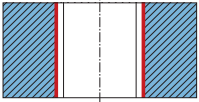
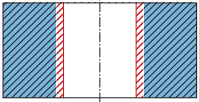
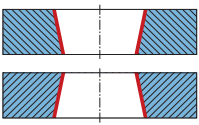
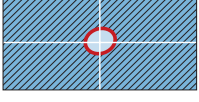
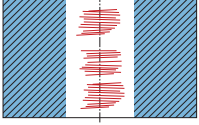
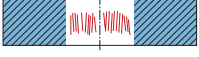


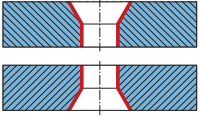

Karnasch Hochleistungsreibahlen mit Innenkühlung sind Werkzeuge für die Feinstbearbeitung und sollten daher in Hydrodehnspannfuttern, Hochgenauigkeitsspannzangen oder im Schrumpffutter aufgenommen werden. Die enorm hohe Rundlaufgenauigkeit, welche mit diesen Werkzeugaufnahmen erreicht werden, kommen dem Bearbeitungsergebnis wesentlich zugute. Karnasch Hochleistungsreibahlen mit Innenkühlung können nach Erreichen des Standzeitendes in der Regel mehrfach nachgeschliffen werden.

Es ist wichtig, die Hochleistungsreibahlen rechtzeitig nachzuschleifen um den Verschleiß zu minimieren und die Produktionssicherheit zu optimieren. Nutzen Sie unser Know-How für Ihre Fertigung. Sollte sich widererwartend ein Bearbeitungsproblem ergeben, haben wir Ihnen einige Punkte zur Problembehebung aufgezeichnet.

Important criteria for the operational application of Karnasch high-performance reamers with internal cooling

Karnasch high-performance reamers with internal cooling are tools for precision finishing and therefore should be received in hydro strain chucks, high-precision collet chucks, or in shrink chucks. The extremely high true-running accuracy which is reached with these tool-receiving sockets is of considerable benefit for the processing result.

Karnasch high-performance reamers with internal cooling can usually be resharpened several times after reaching the end of the dwell time. It is important to resharpen the high-performance reamers in good time in order to minimize the wear and to optimize the production process. Take advantage of our know-how for your production. If, contrary to expectation, there should be processing problems we have listed several steps for the solution of these problems.

| | Problem: | Ursache / Reason: | Lösung / Solution: |
|---|---|--|--|
| 1 |  A. Bohrung ist zu groß Bore too large | <ol style="list-style-type: none"> 1. Werkzeug-\varnothing zu groß – Reamer too big 2. Fluchtung Werkzeug zu Maschine ungenau – Alignment reamer to machine not precise 3. Aufbauschneide – Built up edge 4. Schmierung ungeeignet – Unsuitable coolant 5. Zu wenig Spantiefe – Depth of cut too small | <ol style="list-style-type: none"> 1. Ausgleichhalter einsetzen – Use compensation chuck 2. Flucht korrigieren bzw. Ausgleichs- oder Pendelhalter einsetzen – Correct alignment or insert compensation or floating chuck 3/4. Anderen Kühlschmierstoff wählen – Select a different coolant 5. Kleine Reibahle, eventl. im \varnothing kleiner läppen – Small reamer, lapping with smaller \varnothing if necessary |
| 2 |  B. Bohrung zu klein Bore too small | <ol style="list-style-type: none"> 1. Werkzeug verschlissen – Worn reamer 2. Kühlschmiermittel ungeeignet – Wrong coolant 3. Zu geringe Spantiefe – Depth of cut too small 4. Werkstück verspannt – Deformation through fixation of the work piece | <ol style="list-style-type: none"> 1. Neues Werkzeug verwenden – Use new reamer 2. Kühlschmiermittel wechseln – Change coolant 3. Reibzugabe ändern – Change reaming allowance 4. Spannsystem überprüfen – Check the clamping system |
| 3 |  C. Bohrung ist konisch Tapered bore | <ol style="list-style-type: none"> 1. Ungenaue Fluchtung – Faulty alignment 2. Aufbauschneide – Built up edge | <ol style="list-style-type: none"> 1. Achsfehler auf max. 0,005 mm verringern oder wenn nicht möglich, achsparallelen Ausgleich verwenden Reduce axis error to max. 0.005 mm or if that is not possible, use axis-parallel compensation 2. Anderen Kühlschmierstoff wählen Select a different coolant |
| 4 |  D. Bohrung ist unrund und zeigt Rattermarken Bore not true, shows chatter marks | <ol style="list-style-type: none"> 1. Zu grosser Rundlauf- und Fluchtungsfehler Concentricity a. alignment error too large 2. Schräge Anschnittfläche – Wrong cutting geometry 3. Werkstück ist verspannt – Deformation through fixation of the work piece | <ol style="list-style-type: none"> 1. Spanndruck verringern od. Spannart ändern – Reduce clamping pressure or change clamping type 2. Flucht korrigieren od. Ausgleichs- u. Pendelhalter einsetzen – Correct alignment or insert compensation or floating chuck 3. Bohrung ansenken – Countersink bore |
| 5 |  E. Oberflächengüte ungenügend Surface quality unsatisfactory | <ol style="list-style-type: none"> 1. Schneiden verschlissen – Cutting edges blunt 2. Werkzeug läuft nicht rund – Reamers does not run true 3. Falsche Schnittdaten – Wrong machining data 4. Spänefluss wird behindert/Kühlmitteldruck nicht ausreichend Bad chip flow (insufficient coolant) | <ol style="list-style-type: none"> 1. Vorschub verringern – Reduce feed 2. Kühlschmierstoff anreichern – Concentrate the coolant 3. Vc und f verändern $\pm 25\%$ Change Vc and f $\pm 25\%$ 4. Reibahle neu schärfen bzw. neue Reibahle Resharpen reamer or replace with new one |
| 6 |  F. Vorschubmarken in der Bohrung Feed marks in bore | <ol style="list-style-type: none"> 1. Exzentrische Spindel oder Werkzeug Eccentric spindle or reamer | <ol style="list-style-type: none"> 1. Achsfehler auf max. 0,005 mm verringern oder wenn nicht möglich, achsparallelen Ausgleich verwenden Reduce axis error to max. 0.005 mm or, if that is not possible, use axis-parallel compensation |
| 7 |  M. Werkzeug klemmt Reamers jams | <ol style="list-style-type: none"> 1. Zu geringe Konizität – Reamers taper too slight because of wear relieving | <ol style="list-style-type: none"> 1. Verjüngung vergrößern, schärfen der Reibahle Increase taper, sharpen reamer |
| 8 |  G. Bohrung bauchig Bore bulges | <ol style="list-style-type: none"> 1. Verspannung des Werkstückes auch bei großen Wandstärken möglich. Workpiece may be distorted even with large wall thicknesses | <ol style="list-style-type: none"> 1. Spannkraft verringern bzw. Spannkrafteinwirkungsrichtung ändern Reduce clamping force or change direction of clamping force |
| 8 |  H. Konischer Einlauf Konischer Auslauf Conical run-in Conical run-out | <ol style="list-style-type: none"> 1. Flucht ungenau – Imprecise alignment 2. Differenz zwischen Spindel und Werkzeugachse Difference between spindle and tool axis 3. Reibahle schneidet hinten nach Reamer is cutting back | <ol style="list-style-type: none"> 1. Flucht korrigieren – Correct alignment 2. Werkzeugachse/Achsfluchtung korrigieren – Correct tool axis/axis alignment 3. Schneiden-Verjüngung kontrollieren – Check cutting taper |
| 9 |  K. Bohrung verläuft Bore drifts | <ol style="list-style-type: none"> 1. Vorbearbeitungszugabe zu gering – Not enough preprocessing allowance 2. Mangelhafte Vorbearbeitung – Faulty preprocessing | <ol style="list-style-type: none"> 1. Reibzugabe erhöhen – Increase reaming allowance 2. Vorbearbeitung prüfen – Check preprocessing |

Reibahlen – Herstellungstoleranzen Auszug aus DIN 1420
Reamers – manufacturing tolerances Excerpt from DIN 1420

1. Grundsätzliches zur Festlegung der Herstellungstoleranz

Die in dieser Norm angegebenen Herstellungstoleranzen sind bestimmten Toleranzfeldern der zu reibenden Löchern zugeordnet. Sie gewährleisten im allgemeinen, dass das geriebene Loch innerhalb des zugehörigen Toleranzfeldes liegt und das gleichzeitig die Reibahle wirtschaftlich ausgenutzt werden kann.

Es ist jedoch zu berücksichtigen, dass die Größe des geriebenen Loches außer von der Herstellungstoleranz der Reibahle noch von anderen Faktoren abhängt, z.B. von den Winkeln an der Schneide, vom Anschnitt der Reibahle, von der Aufspannung des Werkstückes, von der Werkzeugaufnahme, vom Zustand der Werkzeugmaschine, von der Schmierung und vom Werkstoff des Werkstückes, in dem gerieben wird. Demzufolge können Sonderfälle auftreten, in denen andere Herstellungstoleranzen günstiger sind.

Mit Rücksicht auf eine wirtschaftliche Herstellung und Lagerhaltung sowie auf die Austauschbarkeit von Reibahlen verschiedener Hersteller sollten jedoch nur in wirklich begründeten Sonderfällen andere Herstellungstoleranzen gefordert werden.

2. Ermittlung der zulässigen Größt- und Kleinstdmaße von Reibahlen

Der zulässige größte Durchmesser d_1 max. der Reibahle liegt um 15% der jeweiligen Bohrungs-Toleranz (0,15 IT) unter dem zulässigen Größtmaß der Bohrung (siehe Bild). Hierbei wird der Wert 0,15 IT auf dem nächst größeren ganzzahligen oder halben μm -Wert gerundet, so dass für d_1 max. glatte μm -Werte entstehen. Der zulässige kleinste Durchmesser d_1 min. der Reibahle liegt bei 35% der jeweiligen Bohrungs-Toleranz (0,35 IT) unter dem zulässigen Größtmaß der Bohrung d_1 max.

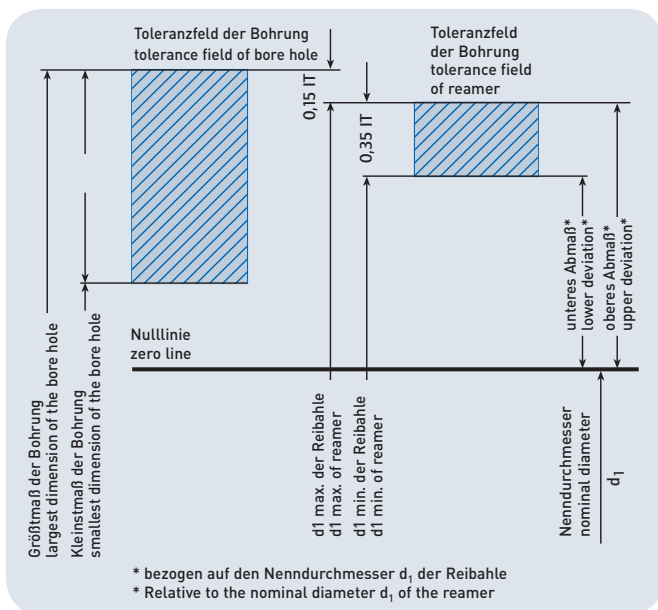
3. Vereinfachte Ermittlung der zulässigen Größt- und Kleinstdmaße von Reibahlen

Um das Rechnen zu vereinfachen, sind für die gebräuchlichsten Toleranzfelder die oberen und unteren Abmaße vom Nenndurchmesser d_1 der Reibahle in den Tabellen auf der folgenden Seite aufgeführt. Mit Hilfe dieser Abmaße können die zulässigen Größt- und Kleinstdmaße der Reibahlen auf einfachste Weise errechnet werden.

4. Bezeichnung (Auszug)

Werden in Sonderfällen Reibahlen mit von dieser Norm abweichenden Größt- und Kleinstdmaßen bestellt, so ist in der Bezeichnung an Stelle des ISO-Kurzzeichens für das Bohrungstoleranzfeld das obere und untere Abmaß der Reibahle in μm anzugeben, z.B. für eine Reibahle mit Nenndurchmesser 20 mm, oberes Abmaß = + 15 μm : Reibahle 20p 25 p 15 p DIN...

In der Bezeichnung wird an Stelle des Pluszeichens ein p und an Stelle des Minuszeichens ein m gesetzt, weil die Zeichen "+" und "-" sich nicht auf allen Maschinen, insbesondere der Daten verarbeitenden Maschinen, schreiben lassen.



1. Basic principles for determining manufacturing tolerance

The manufacturing tolerances specified in this standard are assigned to specific tolerance fields of the holes to be reamed. These tolerances ensure in general that the reamed hole will be within the relevant tolerance field while also guaranteeing economical use of the reamer.

It must be considered, however, that the size of the reamed hole could still be outside the manufacturing tolerance of the reamer because of other factors, for example the angles on the cutting edges, the cut of the reamer, the way the workpiece is clamped, the tool receiving socket, condition of the tool machine, lubrication, or the material of the workpiece being reamed.

Because of this, special cases may arise where other manufacturing tolerances are more favorable.

In consideration of economical production and storage as well as replaceability of reamers made by different manufacturers, however, other manufacturing tolerances should only be used in special cases with real justification.

2. Determining the largest and smallest permissible dimensions of reamers

The largest permissible diameter d_1 max. of the reamer is 15% of the corresponding bore hole tolerance (0.15 IT), taking into account the largest permissible dimension of the bore hole (see picture).

The value of 0.15 IT is rounded up to the next greater whole-number or half μm value. This results in a smooth series of μm values for d_1 . The smallest permissible diameter d_1 min. of the reamer is 35% of the relevant bore hole tolerance (0.35 IT) below the largest permissible reamer diameter d_1 max.

3. Simplified determination of the largest and smallest permissible dimensions of reamers

To simplify calculations, the upper and lower deviations from the nominal diameter d_1 of the reamer for the most commonly used tolerance fields is shown in the tables on the following pages. Using these dimensional deviations, you can calculate the largest and smallest permissible dimensions of reamers quickly and easily.

4. Designation (excerpt)

If reamers are ordered in special cases with largest and smallest dimensions that deviate from this standard, the upper and lower deviations of the reamer must be indicated in the designation in μm instead of the ISO abbreviation for the bore hole tolerance field. For example, for a reamer with a nominal diameter of 20 mm, upper deviation = + 15 μm : Reamer 20p 25 p 15 p DIN...

A p is used in the designation instead of the plus sign and an m instead of the minus sign. This is because the symbols "+" and "-" cannot be written on all machines, especially the data for processing machines.

Einsatz von Kühlschmierstoffen

Beim Reiben sollte – wenn möglich – immer ein Kühlschmierstoff eingesetzt werden. Dieser erfüllt zugleich Kühl- und Schmierfunktionen, wobei beim Reiben bei niedrigen Schnittgeschwindigkeiten die Schmierung die wichtigste Funktion einnimmt.

Die Anforderungen, die an Kühlschmierstoffe gestellt werden:

- Die Reduktion der Reibung zwischen Span und Werkzeug, sowie zwischen Rundschliff-Fase und Bohrungswand
- Wegspülen von Spänen und Abriebteilchen
- Abführen von Wärme

Für das Reiben gelangen vorwiegend wassermischbare Kühlschmierstoffe, materialbedingt auch Luft, Öl und Petroleum zum Einsatz.

Insertion of Coolant

A cooling lubricant should always be used when cutting. This fulfils a cooling and lubricating function at the same time, when lubrication being the most important function when cutting at low cutting speeds.

The demands made on cooling lubricants:

- Reduction of the friction between metal chips and tool and between the cylindrical grinding bevel and bore-hole wall
- Washing away chippings and filings
- Dissipation of heat

Water miscible cooling lubricants are used primarily for cutting although cutting oils can also be used in exceptional cases.



Reibahlen-Herstellungstoleranzen in $\mu = 0,001 \text{ mm}$ Auszug aus DIN 1420 Fabrication tolerances for reamers in $\mu = 0,001 \text{ mm}$ Excerpt from DIN 1420

| Neendurchmesser der Reibahle Nominal diameter for reamers d1 in mm | Zulässiges oberes und unteres Abmaß vom Neendurchmesser d1 der Reibahle in μm für Bohrungs-Toleranzfeld Acceptable up and down allowance from nominal diameter d1 for reamer in μm for the tolerance zone of the drilling | | | | | | | | | |
|--|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | A | | B | | | | C | | | |
| | 9 | 11 | 8 | 9 | 10 | 11 | 8 | 9 | 10 | 11 |
| > 1 | + 291 | + 321 | + 151 | + 161 | + 174 | + 191 | + 71 | + 81 | + 94 | + 111 |
| < 3 | + 282 | + 300 | + 146 | + 152 | + 160 | + 170 | + 66 | + 72 | + 80 | + 90 |
| > 3 | + 295 | + 333 | + 155 | + 165 | + 180 | + 203 | + 85 | + 95 | + 110 | + 133 |
| < 6 | + 284 | + 306 | + 148 | + 154 | + 163 | + 176 | + 78 | + 84 | + 93 | + 106 |
| > 6 | + 310 | + 356 | + 168 | + 180 | + 199 | + 226 | + 98 | + 110 | + 129 | + 156 |
| < 10 | + 297 | + 324 | + 160 | + 167 | + 178 | + 194 | + 90 | + 97 | + 108 | + 124 |
| > 10 | + 326 | + 383 | + 172 | + 186 | + 209 | + 243 | + 117 | + 131 | + 154 | + 188 |
| < 18 | + 310 | + 344 | + 162 | + 170 | + 184 | + 204 | + 107 | + 115 | + 129 | + 149 |
| > 18 | + 344 | + 410 | + 188 | + 204 | + 231 | + 270 | + 138 | + 154 | + 181 | + 220 |
| < 30 | + 325 | + 364 | + 176 | + 185 | + 201 | + 224 | + 126 | + 135 | + 151 | + 174 |

| Neendurchmesser der Reibahle Nominal diameter for reamers d1 in mm | Zulässiges oberes und unteres Abmaß vom Neendurchmesser d1 der Reibahle in μm für Bohrungs-Toleranzfeld Acceptable up and down allowance from nominal diameter d1 for reamer in μm for the tolerance zone of the drilling | | | | | | | | | | | |
|--|--|------|------|------|------|------|------|-------|-------|-----|-----|------|
| | G | | H | | | | | | J | | | |
| | 6 | 7 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 6 | 7 | 8 |
| > 1 | + 7 | + 10 | + 5 | + 8 | + 11 | + 21 | + 34 | + 51 | + 85 | + 1 | + 2 | + 3 |
| < 3 | + 4 | + 6 | + 2 | + 4 | + 6 | + 12 | + 20 | + 30 | + 50 | - 2 | - 2 | - 2 |
| > 3 | + 10 | + 14 | + 6 | + 10 | + 15 | + 25 | + 40 | + 63 | + 102 | + 3 | + 4 | + 7 |
| < 6 | + 7 | + 9 | + 3 | + 5 | + 8 | + 14 | + 23 | + 36 | + 60 | 0 | - 1 | 0 |
| > 6 | + 12 | + 17 | + 7 | + 12 | + 18 | + 30 | + 49 | + 76 | + 127 | + 3 | + 5 | + 8 |
| < 10 | + 8 | + 11 | + 3 | + 6 | + 10 | + 17 | + 28 | + 44 | + 74 | - 1 | - 1 | 0 |
| > 10 | + 15 | + 21 | + 9 | + 15 | + 22 | + 36 | + 59 | + 93 | + 153 | + 4 | + 7 | + 10 |
| < 18 | + 11 | + 14 | + 5 | + 8 | + 12 | + 20 | + 34 | + 54 | + 90 | 0 | 0 | 0 |
| > 18 | + 18 | + 24 | + 11 | + 17 | + 28 | + 44 | + 71 | + 110 | + 178 | + 6 | + 8 | + 15 |
| < 30 | + 13 | + 16 | + 6 | + 9 | + 16 | + 25 | + 41 | + 64 | + 104 | + 1 | 0 | + 3 |

| Neendurchmesser der Reibahle Nominal diameter for reamers d1 in mm | Zulässiges oberes und unteres Abmaß vom Neendurchmesser d1 der Reibahle in μm für Bohrungs-Toleranzfeld Acceptable up and down allowance from nominal diameter d1 for reamer in μm for the tolerance zone of the drilling | | | | | | | | | |
|--|--|-----|------|------|-----|-----|-----|------|------|------|
| | JS | | | | K | | | M | | |
| | 6 | 7 | 8 | 9 | 6 | 7 | 8 | 6 | 7 | 8 |
| > 1 | + 2 | + 3 | + 4 | + 8 | - 1 | - 2 | - 3 | - 3 | - 4 | - 5 |
| < 3 | - 1 | - 1 | - 1 | - 1 | - 4 | - 6 | - 8 | - 6 | - 8 | - 10 |
| > 3 | + 2 | + 4 | + 6 | + 10 | 0 | + 1 | + 2 | - 3 | - 2 | - 1 |
| < 6 | - 1 | - 1 | - 1 | - 1 | - 3 | - 4 | - 5 | - 6 | - 7 | - 8 |
| > 6 | + 3 | + 5 | + 7 | + 12 | 0 | + 2 | + 2 | - 5 | - 3 | - 3 |
| < 10 | - 1 | - 1 | - 1 | - 1 | - 4 | - 4 | - 6 | - 9 | - 9 | - 11 |
| > 10 | + 3 | + 6 | + 9 | + 15 | 0 | + 3 | + 3 | - 6 | - 3 | - 3 |
| < 18 | - 1 | - 1 | - 1 | - 1 | - 4 | - 4 | - 7 | - 10 | - 10 | - 13 |
| > 18 | + 4 | + 7 | + 11 | + 18 | 0 | + 2 | + 5 | - 6 | - 4 | - 1 |
| < 30 | - 1 | - 1 | - 1 | - 1 | - 5 | - 6 | - 7 | - 11 | - 12 | - 13 |

| Neendurchmesser der Reibahle Nominal diameter for reamers d1 in mm | Zulässiges oberes und unteres Abmaß vom Neendurchmesser d1 der Reibahle in μm für Bohrungs-Toleranzfeld Acceptable up and down allowance from nominal diameter d1 for reamer in μm for the tolerance zone of the drilling | | | | | | | | | |
|--|--|------|------|------|------|------|------|------|------|------|
| | N | | | | | P | | | R | |
| | 6 | 7 | 8 | 9 | 10 | 11 | 6 | 7 | 6 | 7 |
| > 1 | - 5 | - 6 | - 7 | - 8 | - 10 | - 13 | - 7 | - 8 | - 11 | - 12 |
| < 3 | - 8 | - 10 | - 12 | - 17 | - 24 | - 34 | - 10 | - 12 | - 14 | - 16 |
| > 3 | - 7 | - 6 | - 5 | - 5 | - 8 | - 12 | - 11 | - 10 | - 14 | - 13 |
| < 6 | - 10 | - 11 | - 12 | - 16 | - 25 | - 39 | - 14 | - 15 | - 17 | - 18 |
| > 6 | - 9 | - 7 | - 7 | - 6 | - 9 | - 14 | - 14 | - 12 | - 18 | - 16 |
| < 10 | - 13 | - 13 | - 15 | - 19 | - 30 | - 46 | - 18 | - 18 | - 22 | - 22 |
| > 10 | - 11 | - 8 | - 8 | - 7 | - 11 | - 17 | - 17 | - 14 | - 22 | - 19 |
| < 18 | - 15 | - 15 | - 18 | - 23 | - 36 | - 56 | - 21 | - 21 | - 26 | - 26 |
| > 18 | - 13 | - 11 | - 8 | - 8 | - 13 | - 20 | - 20 | - 18 | - 26 | - 24 |
| < 30 | - 18 | - 19 | - 20 | - 27 | - 43 | - 66 | - 25 | - 26 | - 31 | - 32 |

| Neendurchmesser der Reibahle Nominal diameter for reamers d1 in mm | Zulässiges oberes und unteres Abmaß vom Neendurchmesser d1 der Reibahle in μm für Bohrungs-Toleranzfeld Acceptable up and down allowance from nominal diameter d1 for reamer in μm for the tolerance zone of the drilling | | | | | | | | | | |
|--|--|------|------|---|------|------|------|-------|----|-------|-------|
| | S | | T | | U | | | X | | Z | |
| | 6 | 7 | 6 | 6 | 7 | 10 | 10 | 11 | 10 | 11 | |
| > 1 | - 15 | - 16 | - | - | - 19 | - 20 | - 24 | - | - | - 32 | - |
| < 3 | - 18 | - 20 | - | - | - 22 | - 24 | - 38 | - | - | - 46 | - |
| > 3 | - 18 | - 17 | - | - | - 22 | - 21 | - 31 | - | - | - 43 | - |
| < 6 | - 21 | - 22 | - | - | - 25 | - 26 | - 48 | - | - | - 60 | - |
| > 6 | - 22 | - 20 | - | - | - 27 | - 25 | - 37 | - | - | - 51 | - |
| < 10 | - 26 | - 26 | - | - | - 31 | - 31 | - 58 | - | - | - 72 | - |
| > 10 | - | - | - | - | - | - | - | - | - | - 61 | - |
| < 14 | - 27 | - 24 | - | - | - 32 | - 29 | - 44 | - | - | - 86 | - |
| > 14 | - 31 | - 31 | - | - | - 36 | - 36 | - 69 | - 56 | - | - 71 | - |
| < 18 | - | - | - | - | - | - | - | - 81 | - | - 96 | - |
| > 18 | - | - | - | - | - 39 | - 37 | - | - 67 | - | - 86 | - |
| < 24 | - 33 | - 31 | - | - | - 44 | - 45 | - | - 97 | - | - 116 | - |
| > 24 | - 38 | - 39 | - 39 | - | - 46 | - 44 | - | - 77 | - | - 101 | - 108 |
| < 30 | - | - | - 44 | - | - 51 | - 52 | - | - 107 | - | - 131 | - 154 |

Rauhtiefen nach DIN
Roughness depth according to DIN

| $R_{max.} \pm 0,001$ | $R_{max.}$ | entspricht R_a -Wert corresponds to R_a -Value | Rauheitskennzahl Roughness parameters |
|----------------------|------------|---|--|
| 71 - 100 | 100 | 17 - 26 | N11 |
| 50 - 71 | 71 | 12 - 18 | |
| 40 - 50 | 50 | 9 - 13 | N10 |
| 31,5 - 40 | 40 | 6,3 - 10 | |
| 25 - 31,5 | 31,5 | 5,2 - 7,6 | N9 |
| 18 - 25 | 25 | 3,5 - 6 | |
| 12,5 - 18 | 18 | 2,5 - 4 | N8 |
| 8 - 12,5 | 12,5 | 1,5 - 2,8 | |
| 5 - 8 | 8 | 0,8 - 1,8 | N7 |
| 2,5 - 5 | 5 | 0,4 - 1 | N6 |
| 1,4 - 2,5 | 2,5 | 0,2 - 0,47 | N5 |
| 0,14 - 1,4 | 1,4 | 0,025 - 0,25 | N1-N4 |

Ungleiche Teilung und extrem-ungleich Teilung für Karnasch Reibahlen
Uneven spacing and extremely uneven spacing for Karnasch reamers

Standard Ungleich-Teilung / Unequal graduation

Standard-Reibahlen werden in normaler Ungleich-Teilung geliefert.
Unequal graduation and extreme unequal graduation.

| Nenn Ø-Bereich Nom. range of dia. | Z | Teilung graduation |
|--------------------------------------|---|-----------------------|
| 0,5 - 1,9 | 3 | 120°/120°/120 |
| 1,9 - 2,65 | 4 | 93°/87° |
| 2,65 - 13,2 | 6 | 63°/60°/57° |
| 13,2 - 20,3 | 8 | 47°/43°/47°/43° |

Extrem Ungleich-Teilung / Extreme unequal graduation

Extrem ungleiche Teilungen ermöglichen die Fertigung von Bohrungen hoher Kreisformgenauigkeit, mit einem maximalen Kreisformfehler von 1-3 µm und eine ISO-Passungsgenauigkeit von nahezu IT 05.

Extremely unequal graduation make it possible to make boreholes of high circularity precision with a maximum circularity deviation of 1-3 µm and an ISO fitting exactness of almost IT 0,5.

| Nenn Ø-Bereich Nom. range of dia. | Z | Teilung graduation |
|--------------------------------------|---|-----------------------|
| 3,0 - 20,0 | 6 | 75°/60°/45° |

Empfohlene Bohrdurchmesser zum Reiben, Richtwerte in mm
Recommended drill hole diameters for reaming. Standard value in mm

| Werkstoff material | Ø bis 6 mm Ø to 6 mm | Ø bis 10 mm Ø to 10 mm | Ø bis 16 mm Ø to 16 mm | Ø bis 25 mm Ø to 25 mm | Ø über 25 mm Ø over 25 mm |
|------------------------------------|-------------------------|---------------------------|---------------------------|---------------------------|------------------------------|
| Stahl ≤ 800 / steel ≤ 800 | 0,1 - 0,2 | 0,2 | 0,2 - 0,3 | 0,3 - 0,4 | 0,4 - 0,5 |
| Stahlguss / steel casting | 0,1 - 0,2 | 0,2 | 0,2 | 0,2 - 0,3 | 0,3 - 0,4 |
| Grauguss / cast iron | 0,1 - 0,2 | 0,2 | 0,2 - 0,3 | 0,3 - 0,4 | 0,4 - 0,5 |
| Temperguss / mailable cast iron | 0,1 - 0,2 | 0,2 | 0,3 | 0,4 | 0,5 |
| Kupfer / copper | 0,1 - 0,2 | 0,2 - 0,3 | 0,3 - 0,4 | 0,4 - 0,5 | 0,5 |
| Messing, Bronze / brass, bronze | 0,1 - 0,2 | 0,2 | 0,2 - 0,3 | 0,3 | 0,3 - 0,4 |
| Aluminium / aluminum | 0,1 - 0,2 | 0,2 - 0,3 | 0,3 - 0,4 | 0,4 - 0,5 | 0,5 |
| Kunststoffe, hart / hard plastic | 0,1 - 0,2 | 0,3 | 0,4 | 0,4 - 0,5 | 0,5 |
| Kunststoffe, weich / thermoplastic | 0,1 - 0,2 | 0,2 | 0,2 | 0,3 | 0,3 - 0,4 |

1



2



3



4



5



6



7



8



9



Index

| | | | |
|----------------|----------------|-----------------|-----------------|
| 29 1783 | 29 1784 | 29 1790A | 29 1790C |
| 11 6001 | 11 6002 | 11 6003 | 11 6004 |

Empfohlene Schnittdaten für Karnasch-Router
Recommended cutting data for Karnasch Router

| Werkstoffgruppe Material group | Werkstoff Material | Schnittge- schwindigkeit Cutting speed Vc m/min. | ae ap | Ø 4 f= mm/U | Ø 5 f= mm/U | Ø 6 f= mm/U | Ø 8 f= mm/U | Ø 10 f= mm/U | Ø 12 f= mm/U | Ø 16 f= mm/U | Ø 20 f= mm/U |
|--------------------------------------|---------------------------------------|---|----------------------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|
| 8.3 | PEEK <> CF 30 PTFE <> CF25 | 130 | ap= 0,1 × d ae= 0,5 × d | 0,06-0,08 | 0,08-0,09 | 0,11-0,13 | 0,15-0,17 | 0,18-0,22 | 0,22-0,26 | 0,26-0,28 | 0,28-0,32 |
| | PEEK <> GF 30 PA 66 <> GF 30 | 100 | ap= 0,1 d ae= 0,5 × d | 0,06-0,08 | 0,08-0,09 | 0,11-0,13 | 0,15-0,17 | 0,18-0,22 | 0,22-0,26 | 0,26-0,28 | 0,28-0,32 |
| | POM <> GF 25 PVDF <> GF 20 | 120 | ap= 0,1 × d ae= 0,5 × d | 0,10-0,12 | 0,12-0,14 | 0,16-0,18 | 0,22-0,24 | 0,28-0,32 | 0,38-0,40 | 0,42-0,46 | 0,48-0,55 |
| | CFK | 130 | ap= 0,1 × d ae= 0,5 × d | 0,08 | 0,09 | 0,10 | 0,13 | 0,15 | 0,20 | 0,25 | 0,28 |

| | | | | | |
|----------------|----------------|----------------|----------------|----------------|----------------|
| 29 6521 | 29 6522 | 29 6523 | 29 6524 | 29 6525 | 29 6526 |
| 29 6553 | 29 6562 | 29 6572 | 29 6573 | 29 6574 | 29 6510 |

Empfohlene Schnittdaten für CVD-Fräser
Recommended cutting data for CVD mills

| Werkstoffgruppe Material group | Werkstoff Material | Schnittge- schwindigkeit Cutting speed Vc m/min. | ae: minimum ap: minimum | Ø 4 fz | Ø 5 fz | Ø 6 fz | Ø 8 fz | Ø 10 fz | Ø 12 fz | Ø 16 fz | Ø 20 fz |
|--------------------------------------|---------------------------------------|---|--|--|-----------|-----------|-----------|------------|------------|------------|------------|
| 8.3 | PEEK <> CF 30 PTFE <> CF25 | 900 | ap= 0,5 × d.mi ae= 0,2 × d.mi | 0,015 | 0,018 | 0,03 | 0,04 | 0,06 | 0,08 | 0,10 | 0,15 |
| | PEEK <> GF 30 PA 66 <> GF 30 | 1100 | ap= 0,5 × d.mi ae= 0,2 × d.mi | 0,01 | 0,015 | 0,025 | 0,03 | 0,05 | 0,07 | 0,08 | 0,10 |
| | POM <> GF 25 PVDF <> GF 20 | 1200 | ap= 0,5 × d.mi ae= 0,5 × 0,2 d.mi | 0,015 | 0,018 | 0,03 | 0,04 | 0,06 | 0,08 | 0,10 | 0,15 |
| | CFK | 600 | ap= 0,5 × d.mi ae= 0,3 × d.mi | 0,016 | 0,020 | 0,03 | 0,05 | 0,06 | 0,08 | 0,10 | 0,15 |
| | 8.1 | Acryl | 1100 | ap= 0,5 × d.mi ae= 0,3 × d.mi | 0,015 | 0,018 | 0,03 | 0,04 | 0,06 | 0,08 | 0,10 |
| 8 | PA 66 PE-HD | 1000 | ap= 0,5 × d.mi ae= 0,3 × d.mi | 0,015 | 0,018 | 0,03 | 0,04 | 0,06 | 0,08 | 0,10 | 0,15 |
| | PEEK | 900 | ap= 0,5 × d.mi ae= 0,3 × d.mi | 0,015 | 0,018 | 0,03 | 0,04 | 0,06 | 0,08 | 0,10 | 0,15 |
| 9 | ALSI 18 CnNiMg | 600 | ap= 0,5 × d.mi ae= 0,2 × d.mi | 0,015 | 0,018 | 0,03 | 0,04 | 0,06 | 0,08 | 0,10 | 0,15 |

Empfohlene Schnittdaten für Einzahnfräser
Recommended cutting data for one-tooth end mills

29 1652

29 1654

29 1658

29 1661

| Werkstoffgruppe Material group | WERKSTOFF WORKPIECE MATERIAL | UNBESCHICHTET UNCOATED - Vc | Fräserdurchmesser / Dimension (mm) VORSCHUB fz (mm/Zahn) (mm per tooth) | | | | |
|-----------------------------------|---------------------------------|--------------------------------|--|-------|-------|--------|--------|
| | | | Ø < 1 | Ø < 2 | Ø < 5 | Ø < 10 | Ø < 20 |
| 11.1 | Polyamid | 350 - 500 | 0,01 - 0,05 | 0,1 | 0,2 | 0,35 | 0,45 |
| | Polyolefine | 350 - 500 | 0,01 - 0,05 | 0,1 | 0,2 | 0,35 | 0,45 |
| | Polyacetale | 300 | 0,01 - 0,1 | 0,15 | 0,3 | 0,4 | 0,5 |
| | Polyester | 300 | 0,01 - 0,1 | 0,15 | 0,3 | 0,4 | 0,5 |
| | Polycarbonat | 300 | 0,01 - 0,1 | 0,15 | 0,3 | 0,4 | 0,5 |
| | Polyphenylenether | 300 | 0,01 - 0,1 | 0,15 | 0,3 | 0,4 | 0,5 |
| | Aromat. Polyamid | 300 | 0,01 - 0,1 | 0,15 | 0,3 | 0,4 | 0,5 |
| | ABS | 400 - 500 | 0,01 - 0,05 | 0,1 | 0,2 | 0,35 | 0,45 |
| | Fluorpolymere | 400 - 500 | 0,01 - 0,05 | 0,1 | 0,2 | 0,35 | 0,45 |
| | Polysulfon | 400 - 500 | 0,01 - 0,05 | 0,1 | 0,2 | 0,35 | 0,45 |
| | Polyphenylsulfon | 400 - 500 | 0,01 - 0,05 | 0,1 | 0,2 | 0,35 | 0,45 |
| | Polyethersulfon | 400 - 500 | 0,01 - 0,05 | 0,1 | 0,2 | 0,35 | 0,45 |
| | Polyetherimid | 400 - 500 | 0,01 - 0,05 | 0,1 | 0,2 | 0,35 | 0,45 |
| | Polyphenylsulfid | 400 - 500 | 0,01 - 0,05 | 0,1 | 0,2 | 0,35 | 0,45 |
| | Polyetherkethon | 400 - 500 | 0,01 - 0,05 | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyimid | 80 - 100 | | 0,005 - 0,03 | 0,05 | 0,1 | 0,2 | 0,35 |

Testergebnisse: CVD-Fräser mit sehr guten Ergebnissen. Wir lösen Ihre Probleme bei Composites!
Test result: Very good test results with our CVD-end mills. We solve your Composites machining problems!

CVD-Fräser/CVD-End mill Art. 29 6526

Ø 8,0 × SL = 20

Material/Werkstoff = Dispall 20 / 20% Silizium
U/min. = 14.000
Vf = 2.000
ae = 0,5 mm
ap = 10 mm

CVD-Fräser/CVD-End mill Art. 29 6522

Ø 6 r 3,0

Material/Werkstoff = FS2 ALU Hochfest
U/min. = 14.000
Vf = 3.000
ae = 2,0 mm
ap = 2,0 mm

CVD-Fräser/CVD-End mill Art. 29 6526

Ø 8,0 × SL = 20

Material/Werkstoff = CFK mit Kevlar
U/min. = 14.000
Vf = 1.200
ae = 3,00 mm

CVD-Fräser/CVD-End mill Art. 29 6526

Ø 8,0 × SL = 20

Material/Werkstoff = PA6 mit 30% Glasanteil
U/min. = 14.000
Vf = 2.500
ae = 4,0 mm
ap = 4,0 mm

CVD-Fräser/CVD-End mill Art. 29 6526

Ø 8,0 × SL = 20

Material/Werkstoff = CFK
U/min. = 14.000
Vf = 3.000
ae = 5,0 mm
ap = 4,0 mm

CVD-Fräser/CVD-End mill Art. 29 6526

Ø 8,0 × SL = 20

Material/Werkstoff = Al Si 05
U/min. = 14.000
Vf = 2.500
ae = 4,0 mm
ap = 4,0 mm



| 11.1 Kunststoffe/Thermoplaste Plastic / Thermoplastic | | | |
|--|-------------------------------|--------------------------------|---|
| Werkstoff/ Material | Kurzbezeichnung Short term | Beschreibung Description | Handelsname Trade name |
| - | ASA | Acrylester Styro Acrylnitril | Luran Centrex |
| - | ABS | Acrylester Styrol Acrylnitril | Cyclocac Novodur Lustran Terluran |
| - | CA | Celluloseacetat | Cellidor Cellit Cellan Trolit |
| - | CH | Cellulosehydrat | Cellophan Zellglas |
| - | CN | Cellulosenitrat | Zelluloid |
| - | COC | Cyclo Olefin Copolymere | Topas |
| - | FEB | Perfluorethylenpropylen | |
| - | LCP | Flüssigkristall Poymere | Vectra Zenite |
| - | HIPS | High Impact Polystyrene | |
| - | PFA | Perfluoralkoxyalkan | |
| - | PLA | Polylactid | |
| - | PA | Polyamid | Nylon Perlon Durethan Ultramid Zytel |
| - | PA 6 | Polyamid 6 | Durethan Maranyl Resistan Ultramid Rilsan |
| - | PA 66 | Polyamid 66 | |
| - | PBT | Polybutylenterephthalat | Arnite Celanex Crastin Pocan Ultradur |
| - | PC | Polycarbonate | Lexan Makrolon |
| - | PCTFE | Polychlortrifluorethylen | Kel-F |
| - | | Polyester | |
| - | PEI | Polyetherimid | Ultem |
| - | PEEK | Polyetherketone | Hostatec Kadel |
| - | PES | Polyethersulfon | Radel A Ultrason E |
| - | PE | Polyethylen | Hostalen Vestolen Trolen |
| - | PE-HD | Polyethylen hoher Dichte | Hostelan Lupolen Vestolen A |
| - | PE-LD | Polyethylen niedriger Dichte | |
| - | PE-UHMW | Polyethylen Ultrahochmolekular | BAAF UHMW- PE Yuhwa Hiden |
| - | PET | Polyethylenterephthalat | Impet |

| 11.1 Kunststoffe/Thermoplaste Plastic / Thermoplastic | | | |
|--|-------------------------------|---------------------------------------|---|
| Werkstoff/ Material | Kurzbezeichnung Short term | Beschreibung Description | Handelsname Trade name |
| - | PETG | Polyethylenterephthalat Glycol | Genius Provista Radicoron Skygreen |
| - | PI | Polyimid | Kapton Vespel |
| - | PMMI | Polymethacrylmethylimid | Pleximid |
| - | PMMA | Polymethylmethacrylat | Plexiglass Degalan Resarit Lucryl |
| - | PMMA-GS | Polymethylmethacrylat gegossen | |
| - | | Polymethylmethacrylat extrudiert | |
| - | PMP | Polymethylpenten | TPX |
| - | POM | Polyoxymethylen | Delrin Hostaform Ultraform |
| - | PPE | Polyphenylether | Noryl |
| - | PPS | Polyphenylensulfid | Fortron Ryton Tedur |
| - | PPA | Polyphtalamid | Amodel |
| - | PP | Polypropylen | Hostalen PP Novolen Procom Vestolen P |
| - | PS | Polystyrol | Hostyron Polystyrol Styropor Trolit Vestyron |
| - | PS-E | Polystyrol geschäumt | Styropor |
| - | SB | Styrol Butadien Copolymer | Hostyren Polystyrol 400 Styroflex Styrolux Vestyron |
| - | PSU | Polysulfon | Ultrason S Udel |
| - | PTFE | Polytetrafluorethylen | Hostaflon Teflon Fluon |
| - | PVAC | Polyvinylacetat | |
| - | PVC-HD | Polyvinylchlorid mit hoher Dichte | Hostalit Trosiplast Vestolit Vinnol Vinoflex |
| - | PVC-LD | Polyvinylchlorid mit niedriger Dichte | Acella Mipolam Skay Vestolit |
| - | PVDF | Polyvinylidenfluorid | Solef Kynar Dyneon |
| - | SAN | Styrol Acrylnitril Copolymer | Luran Vestyron Lustran |

Werkstoffe
Material

| 11.2 Kunststoffe / Duroplaste Plastic / Thermosetting plastics | | | |
|---|-------------------------------|--------------------------------------|---|
| Werkstoff/ Material | Kurzbezeichnung Short term | Beschreibung Description | Handelsname Trade name |
| - | EP | Epoxidharz | Araldit Epikote Epoxyin Lekutherm |
| - | UF | Harnstoff-Formaldehydharz | Hornitex Kaurit Pollopas Resamin Resopal Urecoll |
| - | MF | Melamin-Formaldehydharz | |
| - | MPF | Melamin-Phenol-Formaldehyd | |
| - | PF PF 31 | Phenol-Formaldehydharz Phenoplast | Alberite Bakelit Corephan Supraplast Resitex Pertinax Aramith |
| - | PUR | Polyurethan | |
| - | UP | Polyester | Ureol Lycra Baydur |
| - | | Phenoplast | Bakelit Resitex Pertinax |
| - | | Hartpapier | Resopal |

| 11.3 Faserverstärkte Kunststoffe Fiber reinforced plastics | | | |
|---|-------------------------------|---|---------------------------|
| Werkstoff/ Material | Kurzbezeichnung Short term | Beschreibung Description | Handelsname Trade name |
| - | AFK | Aramifaser Kunststoffe | Kevlar |
| - | CFK | Kohlefaserverstärkter Kunststoff | |
| - | FR4 | Epoxidharz mit Glasfaser Schweretflammbaar | |
| - | GFK | Glasfaserverstärkter Kunststoff | |
| - | GMT | Glasmattenverstärkter Kunststoff | |
| - | BFK | Borfaserkunststoffe | |
| - | MFK | Metallfaserverstärkte Kunststoffe | |
| - | SFK | Synthesefaserverstärkte Kunststoffe | Aramid |
| - | SMC | Shett Moulding Compound | |
| - | | Honeycomb | |
| - | PA66-GF30 | Polyamid 66 mit 30% Glasfaser | |
| - | PEEK GF30 | Polyetherketone mit 30% Glasfaser | |
| - | PEEK CF30 | Polyetherketone mit 30% Kohlefaser | |
| - | POM GF25 | Polyoxymethylen mit 25% Glasfaser | |
| - | PTFE GF20 | Polytetrafluorethylen mit 20% Glasfaser | |
| - | PVDF GF25 | Polyvinylidenfluorid mit 25% Glasfaser | |

Empfohlene Schnittdaten zu MKD/ND Schaftfräser – Fasenfräser für Spiegelschliff
Recommended cutting data for MCD/ND milling/beveling mill

| | | | |
|--|----------------|----------------|----------------|
| | 29 6838 | 29 6837 | 29 6811 |
| | 29 6843 | 29 6841 | 29 6840 |
| | | 29 6839 | |

Bearbeitungshinweise:

- Vorausgesetzt, es werden stabile Maschinenverhältnisse und einwandfreie Werkzeugaufnahmen verwendet (Schrumpffutter)
- Um optimale Schnittbedingungen zu erreichen sind die Einsatzbedingungen vor Ort zu berücksichtigen.

Processing instruction:

- Assumed there are rugged machine conditions and faultless die holder in use.
- To reach optimal cut conditions, the insert terms on location are to consider.

| Werkstoffgruppe Material group | MKD - MCD ND - ND Vc (m/min.) | fz (mm) | Schruppen Roughing | | Schichten Spiegelschliff fz (mm) Finishing ap/ae | |
|-----------------------------------|-------------------------------------|-----------|-----------------------|-----------|---|-----------|
| | | | ap / ae | | | |
| 11.1 11.2 | PMMA-Acryl | 800-1.400 | 0,2-0,4 | 1,0-2,0 | 0,05-0,25 | 0,04-0,06 |
| 15.0 16.0 | Gold-Silber | 400-700 | 0,2-0,4 | 0,8-0,15 | 0,05-0,20 | 0,04-0,06 |
| 9.1 9.2 | Al 99 - Al Mg 5 Al Mg Si Pb | 600-1.000 | 0,1-0,2 | 0,8-0,15 | 0,08-0,15 | 0,03-0,06 |
| 9.3 9.4 | G Al Mg 5 G Al Si 7 Mg | 800-1.600 | 0,1-0,2 | 0,05-0,10 | 0,08-0,20 | 0,03-0,06 |
| 10.1 10.2 | Cu Zn 36 Pb 1,5 Cu Zn 20 | 600-800 | 0,1-0,3 | 0,08-0,18 | 0,08-0,25 | 0,04-0,08 |

Empfohlene Schnittdaten zu Vollhartmetallbohrer GFK/CFK
Recommended cutting data for solid carbide twist drills Fiberglass/Carbon

29 0080

| Werkstoffgruppe / Material group | Werkstoff / Material | E-Modul N/mm ² - DIN 53457 | n / Vf | Ø 1,0 – 3,0 | Ø 3,2 – 7,0 | Ø 8,0 – 11,0 | Ø 12,0 – 14,0 |
|--|----------------------|---------------------------------------|------------------------|-------------|-------------|--------------|---------------|
| 11.1 Thermoplaste / Thermoplastic | PVC-Hart / PVC-hard | 800 - 3.200 | n (min ⁻¹) | 18.000 | 10.000 | 6.000 | 5.000 |
| | PVC-Weich / PVC-soft | | Vf (mm/min) | 2.200 | 2.000 | 1.900 | 1.600 |
| 11.2 Duroplaste / Thermosetting plastic | PUR 5220 | < 10.000 | n (min ⁻¹) | 18.000 | 10.000 | 6.000 | 5.000 |
| | PF 31 / MP 183 | | Vf (mm/min) | 2.200 | 2.000 | 1.900 | 1.600 |
| 11.3 | GFK | < 10.000 | n (min ⁻¹) | 20.000 | 10.000 | 6.000 | 5.000 |
| | PA66 - GF30 | | Vf (mm/min) | 4.000 | 2.400 | 1.800 | 1.500 |
| | CFK | | n (min ⁻¹) | 20.000 | 10.000 | 6.000 | 5.000 |
| | PEEK - CF30 | < 10.000 | Vf (mm/min) | 1.600 | 1.000 | 720 | 800 |



30 6522 30 6523 30 6524 30 6526 30 6528 30 6534

| Werkstoffgruppe Material group | Werkstoff Material | Schnittgeschwindigkeit Cutting speed Vc m/min. | ae: minimum ap: minimum | Ø 4 fz | Ø 5 fz | Ø 6 fz | Ø 8 fz | Ø 10 fz | Ø 12 fz | Ø 16 fz | Ø 20 fz |
|-----------------------------------|---------------------------------------|--|---|----------------------------------|-----------|-----------|-----------|------------|------------|------------|------------|
| 8.3 | PEEK <> CF 30 PTFE <> CF25 | 900 | ap= 0,5 × d.mi ae= 0,2 × d.mi | 0,015 | 0,018 | 0,03 | 0,04 | 0,06 | 0,08 | 0,10 | 0,15 |
| | PEEK <> GF 30 PA 66 <> GF 30 | 1100 | ap= 0,5 × d.mi ae= 0,2 × d.mi | 0,01 | 0,015 | 0,025 | 0,03 | 0,05 | 0,07 | 0,08 | 0,10 |
| | POM <> GF 25 PVDF <> GF 20 | 1200 | ap= 0,5 × d.mi ae= 0,5 × 0,2 d.mi | 0,015 | 0,018 | 0,03 | 0,04 | 0,06 | 0,08 | 0,10 | 0,15 |
| | CFK | 600 | ap= 0,5 × d.mi ae= 0,3 × d.mi | 0,016 | 0,020 | 0,03 | 0,05 | 0,06 | 0,08 | 0,10 | 0,15 |
| | 8.1 | Acryl | 1100 | ap= 0,5 × d.mi ae= 0,3 × d.mi | 0,015 | 0,018 | 0,03 | 0,04 | 0,06 | 0,08 | 0,10 |
| PA 66 PE-HD | | 1000 | ap= 0,5 × d.mi ae= 0,3 × d.mi | 0,015 | 0,018 | 0,03 | 0,04 | 0,06 | 0,08 | 0,10 | 0,15 |
| PEEK | | 900 | ap= 0,5 × d.mi ae= 0,3 × d.mi | 0,015 | 0,018 | 0,03 | 0,04 | 0,06 | 0,08 | 0,10 | 0,15 |
| | ALSI 18 CnNiMg | 600 | ap= 0,5 × d.mi ae= 0,2 × d.mi | 0,015 | 0,018 | 0,03 | 0,04 | 0,06 | 0,08 | 0,10 | 0,15 |

29 0412 29 0416 29 0417

| Werkstoffgruppe Material group | Werkstoff Material | | 6 Ø | 8 Ø | 10 Ø | 12 Ø |
|-----------------------------------|---------------------------|---------|-------|-------|-------|-------|
| 8.3 CFK | PVDF - POM PA66 - PEEK | ae + ap | 1 × D | 1 × D | 1 × D | 1 × D |
| | | fz | 0,06 | 0,07 | 0,08 | 0,10 |
| | | vc = | 190 | 190 | 190 | 190 |
| CFK | CF 30 PTFE - PEEK | ae + ap | 1 × D | 1 × D | 1 × D | 1 × D |
| | | fz | 0,06 | 0,07 | 0,08 | 0,10 |
| | | vc = | 180 | 180 | 180 | 180 |
| GFK | GF 30 - PA Homeycomb | ae + ap | 2 × D | 2 × D | 2 × D | 2 × D |
| | | fz | 0,06 | 0,07 | 0,08 | 0,10 |
| | | vc = | 380 | 380 | 380 | 380 |

29 1751 29 1752 29 1753 29 1761 29 1762 29 1763

| Werkstoffgruppe Material group | Werkstoff Material | | 3-5 Ø | 6 Ø | 8 Ø | 10 Ø | 12 Ø | 16 Ø | 20 Ø |
|-----------------------------------|---------------------------|-----------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| 8.3 CFK | PVDF - POM PA66 - PEEK | ae + ap fz vc = | 1 × D 0,03 - 0,04 190 | 1 × D 0,05 190 | 1 × D 0,06 190 | 1 × D 0,07 190 | 1 × D 0,08 190 | 1 × D 0,08 190 | 1 × D 0,08 190 |
| CFK | CF 30 PTFE - PEEK | ae + ap fz vc = | 1 × D 0,03 - 0,04 180 | 1 × D 0,05 180 | 1 × D 0,06 180 | 1 × D 0,07 180 | 1 × D 0,08 180 | 1 × D 0,08 180 | 1 × D 0,08 180 |
| GFK | GF 30 - PA Homeycomb | ae + ap fz vc = | 2 × D 0,03 - 0,04 200 | 2 × D 0,05 200 | 2 × D 0,06 200 | 2 × D 0,07 200 | 2 × D 0,08 200 | 2 × D 0,08 200 | 2 × D 0,08 200 |
| Aluminium Aluminum | | ae + ap fz vc = | 1 × D 0,01 - 0,03 250 - 600 | 1 × D 0,01 - 0,03 250 - 600 | 1 × D 0,01 - 0,03 250 - 600 | 1 × D 0,01 - 0,03 250 - 600 | 1 × D 0,01 - 0,03 250 - 600 | 1 × D 0,01 - 0,03 250 - 600 | 1 × D 0,01 - 0,03 250 - 600 |
| Kupfer Copper | | ae + ap fz vc = | 1 × D 0,01 - 0,03 100 - 180 | 1 × D 0,01 - 0,03 100 - 180 | 1 × D 0,01 - 0,03 100 - 180 | 1 × D 0,01 - 0,03 100 - 180 | 1 × D 0,01 - 0,03 100 - 180 | 1 × D 0,01 - 0,03 100 - 180 | 1 × D 0,01 - 0,03 100 - 180 |

Schnittdaten Empfehlung
Recommended Cutting Parameters

29 6600

| Werkstoffgruppe Material group | Werkstoff Material | Maximum Schnittgeschw. / Cutting Speed | Maximum Vorschub / Feed | Maximum Schnittgeschw. / Cutting Speed | Maximum Vorschub/ Feed | Maximum Schnittgeschw. / Cutting Speed | Maximum Vorschub/ Feed |
|-----------------------------------|--|--|-------------------------------|--|------------------------------|--|------------------------------|
| | | Vc (m/min) | fz (mm/Zahn/teeth) | Vc (m/min) | fz (mm/Zahn/teeth) | Vc (m/min) | fz (mm/Zahn/teeth) |
| | | ap / doc bis / up to 0,5 mm | | ap / doc bis / up to 2,0 mm | | ap / doc bis / up to 5,0 mm | |
| 9.1 | Aluminium Legierungen / Alloys Si < 1 % | 4.000 | 0,30 | 3.800 | 0,25 | 3.500 | 0,20 |
| 9.5 | Aluminium Legierungen / Alloys Si < 12 % | 3.000 | 0,25 | 2.800 | 0,20 | 2.500 | 0,18 |
| 9.7 | Aluminium Legierungen / Alloys Si < 12 % | 2.000 | 0,20 | 1.800 | 0,18 | 1.500 | 0,15 |
| 10.1- 10.8 | Magnesium / Magnesium Alloys | 4.000 | 0,30 | 3.800 | 0,25 | 3.500 | 0,20 |
| | Kupfer Legierungen / Copper Alloys | 2.500 | 0,15 | 2.000 | 0,12 | 1.500 | 0,10 |
| 12.2 | Messing Legierungen / Brass Alloys | 1.500 | 0,20 | 1.200 | 0,15 | 1.000 | 0,12 |
| 14 | Graphit / Graphite | 2.500 | 0,20 | 2.500 | 0,18 | 2.500 | 0,16 |
| 8.3 | GFK / Glass fibre reinforced | 2.000 | 0,30 | 2.000 | 0,25 | 2.000 | 0,20 |
| | CFK / Carbon fibre reinforced | 2.000 | 0,30 | 2.000 | 0,25 | 2.000 | 0,20 |

Titanlegierungen
Titanium alloys

| Werkstoffgruppe Material group | Legierungsbestandteile / Alloy components (in%) | | | | | | | | | |
|--|---|-------------------------|---------------------|-----|-----|------|------|-----|------|------------------|
| | Legierung Alloy | Bezeichnung / Name | DIN | Al | Sn | Mo | V | Zr | Si | Andere Others |
| Alpha-Ti-Legierungen Alpha-Ti alloy | | Ti-5Al-2,55N | TiAl55n2 | 5,0 | 2,5 | | | | | |
| | | Ti-7Al-4Mo | TiAl7Mo4 | 7,0 | | 4,0 | | | | |
| | | Ti-8Al-1Mo-1V | TiAl8Mo1V1 | 8,0 | | 1,0 | 1,0 | | | |
| | | Ti-6Al-4Zr-2Mo-2Sn | TiAl6Zr4Mo2Sn2 | 6,0 | 2,0 | 2,0 | | 4,0 | | |
| Alpha-Beta-Ti-Legierungen Alpha-Beta Ti-alloy | | Ti-6Al-4V | TiAl6V4 | 6,0 | | | 4,0 | | | |
| | | Ti-6Al-6V-2Sn | TiAl6V6Sn2 | 5,5 | 2,0 | | 5,5 | | | |
| | | Ti-6Al-6V-2Sn | TiAl4Mo4Sn2Si0.5 | 4,0 | 2,0 | 4,0 | | | 0,55 | |
| | | Ti-4Al-4Mo-4Sn-0.5Si | TiAl4Mo4Sn4Si0.5 | 4,0 | 4,0 | 4,0 | | | 0,5 | |
| | | Ti-7Al-4Mo | TiAl7Mo4 | 7,0 | | 4,0 | | | | Fe 0,3 |
| | | Ti-6Al-5Zr-0.5Mo-0.25Si | TiAl6Zr5Mo0.5Si0.25 | 6,0 | | 0,5 | | 5,0 | 0,25 | |
| | | Ti-6Al-5Zr-4Mo-Cu-0.2Si | TiAl6Zr5Mo4CuSi0.2 | 6,0 | | 4,0 | | 5,0 | 0,2 | Cu 1,0 |
| | | Allvac 3-2.5 | | 3,0 | | | 2,5 | | | Fe 0,13 |
| | | Allvac 6-4Eli | | 6,0 | | | | | | Fe 0,2 |
| | | Allvac 6-2-4-6 | | 6,0 | 2,0 | 6,0 | | 4,0 | | Fe 0,10 |
| Beta-Ti-Legierung Beta-Ti-alloy | | Allvac Ti-17 | | 5,0 | 2,0 | 4,0 | | 2,0 | | Cr 4,0 |
| | | Ti-13V-11Cr-3Al | TiV13Cr11Al3 | 3,0 | | | 13,0 | | | Cr 11,0 |
| | | Ti-8Mo-8V-2Fe-3Al | | 3,0 | | 8,0 | | | | |
| | | Ti-3Al-8V-6Cr-4Mo-4Zr | | 3,0 | | 4,0 | 8,0 | 4,0 | | Cr 6,0 |
| Rein-Titan Pure Titanium | | Ti-11.5Mo-6Zr-4.5Sn | | | 4,5 | 11,5 | | 6,0 | | |
| | | Ti 99.5 | Ti 99.5 | | | | | | | |
| | | Ti 99.6 | Ti 99.6 | | | | | | | |
| | | Ti 99.7 | Ti 99.7 | | | | | | | |
| | Ti 99.8 | Ti 99.8 | | | | | | | | |



23 1764

Empfohlene Richtwerte für VHM-Gewindewirbler, LogTop Stahl
Recommended cutting data for solid carbide whirling thread cutter, LogTop steel

| Gewindegröße Thread Size | Gewindegewindegröße Thread cutting side | 1.1-1.2-1.3-1.4-1.5 unlegierter Stahl Carbon Steels <800 N/mm² | | 4.1-4.2-4.3 Rostfreier Stahl Stainless Steels | | Titanlegierung Titanium Alloy TiAl 6V4 | | 8.1 gehärteter Stahl Hardened Steels 45-55 HRC | | gehärteter Stahl Hardened Steels 55-70 HRC | |
|-----------------------------|--|---|----------------|---|----------------|--|----------------|---|----------------|--|----------------|
| | | n min ⁻¹ | fz mm/tooth | n min ⁻¹ | fz mm/tooth | n min ⁻¹ | fz mm/tooth | n min ⁻¹ | fz mm/tooth | n min ⁻¹ | fz mm/tooth |
| M 0,6 | M 0,6 | 50.000-55.000 | 0,003 | 35.000-45.000 | 0,003 | 20.000-25.000 | 0,002 | 30.000-35.000 | 0,003 | 28.000-35.000 | 0,002 |
| M 0,7 | M 0,7 | 45.000-55.000 | 0,003 | 30.000-40.000 | 0,003 | 18.000-23.000 | 0,002 | 25.000-30.000 | 0,003 | 22.000-28.000 | 0,002 |
| M 0,8 | M 0,8 | 35.000-45.000 | 0,004 | 30.000-40.000 | 0,004 | 16.000-20.000 | 0,002 | 23.000-28.000 | 0,004 | 18.000-25.000 | 0,003 |
| M 0,9 | M 0,9 | 30.000-40.000 | 0,004 | 30.000-40.000 | 0,004 | 16.000-20.000 | 0,002 | 20.000-25.000 | 0,004 | 16.000-22.000 | 0,003 |
| M 1 | M 1 M 1,1 | 30.000-40.000 | 0,004 | 30.000-40.000 | 0,004 | 16.000-20.000 | 0,002 | 20.000-25.000 | 0,004 | 20.000-24.000 | 0,003 |
| M 1,2 | M 1,2 | 25.000-30.000 | 0,005 | 25.000-30.000 | 0,005 | 10.000-18.000 | 0,003 | 20.000-23.000 | 0,004 | 18.000-21.000 | 0,003 |
| M 1,4 | M 1,4 | 20.000-28.000 | 0,006 | 20.000-28.000 | 0,006 | 10.000-14.000 | 0,004 | 15.000-18.000 | 0,005 | 13.000-17.000 | 0,004 |
| M 1,6 | M 1,6 | 18.000-24.000 | 0,007 | 18.000-24.000 | 0,007 | 5.000-15.000 | 0,006 | 13.000-15.000 | 0,005 | 12.000-14.000 | 0,004 |
| M 1,7 | M 1,7 M 1,8 | 15.000-25.000 | 0,007 | 15.000-25.000 | 0,007 | 5.000-15.000 | 0,006 | 12.000-14.000 | 0,006 | 11.000-13.000 | 0,005 |
| M 2,0 | M 2 M 2,3 | 10.000-14.000 | 0,008 | 10.000-14.000 | 0,008 | 5.000-15.000 | 0,008 | 8.000-10.000 | 0,006 | 8.000-10.000 | 0,005 |
| M 2,5 | M 2,5 M2,6 | 10.000-14.000 | 0,008 | 10.000-14.000 | 0,008 | 5.000-15.000 | 0,008 | 8.000-10.000 | 0,007 | 8.000-10.000 | 0,006 |
| M 3,0 | M3 | 6.000-10.000 | 0,012 | 5.000-10.000 | 0,012 | 6.000-10.000 | 0,010 | 6.000-8.000 | 0,010 | 5.000-8.000 | 0,008 |

23 1760

Empfohlene Richtwerte für VHM-Gewindewirbler, LogTop poliert
Recommended cutting data for solid carbide whirling thread cutters, LogTop polished

| Gewindegröße Thread Size | Gewindegewindegröße Thread cutting side | Kunststoff Plastic | | Aluminium-Kupfer-Messing Aluminum-Copper-Brass | |
|-----------------------------|--|------------------------|----------------|---|----------------|
| | | n min ⁻¹ | fz mm/tooth | n min ⁻¹ | fz mm/tooth |
| M 0,6 | M 0,6 | 50.000-55.000 | 0,004 | 50.000-60.000 | 0,004 |
| M 0,7 | M 0,7 | 45.000-55.000 | 0,004 | 45.000-55.000 | 0,004 |
| M 0,8 | M 0,8 | 35.000-45.000 | 0,004 | 45.000-55.000 | 0,005 |
| M 0,9 | M 0,9 | 30.000-40.000 | 0,005 | 40.000-50.000 | 0,006 |
| M 1 | M 1 M 1,1 | 30.000-40.000 | 0,005 | 40.000-50.000 | 0,006 |
| M 1,2 | M 1,2 | 28.000-35.000 | 0,006 | 30.000-40.000 | 0,007 |
| M 1,4 | M 1,4 | 25.000-30.000 | 0,008 | 25.000-35.000 | 0,008 |
| M 1,6 | M 1,6 | 20.000-25.000 | 0,009 | 22.000-30.000 | 0,010 |
| M 1,7 | M 1,7 M 1,8 | 18.000-28.000 | 0,009 | 20.000-28.000 | 0,010 |
| M 2,0 | M 2 M 2,3 | 12.000-16.000 | 0,010 | 15.000-25.000 | 0,010 |
| M 2,5 | M 2,5 M2,6 | 12.000-16.000 | 0,012 | 12.000-20.000 | 0,012 |
| M 3,0 | M3 | 8.000-13.000 | 0,016 | 8.000-15.000 | 0,020 |

23 1768

Empfohlene Richtwerte für VHM-Gewindewirbler, LogTop Dia
Recommended cutting data for solid carbide whirling thread cutters, LogTop Dia

| Gewindegröße Thread Size | Gewindegewindegröße Thread cutting side | 14 CFK / GFK-Graphit CRFP / GFRP-Graphite | |
|-----------------------------|--|---|----------------|
| | | n min ⁻¹ | fz mm/tooth |
| M 0,6 | M 0,6 | 40.000-50.000 | 0,003 |
| M 0,7 | M 0,7 | 35.000-45.000 | 0,004 |
| M 0,8 | M 0,8 | 33.000-45.000 | 0,004 |
| M 0,9 | M 0,9 | 30.000-40.000 | 0,005 |
| M 1 | M 1 M 1,1 | 30.000-40.000 | 0,005 |
| M 1,2 | M 1,2 | 26.000-32.000 | 0,006 |
| M 1,4 | M 1,4 | 25.000-30.000 | 0,008 |
| M 1,6 | M 1,6 | 20.000-25.000 | 0,009 |
| M 1,7 | M 1,7 M 1,8 | 18.000-23.000 | 0,009 |
| M 2,0 | M 2 M 2,3 | 15.000-20.000 | 0,011 |
| M 2,5 | M 2,5 M2,6 | 12.000-16.000 | 0,012 |
| M 3,0 | M3 | 10.000-15.000 | 0,015 |

Richtwerte für den Einsatz von Karnasch VHM-Gewindefräser mit Innenkühlung
Recommended cutting data for Karnasch solid carbide thread mills with interior cooling supply

23 1800

| Werkstoffgruppe Material group | | Vc m/min. | M3 | M4 | M5 | M6 | M8 | |
|-----------------------------------|---|-------------------------|---------|-------------|-------------|-------------|------------|------------|
| | | | fz mm | fz mm | fz mm | fz mm | fz mm | |
| P | 1.1-1.2-1.3-1.4-1.5 Unlegierte Stähle / Non-alloy steels | <850 N/mm ² | 80-160 | 0,01-0,02 | 0,015-0,025 | 0,03-0,045 | 0,045-0,06 | 0,05-0,075 |
| | | <1100 N/mm ² | 60-140 | 0,01-0,02 | 0,015-0,025 | 0,03-0,045 | 0,045-0,06 | 0,05-0,075 |
| P | 2.1-2.2-2.3.-2.4 Vergütungsstähle / Heat treatable steel | <950 N/mm ² | 50-130 | 0,01-0,015 | 0,01-0,02 | 0,02-0,035 | 0,03-0,04 | 0,04-0,05 |
| | | <1100 N/mm ² | 50-130 | 0,005-0,01 | 0,01-0,015 | 0,015-0,025 | 0,02-0,04 | 0,03-0,05 |
| | | <1300 N/mm ² | 40-110 | 0,004-0,008 | 0,006-0,015 | 0,01-0,025 | 0,03-0,05 | 0,04-0,06 |
| P | 2.5 Nitrierstahl / Nitriding steels | <1000 N/mm ² | 40-110 | 0,004-0,008 | 0,006-0,015 | 0,01-0,025 | 0,03-0,05 | 0,04-0,06 |
| P | 3.1-3.2 Hochlegierte Stähle / High alloyed steels | <700 N/mm ² | 40-80 | 0,004-0,008 | 0,006-0,015 | 0,01-0,02 | 0,02-0,04 | 0,03-0,05 |
| | | <1400 N/mm ² | 30-60 | 0,004-0,008 | 0,006-0,015 | 0,01-0,02 | 0,02-0,04 | 0,03-0,05 |
| M | 4.1 Rostfreier Stahl / Stainless steel Ferritisch/Martensitisch, ferritic/martensitic | | 50-120 | 0,005-0,008 | 0,01-0,2 | 0,015-0,035 | 0,04-0,05 | 0,04-0,05 |
| M | 4.2 Rostfreier Stahl / Stainless Steel Martensitisch / martensitic | | 35-80 | 0,004-0,008 | 0,008-0,015 | 0,015-0,025 | 0,02-0,03 | 0,03-0,05 |
| M | 4.3 Rostfreier Stahl / Stainless steel Austenitisch/Ferritisch, austenitic/ferritic | | 30-70 | 0,004-0,008 | 0,008-0,015 | 0,015-0,025 | 0,02-0,03 | 0,03-0,05 |
| K | 7.1 Grauguss mit Lamellengraphit / Cast iron with lamellar graphite | <600 N/mm ² | 100-180 | 0,005-0,015 | 0,01-0,02 | 0,02-0,03 | 0,04-0,05 | 0,05-0,06 |
| K | 7.2 Grauguss mit Lamellengraphit / Cast iron with lamellar graphite | <1200 N/mm ² | 100-180 | 0,005-0,015 | 0,01-0,02 | 0,02-0,03 | 0,04-0,05 | 0,05-0,06 |
| K | 7.3 Grauguss mit Kugelgraphit / Cast iron with modular graphite | <600 N/mm ² | 90-180 | 0,005-0,015 | 0,01-0,02 | 0,02-0,03 | 0,04-0,05 | 0,05-0,06 |
| K | 7.4 Grauguss mit Kugelgraphit / Cast iron with modular graphite | <850 N/mm ² | 90-180 | 0,005-0,015 | 0,01-0,02 | 0,02-0,03 | 0,04-0,05 | 0,05-0,06 |
| K | 7.5 Temperguss / Malleable cast iron | <450 N/mm ² | 90-180 | 0,005-0,015 | 0,01-0,02 | 0,02-0,03 | 0,04-0,05 | 0,05-0,06 |
| K | 7.6 Temperguss / Malleable cast iron | <800 N/mm ² | 90-180 | 0,005 | 0,01-0,02 | 0,02-0,03 | 0,04-0,05 | 0,05-0,06 |
| S | 5.1-5.3 Nickel-Chromlegierungen / Nickel-chromium alloy | <800 N/mm ² | 35-70 | 0,004-0,008 | 0,008-0,015 | 0,015-0,025 | 0,02-0,03 | 0,03-0,05 |
| S | 5.4 Nickel-Chromlegierungen / Nickel-chromium alloy | <950 N/mm ² | 35-70 | 0,004-0,008 | 0,008-0,015 | 0,015-0,025 | 0,02-0,03 | 0,03-0,05 |
| S | 5.5 Nickel-Chromlegierungen / Nickel-chromium alloy | <1300 N/mm ² | 35-50 | 0,004-0,008 | 0,008-0,015 | 0,015-0,025 | 0,02-0,03 | 0,03-0,05 |

Richtwerte für den Einsatz von Karnasch VHM Gewindefräser
Recommended cutting data for Karnasch solid carbide thread mills

23 2005

23 2006

| Werkstoff Material | | Vc m/min | M4 | M5 | M6 | M8 | M10 | M12 |
|-----------------------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | | fz mm | fz mm | fz mm | fz mm | fz mm | fz mm |
| GFK / CFK | Vc m/min | 60-90 | 60-90 | 60-90 | 60-90 | 60-90 | 60-90 | 60-90 |
| | fz mm | 0,05-0,06 | 0,05-0,07 | 0,06-0,08 | 0,06-0,08 | 0,08-0,10 | 0,10-0,12 | 0,10-0,12 |
| Graphit / Graphite | Vc m/min | 140-180 | 140-180 | 140-180 | 140-180 | 140-180 | 140-180 | 140-180 |
| | fz mm | 0,04-0,06 | 0,05-0,07 | 0,06-0,08 | 0,06-0,08 | 0,08-0,10 | 0,10-0,12 | 0,10-0,12 |

1



2



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Index

Karnasch – Ein Begriff für Qualität und Präzision seit über 55 Jahren.

Im badischen Heddeshheim wurde das Unternehmen 1961 gegründet und erwarb sich einen hervorragenden Ruf in der Herstellung und Vertrieb herausragender Hochleistungswerkzeuge. Bei der Produktion werden ausschließlich die besten und neuesten Technologien verwendet.

Mit der Eröffnung einer Niederlassung in Brandenburg 1992 wurde frühzeitig auf gesamtdeutsche Präsenz gesetzt. Heute ist Karnasch Professional Tools ein weltweit agierendes Unternehmen mit Vertriebspartnern in 58 verschiedenen Ländern. Kundenbetreuung, Beratung und die kompetente Hilfe bei fachlichen Problemen sind Grundsteine einer dauerhaften Partnerschaft. Diese Grundsteine wurden durch Einführung einer Service-Hotline weiterhin vertieft.

Durch intelligente Lagerhaltung garantieren wir jederzeit sofortige Lieferbarkeit unserer Produkte.

Karnasch – a definition for quality and precision since 55 years.

The company was founded in 1961 in Heddeshheim (Baden) and aquired an excellent reputation concerning the production and the sales of pre-eminent top-class tools. At the production we are using only the best and the latest technologies.

By opening our office in Brandenburg in 1992, we have focused early on a presence all over Germany.

Today Karnasch Professional Tools is a global acting company with distribution partners in 58 different countries.

Customer service, consultation and competent help in case of technical problems are the base for a durable partnership. These base were reinforced by the introduction of a Service-Hotline.

By an intelligent storekeeping we assure the immediate delivery of our products at any time.

KARNASCH – Made for Professionals



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Co-Basislegierungen
Co-based alloys

| Werkstoffgruppe Material group | Legierungsbestandteile in % / Alloy component in % | | | | | | | | | | | | | | | |
|-----------------------------------|--|-----------------------|------------------|------|------|------|-----|-----|------|------|------|------|------|----|---|-----------------|
| | Handelsbezeichnung / Trade name | Werkstoff Material | DIN | Fe | Ni | Co | Cr | Mo | W | Si | Mn | C | Al | Ti | P | S |
| MP35N | | | | 35 | | 20 | 9,8 | | | | 0,01 | | | | | |
| L 605 | | | CoCr20W15Ni | 10 | 0,5 | 20 | | 15 | | 1,7 | 0,1 | | | | | |
| Nickelvac TJA-1537 | | | | 0,2 | 0,25 | 28 | 6 | | 0,5 | 0,5 | 0,06 | | | | | N 0,2 |
| Altemp S 816 | | | CoCr20Ni20W | 20 | 4 | 20 | 4 | 4 | 0,4 | 1,2 | | | 0,38 | | | |
| HS 21 | | | CoCr28Mo | 3 | 1 | 27 | 5 | | 0,6 | 0,6 | | | 0,25 | | | |
| HS 25 | | | CoCr20W15Ni | 10 | 3 | 20 | | 15 | 2 | 1,5 | | | 0,1 | | | |
| HS 30 | | | CoCr26Ni14Mo | 16 | 1 | 24 | 6 | | 0,6 | 0,6 | | | 0,4 | | | |
| HS 31 | 2.4670 | | CoCr25NiW | 10 | 1,5 | 25 | | 8 | 0,75 | 0,6 | | | 0,4 | | | |
| HS 36 | | | CoCr19W14NiB | 10 | 2 | 18 | | 15 | | 1,5 | | | 0,4 | | | |
| Jetalloy 209 | | | | 10 | 1 | 20 | | 15 | | | | 2,0 | 0,02 | | | |
| L 251 | | | | 10 | 1 | 19 | | 14 | | | | | 0,4 | | | |
| M 203 | | | | 24,5 | 1 | 19,5 | | 12 | 1,0 | 0,8 | 2,15 | 24,5 | 0,07 | | | |
| M 204 | | | | 24,5 | | 18,5 | | 12 | 1,0 | 1,0 | | | 0,07 | | | |
| M 205 | | | | 24,5 | | 18,5 | | 12 | | | 2,8 | | 0,07 | | | |
| MAR-M 302 | | | CoCrW10TaZrB | | | 21,5 | | 10 | | | | | 0,85 | | | Ta 9,0 |
| MAR-M 322 | | | CoCr22W9TaZrNb | | | 21,5 | | 9 | 0,1 | 0,1 | | 0,75 | 1,0 | | | Ta 4,5, Zr 2,25 |
| MAR-M 509 | | | CoCr24Ni10WtaZrB | 10 | 1 | 23,5 | | 7 | 0,1 | 0,1 | | 0,2 | 0,6 | | | Ta 3,5, Zr 0,5 |
| MAR-M 905 | | | | 20 | | 20,0 | | | | | | 0,5 | 0,05 | | | Ta 7,5, Zr 0,1 |
| MAR-M 918 | | | CoCr20Ni20Ta | 20 | 0,4 | 20,0 | | | 0,1 | 0,1 | | | 0,05 | | | Ta 7,5, Zr 0,1 |
| Stellite 1 | | | | | | 33,0 | | 13 | | | 2,5 | | | | | |
| Stellite 6 | | | | | | 26,0 | | 5 | | | 1,0 | | | | | Nb 6,0 |
| Stellite 12 | | | | | | 29 | | 9 | | | 1,8 | | | | | |
| V-36 | | | CoCr25Ni20MOWNb | 20 | 3 | 25 | 4 | 2 | 0,4 | 1,0 | | | 0,3 | | | Nb 2,0 |
| WI-52 | | | CoCr21Mo11W | 1 | 2 | 21 | | 11 | 0,25 | | | | 0,45 | | | Nb 2,0 |
| X 40 | | | CoCr25NiW | 10,5 | 1,5 | 25,5 | | 7,5 | 0,75 | 0,75 | | | 0,5 | | | |
| X 45 | | | | 10,5 | 2 | 25,5 | | 7 | | 0,7 | | | 0,25 | | | B 0,01 |
| X 50 | | | | 20,5 | 4 | 22,5 | | 12 | | | | | 0,75 | | | |

Fe-Basislegierungen
Fe-based alloys

| Werkstoffgruppe Material group | Legierungsbestandteile in % / Alloy component in % | | | | | | | | | | | | | | | |
|-----------------------------------|--|-----------------------|-----------------|------|------|-----|------|------|-----|------|------|------|------|------|-------|-------|
| | Handelsbezeichnung / Trade name | Werkstoff Material | DIN | Fe | Ni | Co | Cr | Mo | W | Si | Mn | C | Al | Ti | P | S |
| VascoMax C-250 | | | | | 18,5 | 78 | | 4,8 | | 0,05 | 0,05 | 0,02 | 0,1 | 0,4 | 0,005 | 0,005 |
| VascoMax C-350 | | | | | 18,5 | 12 | | 4,8 | | 0,05 | 0,05 | 0,02 | 0,1 | 1,4 | 0,005 | 0,005 |
| VascoMax C-200 | | | | | 18,5 | 8,5 | | 3,25 | | 0,05 | 0,05 | 0,01 | | 0,2 | 0,005 | 0,005 |
| VascoMax C-300 | | | | | 18,5 | 8,8 | | 4,8 | | 0,05 | 0,05 | 0,02 | 0,1 | 0,73 | 0,005 | 0,005 |
| VascoMax T-200 | | | | | 18,5 | | | 3 | | 0,05 | 0,05 | 0,01 | | 0,7 | 0,005 | 0,005 |
| VascoMax T-250 | | | | | 18,5 | | | 3 | | 0,03 | 0,05 | 0,02 | 0,01 | 1,4 | 0,005 | 0,005 |
| Greek Ascology | | | | | 2 | | 12 | | 2,5 | | | 0,19 | | | | |
| Jethete M-152 | | | | | 2,5 | | 12 | 1,7 | | | | 0,15 | | | | |
| Haynes 556 | | | X12CrCoNi2120 | 31 | 20 | 20 | 21 | 3 | 2,5 | | | 0,1 | | | | |
| N 155 | | | | | 20 | 20 | 21 | 3 | 2,5 | 0,5 | 1,5 | 0,15 | | | | |
| S590 | | | X40CoCrNi2020 | | 20 | 20 | 21 | 4 | 4 | | | 0,43 | | | | |
| Crucible A286 | 1.4980 | | | | 25 | | 14 | 1,3 | | 0,5 | 1,3 | 0,05 | 0,2 | 2,1 | | |
| Discaloy 16/25/6 | | | | | 25 | | 16 | 6 | | 0,7 | 1,35 | 0,12 | | 0,3 | | |
| AL-6XN Alloy | | | | | 25 | | 20,5 | 6,5 | | | | 0,02 | | | | |
| Discaloy 24 | | | | | 26 | | 13,5 | 2,7 | | 0,8 | 0,9 | 0,04 | 0,1 | 1,7 | | |
| Armco 18 | | | | | 3,7 | | 17,2 | | | 0,47 | 12,5 | 0,06 | | | | |
| Incoloy 801 | | | G-X50CrNi3030 | | 32 | | 20,5 | | | 0,5 | 0,8 | 0,05 | | 1,1 | | |
| Incoloy 800 | | | X10NiCrAlTi3220 | 39,5 | 32,5 | | 21 | | | 0,5 | 0,75 | 0,05 | 0,37 | 0,37 | | 0,007 |
| Incoloy A 286 | | | | 56,5 | 26 | | 15 | 1,2 | | 0,4 | 0,8 | 0,4 | | 2 | | |
| N156 | | | | | 33 | 24 | 17 | 3 | 2 | | | 0,33 | | | | |
| 20CB-3 | | | | | 33 | | 20 | 2,2 | | | | | | | | |
| Sanicro 30 | 1.4558 | | X2NiCrAlTi3220 | | 34 | | 22 | | | 0,55 | 0,55 | 0,03 | 0,3 | 0,5 | | |
| Sanicro 28 | 1.4563 | | | 63 | 37 | | 27 | 3,5 | | 0,6 | 2 | 0,02 | | | 0,025 | 0,015 |
| Sanicro 31HT | 1.4876 | | | 46 | 30,5 | | 20,5 | | | 0,6 | 0,6 | 0,07 | 0,5 | 0,5 | 0,015 | 0,01 |
| Incoloy 803 | | | | | 35 | | 25 | | | | | 0,08 | 0,15 | 0,15 | | |
| Allvac 330 | | | | | 35,5 | | 18,5 | | | 1,13 | 1 | 0,04 | | | 0,01 | 0,01 |
| Al 36 | | | | | 36 | | | | | | | | | | | |
| Incoloy DS | | | X12NiCrSi3616 | | 37 | | 18 | | | 2,3 | 1 | 0,06 | | | | |
| AL 42 | | | | | 41 | | | | | | | | | | | |
| Armco 20-45-5 | | | | | 46 | | 20 | 2,3 | | 1 | 5 | 0,08 | | | | |
| AL 4750 | | | | | 49 | | | | | | | | | | | |
| ALLOY 21-6-9 | | | | | 6,5 | | 21 | | | | 6 | | | | | |
| Vasco 13-8 Mo | MF | | | | 8 | | 12,8 | 2,3 | | 0,05 | 0,1 | 0,03 | 1,05 | | 0,005 | 0,004 |



Ni-Basislegierung Ni-Based alloys

| Werkstoffgruppe Material group | Legierungsbestandteile in % / Alloy component in % | | | | | | | | | | | | | | | |
|-----------------------------------|--|-----------------------|--------------------|-----|------|------|-------|------|------|------|------|-------|------|------|-------|-------|
| | Handelsbezeichnung / Trade name | Werkstoff Material | DIN | Ni | Fe | Co | Cr | Mo | W | Si | Mn | C | Al | Ti | P | S |
| AL 22 | | | | 56 | 2,5 | | 20,6 | 13,9 | 2,65 | | | | | | | |
| Allcor | | | | | | | 31,0 | 10,0 | 2,0 | | 0,02 | 0,25 | 0,25 | | | |
| Astroloy | | | | | | 17,0 | 15,0 | 5,0 | | | 0,04 | 4,0 | 3,5 | | | |
| Duranickel 310 | | | | | 0,6 | | | 0,5 | | 1,0 | 0,5 | 4,4 | 0,6 | | | |
| GMR 235 | | | | | 10,0 | | 15,5 | 5,2 | | 0,4 | 0,2 | 0,15 | 3,0 | 2,0 | | |
| GMR 235-D | | | NiCr16MoAl | | 4,5 | | 15,5 | 5,0 | | | | 0,15 | 3,5 | 2,5 | | |
| Hastelloy B | | | S-NiMo30 | 65 | 5,0 | 2,0 | 1,5 | 28,0 | | 0,05 | 0,5 | 0,02 | | | | |
| Hastelloy B-2 | | | | 69 | 1,0 | 0,5 | 0,5 | 16,0 | | 0,05 | 0,5 | 0,01 | | | 0,02 | 0,015 |
| Hastelloy C | 2.4602 | | NiCr17Mo17FeW | 65 | 6,0 | 2,0 | 15,0 | 17,0 | 5 | | | 0,04 | | | | |
| Hastelloy D | | | | | 2,0 | | 1,0 | | | 9,0 | 1,0 | 0,1 | | | | |
| Hastelloy N | | | | | 4,0 | | 7,0 | 16,5 | | | | 0,02 | | | | |
| Hastelloy R235 | | | | | 10,0 | 2,5 | 15,5 | 5,5 | | | | 0,15 | 2 | 2,5 | | |
| Hastelloy W | | | | | 4,0 | | 5,0 | 24,5 | | | | 0,02 | | | | |
| Hastelloy X | 2.4665 | | NiCr22FeMo | 47 | 18 | 1,5 | 22 | 9,0 | 0,6 | | | 0,1 | | | | |
| Haynes 75 | | | | 10 | 5,0 | | 20,0 | | | | | 0,12 | 0,25 | 0,4 | | |
| HS 27 | | | NiCo32Cr26Mo | | 2,0 | 31,5 | 26,0 | 6,0 | | | | 0,4 | | | | |
| IN 100 | 2.4674 | | NiCo15Cr10MoAlTi | | | 15,0 | 10,0 | 3,0 | | | | 0,18 | 5,5 | 4,7 | | |
| IN 713 | | | | | 2,5 | | 13,0 | 4,6 | | 0,4 | 0,2 | 0,18 | 6,0 | 0,8 | | |
| Incoloy 020 | 2.4660 | | | 46 | 37 | 20 | 2,5 | | | | | | | | | |
| Incoloy 804 | | | | 46 | 25,4 | | 29,5 | | | 0,5 | 0,75 | 0,06 | 0,25 | 0,6 | | |
| Incoloy 825 | 2.4858 | | NiCr21Mo | 46 | 30 | | 21,5 | | 3,0 | 0,5 | 0,65 | 0,03 | 0,2 | 0,9 | | |
| Incoloy 901 | 2.4662 | | NiFe35Cr14MoTi | 45 | 35,3 | | 13,45 | 6,20 | | 0,22 | 0,48 | 0,05 | | 2,5 | | |
| Incoloy 903 | | | | 40 | | 15,0 | | | | | | | 0,7 | 1,4 | | |
| Incoloy 925 | | | | 44 | 22 | | 21 | 3 | | | | | 0,3 | 2,1 | | |
| Inconel® 600 | 2.4816 | | NiCr15Fe | 75 | 8,0 | | 15,5 | | | | | 0,075 | | | | |
| Inconel® 601 | 2.4851 | | | 61 | 14,0 | | 23,0 | | | 0,2 | 0,5 | 0,05 | 1,3 | | | 0,008 |
| Inconel® 617 | 2.4663 | | | 55 | | 12,5 | 22 | 9,0 | | | | 0,07 | 1,0 | | | |
| Inconel® 622 | 2.4602 | | | | 2,3 | | 20,5 | 14,2 | 3,2 | | | | | | | |
| Inconel® 625 | 2.4856 | | NiCr22Mo9Nb | 62 | 2,5 | | 21,5 | 9,0 | | | | 0,05 | 0,3 | 0,3 | | |
| Inconel® 690 | 2.4642 | | | 58 | 9,0 | | 29,0 | | | 0,2 | 0,2 | 0,25 | | | | 0,007 |
| Inconel® 700 | | | NiCo28Cr15MoAlTi | | 0,7 | 28,5 | 15 | 3,7 | | 0,3 | 0,1 | 0,12 | 3,0 | 2,2 | | |
| Inconel® 702 | | | | | 0,4 | | 15,6 | | | 0,2 | 0,05 | 0,04 | 3,4 | 0,7 | | |
| Inconel® 706 | | | | | | | 16,0 | | | | | 0,03 | | 1,8 | | |
| Inconel® 713 | 2.4670 | | G-NiCr13Al16MoNb | | | | 12 | 4,5 | | | | 0,13 | 6 | 0,6 | | |
| Inconel® 718 | 2.4668 | | NiCr19Fe19NbMo | 55 | | | 19,0 | 3,1 | | | | 0,02 | 0,5 | 0,9 | | |
| Inconel® 718-OP | | | | 55 | | | 19,0 | 3,1 | | | | 0,02 | 0,5 | 0,9 | | |
| Inconel® 720 | | | | | | 14,7 | 18 | 3 | 1,25 | | | | 2,5 | 5 | | |
| Inconel® 721 | | | | | 8,0 | | 16 | | | 0,15 | 2,25 | 0,07 | 0,1 | 3,0 | | |
| Inconel® 722 | | | | | 7,0 | | 15,5 | | | | | 0,04 | 0,7 | 2,4 | | |
| Inconel® 725 | | | NiCr16FeTi | | 7,5 | | 21 | 8 | | | | | 0,3 | 1,5 | | |
| Inconel® 751 | 2.4694 | | | | 7,0 | | 15,5 | | | 0,2 | 0,5 | 0,05 | 1,2 | 2,3 | | 0,005 |
| Inconel® X-750 | 2.4669 | | NiCr16FeTi | 70 | 7,0 | | 15,5 | | | | | 0,04 | 0,7 | 2,5 | | |
| Inconel® 783 | | | Ni27Co34Fe25Nb3Cr3 | 28 | 25 | 34 | 3 | | | 0,5 | 0,5 | 0,1 | 5,5 | 0,2 | 0,015 | 0,005 |
| Jessop G 81 | | | NiCr20Co18Ti | | 0,5 | 16,9 | 20,6 | | | 0,2 | 0,5 | 0,08 | 1,5 | 2,5 | | |
| Jessop X-40 | 2.4670 | | G-NiCr13Al6MoNb | | | | 12 | 4,5 | | | | 0,13 | 6 | 0,6 | | |
| Jethete M-252 | | | G-NiCr19Co | | 2,5 | 10,0 | 19,0 | 9,75 | | | | 0,15 | 1,0 | 2,5 | | |
| MAR-M 200 | | | NiW13Co10Cr9AlTi | | | 10,0 | 9,0 | | 12,5 | | | 0,15 | 5,0 | 2,0 | | |
| MAR-M 246 | 2.4676 | | NiCo10W10Cr9AlTi | | | 10,0 | 9,0 | 2,5 | 10,0 | | | 0,15 | 5,5 | 1,5 | | |
| MAR-M 421 | | | NiCr16Co10WAlTi | | | 10,0 | 15,5 | 1,7 | 3,5 | | | 0,15 | 4,25 | 1,75 | | |
| MAR-M 432 | | | NiCo20Cr16WAlTi | | | 20,0 | 15,5 | | 3 | | | 0,15 | 2,5 | 4,3 | | |
| Monel 400 | 2.4360 | | NiCu30Fe | 63 | 1,2 | | | | | 0,25 | | 0,15 | | | | 0,01 |
| Monel K 500 | 2.4375 | | NiCu30Al | 63 | 1,0 | | | | | 0,25 | 0,7 | 0,1 | 2,7 | 0,6 | | 0,01 |
| Monel R 405 | | | | | 1,25 | | | | | 0,25 | 1,0 | 0,15 | | | | |
| Nimocast 713 | 2.4670 | | G-NiCr13Al16MoNb | | | | 13,5 | 4,5 | | | | 0,12 | 6,0 | 0,9 | | |
| Nimocast PD 16 | | | NiFe33Cr17Mo | | 34,0 | | 16,5 | 3,3 | | | | 0,06 | 1,2 | 1,2 | | |
| Nimocast PE 10 | | | | | 3,0 | | 20,0 | 6,0 | 2,5 | | | | | | | |
| Nimocast PK 24 | 2.4674 | | NiCo15Cr10MoAlTi | | | 15,0 | 10,0 | 3,0 | | | | 0,18 | 5,5 | 4,7 | | |
| Nimonic 105 | 2.4634 | | NiCo20Cr15MoAlTi | | 0,5 | 20 | 14,75 | 5 | | 0,5 | 0,5 | 0,1 | 4,7 | 1,2 | | |
| Nimonic 115 | 2.4636 | | NiCo15Cr15MoAlTi | | | 13,2 | 14,2 | 4 | | | | 0,16 | 5 | 4 | | |
| Nimonic 75 | 2.4630 | | NiCr20Ti | 0,3 | 4 | | 20 | | | 0,45 | 0,45 | 0,45 | 0,1 | 0,35 | | |
| Nimonic 80A | 2.4631 | | NiCr20TiAl | | 0,55 | | 19,5 | | | 0,2 | 0,55 | 0,08 | 1,4 | 2,4 | | |
| Nimonic 86 | | | | | | | 25 | 10 | | | | | | | | |
| Nimonic 90 | 2.4632 | | NiCr20Co18Ti | 0,3 | 1,5 | 18,0 | 19,5 | | | | | 0,065 | 1,4 | 2,4 | | |
| Nimonic 901 | 2.4662 | | NiCr15MoTi | | 35,0 | | 12,5 | 6,0 | | | | 0,05 | | 2,8 | | |
| Nimonic 95 | | | | | 5,0 | 18,0 | 19,5 | | | 1,0 | 1,0 | 0,1 | 2,0 | 3,5 | | |
| Nimonic C-22 | | | | | 4,0 | 1,2 | 21,2 | 13,5 | 3,0 | 0,04 | 0,2 | 0,07 | | | 0,01 | |
| Nimonic C-263 | 2.4650 | | NiCr20CoMoTi | | | 20,0 | 20,0 | 5,85 | | | | 0,06 | 0,45 | 2,15 | | |
| Nimonic C-276 | 2.4819 | | | | 5,0 | 0,5 | 15,5 | 16,0 | 3,5 | | | 0,01 | | | | |
| Nimonic PE 13 | 2.4665 | | NiCr22Fe18Mo | | 18,5 | 1,5 | 21,75 | 9 | 0,6 | 0,5 | 0,5 | 0,01 | | | | |
| Nimonic PE 16 | | | NiFe33Cr17Mo | | 1,2 | | 16,5 | 3,5 | | | | 0,05 | 1,2 | 1,2 | | |
| Nimonic PK 25 | | | | | | 19,5 | 19 | 4 | | 0,75 | 0,75 | 0,08 | 2,9 | 2,9 | | |
| Nimonic PK 31 | | | | | | 14 | 20 | 4,5 | | | | | 0,4 | 2,3 | | |
| Nimonic PK 33 | | | NiCr20Co16MoTi | | 0,5 | 14 | 18 | 7 | | 0,25 | 0,25 | 0,05 | 2,1 | 2 | | |
| R-235 | | | | | 10,0 | 1,15 | 15,0 | 5,5 | | 0,3 | 0,1 | 0,12 | 20 | 2,5 | | |
| Refractaloy 26 | | | | | 16,0 | 20,0 | 18,0 | 3,2 | | 1,0 | 0,8 | 0,03 | 0,2 | 2,8 | | |
| René 100 | | | NiCo15Cr10MoAlTi | | | 15,0 | 10,0 | 3,0 | | | | 0,18 | 5,5 | 4,7 | | |
| René 125 | | | | | | 10,0 | 8,9 | 2,0 | 7,0 | | | 0,1 | 4,7 | 2,5 | | |
| René 41 | 2.4973 | | NiCr19Co11MoTi | 20 | 3,0 | 11,0 | 19,0 | 9,75 | | | | 0,06 | 1,6 | 2,5 | | |
| René 63 | | | | | 3,5 | 15,0 | 14,0 | 6,0 | 3,5 | 0,2 | 0,1 | 0,05 | 3,8 | 2,5 | | |
| René 77 | | | | | 0,4 | 15,0 | 15,0 | 4,2 | | 0,1 | 0,1 | 0,07 | 4,3 | 3,3 | | |
| René 80 | | | | | | 9,5 | 14,0 | 4,0 | 4,0 | | | 0,17 | 3,0 | 5,0 | | |
| René 95 | | | | | | 8,0 | 14,0 | 3,5 | 3,5 | | | 0,15 | 3,5 | 2,5 | | |
| Sanicro 41 | 2.4858 | | | 46 | 30 | | 21,5 | | 3,0 | 0,5 | 0,65 | 0,03 | 0,2 | 0,9 | | |
| Sanicro 69 | 2.4642 | | | 58 | 9,0 | | 29,0 | | | 0,2 | 0,2 | 0,25 | | | | 0,007 |
| Sanicro 70 | 2.4816 | | | 75 | 8,0 | | 15,5 | | | | | 0,075 | | | | |
| TRW VIA | | | NiTa9Co8W6CrAl | | | 7,5 | 6,0 | 2,0 | 5,8 | | | 0,13 | 5,4 | 1,0 | | |
| Udimet 500 | 2.4983 | | NiCr18CoMoAlTi | | | 19,0 | | 4,0 | | 0,1 | 0,1 | 0,07 | 3,0 | 3,0 | | |
| Udimet 520 | | | | | | 12 | 19 | 6 | 1 | | | | 2 | 3 | | |
| Udimet 630 | 2.4668 | | NiCr19NbMo | | 18,0 | 18,0 | | 3,0 | | | | 0,03 | 0,5 | 1,0 | | |
| Udimet 700 | 2.4636 | | NiCo15Cr15MoAlTi | | | 16,5 | 15,0 | 5,0 | | | | 0,07 | 4,4 | 3,4 | | |
| Udimet 710 | | | | | | 15,0 | 18,0 | 3,0 | 1,5 | | | 0,07 | 2,5 | 5,0 | | |
| Udimet 718 | | | NiCr19Fe19NbMo | | 18,0 | | 18,0 | 3,0 | | | | 0,05 | 0,6 | 1,0 | | |
| Waspaloy | 2.4654 | | NiCr20Co14MoTi | 0,3 | 2 | 13,0 | 19,5 | 4,3 | | | | 0,05 | 1,40 | 3,0 | | |

P Werkstoffgruppe / material group
1. Unlegierte Stähle - Automatenstähle / Unalloyed steels - machining steels

| Werkstoff Nr.: material No.: | Deutschland Germany DIN | Europa Europe EN | Frankreich France AFNOR | Großbritannien Great Britain BS | Italien Italy UNI | Schweden Sweden SIS | Spanien Spain UNE | USA USA AISI |
|--|-------------------------------|------------------------|-------------------------------|---------------------------------------|-------------------------|---------------------------|-------------------------|--------------------|
| 1.1 bis 450 N/ mm² / up to 450 N/ mm² | | | | | | | | |
| 1.0432 | C21 | | | | | | | |
| 1.0498 | St42.8 | | | | | | | |
| 1.0044 | St442 | | E 28-2 | 4360-43 B | Fe 430 BFN | 1412 | AE 275-B | A 570 Gr. 40 |
| 1.0401 | C15 | | CC12 | 080 M 15 | C 15 | 1350 | F.111 | 1015 |
| 1.0420 | GS38 | GE 200 | 230-400M | | | 1306 | | |
| 1.0446 | GS45 | GE 230 | E23-45M | A1 | | 1305 | F.221 | |
| 1.1120 | GS20Mn5 | | | | | | | |
| 1.1121 | Ck10 | 2 C 10 | XC 10 | 040 A 10 | C 10 | 1265 | C 10 k | 1010 |
| 1.1131 | GS16Mn5 | GE 17 Mn 5 | | | | | | |
| 1.1141 | Ck15 | 2 C 15 | XC 15 | 080 M 15 | C 15 | 1370 | C 16 k | 1015 |
| 1.1151 | Ck22 | 2 C 22 | XC 25 | 050 A 20 | C 20 | | C 25 k | 1023 |
| 1.5523 | 19MnB4 | | | 170 H 20 | | | 20 MnB 4 DF | |
| 1.8961 | WTSt373 | | | | Fe 360 D FF | | | |
| 1.0035 | St33 | | A 33 | | Fe 320 | | AE 235-B | |
| 1.0037 | St372 | | | | | | | |
| 1.0710 | 15S10 | | | | | | | |
| 1.0711 | 9S20 | | | 220 M 07 | CF 9 S 22 | | | 1212 |
| 1.0715 | 9SMn28 | 11 SMn 28 | S 250 | 230 M 07 | CF 9 SMn 28 | 1912 | 11 SMn 28 | 1213 |
| 1.0718 | 9SMnPb28 | 11 SMnPb 28 | S 250 Pb | | CF 9 SMnPb 28 | 1914 | 11 SMnPb 28 | 12 L 13 |
| 1.0721 | 10S20 | 10 S 20 | 10 F 1 | 210 M 15 | CF 10 S 20 | | 10 S 20 | 1108 |
| 1.0722 | 10SPb20 | 10 SPb 20 | 10 Pb F 2 | | CF 10 SPb 20 | | 10 SPb 20 | 11 L 08 |
| 1.0736 | 9SMn36 | | S 300 | 240 M 07 | CF 9 SMn 36 | | 12 SMn 35 | 1215 |
| 1.0737 | 9SMnPb36 | | S 300 Pb | | CF 9 SMnPb 36 | 1926 | 12 SMnPb 35 | 12 L 14 |
| 1.1127 | 36Mn6 | | | 212 M 36 | | | | 1141 |
| 1.1133 | 20Mn5 | | | 120 M 19 | G 22 Mn 3 | | 20 Mn 6 | 1022 |
| 1.1273 | 90Mn4 | | | 060 A 96 | | | | 1090 |
| 1.2 bis 650 N/ mm² / up to 650 N/ mm² | | | | | | | | |
| 1.0136 | St423 | | | | | | | |
| 1.0254 | St37.0 | P235T1 | | | | | | |
| 1.0553 | S355J0 | S355J0 | S355J0; E 36-3 | En 50 C; S355J0 | S355J0; Fe 510 C FN | | | S355J0 |
| 1.0581 | St52.4 | | | | | | | |
| 1.1140 | C15R | C15R | C15R | C15R | | | C15R; C 16 k-1; F.1513 | |
| 1.1190 | S355G15 | | | | | | | |
| 1.0116 | St373 | | E 24-3 | 4360-40 C | Fe 37-3 | 1312 | A 360 C | A 570 Gr. 36 |
| 1.0144 | St443 | | E 28-3 | 4360-43 C | Fe 430 D FF | 1414 | AE 275-D | A 573 Gr. 70 |
| 1.0406 | C25 | 1 C 25 | CC 25 | 070 M 26 | C 25 | | C 25 k | 1025 |
| 1.0461 | StE255 | | | | | | | |
| 1.0482 | 19Mn5 | | A 52 CP; AP; FP | 224-460 | | | | |
| 1.0486 | StE285 | | | | Fe E 285 KG | | AE 285 KG | |
| 1.0501 | C35 | 1 C 35 | CC 35 | 060 A 35 | C 35 | 1550 | F.113 | 1035 |
| 1.0503 | C45 | 1 C 45 | CC 45 | 080 M 46 | C 45 | 1650 | C 45 k | 1045 |
| 1.0505 | StE315 | | | | | | | |
| 1.0511 | C40 | 1 C 40 | | 080 M 40 | | | F.114.A | 1040 |
| 1.0528 | C30 | 1 C 30 | CC 32 | 080 M 30 | C 30 | | | 1030 |
| 1.0540 | C50 | 1 C 50 | | 080 M 50 | | 1674 | | 1050 |
| 1.0552 | GS52 | GE 260 | | | | | | |
| 1.0558 | GS60 | GE 300 | 320-560M | A3 | C 45 | 1606 | | |
| 1.0562 | StE355 | | E 355 R/ FP | | Fe E 355 KG | 2132 | AE 355 KG | A 633 Gr. C |
| 1.0970 | 38Si7 | | 41 S 7 | | | | | |
| 1.1106 | ESTe355 | | | | | | | |
| 1.1157 | 40Mn4 | | 35 M 5 | 150 M 36 | | | | 1039 |
| 1.1169 | 20Mn6 | | | | | | | |
| 1.1520 | C70W1 | | | | C 70 KU | | | |
| 1.2002 | 125Cr1 | | Y2 120 C | | | | | |
| 1.2003 | 75Cr1 | | | | | | | |
| 1.2008 | 140Cr3 | | Y2 140 C | | | | | |
| 1.2056 | 90Cr3 | | | | | | | |
| 1.2057 | 105Cr4 | | | | | | F.120.J | |
| 1.5637 | 10Ni14 | | | 503 | 18 Ni 14 KT | | | A 350-LF 5 |
| 1.8962 | 9CrNiCuP324 | | | WR 50 A | | | | |
| 1.0726 | 35S20 | 35 S 20 | 35 MF 4 | 212 M 36 | | 1957 | F.210G | 1140 |
| 1.0760 | 38SMn28 | 38SMn28 | 38SMn28 | 38SMn28 | | | 38SMn28 | |
| 1.1158 | Ck25 | 2 C 25 | XC 25 | 070 M 26 | C 25 | | C 25 k | 1025 |
| 1.1167 | 36Mn5 | | 40 M 5 | 150 M 36 | | 2120 | 36 Mn 5 | 1335 |
| 1.1170 | 28Mn6 | 28 Mn 6 | 35 M 5 | 150 M 28 | C 28 Mn | | 36 Mn 6 | 1330 |
| 1.1178 | Ck30 | 2 C 30 | XC 32 | 080 M 30 | C 30 | | | 1030 |
| 1.1181 | Ck35 | 2 C 35 | XC 38 H1 | 080 M 36 | C 35 | 1572 | C 35 k | 1034 |
| 1.1183 | Cf35 | | XC 38 TS | 060 A 35 | C 35 | 1572 | | 1035 |
| 1.1191 | Ck45 | 2 C 45 | XC 42 | 080 M 46 | C 40 | | C 45 k | 1045 |
| 1.1206 | Ck50 | 2 C 50 | | 080 M 50 | C 50 | 1674 | | 1050 |
| 1.1730 | C45W | C 45 U | Y3 42 | | | | | |
| 1.5423 | 16Mo5 | | | 1503-245-420 | 16 Mo 5 | | 16 Mo 5 | 4520 |

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P Werkstoffgruppe / material group
1. Unlegierte Stähle - Automatenstähle / Unalloyed steels - machining steels

| Werkstoff Nr.: material No.: | Deutschland Germany DIN | Europa Europe EN | Frankreich France AFNOR | Großbritannien Great Britain BS | Italien Italy UNI | Schweden Sweden SIS | Spanien Spain UNE | USA USA AISI |
|--|-------------------------|------------------|-------------------------|---------------------------------|-------------------|---------------------|-------------------|--------------------|
| 1.3 bis 850 N/ mm² / up to 850 N/ mm² | | | | | | | | |
| 1.1165 | GS30Mn5 | | | | | | 30 Mn 5 | 1330 |
| 1.1744 | C67W | | Y1 70 | | | | F.512 | |
| 1.1750 | C75W | | | BW 1A | | | | W 1 |
| 1.2004 | 85Cr1 | | Y1 100 C 2 | | | | | |
| 1.5029 | 71Si7 | | | | | | | |
| 1.5404 | 21MoV53 | | | | | | | |
| 1.5406 | 17MoV84 | | | | | | | |
| 1.5633 | 24Ni8 | | 22 N 8 | | | | | |
| 1.6311 | 20MnMoNi45 | | | | | | | |
| 1.7242 | 16CrMo4 | | 15 CD 3.5 | | 18 CrMo 4 | | 18 CrMo 4 | |
| 1.7258 | 24CrMo5 | | | | | | | |
| 1.7259 | 26CrMo7 | | | | | | | |
| 1.7273 | 24CrMo10 | | | | | | | |
| 1.7337 | 16CrMo44 | | | | A 18 CrMo 4 5 KW | | | A 387 Gr. 12 Cl. 2 |
| 1.7350 | 22CrMo44 | | | | | | | |
| 1.7362 | 12CrMo195 | | Z 10 CD 5.05 | 3606-625 | 16 CrMo 20 5 | | | |
| 1.7709 | 21CrMoV57 | | | | | | | |
| 1.7766 | 17CrMoV10 | | | | | | | |
| 1.7779 | 20CrMoV135 | | | | | | | |
| 1.4 bis 950 N/ mm² / up to 950 N/ mm² | | | | | | | | |
| 1.0062 | St601 | | | | | | | |
| 1.0532 | St522 | | | | | | | |
| 1.0535 | C55 | 1 C 55 | | 070 M 55 | C 55 | 1655 | | 1055 |
| 1.0570 | St523 | S 355 J 2 G 3 | E 36-3 | 4360-50 B | Fe 510 B | 2132 | A 510 C | |
| 1.0601 | C60 | 1 C 60 | AF 70 C 55 | 080 A 62 | C 60 | | | 1060 |
| 1.0728 | 60S20 | 60 S 20 | 60 MF 4 | | | | | |
| 1.1203 | Ck55 | 2 C 55 | XC 55 H1 | 070 M 55 | C 55 | | C 55 k | 1055 |
| 1.1221 | Ck60 | 2 C 60 | XC 60 | 060 A 62 | C 60 | 1678 | | 1060 |
| 1.1223 | Cm60 | 3 C 60 | | 080 A 67 | | | | |
| 1.1525 | C80W1 | C 80 U | Y1 90 | | C 80 KU | | F.513 | W 108 |
| 1.1545 | C105W1 | C105 U | Y1 105 | | C 100 KU | 1880 | F.515 | W 110 |
| 1.1620 | C70W2 | C 70 U | | | | | | |
| 1.1625 | C80W2 | | Y1 90 | BW 1B | | | C 80 | W 1 |
| 1.1645 | C105W2 | | | | | | C 102 | |
| 1.1663 | C125W | C 120 U | Y2 120 | | C 120 KU | | C 120 | W 112 |
| 1.1673 | C135W | | Y2 140 | | C 140 KU | | | |
| 1.1740 | C60W | | Y3 55 | | | | | |
| 1.1820 | C55W | | | | | | | |
| 1.1830 | C85W | C 90 U | Y3 90 | | | | | |
| 1.3561 | 44Cr2 | | | | | | | |
| 1.3563 | 43CrMo4 | | | | | | | |
| 1.5131 | 50MnSi4 | | | | | | | |
| 1.5141 | 53MnSi4 | | | | | | | |
| 1.7276 | 10CrMo11 | | 12 CD 10 | | | | | |
| 1.7281 | 16CrMo93 | | 20 CD 8 | | | | | |
| 1.5 bis 1100 N/ mm² / up to 1100 N/ mm² | | | | | | | | |
| 1.0070 | St702 | | A 70-2 | | Fe 70-2 | | A 690-2 | |
| 1.0603 | C67 | | | | | | | |
| 1.7238 | 49CrMo4 | | | | | | | |
| 1.7561 | 42CrV6 | | | | | | | |
| 1.7701 | 51CrMoV4 | | 51 CDV 4 | | 51 CrMoV 4 | | | |

P Werkstoffgruppe / material group
2. Vergütungsstähle / Alloy steels

| 2.1 bis 600 N/ mm² / up to 600 N/ mm² | | | | | | | | |
|--|---------------|------------|-----------|----------|---------------|------|------------|------|
| 1.0902 | 46Si7 | | 45 S 7 | | | | 46 Si 7 | |
| 1.0961 | 60SiCr7 | | 60 SC 7 | 250 A 61 | 60 SiCr 8 | | 60 SiCr 8 | 9262 |
| 1.0985 | QStE500N | | | | | | | |
| 1.2101 | 62SiMnCr4 | | | | | | | |
| 1.2162 | 21MnCr5 | 21 MnCr 5 | 20 NC 5 | | | | | |
| 1.2208 | 31CrV3 | | | | | | | |
| 1.2210 | 115CrV3 | | | | 107 CrV 3 KU | | F.520.L | L2 |
| 1.2235 | 80CrV2 | | | | | | F.520.J | |
| 1.2241 | 51CrV4 | 51 CrMnV 4 | | | 51 CrMnV 4 KU | | | |
| 1.2307 | 29CrMoV9 | | | | | | | |
| 1.2323 | 48CrMoV67 | | 45 CDV 6 | | | | | |
| 1.2382 | GX155CrVMo121 | | | | | | | |
| 1.2414 | 120W4 | | | | | | F.532 | |
| 1.2419 | 105WCr6 | 105 WCr 5 | 105 WC 13 | | 107 WCr 5 KU | 2140 | 105 WCr 5 | |
| 1.2519 | 110WCrV5 | | | | | | 102 WCrV 5 | |
| 1.2542 | 45WCrV7 | 45 WCrV 8 | | BS 1 | 45 WCrV 8 KU | 2710 | 45 WCrSi 8 | S1 |
| 1.2552 | 80WCrV8 | | | | | | 60 WCrSi 8 | |
| 1.2710 | 45NiCr6 | | | | | | | |
| 1.2726 | 26NiCrMoV5 | | | | | | | |
| 1.2737 | 28NiCrV5 | | | | | | | |

Internationaler Normenvergleich
International comparison of standards

P Werkstoffgruppe / material group
2. Vergütungsstähle / Alloy steels

| Werkstoff Nr.: material No.: | Deutschland Germany DIN | Europa Europe EN | Frankreich France AFNOR | Großbritannien Great Britain BS | Italien Italy UNI | Schweden Sweden SIS | Spanien Spain UNE | USA USA AISI |
|--|-------------------------------|------------------------|-------------------------------|---------------------------------------|-------------------------|---------------------------|-------------------------|--------------------|
| 2.1 bis 600 N/ mm² / up to 600 N/ mm² | | | | | | | | |
| 1.2738 | 40CrMnNiMo864 | 40CrMnNiMo8-6-4 | | | | | | |
| 1.2740 | 28NiCrMoV10 | | | | | | | |
| 1.2743 | 60NiCrMoV124 | | | | | | | |
| 1.2762 | 75CrMoNiW67 | | | | | | | |
| 1.2826 | 60MnSi4 | | | | | | | |
| 1.2838 | 145V33 | | | | | | | |
| 1.2842 | 90MnCrV8 | | 90 MV 8 | BO 2 | 90 MnVCr 8 KU | | | O 2 |
| 1.2851 | 34CrAl6 | | | | | | | |
| 1.3505 | 100Cr6 | 100 Cr 6 | 100 C 6 | 535 A 99 | 100 Cr 6 | 2258 | 100 Cr 6 | E 52100 |
| 1.3520 | 100CrMn6 | 100 CrMn 6 | 100 CM 6 | | | | 100 CrMn 6 | |
| 1.3565 | 48CrMo4 | | | | | | | |
| 1.5023 | 38Si7 | | | | | | | |
| 1.5025 | 51Si7 | | | | | | | |
| 1.5085 | 51Mn7 | | | | | | | |
| 1.5142 | 60SiMn5 | | | | | | | |
| 1.5213 | 15MnV5 | | | | | | | |
| 1.5223 | 42MnV7 | | | | | | | |
| 1.5225 | 51MnV7 | | | | | | | |
| 1.5752 | 14NiCr14 | | 16 NC 12 | 655 M 13 | | | | E3310 |
| 1.5919 | 15CrNi6 | | 16 NC 6 | S 107 | 16 CrNi 4 | | | |
| 1.6511 | 36CrNiMo4 | 36 CrNiMo 4 | 40 NCD 3 | 816 M 40 | 38 NiCrMo 4 KB | | 35 NiCrMo 4 | 9840 |
| 1.6582 | 34CrNiMo6 | 34 CrNiMo 6 | 35 NCD 6 | 817 M 40 | 35 NiCrMo 6 KB | 2541 | 40 NiCrMo 7 | 4340 |
| 1.6587 | 17CrNiMo6 | | 18 NCD 6 | 820 A 16 | 18 NiCrMo 7 | | 14 NiCrMo 13 | |
| 1.7003 | 38Cr2 | 38 Cr 2 KD | 38 C 2 | | 38 Cr 3 | | 38 Cr 3 | |
| 1.7012 | 13Cr2 | | | | | | | |
| 1.7045 | 42Cr4 | | 42 C 4 TS | 530 A 40 | 41 Cr 4 | 2245 | 42 Cr 4 | 5140 |
| 1.7103 | 67SiCr5 | | | | 67 SiCr 5 | | | |
| 1.7131 | 16MnCr5 | 16 MnCr 5 KD | 16 MC 5 | 527 M 17 | 16 MnCr 5 | 2173 | 16 MnCr 5 | 5115 |
| 1.7226 | 34CrMoS4 | 34 CrMoS 4 | | | | | 35 CrMo 4-1 | |
| 1.7227 | 42CrMoS4 | 42 CrMoS 4 | | 708 H 42 | | | 40 CrMo 4 | |
| 1.7271 | 23CrMoB33 | | | | | | | |
| 1.7707 | 30CrMoV9 | | | | | | | |
| 1.7715 | 14MoV63 | | | 1503-660-440 | | | 13 MoCrV 6 | |
| 1.7735 | 14CrMoV69 | | | | | | | |
| 1.8159 | 50CrV4 | 51 CrV 4 | 50 CV 4 | 735 A 50 | 50 CrV 4 | 2230 | 51 CrV 4 | 6150 |
| 1.8515 | 31CrMo12 | 31 CrMo 12 | | 722 M 24 | 31 CrMo 12 | | 31 CrMo 12 | |
| 1.8907 | StE500 | | | | | | | |
| 1.8911 | ESTE380 | | | | | | | |
| 2.2 bis 950 N/ mm² / up to 950 N/ mm² | | | | | | | | |
| 1.0906 | 65Si7 | | | 250 A 61 | | | | |
| 1.1199 | 49MnVS3 | | | | | | | |
| 1.2108 | 90CrSi5 | | | | | | | |
| 1.2109 | 125CrSi5 | | | | | | | |
| 1.2127 | 105MnCr4 | | | | 100 CrMn 4 KU | | | |
| 1.2206 | 140CrV1 | | 130 C 3 | | | | | |
| 1.2242 | 59CrV4 | | | | | | | |
| 1.2243 | 61CrSiV5 | | | | | | | |
| 1.2249 | 45SiCrV6 | | | | | | | |
| 1.2303 | 100CrMo5 | | | | | | F.520.F | L 7 |
| 1.2312 | 40CrMnMoS86 | | | | | | | |
| 1.2562 | 142WV13 | | | | | | | |
| 1.2747 | 28NiMo17 | | | | | | | |
| 1.2766 | 35NiCrMo16 | | | | | | | |
| 1.3501 | 100Cr2 | | 100 C 2 | | | | | E 50100 |
| 1.3503 | 105Cr4 | | | | | | | E 51100 |
| 1.5094 | 38 MnS 6 | 38MnS6 | | | | | | |
| 1.5217 | 20MnV6 | | | | | | | |
| 1.5231 | 38MnSiVS5 | | | | | | | |
| 1.5232 | 27MnSiVS6 | | | | | | | |
| 1.5233 | 44MnSiVS6 | | | | | | | |
| 1.5403 | 17MnMoV64 | | | 1501-261 | | | | |
| 1.5526 | 30MnB4 | | | | | | | |
| 1.5710 | 36NiCr6 | | 30 NC 6 | 640 A 35 | | | | 3135 |
| 1.5736 | 36NiCr10 | | 30 NC 11 | | 35 NiCr 9 | | | 3435 |
| 1.5755 | 31NiCr14 | | 18 NC 13 | 653 M 31 | | | | |
| 1.6225 | 11NiMn54 | | | | | | | |
| 1.6310 | 20MnMoNi55 | | | | | | | |
| 1.6368 | 15NiCuMoNb5 | | | 3604-591 | | | | |
| 1.6946 | 30CrMoNiV511 | | | | | | | |
| 1.6948 | 26NiCrMoV115 | | | | | | | |
| 1.6971 | 79Ni1 | | | | | | | |
| 1.6972 | 83Ni1 | | | | | | | |
| 1.7038 | 37CrS4 | 37 CrS 4 | | | | | | |
| 1.7214 | 25CrMo4 | | | | | | | |
| 1.7219 | 26CrMo4 | | | | | | | |

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Index

P Werkstoffgruppe / material group 2. Vergütungsstähle / Alloy steels

| Werkstoff Nr.: material No.: | Deutschland Germany DIN | Europa Europe EN | Frankreich France AFNOR | Großbritannien Great Britain BS | Italien Italy UNI | Schweden Sweden SIS | Spanien Spain UNE | USA USA AISI |
|--|-------------------------------|------------------------|-------------------------------|---------------------------------------|-------------------------|---------------------------|-------------------------|--------------------|
| 2.2 bis 950 N/ mm² / up to 950 N/ mm² | | | | | | | | |
| 1.7222 | 42CrMoPb4 | | | | | | | |
| 1.7225 | 42CrMo4.M4S | | | | | | | |
| 1.7389 | GX12CrMo101 | | | | | | | |
| 1.7711 | 40CrMoV47 | | | 1506-670-860 | | | | |
| 1.7725 | GS30CrMoV64 | | | | | | | |
| 1.7733 | 24CrMoV55 | | 20 CDV 6 | | 24 CrMoV 5 5 | | | |
| 1.7741 | 42CrMoV73 | | | | | | | |
| 1.7755 | GS45CrMoV104 | | | | | | | |
| 1.8070 | 21CrMoV511 | | | | 21 CrMoV 5 11 | | | |
| 1.8212 | 21CrVMoW12 | | | | | | | |
| 1.8521 | 15CrMoV59 | | | | | | | |
| 1.8550 | 34CrAlNi7 | | | | | | | |
| 2.3 bis 1100 N/ mm² / up to 1100 N/ mm² | | | | | | | | |
| 1.2511 | 80WCrV3 | | | | | | | |
| 1.2515 | 100WV4 | | | | | | | |
| 1.7756 | GS36CrMoV104 | | | | | | | |
| 1.8509 | 41CrAlMo7 | | | 905 M 39 | 41 CrAlMo 7 | 2940 | 41 CrAlMo 7 | A 355 Cl.A |
| 1.8523 | 39CrMoV139 | | | 897 M 39 | | | | |
| 1.8827 | S460M | S460M | E 460; S460M | S460M | S460M | | S460M | |
| 2.4 bis 1300 N/ mm² / up to 1300 N/ mm² | | | | | | | | |
| 1.2311 | 40CrMnMo7 | | | | 35 CrMo 8 KU | | | |
| 1.5864 | 35NiCr18 | | | | | | | |
| 2.5 Nitrierstähle bis 1000 N/ mm² / up to 1000 N/ mm² | | | | | | | | |
| 1.8504 | 34CrAl6 | | | | | | | |
| 1.8506 | 34CrAlS5 | | | | | | | |
| 1.8507 | 34CrAlMo5 | | | | | | | |
| 2.6 Nitrierstähle über 1000 N/ mm² / over 1000 N/ mm² | | | | | | | | |
| 1.8519 | 31CrMoV9 | | | | | | | |

P Werkstoffgruppe / material group 3. Hochlegierte Stähle / High-alloy steels

| 3.1 bis 700 N/ mm² / up to 700 N/ mm² | | | | | | | | |
|--|---------------|-----------------|--------------|-------|---------------------|------|----------------|-------|
| 1.2080 | X210Cr12 | X 210 Cr 12 | Z 200 C 12 | BD 3 | X 205 Cr 12 KU | | X 210 Cr 12 | D3 |
| 1.2083 | X42Cr13 | X 42 Cr 13 | Z 40 C 14 | | X 41 CR 13 KU | | | |
| 1.2316 | X36CrMo17 | X 36 CrMo 17 | | | X 38 CrMo 16 1 KU | | X 38 CrMo 16 | |
| 1.2343 | X38CrMoV5H1 | X 38 CrMoV 5 1 | Z 38 CDV 5 | BH 11 | X 37 CrMoV 5 1 KU | | X 37 CrMoV 5 | H 11 |
| 1.2344 | X40CrMoV51 | X 40 CrMoV 5 1 | Z 40 CDV 5 | BH 13 | X 40 CrMoV 5 1 1 KU | 2242 | X 40 CrMoV 5 | H 13 |
| 1.2364 | X63CrMoV51 | | | | | | | |
| 1.2363 | X100CrMoV51 | X 100 CrMoV 5 1 | Z 100 CDV 5 | BA 2 | X 100 CrMoV 5 1 KU | 2260 | X 100 CrMoV 5 | A 2 |
| 1.2367 | X38CrMoV53 | | | | | | | |
| 1.2376 | X96CrMoV12 | | | | | | | |
| 1.2379 | X155CrVMo121 | X 153 CrMoV 12 | Z 160 CDV 12 | BD 2 | X 155 CrVMo 12 1 KU | | | D 2 |
| 1.2436 | X210CrW12 | X 210 CrW 12 | | | X 215 CrW 12 1 KU | 2312 | X 210 CrW 12 | |
| 1.2453 | X130W5 | | | | | | | |
| 1.2564 | X30WCrV41 | | | | | | F.527 | |
| 1.2567 | X30WCrV53 | X 30 WCrV 5 3 | Z 32 WCV 5 | | X 30 WCrV 5 3 KU | | | |
| 1.2581 | X30WCrV93 | X 30 WCrV 9 3 | Z 30 WCV 9 | BH 21 | X 30 WCrV 9 3 KU | | X 30 WCrV 9 | H 21 |
| 1.2601 | X165CrMoV12 | X 165 CrMoV 12 | | | X 165 CrMoV 12 KU | 2310 | X 160 CrMoV 12 | |
| 1.2606 | X37CrMoV51 | | Z 35 CWDV 5 | BH 12 | X 35 CrMoV 05 KU | | F.537 | H 12 |
| 1.2622 | X60WCrMoV94 | | | | | | | |
| 1.2631 | X50CrMoW911 | | | | | | | |
| 1.2662 | X30WCrCoV93 | | | | | | | |
| 1.2678 | X45CrCoVW555 | | | | | | | |
| 1.2764 | X19NiCrMo4 | | | | | | | |
| 1.2767 | X45NiCrMo4 | 40 NiCrMo 4 | Y35 NCD 16 | | 42 NiCrMo 15 7 KU | | | |
| 1.2786 | X13NiCrSi3615 | | | | | | | |
| 1.2889 | X45CoCrMoV553 | | | | | | | |
| 1.3302 | S1214 | | | | (X 150 WW 1305 KU) | | | |
| 1.3318 | S1212 | | | | | | | |
| 1.3401 | X120Mn12 | | Z 120 M 12 | | X G 120 Mn 12 | | AM-X 120 Mn 12 | A 128 |
| 1.3533 | 18NiCrMo146 | | | | | | | |
| 1.3815 | X40MnCr182 | | | | | | | |
| 1.3817 | X40MnCr18 | | | | | | | |
| 1.3941 | X4CrNi1813 | | | | | | | |
| 1.3952 | X4CrNiMoN1814 | | | | | | | |
| 1.3958 | X5CrNi1811 | | | | | | | |
| 1.3962 | X15CrNiMn1210 | | | | | | | |
| 1.3965 | X8CrMnNi188 | | | | | | | |
| 1.3967 | X50CrMnNiN229 | | | | | | | |
| 1.4704 | X45SiCr4 | | | | | | | HNv 2 |
| 1.4710 | GX30CrSi6 | | | | | | | |
| 1.4712 | X10CrSi6 | | | | | | | |
| 1.4716 | X8Cr9 | | | | | | | |
| 1.4721 | 215Cr12 | | | | | | | |
| 1.4722 | X10CrSi13 | | | | | | X 10 CrSi 13 | |
| 1.4725 | CrAl144 | | | | | | | |

Internationaler Normenvergleich
International comparison of standards

P Werkstoffgruppe / material group
3. Hochlegierte Stähle / High-alloy steels

| Werkstoff Nr.: material No.: | Deutschland Germany DIN | Europa Europe EN | Frankreich France AFNOR | Großbritannien Great Britain BS | Italien Italy UNI | Schweden Sweden SIS | Spanien Spain UNE | USA USA AISI |
|--|-------------------------------|------------------------|-------------------------------|---------------------------------------|-------------------------|---------------------------|-------------------------|--------------------|
| 3.1 bis 700 N/ mm² / up to 700 N/ mm² | | | | | | | | |
| 1.4767 | CrAl205 | | | | | | | |
| 1.4773 | X8Cr30 | | | | | | | |
| 1.4822 | GX40CrNi245 | | | | | | | |
| 1.4829 | X12CrNi2212 | | | | X 16 CrNi 23 14 | | | |
| 1.4842 | X12CrNi2520 | | | 310 S 94 | | | | |
| 1.4846 | X40CrNi2521 | | | 310 S 98 | | | | |
| 1.4861 | X10NiCr3220 | | | | | | | |
| 1.6903 | X10CrNiTi1810 | | | | | | | |
| 3.2 bis 1400 N/ mm² / up to 1400 N/ mm² | | | | | | | | |
| 1.2709 | X3NiCoMoTi1895 | | | | | | | |
| 1.2731 | X50NiCrWV1313 | | | | | | | |
| 1.2779 | X6NiCrTi2615 | | | | | | | |
| 1.2787 | X23CrNi17 | | | | | | | |
| 1.2790 | 72SiNiCrMoV54 | | | | | | | |
| 1.2888 | X20CoCrWMo109 | | | | | | | |
| 1.3202 | S12145 | (HS12-1-5-5) | | BT 15 | HS 12-1-5-5 | | 12-1-5-5 | T 15 |
| 1.3207 | S104310 | HS10-4-3-10 | Z130WKCDV10-10-04-04 | | BT 42 | HS 10-4-3-10 | 10-4-3-10 | |
| 1.3243 | S6525 | (HS6-5-2-5) | KCV 06-05-05-04-02 | | HS 6-5-2-5 | 2723 | 6-5-2-5 | M 35 |
| 1.3246 | S7425 | HS1-8-1 | Z110 WKCDV 07-05-04 | | HS 7-4-2-5 | | 7-4-2-5 | M 41 |
| 1.3247 | S21018 | HS2-9-1-8 | Z110 DKCWW 09-08-04 | BM 42 | HS 2-9-1-8 | | 2-10-1-8 | M 42 |
| 1.3249 | S2928 | | | BM 34 | | | 2-9-2-8 | |
| 1.3255 | S18125 | (HS18-1-1-5) | Z80 WKCV 18-05-04-01 | BT 4 | HS 18-1-1-5 | | 18-1-1-5 | T 4 |
| 1.3257 | S181215 | | | | | | | |
| 1.3265 | S181210 | (HS18-0-1-10) | | BT 5 | HS 18-0-1-10 | | 18-0-2-10 | T 5 |
| 1.3342 | SC652 | (HS6-5-2) | Z90WDCV06-05-04-02 | | HSC 6-5-3 | | | M 3 |
| 1.3343 | S652 | HS6-5-3 | Z85WDCV06-05-04-02 | BM 2 | HS 6-5-2 | 2722 | 6-5-2 | M 2 |
| 1.3344 | S653 | | Z120WDCV06-05-04-03 | | | | 6-5-3 | M 3 Cl.2 |
| 1.3346 | S291 | HS1-8-1 | Z85DCWV08-04-02-01 | BM 1 | HS 1-8-1 | | | M 1 |
| 1.3348 | S292 | HS2-9-2 | Z100DCWV09-04-02-02 | | HS 2-9-2 | 2782 | 2-9-2 | M 7 |
| 1.3355 | S1801 | HS18-0-1 | Z80WCV18-04-01 | BT 1 | HS 18-0-1 | | 18-0-1 | T 1 |
| 1.3543 | X102CrMo17 | | | | X 105 CrMo 17 | | X 100 CrMo 17 | |
| 1.3549 | X89CrMoV81 | | | | | | | |
| 1.3551 | 80MoCrV4216 | | 80 DCV 40 | | X 80 MoCrV 4 4 | | 80 MoCrV 40-16 | M 50 |
| 1.3819 | X50MnCrV2014 | | | | | | | |
| 1.3949 | X5MnCr1813 | | | | | | | |
| 1.3964 | X4CrNiMnMoN19165 | | | | | | | |
| 1.3968 | X12MnCr1812 | | | | | | | |
| 1.3974 | X3CrNiMoNbN2317 | | | | | | | |
| 1.4718 | X45CrSi93 | X 45 CrSi 8 | Z 45 CS 9 | 401 S 45 | X 45 CrSi 8 | | X 4 SCrSi 09-03 | HNV 3 |
| 1.4748 | X85CrMoV182 | | Z 85 CDMV 18.02 | | X 85 CrMoV 19 3 | | X 85 CrMoV 18-02 | |
| 1.4785 | X60CrMnMoVNB2110 | | | | | | | |
| 1.4873 | X45CrNiW189 | | Z 35 CNWS 14.14 | 331 S 40 | X 45 CrNiW 18 9 | | X 45 CrNiSiW 18-09 | |
| 1.4875 | X55CrMnNiN208 | | | | | | X 55 CrMnNiN 20-08 | EV 12 |
| 1.4911 | X8CrCoNiMo106 | | | S.152 | | | | |
| 1.4913 | X19CrMoVNbN111 | | | | | | | |
| 1.4920 | X15CrMoV121 | | | | | | | |
| 1.4922 | X20CrMoV121 | | | | | | | |
| 1.4935 | X20CrMoWV121 | | | | X 22 CrMoWV 121 | | | 422 |
| 1.4945 | X6CrNiWNB1616 | | | | | | | |
| 1.4960 | X40CrNiCoNb1313 | | | | | | | |
| 1.4962 | X12CrNiWTi1613 | | | | | | | |
| 1.4971 | X12CrCoNi2120 | | | | | | | 661 |
| 1.4986 | X8CrNiMoBNb1616 | | | | | | | |

M Werkstoffgruppe / material group
4. Rostfreie Stähle / Stainless steels

| | | | | | | | | |
|--|------------|-----------------|----------------|----------|--------------|------|-------------|-------|
| 4.1 ferritisch/ martensitisch / ferritic/ martensitic | | | | | | | | |
| 1.4000 | X6Cr13 | X 6 Cr 13 | Z 6 C 13 | 403 S 17 | X 6 Cr 13 | 2301 | X 6 Cr 13 | 403 |
| 1.4002 | X6CrAl13 | X 6 CrAl 13 | Z 6 CA 13 | 405 S 17 | X 6 CrAl 13 | 2302 | X 6 CrAl13 | 405 |
| 1.4005 | X12CrS13 | X 12 CrS 13 | Z 12 CF 13 | 416 S 21 | X 12 CrS 13 | 2380 | X 12 CrS 13 | 416 |
| 1.4006 | X10Cr13 | (X 12 Cr 13 KD) | Z 12 C 13 | 410 S 21 | X 12 Cr 13 | 2302 | X 12 Cr 13 | 410 |
| 1.4008 | GX8CrNi13 | | Z 12 CN 13 M | 410 C 21 | GX 12 Cr 13 | | | |
| 1.4016 | X6Cr17 | | Z 8 C 17 | 430 S 15 | X 8 Cr 17 KD | 2320 | X 8 Cr 17 | 430 |
| 1.4021 | X20Cr13 | X 20 Cr 13 | Z 20 C 13 | 420 S 37 | X 20 Cr 13 | 2303 | X 20 Cr 13 | 420 |
| 1.4024 | X15Cr13 | X 15 Cr 13 | | 420 S 29 | X 12 Cr 13 | | | |
| 1.4027 | GX20Cr14 | | Z 20 C 13 M | 420 C 29 | | | | |
| 1.4028 | X30Cr13 | X 30 Cr 13 | Z 30 C 13 | 420 S 45 | X 30 Cr 13 | 2304 | X 30 Cr 13 | |
| 1.4059 | GX22CrNi17 | | Z 20 CN 17.2 M | | | | | |
| 1.4085 | GX70Cr29 | | | | | | | |
| 1.4086 | GX120Cr29 | | | | | | | |
| 1.4104 | X12CrMoS17 | X 14 CrMoS 17 | Z 10 CF 17 | | X 10 CrS 17 | 2383 | X 10 CrS 17 | 430 F |
| 1.4105 | X4CrMoS18 | | | | | | | |
| 1.4106 | X10CrMo13 | | | | | | | |
| 1.4107 | GX8CrNi12 | | | | | | | |
| 1.4113 | X6CrMo171 | (X 8 CrMo 17) | Z 8 CD 17.01 | 434 S 17 | X 8 CrMo 17 | 2325 | | 434 |



M

Werkstoffgruppe / material group

4. Rostfreie Stähle / Stainless steels

| Werkstoff Nr.: material No.: | Deutschland Germany DIN | Europa Europe EN | Frankreich France AFNOR | Großbritannien Great Britain BS | Italien Italy UNI | Schweden Sweden SIS | Spanien Spain UNE | USA USA AISI |
|--|-------------------------------|------------------------|-------------------------------|---------------------------------------|-------------------------|---------------------------|-------------------------|--------------------|
| 4.1 ferritisch / martensitisch / ferritic / martensitic | | | | | | | | |
| 1.4119 | X15CrMo13 | | | | | | | |
| 1.4302 | X5CrNi199 | | | | | | | |
| 1.4305 | X10CrNiS189 | X 10 CrNiS 18 9 | Z 10 CNF 18.09 | 303 S 21 | X 10 CrNiS 18 09 | 2346 | X 10 CrNiS 18 9 | 303 |
| 1.4313 | X5CrNi134 | | Z 4 CDN 13.4 | | X 6 CrNi 13 04 | 2385 | | CA 6-NM |
| 1.4321 | X2NiCr1816 | | | | | | | |
| 1.4332 | X2CrNi2412 | | Z 2 CN 24.13 | | | | | |
| 1.4337 | X10CrNi309 | | | | | | | |
| 1.4340 | GX40CrNi274 | | | | GX 35 CrNi 28 05 | | | |
| 1.4347 | GX6CrNiN267 | | | | | | | |
| 1.4351 | X3CrNi134 | | | | | | | |
| 1.4370 | X15CrNiMn188 | | | | | | | |
| 1.4405 | GX5CrNiMo165 | | | | | | | |
| 1.4430 | X2CrNiMo1912 | | Z 2 CND 19.12 | 316 S 93 | | | | |
| 1.4437 | GX6CrNiMo1812 | | | 317 C 12 | | | | |
| 1.4440 | X2CrNiMo18165 | | | | | | | |
| 1.4446 | GX2CrNiMoN17132 | | | | | | | |
| 1.4448 | GX6CrNiMo1713 | | | 317 C 16 | | | | |
| 1.4449 | X5CrNiMo1713 | | | 317 S 16 | X 5 CrNiMo 18 15 | | | 317 |
| 1.4455 | X2CrNiMnMoN2016 | | | | | | | |
| 1.4463 | GX6CrNiMo2482 | | | | | | | |
| 1.4502 | X8CrTi18 | | | | | | | |
| 1.4505 | X5NiCrMoCuNb2018 | | | | | | | |
| 1.4510 | X6CrTi17 | X 8 Cr Ti 17 | Z 8 CT 17 | | X 6 CrTi 17 | | X8CrTi17 | 430 Ti |
| 1.4511 | X6CrNb17 | | Z 8 CNb 17 | | X 6 CrNb 17 | | | 430 Nb |
| 1.4512 | X6CrTi12 | | Z 6 CT 12 | 409 S 19 | X 6 CrTi 12 | | | 409 |
| 1.4523 | X8CrMoTi17 | | | | | | | |
| 1.4528 | X105CrCoMo182 | | | | | | | |
| 1.4531 | GX2NiCrMoCuN2018 | | | | | | | |
| 1.4535 | X90CrCoMoV17 | | | | | | | |
| 1.4536 | GX2NiCrMoCuN2520 | | | | | | | |
| 1.4543 | X5CrNiNb189 | | | | X6CrNiNb 18 11 | | | |
| 1.4551 | X5CrNiNb199 | | | | | | | |
| 1.4576 | X5CrNiMoNb1912 | | | 318 S 96 | | | | |
| 1.4724 | X10CrAl13 | | Z 10 C 13 | (403 S 17) | X 10 CrAl 12 | | X 10 CrAl13 | |
| 1.4742 | X10CrAl18 | | Z 10 CAS 18 | (403 S 15) | [X 8 Cr 17] | | X 10 CrAl 18 | 430 |
| 1.4747 | X80CrNiSi20 | | Z 80 CSN 20.02 | 433 S 65 | X 80 CrSiNi 20 | | X 80 CrSiNi20-02 | HNV 6 |
| 1.4762 | X10CrAl24 | | Z 10 CAS 24 | | X 16 Cr 26 | | X 10 CrAl 24 | 446 |
| 1.4871 | X53CrMnNiN219 | | Z 52 CMN 21.09 | 349 S 54 | X 53 CrMnNiN 21 9 | | X 53 CrMnNiN 21-09 | EV 8 |
| 1.4882 | X50CrMnNiNbN219 | | Z 50 CMNnb 21.09 | | | | | |
| 4.2 martensitisch / martensitic | | | | | | | | |
| 1.4031 | X38Cr13 | X 40 Cr 13 | Z 40 C 14 | | X 40 Cr 14 | 2304 | X 40 Cr 13 | |
| 1.4034 | X46Cr13 | X 45 Cr 13 | Z 40 C 14 | (420 S45) | X 40 Cr 14 | | X 46 Cr 13 | |
| 1.4057 | X20CrNi172 | X 19 CrNi 17 2 | Z 15 CN 16.02 | 431 S 29 | X 16 CrNi 16 | 2321 | X 15 CrNi 16 | 431 |
| 1.4109 | X65CrMo14 | | Z 70 CD 14 | | | | | |
| 1.4110 | X55CrMo14 | | Z 50 CD 13 | | | | | |
| 1.4111 | X110CrMoV15 | | | | | | | |
| 1.4112 | X90CrMoV18 | | | | | | | 440 B |
| 1.4115 | X20CrMo171 | | | | | | | |
| 1.4116 | X45CrMoV15 | | | | | | X 46 CrMo 16 | |
| 1.4117 | X38CrMoV15 | | | | | | | |
| 1.4120 | X20CrMo13 | | Z 20 CD 14 | | | | | |
| 1.4122 | X35CrMo17 | | | | X 35 CrMo 17 | | | |
| 1.4125 | X105CrMo17 | | Z 100 CD 17 | | | | | 440 C |
| 1.4136 | GX70CrMo292 | | Z 60 CD 29.2 M | | | | | |
| 1.4138 | GX120CrMo292 | | | | | | | |
| 1.4729 | GX40CrSi13 | | | | GX 35 Cr 13 | | | |
| 1.4740 | GX40CrSi17 | | | | GX 35 Cr 17 | | | |
| 1.4745 | GX40CrSi23 | | | | | | | |
| 1.4776 | GX40CrSi29 | | | | GX 35 Cr 28 | | | |
| 1.4923 | X22CrMoV121 | | | | X 22 CrMoV121 | | | |
| 1.4931 | GX22CrMoV121 | | | | | | | |
| 2.4537 | GNiMo16CrW | | | | | | | |
| 2.4631 | NiCr20TiAl | | | | | | | |
| 1.4319 | X3CrNiN178 | | | | | | | |
| 4.3 austenitisch, austenitisch/ferritisch / austenitic/ferritic | | | | | | | | |
| 1.2780 | X15CrNiSi2012 | X 16 CrNiSi 20 12 | Z 15 CN 24.13 | | | | | |
| 1.2782 | X15CrNiSi2520 | X 16 CrNiSi 25 20 | Z 15 CN 24.13 | | | | | |
| 1.4009 | X8Cr14 | | | | | | | |
| 1.4015 | X8Cr18 | | | | | | | |
| 1.4108 | X100CrMo13 | | | | | | | |
| 1.4301 | X5CrNi1810 | X 6 CrNi 18 10 KD | Z 6 CN 18.09 | 304 S 15 | X 5 CrNi 18 10 | 2332 | X 5 CrNi 18 11 | 304 H |
| 1.4303 | X5CrNi1812 | X 8 CrNi 18 12 KD | Z 8 CN 17.07 | 305 S 19 | X 8 CrNi 19 10 | | X 8 CrNi 18-12 | 308 |
| 1.4310 | X12CrNi177 | X 12 CrNi 17 7 | Z 12 CN 17.07 | 301 S 21 | X 12 CrNi 17 07 | | X 12 CrNi 17 07 | 301 |
| 1.4311 | X2CrNiN1810 | X 2 CrNiN 18 10 | Z 8 CN 18.12 | 304 S 62 | X 8 CrNi 19 10 | 2371 | X 8 CrNi 18-12 | 304 LN |
| 1.4312 | GX10CrNi188 | | Z 10 CN 18.9 M | 302 C 25 | | | | |

M Werkstoffgruppe / material group
4. Rostfreie Stähle / Stainless steels

| Werkstoff Nr.: material No.: | Deutschland Germany DIN | Europa Europe EN | Frankreich France AFNOR | Großbritannien Great Britain BS | Italien Italy UNI | Schweden Sweden SIS | Spanien Spain UNE | USA USA AISI |
|--|-------------------------------|------------------------|-------------------------------|---------------------------------------|-------------------------|---------------------------|-------------------------|--------------------|
| 4.3 austenitisch, austenitisch/ferritisch / austenitic/ferritic | | | | | | | | |
| 1.4401 | X5CrNiMo17122 | X6 CrNiMo 17 12 2 KD | Z 6 CND 17.11 | 316 S 16 | X 5 CrNiMo 17 12 | 2347 | X 5 CrNiMo 17-12 | 316 |
| 1.4404 | X2CrNiMo17132 | GX3CrNiMo 17 12 2 KD | Z 3 CND 19.10 M | 316 S 12 | GX 2 CrNiMo 19 11 | 2348 | X 2 CrNiMo 17-12-03 | 316 L |
| 1.4406 | X2CrNiMoN17122 | X 3 CrNiMoN 17 12 2 | Z 2 CND 17.12 Az | 316 S 61 | X 2 CrNiMoN 17 12 | | | 316 LN |
| 1.4408 | GX6CrNiMo1810 | | | 316 C 16 | | 2343 | X 7 CrNiMo 20 10 | CF-8M |
| 1.4410 | GX10CrNiMo189 | | Z 5 CND 20.10 M | | | | | |
| 1.4429 | X2CrNiMoN17133 | X 3 CrNiMoN 17 13 3 | Z 2 CND 17.13 Az | 316 S 62 | X 2 CrNiMoN 17 13 | 2375 | | 316 LN |
| 1.4436 | X5CrNiMo17133 | X 6 CrNiMo 18 13 3 KD | Z 6 CND 17.12 | 316 S 16 | X 5 CrNiMo 17 13 | 2343 | X 6 CrNiMo 17-12-03 | 316 |
| 1.4439 | X2CrNiMoN17135 | | | | | | | |
| 1.4465 | X1CrNiMoN25252 | | | | | | | |
| 1.4503 | X3NiCrCuMoTi2723 | | | | | | | |
| 1.4506 | X5NiCrMoCuTi2018 | | | | | | | |
| 1.4529 | X1NiCrMoCuN25206 | | | | | | | |
| 1.4539 | X1NiCrMoCuN25205 | | Z 1 NCDU 25.20 | | | 2662 | | |
| 1.4541 | X6CrNiTi1810 | X 6 CrNiTi 18 10 | Z 6 CNT 18.10 | 321 S 12 | X 6 CrNiTi 18 11 | 2337 | X 7 CrNiTi 18-11 | 321 |
| 1.4542 | X5CrNiCuNb164 | X5CrNiCuNb16-4 | Z 7 CNU 17.04 | X5CrNiCuNb16-4 | X5CrNiCuNb16-4 | | | 630 |
| 1.4550 | X6CrNiNb1810 | X 6 CrNiNb 18 10 | Z 6 CNNb 18.10 | 347 S 17 | X 6 CrNiNb 18 11 | 2338 | X 6 CrNiNb 18-11 | 347 |
| 1.4552 | GY5CrNiNb189 | | Z 4 CNNb 19.10 M | 347 C 17 | | | | |
| 1.4571 | X6CrNiMoTi17122 | | Z 6 CNDT 17.12 | 320 S 31 | X 6 CrNiMoTi 17 12 | 2350 | X6 CrNiMoTi 17-12-03 | 316 Ti |
| 1.4573 | X10CrNiMoTi812 | | | 320 S 33 | X 6 CrNiMoTi 17 13 | | | 316 Ti |
| 1.4575 | X1CrNiMoNb2842 | | | | | | | |
| 1.4577 | X3CrNiMoTi2525 | | | | | | | |
| 1.4581 | GX5CrNiMoNb1810 | | Z 4 CNDNb 18.12 M | 318 C 17 | GX 6 CRNOMNB 20 11 | | | |
| 1.4582 | X4CrNiMoNb257 | | | | | | | |
| 1.4583 | X10CrNiMoNb1812 | | | | X 6 CrNiMoNb 17 13 | | | 318 |
| 1.4585 | GX7CrNiMoCuNb1818 | | | | | | | |
| 1.4586 | X5CrNiMoCuNb2218 | | | | | | | |
| 1.4825 | GX25CrNiSi189 | | | | | | | |
| 1.4826 | GX40CrNiSi229 | | | | | | | |
| 1.4828 | X15CrNiSi2012 | | Z 15 CNS 20.12 | 309 S 24 | X 16 CrNiSi 25,20 | | X 15 CrNiSi 20-12 | 309 |
| 1.4833 | X7CrNi2314 | | Z 15 CN 24.13 | 309 S 24 | X 6 CNI 23 14 | | | 309 S |
| 1.4841 | X15CrNiSi2520 | | Z 15 CNS 25.20 | | X 16 CrNiSi 25 20 | | X 15 CrNiSi 25-20 | 310 |
| 1.4845 | X12CrNi2521 | | Z 12 CN 25.20 | 310 S 24 | X 6 CrNi 25 20 | 2361 | F.331 | 310 S |
| 1.4848 | GX40CrNiSi2520 | | | 310 C 40 | GX 40 CrNi 26 20 | | X 40 CrNi 25 20 | HK |
| 1.4878 | X12CrNiTi189 | | Z 6 CNT 18.12 | 321 S 20 | X 6 CrNiTi 18.11 | 2337 | X 6 CrNiTi 18 11 | 321 |
| 1.4941 | X8CrNiTi1810 | | | | | | | |
| 1.4948 | X6CRNi1811 | | | 304 S 51 | | | | |
| 1.4949 | X3CRNi1811 | | | | X 2 CRNiN 18 11 | | | |
| 1.4961 | X8CrNiNb1613 | | | | | | X 7 CrNiNb 16-13 | |
| 1.4981 | X8CrNiMoNb1616 | | | | | | X 7 CrNiMo 16-16 | |
| 1.4460 | X4CrNiMo2752 | | | | | 2324 | X 8 CrNiMo 27-05 | 329 |
| 1.4462 | X2CrNiMoN2253 | | | | | 2377 | | |
| 1.4821 | X20CrNiSi254 | | Z 20 CNS 25.04 | | X 20 CrNiSi 254 | | X 20 CrNiSi 25-04 | |
| 1.4523 | GX40CrNiSi274 | | | | | | | |
| 1.4534 | X3CrNiMoAl1382 | | | | | | | |
| 1.4547 | X1CrNiMoCuN20187 | X1CrNiMoCuN20-18-7 | X1CrNiMoCuN20-18-7 | X1CrNiMoCuN20-18-7 | X1CrNiMoCuN20-18-7 | | X1CrNiMoCuN20-18-7 | |
| 1.4548 | X5CrNiCuNb1744 | | | | | | | |
| 1.4568 | X7CrNiAl177 | X7CrNiAl17-7 | X7CrNiAl17-7; Z 9 CNA 17-07 | X7CrNiAl177, 301 S 81 | X7CrNiAl17-7 | | X7CrNiAl17-7 | |

S Werkstoffgruppe / material group
5. Warmfeste Legierungen/ Heat-resistant materials

| | | | | | | | | |
|--|------------------|---------------------|----------------|-----------------|------------------|------|---------------------|-----------------|
| 5.1 Fe-Basis bis 650 N/mm² / Fe-basis up to 650 N/mm² | | | | | | | | |
| 0.6676 | GGLNiCr303 | GJLA-XNiCr 30-3 | L-NC 30 3 | L-NiCr 30 3 | | | | A 436 Type 3 |
| 0.6680 | GGLNiSiCr3055 | GJLA-XNiSiCr 30-5-5 | L-NSC 30 5 5 | L-NiSiCr 30 5 5 | | | | A 436 Type 4 |
| 0.7676 | GGGNiCr303 | GJSA-XNiCr 30-3 | S-NC 30 3 | S-NiCr 30 3 | | | | A 439 Type D-3 |
| 0.7677 | GGGNiCr301 | GJSA-XNiCr 30-1 | S-NC 30 1 | S-NiCr 30 1 | | | | A 439 Type D-3A |
| 0.7679 | GGGNiSiCr3055 | GJSA-XNiSiCr 30-5-5 | | | | | | |
| 0.7680 | GGGNiSiCr3053 | GJSA-XNiSiCr 30-5-3 | S-NSC 30 5 5 | S-NiSiCr 30 5 5 | | | | A 439 Type D-4 |
| 0.7683 | GGGNi35 | GJSA-XNi 35 | S-N 35 | S-Ni 35 | | | | A 439 Type D-5 |
| 0.7685 | GGGNiCr353 | GJSA-XNiCr 35-3 | S-NC 35 3 | S-NiCr 35 3 | | | | A 439 Type D-5A |
| 0.7688 | GGGNiNiSiCr3552 | GJSA-XNiSiCr 35-5-2 | | | | | | |
| 1.4335 | X1CrNi2521 | | | | | | | |
| 1.4361 | X1CrNiSi1815 | | Z 1 CNS 18.15 | | | | | |
| 1.4558 | X2NiCrAlTi3220 | | | | | | | |
| 1.4562 | X1NiCrMoCu32287 | | | | | | | |
| 1.4563 | X1NiCrMoCuN31274 | | | | | 2584 | | |
| 1.4857 | GX40NiCrSi3525 | | | | GX 50 NiCr 35 25 | | | |
| 1.4862 | X8NiCrSi3818 | | | | | | | |
| 1.4864 | X12NiCrSi3616 | | Z 12 NCS 37.18 | NA 17 | | | X 12 CrNiSi 36-16 | 330 |
| 1.4865 | GX40NiCrSi3818 | | | 330 C 40 | GX 50 NiCr 39 19 | | | |
| 1.4876 | X10NiCrAlTi3220 | | Z 8 NC 32.21 | NA 15 | | | X 10 NiCrAlTi 32-30 | B 163 |
| 5.2 Fe-Basis bis 750 N/mm² / Fe-basis up to 750 N/mm² | | | | | | | | |
| 1.4958 | X5NiCrAlTi3120 | | | | | | | |
| 1.4977 | X40CoCrNi2020 | | Z 42 CNKDOWNb | | | | | |
| 5.3 Cr-Ni-Basis bis 800 N/mm² / Cr-Ni-basis up to 800 N/mm² | | | | | | | | |
| 1.4939 | X12CrNiMo12 | | | S.151 | | | | |



Internationaler Normenvergleich International comparison of standards

S Werkstoffgruppe / material group 5. Warmfeste Legierungen/ Heat-resistant materials

| Werkstoff Nr.: material No.: | Deutschland Germany DIN | Europa Europe EN | Frankreich France AFNOR | Großbritannien Great Britain BS | Italien Italy UNI | Schweden Sweden SIS | Spanien Spain UNE | USA USA AISI |
|--|-------------------------------|------------------------|-------------------------------|---------------------------------------|-------------------------|---------------------------|-------------------------|--------------------|
| 5.3 Cr-Ni-Basis bis 800 N/mm² / Cr-Ni-basis up to 800 N/mm² | | | | | | | | |
| 1.4944 | A286 | | | | | | | |
| 1.4959 | X5NiCrAlTi3221 | | | | | | | |
| 1.4980 | X5CrNiTi2615 | | Z 6 NCTDV 25.15 B | 286 S 31 | | | | 660 |
| 2.4060 | Ni99,6 | | | | | | | |
| 2.4066 | Ni99,2 | | | NA 11 | | | | N 02200 |
| 2.4170 | GNi95 | | | | | | | SZ-100 |
| 2.4175 | GNi93C | | | | | | | CZ-100 |
| 2.4180 | GNi93Si | | | | | | | |
| 2.4360 | NiCu30Fe | | NU 30 | NA 13 | | | | N 04400 |
| 2.4602 | NiCr21Mo14W | | | | | | | |
| 2.4605 | NiCr23Mo16Al | | | | | | | |
| 2.4610 | NiMo16Cr16Ti | | | | | | | N 06455 |
| 2.4617 | NiMo28 | | NiMo28 | | | | | N 10665 |
| 2.4619 | NiCr22Mo7Cu | | | | | | | N 06985 |
| 2.4630 | NiCr20Ti | | NC 20 T | HR 5 | | | | N 06075 |
| 2.4642 | NiCr29Fe | | NC 30 Fe | | | | | N 06690 |
| 2.4658 | NiCr7030 | | | | | | | |
| 2.4660 | NiCr20CuMo | | | | | | | N 08020 |
| 2.4665 | NiCr22Fe18Mo | | | | | | | |
| 2.4778 | GCoCr28 | | | | | | | |
| 2.4810 | GNiMo30 | | | | | | | N-12 MV |
| 2.4816 | NiCr15Fe | | NC 15 Fe | NA 14 | | | | N 06600 |
| 2.4819 | NiMo16Cr15W | | NC 17 D | | | | | N 10276 |
| 2.4851 | NiCr23Fe | | NC 23 Fe A | | | | | N 06601 |
| 2.4856 | NiCr22Mo9Nb | | NC 22 Fe DNB | NA 21 | | | | N 06625 |
| 2.4858 | NiCr21Mo | | NC 21 Fe Du | NA 16 | | | | N 08825 |
| 2.4867 | NiCr6015 | | | | | | | |
| 2.4869 | NiCr8020 | | | | | | | |
| 2.4951 | NiCr20Ti | | NC 20 T | HR 5 | | | | N 06075 |
| 2.4952 | NiCr20TiAl | | | | | | | |
| 2.4969 | NiCr20Co18Ti | | | | | | | |
| 2.4975 | NiFeCr12Mo | | | | | | | |
| 2.4976 | NiCr20Mo | | | | | | | |
| 2.4982 | NiCr20CoMo | | | | | | | |
| 2.4989 | CoCr20NiW | | | | | | | |
| 5.4 Cr-Ni-Basis bis 950 N/mm² / Cr-Ni-basis up to 950 N/mm² | | | | | | | | |
| 2.4365 | GNiCu30Nb | | | | | | | M 35-1/2 |
| 2.4367 | GNiCu30Si3 | | | | | | | M 30-H |
| 2.4368 | GNiCu30Si4 | | | | | | | M-255 |
| 2.4669 | NiCr15FeTiAl | | NC 15 TNb A | | | | | N 07750 |
| 2.4685 | GNiMo28 | | | | | | | N-7 M |
| 2.4686 | GNiMo17CrW | | | | | | | CW-12 MW |
| 2.4879 | GNiCr28W | | | | | | | |
| 2.4883 | GNiMo16CrW | | | | | | | |
| 2.4964 | CoCr20W15Ni | | KC 22 WN | HR 240 | | | | R 30605 |
| 2.4973 | NiCr19Co11MoTi | | NC 19 KDT | | | | | AMS 5399 |
| 5.5 Cr-Ni-Basis bis 1100 N/mm² / Cr-Ni-basis up to 1100 N/mm² | | | | | | | | |
| 2.4375 | NiCu30Al | | NU 30 AT | NA 18 | | | | N 05500 |
| 2.4632 | NiCr20Co18Ti | | | | | | | |
| 2.4634 | NiCo20Cr15MoAlTi | | | | | | | |
| 2.4650 | NiCo20Cr20MoTi | | NCK 20 D | HR 10 | | | | N 70263 |
| 2.4663 | NiCr23Co12Mo | | | | | | | N 06617 |
| 2.4668 | NiCr19FeNbMo | | NC 19 Fe Nb | | | | | N 07718 |
| 2.4952 | NiCr20TiAl | | NC 20 TA | NA 20 | | | | N 07080 |
| 2.4955 | NiFe25Cr20NbTi | | | | | | | |
| 2.4983 | NiCr18Co18MoTi | | | | | | | |

S Werkstoffgruppe / material group 6. Titan- und Titanlegierungen / Titanium and titanium alloys

| 6.1 Reintitan / Titanlegierungen bis 850 N/mm² / pure titanium and titanium alloys up to 850 N/mm² | | | | | | | | |
|---|------------------|--|---------|------------|--|--|--|---------|
| 3.7025 | Ti1 | | | 2 TA 1 | | | | R 50250 |
| 3.7035 | Ti2 | | | 2 TA 2-5 | | | | R 50400 |
| 3.7055 | Ti3 | | | TA 3 | | | | R 50550 |
| 3.7065 | Ti4 | | | 2 TA 6-9 | | | | R 50700 |
| 3.7124 | TiCu2 | | | 2 TA 21-24 | | | | |
| 3.7195 | TiAl3V2,5 | | | | | | | |
| 3.7225 | Ti1Pd | | | TP 1 | | | | R 52250 |
| 3.7235 | Ti2Pd | | | | | | | R 52400 |
| 3.7255 | Ti3Pd | | | | | | | |
| 6.2 Titanlegierungen bis 1200 N/mm² / titanium alloys up to 1200 N/mm² | | | | | | | | |
| 3.7110 | TiAl5Fe2,5 | | | | | | | |
| 3.7115 | TiAl5Sn2 | | | | | | | |
| 3.7145 | TiAl6Sn2Zr4Mo2Si | | | | | | | R 54620 |
| 3.7155 | TiAl6ZrMo0,5 | | | TA 43 | | | | |
| 3.7165 | TiAl6V4 | | T-A 6 V | TA 10-13 | | | | R 56400 |
| 3.7175 | TiAl6V6Sn2 | | | | | | | |
| 3.7185 | TiAl4Mo4Sn2 | | | TA 45-51 | | | | |

Internationaler Normenvergleich
International comparison of standards

K Werkstoffgruppe / material group
7. Gusseisen / Cast iron

| Werkstoff Nr.: material No.: | Deutschland Germany DIN | Europa Europe EN | Frankreich France AFNOR | Großbritannien Great Britain BS | Italien Italy UNI | Schweden Sweden SIS | Spanien Spain UNE | USA USA AISI |
|---|-------------------------------|------------------------|-------------------------------|---------------------------------------|-------------------------|---------------------------|-------------------------|--------------------|
| 7.1 Grauguss bis 180 HB / grey cast iron up to 180 HB / GG | | | | | | | | |
| 0.6010 | GG10 | GJL-100 | Ft 10 B | | G 10 | 0110-00 | FG 10 | A48-20 B |
| 0.6012 | GG150HB | GJL-HB 170 | | | | | | |
| 0.6015 | GG15 | GJL-150 | Ft 15 D | Grade 150 | G 15 | 0115-00 | FG 15 | A48-25 B |
| 0.6017 | GG170HB | GJL-HB 205 | | | | | | |
| 7.2 Grauguss bis 350 HB / grey cast iron up to 350 HB / GG | | | | | | | | |
| 0.6020 | GG20 | GJL-200 | Ft 20 D | Grade 220 | G 20 | 0120-00 | FG 20 | A48-30 B |
| 0.6022 | GG190HB | GJL-HB 230 | | | | | | |
| 0.6025 | GG25 | GJL-250 | Ft 25 D | Grade 260 | G 25 | 0125-00 | FG 25 | A48-40 B |
| 0.6027 | GG220HB | GJL-HB 250 | | | | | | |
| 0.6030 | GG30 | GJL-300 | Ft 30 D | Grade 300 | G 30 | 0130-00 | FG 30 | A48-45 B |
| 0.6032 | GG240HB | GJL-HB 275 | | | | | | |
| 0.6035 | GG35 | GJL-350 | Ft 35 D | Grade 350 | G 35 | 0135-00 | FG 35 | A48-50 B |
| 0.6037 | GG260HB | GJL-HB 275 | | | | | | |
| 0.6040 | GG40 | GJL-400 | Ft 40 D | Grade 400 | | 0140-00 | | A48-60 B |
| 7.3 Kugelgraphitguss bis 200 HB / modular cast iron up to 200 HB / GGG | | | | | | | | |
| 0.6652 | GGLNiMn137 | GJLA-XNiMn 13-7 | L-NM 13 7 | L-NiMn 13 7 | | | | |
| 0.6655 | GGLNiCuCr1562 | GJLA-XNiCuCr 15-6-2 | L-NUC 15 6 2 | L-NiCuCr 15 6 2 | | | | A 436 Type 1 |
| 0.6656 | GGLNiCuCr1563 | GJLA-XNiCuCr 15-6-3 | L-NUC 15 6 3 | L-NiCuCr 15 6 3 | | | | A 436 Type 1b |
| 0.6660 | GGLNiCr202 | GJLA-XNiCr 20-2 | L-NC 20 2 | L-NiCr 20 2 | | 0523-00 | | A 436 Type 2 |
| 0.7033 | GGG353 | | | | | | | |
| 0.7040 | GGG40 | | FGS 400-12 | 420/12 | GS 400-12 | 0717-02 | | 60-40-18 |
| 0.7043 | GGG403 | | FGS 370-17 | 370/17 | GSO 42/15 | 0717-15 | | |
| 0.7050 | GGG50 | | FGS 500-7 | 500/7 | GS 500/7 | 0727-02 | | 65-45-12 |
| 0.7652 | GGGNiMn137 | GJSA-XNiMn | S-Mn 13 7 | S-NiMn 13 7 | | 0772-00 | | |
| 0.7659 | GGGNiCrNb202 | GJSA-XNiCrNb 20-2 | | | | | | |
| 0.7660 | GGGNiCr202 | GJSA-XNiCr 20-2 | L-NC 20 2 | L-NiCuCr 20 2 | | 0523-00 | | A 439 Type D-2 |
| 0.7665 | GGGNiSiCr2052 | GJSA-XNiSiCr 20-5-2 | S-NSC 20 5 2 | S-NiSiCr 20 5 2 | | | | |
| 0.7670 | GGGNi22 | GJSA-XNi 22 | S-N 22 | S-Ni 22 | | | | A 439 Type D-2C |
| 07673 | GGGNiMn234 | GJSA-XNiMn 23-4 | | S-NiMn 23 4 | | | | A 571 Type D-2M |
| GGGV30 | GGGV30 | | | | | | | |
| 7.4 Kugelgraphitguss bis 250 HB / modular cast iron up to 250 HB | | | | | | | | |
| 0.6661 | GGLNiCr203 | GJLA-XNiCr 20-3 | | L-NiCr 20 3 | | | | A 436 Type 2b |
| 0.6667 | GGLNiSiCr2053 | GJLA-XNiSiCr 20-5-3 | L-NSC 20 5 3 | L-NiSiCr 20 5 3 | | | | |
| 0.7060 | GGG60 | | FGS 600-3 | 600/3 | GS 200/3 | 0732-03 | | 80-55-06 |
| 0.7070 | GGG70 | | FGS 700-2 | 700/2 | GS 700-2 | 0737-01 | | 100-70-03 |
| 7.5 Temperguss 130 HB / malleable cast iron up to 130 HB | | | | | | | | |
| 0.8038 | GTWS3812 | GJMW-360-12 | | | | | | |
| 0.8040 | GTW4005 | GJMW-400-5 | MB 40-10 | | GMB 40 | | | |
| 0.8045 | GTW4507 | GJMW-450-7 | | | GMB 45 | | | |
| 0.8055 | GTW55 | | | | GMB 55 | | | |
| 0.8065 | GTW65 | | | | GMB 65 | | | |
| 0.8135 | GTS3510 | GJMB-350-10 | MN 35-10 | B 340/12 | | 0815 | | 32510 |
| 0.8145 | GTS4506 | GJMB-450-6 | | P 440/7 | | 0852 | | 40010 |
| 7.6 Temperguss 230 HB / malleable cast iron up to 230 HB | | | | | | | | |
| 0.8035 | GTW3504 | GJMW-350-4 | | | | | | |
| 0.8155 | GTS5504 | GJMB-550-4 | MP 50-5 | P 510/4 | | 0854 | | 50005 |
| 0.8165 | GTS6502 | GJMB-650-2 | MP 60-3 | P 570/3 | | 0858 | | 70003 |
| 0.8170 | GTS7002 | GJMB-700-2 | Mn 700-2 | P 690/2 | GMN 70 | 0862 | | 90001 |

H Werkstoffgruppe / material group
8. Gehärtete Stähle / Hardened materials

| | | | | | | | | |
|--|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| 8.1 Toolox 44 | 45-55 HRC | 45-55 HRC | 45-55 HRC | 45-55 HRC | 45-55 HRC | 45-55 HRC | 45-55 HRC | 45-55 HRC |
| 8.11 Toolox 33 | 850-1100 N/mm ² | 850-1100 N/mm ² | 850-1100 N/mm ² | 850-1100 N/mm ² | 850-1100 N/mm ² | 850-1100 N/mm ² | 850-1100 N/mm ² | 850-1100 N/mm ² |
| 8.2 Gehärtet | 55-60 HRC | 55-60 HRC | 55-60 HRC | 55-60 HRC | 55-60 HRC | 55-60 HRC | 55-60 HRC | 55-60 HRC |
| 8.3 Gehärtet | 60-70 HRC | 60-70 HRC | 60-70 HRC | 60-70 HRC | 60-70 HRC | 60-70 HRC | 60-70 HRC | 60-70 HRC |
| 8.4 Hartguss bis 48 HRC / hardened cast iron up to 48 HRC | | | | | | | | |
| 0.9620 | GX260NiCr42 | GJH-X260NiCr 4-2 | | Grade 2 A | | 0512-00 | | A532 I B NiCr-LC |
| 0.9625 | GX330NiCr42 | GJH-X330NiCr 4-2 | | Grade 2 B | | 0513-00 | | A532 I A NiCr-HC |
| 0.9630 | GX300CrNiSi952 | GJH-X300CrNiSi 9-5-2 | | Grade 2 C | | | | A532 I D Ni-HiCr |
| 0.9635 | GX300CrMo153 | GJH-X300CrMo 15-3 | | Grade 3 A | | | | A532 IIC15% CrMo-HC |

N Werkstoffgruppe / material group
9. Alulegierungen / Aluminum alloys

| | | | | | | | | |
|--|-----------|-----------|-----------|------|--|--|--|------|
| 9.1 Alu-Knetlegierungen bis 250 N/mm² / malleable alu alloy up to 250 N/mm² | | | | | | | | |
| 3.0255 | Al99.5 | | A 59050 C | L 31 | | | | 1000 |
| 3.0280 | Al99.8 | | | | | | | |
| 3.0515 | GA1995 | | | | | | | |
| 3.3292 | GDAlMg9 | | | | | | | |
| 3.3315 | AlMg1 | AW-6082 | | | | | | |
| 3.3535 | AlMg3 | | | | | | | |
| 3.3547 | AlMg4,5Mn | | | | | | | |
| 3.3555 | AlMg5 | | | | | | | |
| 9.2 Alu-Knetlegierungen bis 350 N/mm² / malleable alu alloy up to 350 N/mm² | | | | | | | | |
| 3.0615 | AlMgSiPb | | | | | | | |
| 3.1325 | AlCuMg1 | AW-2017 A | | | | | | |
| 3.1355 | AlCuMg2 | AW-2024 | | | | | | |



N 9. Alulegierungen / Aluminum alloys

Werkstoffgruppe / material group

| Werkstoff Nr.: material No.: | Deutschland Germany DIN | Europa Europe EN | Frankreich France AFNOR | Großbritannien Great Britain BS | Italien Italy UNI | Schweden Sweden SIS | Spanien Spain UNE | USA USA AISI |
|---|-------------------------------|------------------------|-------------------------------|---------------------------------------|-------------------------|---------------------------|-------------------------|--------------------|
| 9.2 Alu-Knetlegierungen bis 350 N/mm² / malleable alu alloy up to 350 N/mm² | | | | | | | | |
| 3.1371 | AlCu4TiMg | | | | | | | |
| 3.1645 | AlCuMgPb | | | | | | | |
| 3.1655 | AlCuBiPb | | | | | | | |
| 3.1754 | AlCu5Ni1,5 | | | | | | | |
| 3.2315 | AlMgSi1 | AW-6005 A | | | | | | |
| 3.3206 | AlMgSi0,5 | | | | | | | |
| 9.2 Alu-Knetlegierungen bis 350 N/mm² / malleable alu alloy up to 350 N/mm² | | | | | | | | |
| 3.3541 | AlMg3 | | | | | | | |
| 3.4345 | AlZnMgCu0,5 | | AZ 4 GU/9051 | L 86 | 811-04 | | | 7050 |
| 9.3 Alu-Gusslegierungen < 12% Si bis 250 N/mm² / cast alu < 12% Si up to 250 N/mm² | | | | | | | | |
| 3.1841 | AlCu4Ti | | | | | | | |
| 3.2131 | AlSi5Cu1 | | | | | | | |
| 3.2151 | AlSi6Cu4 | | | | | | | |
| 3.2161 | AlSi8Cu3 | | | | | | | |
| 3.2163 | GDAlSi9Cu3 | | | | | | | |
| 3.2211 | AlSi11 | | | | | | | |
| 3.2341 | AlSi5Mg | | | | | | | |
| 3.2373 | AlSi9Mg | | | | | | | |
| 3.2381 | AlSi10Mg | | | | | | | |
| 3.2382 | GDAlSi10Mg | | | | | | | |
| 3.2383 | AlSi10Mg(Cu) | | | LM 9 | | 4253 | | A 360.2 |
| 3.2581 | AlSi12 | | | LM 6 | | 4261 | | A 413.2 |
| 3.2582 | GDAlSi12 | | | | | 4247 | | A 413.0 |
| 3.2583 | AlSi12(Cu) | | | LM 20 | | 4260 | | A 413.1 |
| 3.2585 | AlSi12 | | | | | | | |
| 3.2982 | GDAlSi12(Cu) | | | | | | | |
| 3.3241 | AlMg3Si | | | | | | | |
| 3.3261 | AlMg5Si | | | | | | | |
| 3.3561 | AlMg5 | | | | | | | |
| 3.5101 | GMgZn4SE1Zr1 | MCMgZn 4 RE 1 Zr | G-Z 4 TR | MAG 5 | | | | ZE 41 |
| 3.5102 | GMgZn5Th2Zr1 | | | | | | | |
| 3.5103 | MgSE3Zn2Zr1 | MCMgRE 3 Zn 2 Zr | G-TR 3 Z 2 | MAG 6 | | | | EZ 33 |
| 3.5105 | GMgTh3Zn2Zr1 | | | | | | | |
| 3.5106 | GMgAg3SE2Zr1 | MCMgRE 2 Ag 2 Zr | G-Ag 22,5 | MAG 12 | | | | QE 22 |
| 3.5200 | GMgAl8Zn1 | | | | | | | |
| 3.5470 | GDMgAl4Si1 | | | | | | | AS 41 |
| 3.5612 | GDMgAl6Zn1 | | | | | | | |
| 3.5662 | GDMgAl6 | | | | | | | |
| 3.5812 | GMgAl8Zn1 | MCMgAl 8 Zn 1 | G-A 9 | MAG 1 | | | | AZ 81 |
| 3.5912 | GMgAl9Zn1 | MCMgAl 9 Zn 1 | G-A 9 Z 1 | MAG 1 | | | | AZ 91 |
| 9.4 Alu-Gusslegierungen < 12% Si bis 300 N/mm² / cast alu < 12% Si up to 300 N/mm² | | | | | | | | |
| 2.1871 | AlCu4TiMg | | | | | | | |
| 3.2371 | AlSi7Mg | | | | | | | 4218 B |
| 9.5 Alu-Gusslegierungen < 12% Si bis 450 N/mm² / cast alu < 12% Si up to 450 N/mm² | | | | | | | | |
| 9.6 Magnesium / magnesium | | | | | | | | |

N 10. Kupfer- und Kupferlegierungen / Copper and copper alloys

Werkstoffgruppe / material group

| Werkstoff Nr.: material No.: | Deutschland Germany DIN | Europa Europe EN | Frankreich France AFNOR | Großbritannien Great Britain BS | Italien Italy UNI | Schweden Sweden SIS | Spanien Spain UNE | USA USA AISI |
|---|-------------------------------|------------------------|-------------------------------|---------------------------------------|-------------------------|---------------------------|-------------------------|--------------------|
| 10.1 Kupfer - Automatenlegierungen, Blei > 1% / copper machining alloys Pb>1 | | | | | | | | |
| 2.0290 | GCuZn33Pb | | | | | | | |
| 2.0330 | CuZn36Pb1,5 | | | | | | | |
| 2.0331 | CuZn36Pb1,5 | | | | | | | |
| 2.0332 | CuZn37Pb0,5 | | | | | | | |
| 2.0340 | GCuZn37Pb | | | | | | | |
| 2.0401 | CuZn39Pb3 | | | | | | | |
| 2.0402 | CuZn39Pb2 | | | | | | | |
| 2.1061 | GCuSn12Pb | | | | | | | |
| 2.1090 | GCuSn7ZnPb | | U-E 7 Z 5 Pb 4 | | | | | C 93200 |
| 2.1096 | GCuSn5ZnPb | | U-E 5 Pb 5 Z 5 | LG 2 | | | | C 83600 |
| 2.1098 | GCuSn2ZnPb | | | | | | | |
| 2.1176 | GCuPb10Sn | | U-E 10 Pb 10 | LB 2 | | | | C 93700 |
| 2.1182 | GCuPb15Sn | | U-Pb 15 E 8 | LB 1 | | | | C 93800 |
| 10.2 Bronze, Messing / bronze, brass | | | | | | | | |
| 2.0220 | CuZn5 | | | | | | | |
| 2.0240 | CuZn15 | | CuZn 15 | | | | | C 23000 |
| 2.0250 | CuZn20 | | | | | | | |
| 2.0265 | CuZn30 | | CuZn 30 | CZ 102 | | | | C 26000 |
| 2.0280 | CuZn33 | | | | | | | |
| 2.0321 | CuZn37 | | CuZn 37 | CZ 108 | C 2720 | | | C 27200 |
| 2.0380 | CuZn39Pb2 | | | | | | | |
| 2.0492 | GCuZn15Si4 | | | | | | | B-198 |
| 2.0510 | CuZn37Al1 | | | | | | | |
| 2.0550 | CuZn40Al2 | | | | | | | |
| 2.0561 | CuZn40Al1 | | | | | | | |
| 2.0590 | GCuZn40Fe | | | | | | | |
| 2.0591 | GKCuZn38Al | | | | | | | |
| 2.0592 | GCuZn35Al1 | | U-Z 36 N 3 | HTB 1 | | | | C 86500 |

Internationaler Normenvergleich
International comparison of standards

N Werkstoffgruppe / material group
10. Kupfer- und Kupferlegierungen / Copper and copper alloys

| Werkstoff Nr.: material No.: | Deutschland Germany DIN | Europa Europe EN | Frankreich France AFNOR | Großbritannien Great Britain BS | Italien Italy UNI | Schweden Sweden SIS | Spanien Spain UNE | USA USA AISI |
|--|-------------------------------|------------------------|-------------------------------|---------------------------------------|-------------------------|---------------------------|-------------------------|--------------------|
| 10.2 Bronze, Messing / bronze, brass | | | | | | | | |
| 2.0595 | GKCuZn37Al1 | | | | | | | |
| 2.0596 | GCuZn34Al2 | | U-Z 36 N 3 | HTB 1 | | | | C 86200 |
| 2.0598 | GCuZn25Al5 | | | | | | | |
| 2.1188 | GCuPb20Sn | | U-Pb 20 | LB 5 | | | | C 94100 |
| 2.1292 | GCuCrF35 | | | | CC1-FF | | | C 81500 |
| 2.1293 | CuCrZr | | U-Cr 0,8 Zr | CC 102 | | | | C 18200 |
| 10.2.1 Bronze 850 - 1200 N/mm² | | | | | | | | |
| 2.1247 | Cu Be2 | | | | | | | |
| 10.3 Kupfer, bleifreies Kupfer, Elektrokupfer / copper, lead-free copper, electrolytic copper | | | | | | | | |
| 2.0040 | OFCu | | | | | | | |
| 2.0060 | ECu57 | | | | | | | B-120 |
| 2.0065 | ECu58 | | Cn-a2 | C 101 | | | | C 11000 |
| 2.0070 | SeCu | | Cu-c1 | C 101 | | | | C 10300 |
| 2.0082 | GCuL45 | | | HCC 1 | | | | C 81100 |
| 2.0085 | GCuL50 | | | HCC 1 | | | | C 81100 |
| 2.0241 | CuZn40MnPb | | | | | | | |
| 2.0460 | CuZn20Al2 | | | | | | | |
| 2.0872 | CuNi10Fe1Mn | | | | | | | |
| 2.0882 | CuNi30Mn1Fe | | | | | | | |
| 2.0936 | CuAl10Fe3Mn2 | | U-A 10 Fe | CA 103 | | | | |
| 2.0940 | GCuAl10Fe | | | | | | | |
| 2.0966 | CuAl10Ni5Fe4 | | U-A 10 N | CA 104 | | | | C 63000 |
| 2.0975 | GCuAl10Ni | | | | | | | B-148-52 |
| 2.1050 | GCuSn10 | | | | CT 1 | | | C 90700 |
| 2.1052 | GCuSn12 | | UE 12 P | Pb 2 | | | | C 90800 |
| 2.1060 | GCuSn12Ni | | | | | | | C 91700 |
| 2.1086 | GCuSn10Zn | | | | | | | |
| 2.1093 | GCuSn6ZnNi | | | LG 4 | | | | |

P Werkstoffgruppe / material group
11. Kunststoffe / plastics

| 11.1 Thermoplaste / thermoplastics | | | | | | | | |
|---|--|--|-----------------|-------------------|---------------------|--|--|-----------------------------------|
| PC | Makralon, Nuclon, Plastrocarbon | | Orgalan | Sinvet | | | | Lexan, Merlon |
| Pe | Baylon, Dekalen, Lupolen, Hostalen | | | Fertene, Eraclene | Carlona, Escorene | | | Althon, Bakelite, Chemplex, Dylan |
| PF | Alberit, Bakelit, Bulitol, Durax, Harex, Resinol | | | | Fenachem, Moldesile | | | Biralit, Biratex, Birax |
| PFTE | Hostafalon | | Soreflon | | | | | Halon, Teflon |
| PP | Vestolen PP, Synalen PP, Novolen, Hostalen PP | | Eitex P, Napryl | Moplen, Kastilen | Carola P, Procom | | | Pro-fax, Rexene, Tenite |
| PS | Hostylon, Lorkalen, Polystyrol, Styropor | | | Sdistir, Lastinol | Lustrex | | | Carinex, Dylene, Toporex |
| PVC | Coroplast, Hostalit, Mipolam, Opalon, Solvec, Vinoflex | | | | | | | |
| PP-H | Homopolymer (Vestolen) | | | | | | | |
| PP-C | Copolymer | | | | | | | |
| ABS | Acrylnitrid Butadien Styrol | | | | | | | |
| PMMA | Polymethyl metha Crylat (Plexiglas-Resarit-Degulan) | | | | | | | |
| POMC | Polyoxymethylen (Hostaform-ultraform) | | | | | | | |
| PI | Polyimid | | | | | | | |
| PEI | Polytherimid | | | | | | | |
| PVC-H | Polyvinylchlorid hart (Hostalit-Vinoflex-Vestolit) | | | | | | | |
| 11.2 Duroplaste / duroplastics | | | | | | | | |
| PUR 5220 | | | | | | | | |
| PF 31 | | | | | | | | |
| MP 183 | | | | | | | | |
| 11.3 Faserverstärkte Kunststoffe / fibrous-reinforced plastics | | | | | | | | |
| AFK | Kevlar | | | | | | | |
| BFK | | | | | | | | |
| CFK | | | | | | | | |
| GFK | | | | | | | | |
| MFK | | | | | | | | |
| SFK | | | | | | | | |
| PA66-GF30 | Polyamid +30% Glasfaser (Ertalon 66-GF30) | | | | | | | |
| POM-GF25 | Polyoxymethylen +25% Glasfaser (Ultraform N2200 G53) | | | | | | | |
| PP-GF20 | Polypropylen +20% Glasfaser C | | | | | | | |
| PVDF-GF20 | Polyvinylidenfluorid +20% Glasfaser | | | | | | | |
| PEEK-GF30 | Polyetherketon +30% Glasfaser (Victrex) | | | | | | | |
| PEEK-CF30 | Polyetherketon +30% Kohlefaser (Victrex) | | | | | | | |
| PTFE | +25% Glas Polytetrafluorethylen | | | | | | | |
| PTFE | +25% Kohle Polytetrafluorethylen | | | | | | | |
| 11.4 Hartgummi, Holz / hard rubber | | | | | | | | |
| 11.5 Polyamide | | | | | | | | |
| PA 6 | | | | | | | | |
| PA 66 | | | | | | | | |
| 12.0 | Hardox 400 < 1350 N/mm² | | | | | | | |
| 12.1 | Hardox 500 < 1800 N/mm² | | | | | | | |

P Werkstoffgruppe / material group
13. Federstähle bis 1500 N/mm²

| | | | | | | | | |
|--------|--------|--|--|--|--|--|--|--|
| 1.503 | 38Si7 | | | | | | | |
| 1.7176 | 55Cr3 | | | | | | | |
| 1.8159 | 50CrV4 | | | | | | | |



Hinweise zum sicheren Umgang mit VHM-Werkzeugen

1. Allgemeine Hinweise

Karnasch Werkzeugverpackungen sind mit allgemeinen Sicherheitswarnungen versehen. Es können nur allgemeine Sicherheitshinweise aufgebracht werden. Wir empfehlen Ihnen dringend die Sicherheitshinweise und Vorschriften auf dieser Seite eingehend zu lesen. Zusätzlich sollten alle Mitarbeiter im Rahmen einer Sicherheitsunterweisung auf mögliche Gefahren im Umgang mit Hartmetallwerkzeugen unterwiesen werden.

2. Vorschläge zum Umgang von Schneidwerkzeuge

| Gefahren | Maßnahmen |
|---|---|
| <ul style="list-style-type: none"> Hartmetallwerkzeuge haben scharfe Schneiden. Die Handhabung kann zu Verletzungen führen. | <ul style="list-style-type: none"> Tragen Sie Schutzhandschuhe beim hantieren von Hartmetallwerkzeugen. |
| <ul style="list-style-type: none"> Hartmetallwerkzeuge und Werkstücke können während der Bearbeitung sehr heiß werden. Das Berühren mit bloßen Händen kann zu Verbrennungen führen. Beim Fräsen können heiße Späne entstehen die Verletzungen und Verbrennungen zur Folge haben können. | <ul style="list-style-type: none"> Tragen Sie Schutzhandschuhe. Stellen Sie sicher, dass die Schutztüren an den Maschinen geschlossen sind und das Schutzbrillen getragen werden. Beim Reinigen der Maschinen muss sichergestellt sein, dass die Maschine nicht mehr läuft und das Handschuhe getragen werden. |
| <ul style="list-style-type: none"> Heiße Späne, Funken und Hitzeentwicklung beim Fräsen (z.B. verursacht bei Werkzeugbruch) können zum Entfachen eines Feuers führen. Der Einsatz von Schneidwerkzeugen bei ungeeigneten Einsatzbedingungen oder Schnittdaten sowie von ungeeigneten Werkzeugen, kann zu einem Werkzeugbruch führen und Verletzungen verursachen. | <ul style="list-style-type: none"> Vermeiden Sie den Einsatz von Fräswerkzeugen in leichtentzündlichen Umgebungen. Für den Fall das keine Kühlflüssigkeit beim fräsen verwendet wird, stellen Sie sicher, dass Feuerverhütungsmaßnahmen ergriffen werden. Stellen Sie sicher, dass die Schutztüren an den Maschinen stets geschlossen sind und Schutzbrillen getragen werden. Beachten Sie die Verwendungshinweise sowie die empfohlenen Schnittdaten. |
| <ul style="list-style-type: none"> Stoßlasten sowie stark erhöhte Schnittkräfte führen zu starkem Verschleiß was einen Werkzeugbruch zur Folge haben kann. Dies kann zu Verletzungen durch umherfliegende Teile führen. Microwerkzeuge haben einen sehr kleinen Werkzeugdurchmesser und sind sehr spitz. Bei unvorsichtiger Handhabung, können diese die Haut durchstechen und zu Verletzungen führen. | <ul style="list-style-type: none"> Stellen Sie sicher, dass die Schutztüren stets geschlossen sind und Schutzbrillen getragen werden. Wechseln Sie die Werkzeuge bevor ein übermäßiger Verschleiß entsteht. Gehen Sie immer sehr vorsichtig mit Microwerkzeugen um und tragen Sie stets geeignete Schutzhandschuhe und Schutzkleidung. |
| <ul style="list-style-type: none"> Beim Hochgeschwindigkeitsfräsen können durch die Zentrifugalkraft einzelne Teile oder Späne aus der Maschine geschleudert werden. Dies kann Verletzungen verursachen. Spindeln mit zu hohen Rundlauffehler oder Werkzeuge die außermittig gespannt sind sowie Werkstücke die unzureichend gespannt sind, können zu Vibrationen führen die Ausbrüche verursachen und zum Werkzeugbruch führen können. Dies kann zu Verletzungen führen. Scheidwerkzeuge müssen immer fest in den Aufnahmen eingespannt sein. Ist dies nicht der Fall, besteht die Gefahr, dass diese sich lösen und eine erhöhte Verletzungsgefahr darstellen. | <ul style="list-style-type: none"> Stellen Sie sicher, dass die Schutztüren an den Maschinen stets geschlossen sind und Schutzbrillen sowie Schutzkleidung getragen wird. Setzen Sie die Werkzeuge mit den empfohlenen Schnittdaten ein. Überprüfen Sie den Rundlauf der Spindel sowie die Werkzeugaufnahmen in regelmäßigen Abständen und verwenden Sie die Werkzeuge mit den empfohlenen Schnittdaten. Stellen Sie sicher, dass die Werkzeugaufnahmen stets sauber und unbeschädigt sind. Überprüfen Sie, ob das Werkzeug fest eingespannt ist, bevor Sie es verwenden. Verwenden Sie ausschließlich die für die Werkzeuge empfohlenen Spannvorrichtungen. |
| <ul style="list-style-type: none"> Werkzeuge die zu fest in der Werkzeugaufnahme eingespannt werden, können brechen und Verletzungen hervorrufen. Das Bearbeiten von Werkstücken mit Frässtiften von Hand kann zu Verletzungen führen. Maschinen und Werkzeuge können beschädigt werden falls Schneidwerkzeuge für Zwecke eingesetzt werden für die Sie nicht bestimmt sind. | <ul style="list-style-type: none"> Verwenden Sie ausschließlich die zum Einspannen der Werkzeuge vorgeschriebenen Werkzeuge und Daten. Tragen Sie Schutzkleidung sowie Schutzbrillen. Verwenden Sie die Werkzeuge ausschließlich für ihren bestimmten Zweck. |

Information:

Dieser Katalog beinhaltet die wichtigsten Angaben zum Umgang mit unseren Werkzeugen. Für weitere Informationen bitten wir Sie uns zu kontaktieren. Wir sind für keine Unfälle verantwortlich zu machen die aufgrund von Änderungen an unseren Werkzeugen eingetreten sind und ohne unsere Zustimmung vorgenommen wurden.

Tragen Sie stets geeignete Schutzkleidung und Sicherheitsausrüstung!



Safety information on how to use cutting tools

1. Basic informations

Karnasch packages are labeled with general safety information. The tools are not labelled with detailed warning instructions. We suggest to read our safety information and instructions before handling cutting tools. Furthermore, as a part of your workers safety briefing, please notify the contents of the safety information to all your workers.

2. Suggestions how to use cutting tools

| Hazard | Counteraction |
|---|--|
| <ul style="list-style-type: none"> Solid carbide tools have sharp edges. Handling them with bare hand may cause injuries. | <ul style="list-style-type: none"> Wear protective gloves when handling tools. |
| <ul style="list-style-type: none"> Cutting tools and workpieces can become extremely hot during machining. Touching them with bare hand may cause burns. | <ul style="list-style-type: none"> Wear protective gloves. |
| <ul style="list-style-type: none"> Hot chips produced during the cutting process may cause burns and injuries. | <ul style="list-style-type: none"> Make sure, that the guard doors are closed on the machine and protection goggles are used. During machine cleaning ensure the machine is stopped and wear protection gloves. |
| <ul style="list-style-type: none"> Hot chips, sparks and heat generation during the cutting process (e.g. by tool breakage) provides a risk of igniting a fire. | <ul style="list-style-type: none"> Avoid using cutting tools in environments where there is a possibility of igniting fire. If it is not possible to use a cooling lubricant, make sure to have a fire prevention countermeasure. |
| <ul style="list-style-type: none"> The use of cutting tools with inappropriate cutting conditions or inappropriate cutting tools may cause the tool to break and providing risk of injuries. | <ul style="list-style-type: none"> Make sure, that the guard doors are closed on the machine and protection goggles are used. Use cutting tools under recommended cutting conditions. |
| <ul style="list-style-type: none"> Impact load and rapid increase of cutting forces to excessive wear may cause the tool to break. This provides a risk of injuries. | <ul style="list-style-type: none"> Make sure, that the guard doors are closed on the machine and protection goggles are used. Change tools before excessive wear occurs. |
| <ul style="list-style-type: none"> Microtools have a extremely small diameter with a very sharp point which may puncture the skin if not handled carefully. | <ul style="list-style-type: none"> Handle Microtools always with care and wear always suitable gloves. |
| <ul style="list-style-type: none"> During High speed cutting spare parts and chips may be expelled due to centrifugal forces. This may cause injuries. | <ul style="list-style-type: none"> Make sure, that the guard doors are closed on the machine and protection goggles and protective clothes are worn. |
| <ul style="list-style-type: none"> Poor balanced spindles or off centred revolving of tools and workpieces which are poor fixed may cause vibrations and chattering which could cause the tool to break. | <ul style="list-style-type: none"> Adjust accuracy and balance of spindles and check the clamping of the workpiece to prevent off centre revolving and chattering. Use cutting tools under recommended cutting conditions. |
| <ul style="list-style-type: none"> If cutting tools are not held securely, they may become loose and producing risk of injuries. | <ul style="list-style-type: none"> Make sure, that chucks are always clean and without damages. Always check if the tool is clamped safely in the chucks before you use the tools. Only use parts which are suitable. |
| <ul style="list-style-type: none"> Clamping cutting tools to tightly may cause them to break which may cause injuries. | <ul style="list-style-type: none"> Only use the recommended tools for clamping cutting under recommended conditions. |
| <ul style="list-style-type: none"> Machining parts with burrs using bare hands may cause injuries. | <ul style="list-style-type: none"> Wear safety clothe, safety goggles and safety gloves. |
| <ul style="list-style-type: none"> Machines and tools could be damaged if they used for purposes other than the prescribed applications. | <ul style="list-style-type: none"> Use them strictly and only for the prescribed application. |

Information:

This catalogue contains the basic information for safety handling of our cutting tools. For further information, please contact us. We are not responsible for any accidents causing by modifying tools without our permission.

Always wear suitable safety cloth and safety equipment!



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Formelbezeichnungen in der Zerspangung Formula classifications in the cutting tool industry

| | | Dimension | neues Zeichen nach DIN 6580/84 |
|---|--|---------------------------|--------------------------------|
| Drehzahl | • speed | min ⁻¹ | |
| Fräsweg, Bohrweg | • milling/drilling travel | mm | lf |
| Schneiddurchmesser | • cutting diameter | mm | Dc |
| Schnittbreite, Eingriffgröße | • width of cut | mm | ae |
| Schnittgeschwindigkeit | • cutting speed | m/min | Vc |
| Schnittkraft | • cutting force | N | Fc |
| Schnittkraftexponent | • cutting force | | 1 - mc |
| Schnittleistung | • cutting power | kW | Pc |
| Schnitttiefe | • depth of cut | mm | ap |
| Spanungsdicke | • undeformed chip thickness | mm | h |
| Spanungsdicke - mittlere | • average undeformed chip thickness | mm | |
| Spezifische Schnittkraft | • specific cutting force | N/mm ² | kc |
| Spezifische Schnittkraft bei h = 1 mm und b = 1 mm | • specific cutting force at h = 1 mm and b = 1 mm | N/mm ² | kc1.1 |
| Spezifisches Zeitspanvolumen | • spec. time-chip volume | cm ³ /kW · min | Qsp |
| Standweg in Vorschubrichtung | • tool life in feed direction | mm | Lf |
| Standzeit | • tool life | min | T |
| Vorschub je Umdrehung | • feed per revolution | mm | f |
| Vorschub je Zahn | • feed per tooth | mm | fz |
| Korrekturfaktor für Vf | • Correction factor for Vf | mm | f2 |
| Vorschubgeschwindigkeit | • feed rate | mm/min | Vf |
| Zähnezahl | • number of tooth | | Z |
| Zeitspanvolumen | • time-chip-volume | cm ³ /min | Q |
| Zerspangkraft | • resultant cutting force | N | F |
| Spiralsteigung bei | • Spiral increase with spiral interpolation | mm | a |
| Spiralinterpolation | | | |
| Radiales Aufmass | • Radial allowance | mm | ar |
| Anfahrorschub beim Außenzirkularfräsen | • Drive feed for external circular milling | mm | fz _a |
| Konturvorschub pro Zahn | • Contour feed per tooth | mm | fz _{kont} |
| mittlere Spandicke | • Middle cutting thickness | mm | hm |
| Vorschubgeschwindigkeit beim Zirkularfräsen am Fräser-Ø | • Feeder speed for circular milling an the rotary grinder-Ø | mm/min | vf _{kont} |
| Antriebsleistung | • Drive power | kW | P |
| Drehmoment | • Torque | Nm | M |
| Maschinenwirkungsgrad | • Machine efficiency | | η |
| Schnittbogenwinkel / Eingriffswinkel | • Cut arc angle/angle of attack | ° | φ |
| Steigungswinkel beim Spiralinterpolieren | • Angle of incline for spiral interpolation | ° | δ |
| Eintauchwinkel beim Nutfräsen ins Volle | • Angle of immersion for complete groove milling | ° | β |
| Auf den Spannungsquerschnitt bezogene Schnittkraft | • Tensioning lateral force with reference to the cutting power | N/mm ² | kc |
| Freiwinkel | • Free angle | ° | α |

$$V_c = \frac{D_1 \cdot \pi \cdot n}{1000}$$

$$n = \frac{V_c \cdot 1000}{D_1 \cdot \pi}$$

$$V_f = f_z \cdot z \cdot n$$

$$f_z = \frac{V_f}{n \cdot z}$$

$$h = f_z \cdot \sin \kappa$$

$$Q = \frac{a_p \cdot a_e \cdot v_f}{1000}$$
























































$$P = \frac{a_p \cdot a_e \cdot v_f \cdot kc}{6 \cdot 10^7 \cdot \eta}$$

$$M = \frac{9550 \cdot P}{n}$$

Formeln Zirkularfräsen Formula for circular milling

| Zu berechnender Werkstoff Material to be calculated | Fräserdurchmesser / Dimension | | | |
|--|---|--|---|--|
| | INNEN/INSIDE | | AUSSEN/OUTSIDE | |
| | ae/D < 0.30 | ae/D > 0.30 | ae/D < 0.30 | ae/D > 0.30 |
| ar | $ar = \frac{D_1 - D_2}{2}$ | | $ar = \frac{D_2 - D_1}{2}$ | |
| ae | $\frac{D_1^2 - D_2^2}{4 \cdot D_1 - D}$ | | $\frac{D_2^2 - D_1^2}{4 \cdot D_1 + D}$ | |
| hm | $f_z \cdot \sqrt{ae/D_1}$ | $\frac{f_z \cdot 360 \cdot ae}{D_1 \cdot \pi \cdot \varphi}$ | $f_z \cdot \sqrt{ae/D_1}$ | $\frac{f_z \cdot 360 \cdot ae}{D_1 \cdot \pi \cdot \varphi}$ |
| fz | $hm \cdot \sqrt{D_1/ae}$ | $\frac{hm \cdot D_1 \cdot \pi \cdot \varphi}{360 \cdot ae}$ | $hm \cdot \sqrt{D_1/ae}$ | $\frac{hm \cdot D_1 \cdot \pi \cdot \varphi}{360 \cdot ae}$ |
| fz _a | $hm \cdot \sqrt{D/ar}$ | | | |
| φ | $\arccos [1 - (2 \cdot ae/D_1)]$ | | | |
| Vf | $f_z \cdot z \cdot n$ | | | |
| Vf _{kont} | $\frac{f_z \cdot z \cdot n \cdot D_1}{[D_1 - D]}$ | | $\frac{f_z \cdot z \cdot n \cdot D_1}{[D_1 + D]}$ | |

Erläuterung der Karnasch Piktogramme und Grafiken
 Explanation of Karnasch pictograms and graphics

| | | | | |
|--|---|---|---|---|
| Schneidstoff Cutting material |  | Ultrafeinkorn-Vollhartmetall Ultrafine solid carbide |  | Kubischer Bornitrid Cubic boron nitride |
| |  | Polykristalliner Diamant in einer metallischen Bindungsmatrix Polykristalline Diamond in a metabolic bond matrix |  | Polykristalliner Diamant Polykristalline Diamond |
| |  | Chemical Vapour Deposition (99,9% Diamant/Diamond) |  | Vollhartmetall Solid carbide |
| |  | Monokristalliner Diamant Monokristalline Diamond | | |
| Schneidenform Type of cutting edge |  | Kugelfräser mit Innenkühlung Ball nose end mill with interior cooling supply |  | Spezielle Schruppschichtverzahnung Special roughing-finishing end mill |
| |  | Aluminium-Verzahnung Toothing for aluminum |  | Typ H = Hart Type H = Hard |
| |  | Karnasch-Spezial-Verzahnung Karnasch-special-toothing |  | Spezielle Geometrie für Diamant-Fräser Special geometry for Diamond coated end mills |
| |  | Aluminium-Schruppverzahnung Roughing cutter for aluminum |  | Metrisches ISO-Regelgewinde ISO metric screw thread |
| |  | Aluminium Fräser geläppt Lapped end mill for aluminum |  | Metrisches ISO-Feingewinde ISO metric fine thread |
| |  | Typ N-Microwerkzeug Type N-Microtool |  | Whitworth Rohrgewinde Whitworth threads |
| |  | Typ N mit unterschiedlicher Spankammer Type N with different flutes |  | 60° Flankenwinkel 60° thread angle |
| |  | Schruppfräser Typ HR Roughing end mill Type HR | | |
| Spiralwinkel Helix angle |  | 30° Spiralwinkel 30° Helix angle |  | 40° Spiralwinkel 40° Helix angle |
| |  | 0° Spiralwinkel (gerade genutet) 0° Helix angle (straight fluted) |  | 20° Spiralwinkel 20° Helix angle |
| |  | 25° Spiralwinkel 25° Helix angle |  | 45° Spiralwinkel 45° Helix angle |
| |  | Progressiver Spiralwinkel Progressive helix angle |  | 50° Spiralwinkel 50° Helix angle |
| |  | 15° Spiralwinkel 15° Helix angle |  | 35° Spiralwinkel 35° Helix angle |
| |  | Pyramiden-Verzahnung Pyramid-toothed |  | Ungleiche Spirale Unequal helix |
| |  | 30° Linksspirale – rechtsschneidend 30° Leftspiral – right hand cutting |  | 36° Spiralwinkel 36° Helix angle |
| |  | 30° Spiralwinkel 30° Helix angle |  | 15° Spiralwinkel 15° Helix angle |
| |  | 35° Spiralwinkel 35° Helix angle |  | 7° Linksspirale – rechtsschneidend 7° Left helix – right hand cutting |
| |  | 0° Spiralwinkel, rechtsschneidend 0° Helix angle, right hand cutting |  | Gratfreies fräsen Burr-free milling |
| |  | Ziehender und schiebender Schnitt Drawing and pushing cut |  | 8° Linksspirale 8° Left helix |
| |  | Gratfreies fräsen Burr-free milling |  | Ungleich geteilt Unequal helix |
| |  | 8° Rechtsspirale 8° Right helix | | |
| Werkzeuglänge Tool length |  | Extra kurz Extra short |  | Kurz Short |
| |  | Extra lang Extra long |  | Lang Long |
| |  | Extra kurze und kurze Ausführung Extra short and short version |  | Kurze und lange Ausführung Short and long version |
| |  | In zahlreichen Längen an Lager Numerous length available from our stock |  | Messerkopf in unterschiedlichen Durchmesser Cutter head in different diameter |

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
















































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Erläuterung der Karnasch Piktogramme und Grafiken Explanation of Karnasch pictograms and graphics

| | | | | |
|--|-------------------|--|---|--|
| Bearbeitungsrichtung Direction of machining | | Mögliche Bearbeitungsrichtungen Possible machining directions | | Mögliche Fräszustellungen bei Vielzahnfräsern mit Zentrumschnitt Possible milling directions for multi tooth end mills with a centrecut |
| | | Zirkular fräsen Circular milling | | Für Durchgangs- und Sackloch For through- and blind hole |
| Werkzeugverwendung Machining applications | | Kopierfräser Copy milling | | 45° Entgraten 45° Deburring |
| | | Abzeilen Machining in small steps | | Nuten Grooving |
| | | Umfangfräsen Side milling | | Umfangfräsen und Nuten Side milling and grooving |
| | | Abzeilen Machining in small steps | | Kegelsenken Countersinking |
| | | Fräser mit konischer Schneide End mill with conical cutting edge | | Bohren und fräsen Drilling and milling |
| | | Vorwärts- und Rückwärtsgraten (Viertelkreis) Forward- and backward deburring (quadrant) | | Bohren mit Innenkühlung Drilling with interior cooling supply |
| | | Vorwärts- und Rückwärtsgraten Forward- and backward deburring | | Gewindebohrer Tapping |
| | | 30° Entgraten 30° Deburring | | Gewindefräsen inkl. senken Thread milling incl. countersink |
| | | Viertelkreis-Entgraten Corner rounding | | Reiben ohne Innenkühlung Reaming without interior cooling supply |
| | | Stufenbohrer Stepdrill | | Fräser mit Bohrspitze Milling cutter with drill bit |
| | | Bohren ohne Innenkühlung Drilling without interior cooling supply | | Fräser in der Werkzeugmitte positionieren Adjust the end mill into the middle of the workpiece |
| | | 180° bohren mit Innenkühlung 180° drilling with interior cooling supply | | Planfräsen Face milling |
| | | PKD-Bohrer PCD-Drill | | Stirnfräsen Face milling |
| | | Gewindefräsen Thread milling | | |
| | Norm Shank | | Entpricht DIN 6527 Equal to DIN 6527 | |
| | | Karnasch Werksnorm Karnasch company standard | | Entspricht DIN 5156 Equal to DIN 5156 |
| | | Entspricht DIN 335 C für Kegelsenker Equal to DIN 335 C for Countersinker | | Für Gewinde nach DIN 13 For threads in accordance to DIN 13 |
| Schaftausführung Shank type | | Entspricht DIN 6535 mit Innenkühlung, Form HAK Equal to DIN 6535 with interior cooling supply, Form HAK | | Entspricht DIN 6535 ohne Innenkühlung, Form HE Equal to DIN 6535 without interior cooling supply, Form HE |
| | | Entspricht DIN 6535 ohne Innenkühlung, Form HA Equal to DIN 6535 without interior cooling supply, Form HA | | Entspricht DIN 6535 mit Innenkühlung, Form HEK Equal to DIN 6535 with interior cooling supply, Form HEK |
| | | Entspricht DIN 6535 ohne Innenkühlung, Form HB Equal to DIN 6535 without interior cooling supply, Form HB | | Ausführung für Messerkopfaufnahmen Design for face mill arbor |
| | | Entspricht DIN 6535 ohne Innenkühlung, Form HA und HB Equal to DIN 6535 without interior cooling supply, Form HA and HB | | |
| Werkzeugausführung Tool design | | Kugelfräser mit Innenkühlung Ballnose and mill with interior cooling supply | | Kugelfräser Ballnose end mill |
| | | Entgrater Deburrer | | 90° Schneidecke 90° cutting edge |
| | | Fräser mit Eckenradius End mill with corner radius | | 90° Schneidecke 90° cutting edge |

Erläuterung der Karnasch Piktogramme und Grafiken
 Explanation of Karnasch pictograms and graphics

| Werkzeugausführung Tool design | |
|---|--|
|  | 45° Eckenfase 45° Corner chamfer |
|  | Kugelfräser ohne Halsfreischliff Ballnose end mill without neck lengths |
|  | Eckenfase Corner chamfer |
|  | Fräser mit Eckenradius End mill with corner radius |
|  | Fräser mit Eckenradius und konischer Schneide End mill with corner radius and conical cutting edge |
|  | Fräser mit Eckenradius und Eckenfase End mill with corner radius and corner chamfer |
|  | Kugelfräser mit zylindrischem und konischem Hals Ballnose end mill with cylindrical and conical neck |
|  | 250° Kugelfräser 250° Ball nose end mill |
|  | Viertelkreis Vorwärts- und Rückwärtsentgrater Quadrant forward- and backward deburrer |
|  | Vorwärts- und Rückwärtsentgrater, 45° Forward- and backward deburrer, 45° |
|  | Viertelkreis - Profilfräser Corner rounding cutter |
|  | Kegelsenker 90° Countersinker 90° |
|  | Anschnittform D nach DIN 2197 für Maschinen- gewindebohrer Chamfer form D according to DIN 2197 for machine taps |
|  | 90° Bohrspitze 90° Point angle |
|  | Anschnitt VHM-Reibahle Cutting geometry |
|  | Anschnitt VHM-Reibahle Cutting geometry |
|  | Anschnitt VHM-Reibahle Cutting geometry |
|  | Bohren und fräsen von Aramid Drilling and milling of aramide |
|  | 220° Kugelfräser 220° Ballnose end mill |
|  | Kugelfräser und Fräser mit Eckenfase Ballnose end mill and corner chamfer end mills |
|  | Kugelfräser mit langer Schneide Ballnose end mill with long cutting edge |
|  | Einzahn-Kugelfräser One-tooth ballnose end mill |
|  | 170° Spitzenwinkel 170° Point angle |
|  | 140° Spitzenwinkel 140° Point angle |
|  | 130° Spitzenwinkel 130° Point angle |
|  | 142° Spitzenwinkel 142° Point angle |
|  | 137° Spitzenwinkel 137° Point angle |
|  | 180° Spitzenwinkel 180° Point angle |
|  | Gewindefräser Thread milling cutter |
|  | Bohrspitze für Aramidfasern Point angle for aramide fibres |
|  | Anschnittform B nach DIN 2197 für Maschinen- gewindebohrer Chamfer form B according to DIN 2197 for machine taps |
|  | Kreuzverzahnter Fräser mit V-Spitze Cross cut end mill with V-Point |
|  | 45° Eckenfräser mit einer Stärke von 0,1 mm 45° Corner chamfer with a size of 0,1 mm |
|  | Gratfreies fräsen Burrfree milling |
|  | Mit einem speziellen Radius-Anschliff With a special radius grinding |
| Zerspanungsverfahren Machining | |
|  | Hochgeschwindigkeitszerspanung, Hartfräsen High Speed Cutting, High Hard Cutting |
|  | Hochgeschwindigkeitszerspanung, Hochleistungs- zerspanung High Speed Cutting, High Performance Cutting |
|  | Hochgeschwindigkeitszerspanung High Speed Cutting |
|  | Hochleistungszerspanung High Performance Cutting |
|  | Multi Task Cutting |
|  | Hartfräsen High Hard Cutting |
|  | Hartfräsen, Hochgeschwindigkeitszerspanung, Hochleistungszerspanung High Hard Cutting, High Speed Cutting, High Performance Cutting |
|  | Hochgeschwindigkeitszerspanung, Alu-Ne Zerspanung High Speed Cutting, Alu-Non ferrous Cutting |
|  | Hochleistungszerspanung High Performance Cutting |
|  | Zum schnellen Fräsen bei hohem Spanvolumen Extreme Rapid Cutting |
|  | Für exotisches Material For exotic materials |
|  | Ziehender und schiebender Schnitt Drawing and pushing cut |
| Kühlmittel Coolant | |
|  | Zur Verwendung mit Innenkühlung To use with cooling liquid |
|  | Zur Verwendung mit Öl, Emulsion, Luft oder MMKS To use with oil, cutting emulsion, air or MQL |
|  | Zur Verwendung mit Kühlflüssigkeit oder trocken To use with cooling liquid or dry |
|  | Zur Verwendung mit MMKS To use with MQL |
|  | Zur Verwendung mit Öl oder Emulsion To use with oil or cutting emulsion |
|  | Zur Verwendung mit Luftkühlung To use with air cooling |

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Erläuterung der Karnasch Piktogramme und Grafiken Explanation of Karnasch pictograms and graphics

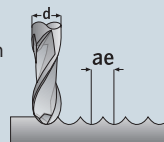
| | | | | |
|---|---|--|--|--|
| Kühlmittel Coolant | | Zur Verwendung mit Öl, Emulsion, und MMKS To us with oil, cutting emulsion and MQL | | Zur Verwendung mit Öl oder unserer Schneidpaste Art. 60 1150 To use with oil or our cutting-past Art. 60 1150 |
| | | Zur Verwendung mit 50-80 bar Kühlmitteldruck To use with 50-80 bar coolant pressure | | Zur Verwendung mit 10-20 bar Kühlmitteldruck To use with 10-20 bar coolant pressure |
| | | Zur Verwendung mit Emulsion oder MMKS To use with cutting emulsion or MQL | | |
| Beschichtungen/ Oberflächen Coatings/Surfaces | NE-Metalle, Kunststoffe Non ferrous metal, Plastics | | | |
| | Stahl, Edelstähle, Gusseisen Steel, stainless steel, cast iron | | | |
| | Graphit, Composites, Hartmetall Graphite, Composites, Cemented Carbide | | | |
| | Titan, Titanlegierungen Titanium, Titanium alloy | | | |
| | Titan, Titanlegierungen Titanium, Titanium alloy | | | |

Berechnung von Schnittgeschwindigkeit, Drehzahl, Vorschubgeschwindigkeit und Vorschub pro Zahn Calculation of cutting speed, rpm, feed speed and feed per tooth

Zeitspanvolumen
Time-chip volume

$$Q = \frac{a_e \cdot a_p \cdot Vf}{1000} \quad (\text{cm}^3/\text{min})$$

a_e = Zeilensprung/Pitch



Schnittgeschwindigkeit u. Drehzahl – Kopierfräsen Cutting speed and rpm – Copying milling

$$Vc = \frac{n \cdot n \cdot a_e}{1000} \quad (\text{m/min})$$

$$n = \frac{Vc \cdot 1000}{n \cdot a_e} \quad (\text{m/min})$$

$$a_e = 2 \cdot \sqrt{a_p (d_1 - a_p)} \quad (\text{mm})$$

a_p = Schnitttiefe/Depth



VHM-SCHAFTFRÄSER
SOLID CARBIDE END MILLS



VHM-GEWINDEWIRBLER
GEWINDEFÄSER
SOLID CARBIDE WHIRLING
THREAD CUTTERS
THREAD MILLS



WERKZEUGE FÜR COMPOSITES
CFK / GFK - TITAN - KUNSTSTOFF
TOOLS FOR COMPOSITES
CFRP / GFRP - TITANIUM -
PLASTICS



VHM-BOHRER
SOLID CARBIDE TWIST DRILL



VHM-REIBAHLEN
SOLID CARBIDE REAMERS



SPATEN-BOHRER
SPADE DRILLS



KERNBOHRER
ANNULAR CUTTERS



LOCHSÄGEN
HOLE SAWS



STUFEN- UND BLECHSCHÄL-
BOHRER
STEP-DRILLS, TUBE AND
SHEET DRILLS



HSS SPIRAL- UND
GEWINDEBOHRER
HSS TWIST DRILLS · TAPS



VOLLHARTMETALL GEWINDE-
BOHRER-AUSBOHRER
SOLID CARBIDE DRILLS
TO REMOVE JAMMED TAPS




KEGELSENKER, FLACHSENKER,
STUFENBOHRER
COUNTERSINK,
COUNTERBORES,
SUBLAND DRILLS



FRÄSSTIFTE
BURRS



FRÄSSTIFTE · LOCHSÄGEN
FÜR SCHLÜSSELDIENSTE
BURRS · HOLESAWS FOR
LOCKSMITH



SPEZIAL FRÄSSTIFTE
ZUBEHÖR
SPECIAL BURRS · ACCESSORIES



HM-BESTÜCKTE SÄGEN
T.C.T CIRCULAR SAW BLADES



HSS-SÄGEN
HSS-SAW BLADES



DIN-VHM-SÄGEN
DIN-SOLID CARBIDE-
SAW BLADES



DIN-HSS-SÄGEN
DIN-HSS-SAW BLADES



ORBITALE ROHRKREISSÄGEN
ORBITAL PIPE CUTTING
CIRCULAR SAW BLADES



AUFNAHMEHALTER FÜR
KREISSÄGEBLÄTTER
CIRCULAR SAW BLADE RETAINER




MAGNET-KERNBOHR-
MASCHINEN
MAGNETIC HOLE
CUTTING
MACHINES



DRUCKLUFT-GERADSCHLEIFER
PNEUMATIC STRAIGHT GRINDER



SCHMIERSTOFFE · SCHNEIDÖL
LUBRICANTS · CUTTING OIL



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EINSATZHINWEISE FÜR ALLE KERNBOHRER HARTMETALL-BESTÜCKT, PULVERSTAHL, HSS-XE STAHL APPLICATION GUIDELINES FOR ALL ANNULAR CUTTER CARBIDE-TIPPED, POWDER STEEL, HSS-XE STEEL



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7



8



9

Index

1. Vorkörnen bei Kernbohrern

Bei Kernbohrer Durchmesser 12-15 mm ist es absolut notwendig einen starken Körnerpunkt zu setzen. Es ist darauf zu achten, dass die Spitze des Auswerferstiftes exakt mittig auf dem Körnerpunkt aufsitzt. Sehr empfehlenswert auch bei allen anderen Durchmessern. Das gleiche gilt für die Power-Max-Serie HM-Lochsägen bei Anwendung als Kernbohrer mit Auswerferstiften. Das Spindelspiel der Maschine muss einwandfrei sein für Kernbohrer/Lochsägen Durchmesser 12-15 mm.

2. Drehzahlen für Kernbohrer/Lochsägen

Bei HSS-Kernbohrer 12-15 mm muss eine Mindestdrehzahl von 450 U./min. eingehalten werden. Für HM-Kernbohrer wäre Minimum ca. 600 U./min. optimal. Ist dies nicht möglich muss mit halbem Vorschub gearbeitet werden (Vorschübe und Drehzahlen siehe Seite 1295-1297 / 1312).

3. Vorschub

Unbedingt vorsichtig und langsam 1 mm tief anbohren. Anschließend kann mit normalem Vorschub weitergearbeitet werden (Vorschübe siehe Seite 1297). Dieser Vorgang ist absolut notwendig bei Durchmessern 12-15 mm. Sehr empfehlenswert bei allen anderen Durchmessern. Beherzigen Sie bitte diesen Vorgang. Es erhöht die Standzeit des Bohrers wesentlich.

4. Bohren

Je nach Spanablauf ist der Bohrer öfters zu lüften. Dies gilt insbesondere bei Schnitttiefen ab ca. 25 mm. Spüren Sie z. B. einen größeren Widerstand oder Rattern bitte sofort wie folgt vorgehen:

- Im laufenden Zustand aus dem Bohrloch hinausfahren.
- Bohrer und Bohrloch von Spänen säubern (z. B. mit Karnasch Druckflasche Art. 20 1308/20 1327 auf Seite 528).
- Bohrloch mit Kühl- oder Schmieremulsion füllen (siehe Karnasch-Schneidöle ab Seite 1143).
- Wieder im laufenden Zustand langsam und vorsichtig in das bereits vorhandene Loch hineinfahren. Während diesem gesamten Vorgang darf der Standort der Maschine oder des Werkstückes nicht verändert werden. Also z. B. den Magnet der Kernbohrmaschine nicht ausschalten.
- Je nach Spanablauf und Bohrtiefe ist dieser Vorgang mehrmals zu wiederholen.

5. Kühlung

Verwenden Sie nur Hochleistungsschneidöle (Karnasch-Schneidöle siehe ab Seite 1143). Kontinuierliche Kühlung während des gesamten Bohrvorgangs ist empfehlenswert. Ab ca. 35 mm Durchmesser nur Morsekonusaufnahmen mit automatischer Innenkühlung verwenden (Morsekonusaufnahmen siehe Seite 521-523).

1. Center punch with annular cutters

For annular cutters with a diameter of 12-15 mm it is absolutely necessary to set a strong center mark. See that the tip of the ejector pin is set exactly in the middle of the center mark. Highly recommendable also with all other diameters. The same applies for the Power Max carbide tipped hole saws with usage as annular cutters with ejector pins. The spindle tolerances of the machine must be in good condition for annular cutters / T.C.T. hole saws diameter 12-15 mm (do not use old, worn out machines for these diameter).

2. Speeds for annular cutters/hole saws

With HSS annular cutters 12-15 the minimum speed is 450 rev/min. For carbide annular cutters a minimum speed of 600 rev/min is optimal. In case this is not possible, it is recommended to work with half the feed (feeds and speeds see pages 1295-1297 / 1312).

3. Feed

Slowly and cautiously drill 1 mm deep. Then proceed with normal feed (feeds see page 1297). This procedure is absolutely necessary for diameters of 12-15 mm. Highly recommendable with all other diameters. Please heed this procedure. It significantly extends the drill's durability.

4. Drilling

It may be necessary to ventilate the drill depending on the chip flow. This especially applies for cutting depths of approx. 25 mm. In case you feel a higher resistance or in case of clattering please immediately proceed as follows:

- Exit the borehole while drill is turning.
- Free drill and borehole from chips (e. g. with Karnasch pressure bottle art. 20 1308/20 1327 on page 528).
- Fill borehole with cooling and lubricating emulsion (see Karnasch cutting oils from page 1143).
- Insert the drill into the borehole while drill is turning. During the entire process, the position of the machine or the workpiece must not be changed. So do not switch off e.g. the magnet of the core drilling machine.
- This procedure has to be repeated according to the chip flow and drilling depth.

5. Cooling

Use only heavy-duty cutting oils (Karnasch cutting oils see from page 1143). We recommend continuous cooling during the entire drilling process. Use tool holders with internal cooling only for dia. 35 mm and more. (Tool holders see pages 521-523).

HARD-LINE



364-373
436-451
490-493

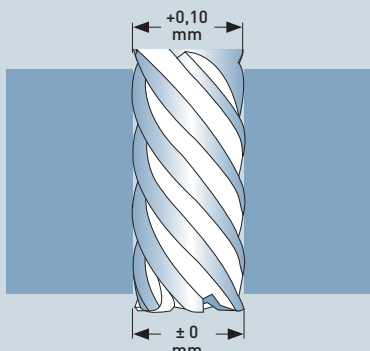
RAIL-LINE



506-509

| Ø | mm Zoll / Inch | 12-18 | 19-25 | 26-32 | 33-39 | 40-46 | 47-53 | 54-60 | 61-70 | 71-80 | 81-90 | 91-100 | 101-112 | 113-124 | 125-136 | 137-150 | 151-160 | 161-170 | 171-180 | 181-190 | 191-200 |
|---|------------------------------|-------------------|--------------|---------------------|----------------------|----------------------|---------------------|--------------------|----------------------|-----------------------|----------------------|------------------------|------------------------|----------------------|----------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|----------------------|
| | | 7/16" 1. 1/16" | 3/4" 1" | 1. 1/16" 1. 1/4" | 1. 5/16" 1. 9/16" | 1. 5/8" 1. 13/16" | 1. 7/8" 2. 1/16" | 2. 1/8" 2. 3/8" | 2. 13/32" 2. 3/4" | 2. 51/64" 3. 5/32" | 3. 3/16" 3. 9/16" | 3. 19/32" 3. 15/16" | 3. 31/32" 4. 13/32" | 4. 15/32" 4. 7/8" | 4. 15/32" 4. 7/8" | 4. 15/16" 5. 11/32" | 5. 13/32" 5. 29/32" | 5. 15/16" 6. 19/64" | 6. 11/32" 6. 11/16" | 6. 47/64" 7. 3/32" | 7. 1/8" 7. 31/64" |
| | Stahl · Steel < 500 N | 1475 885 | 838 637 | 612 498 | 483 408 | 398 346 | 338 300 | 295 265 | 261 227 | 224 199 | 197 177 | 175 159 | 158 142 | 141 128 | 127 117 | 116 106 | 105 100 | 99 95 | 93 88 | 88 84 | 83 80 |
| | Stahl · Steel < 750 N | 1327 796 | 754 537 | 550 448 | 434 367 | 358 311 | 304 270 | 265 230 | 234 204 | 201 179 | 177 159 | 157 143 | 142 128 | 127 115 | 114 105 | 104 95 | 95 90 | 89 84 | 84 79 | 79 75 | 75 72 |
| | Stahl · Steel < 900 N | 930 620 | 590 450 | 430 340 | 335 285 | 280 240 | 239 210 | 205 185 | 182 160 | 155 140 | 137 125 | 122 110 | 108 100 | 98 90 | 89 81 | 80 75 | 74 70 | 69 65 | 65 62 | 62 59 | 58 56 |
| | Stahl · Steel < 1200 N | 795 530 | 500 380 | 370 300 | 290 245 | 240 265 | 200 180 | 175 160 | 155 135 | 135 120 | 117 105 | 104 95 | 94 85 | 84 77 | 76 70 | 69 63 | 63 60 | 59 56 | 56 53 | 53 50 | 50 48 |
| | Stahl · Steel < 1400 N | 660 440 | 420 320 | 305 250 | 240 200 | 195 170 | 165 150 | 145 130 | 125 115 | 110 100 | 95 90 | 85 80 | 75 70 | 68 65 | 63 58 | 57 50 | 53 50 | 49 47 | 46 44 | 44 42 | 42 40 |
| | Edelstahl Stainless steel | 530 350 | 340 250 | 245 200 | 195 165 | 160 140 | 135 120 | 115 105 | 103 90 | 87 78 | 77 70 | 68 63 | 62 56 | 55 51 | 56 46 | 45 42 | 42 40 | 40 37 | 37 35 | 35 33 | 33 32 |
| | Alu Aluminum | 2390 1590 | 1510 1150 | 1100 895 | 870 735 | 715 625 | 610 540 | 530 480 | 470 410 | 405 360 | 355 320 | 315 285 | 283 255 | 253 230 | 229 210 | 209 190 | 190 179 | 178 168 | 167 159 | 158 151 | 150 143 |
| | Grauguss Grey cast iron | 930 620 | 590 450 | 430 340 | 335 285 | 280 240 | 239 210 | 205 185 | 182 160 | 155 140 | 137 125 | 122 110 | 108 100 | 98 90 | 89 81 | 80 75 | 74 70 | 69 65 | 65 62 | 62 59 | 58 56 |
| | Bronze Brass | 1325 885 | 840 635 | 615 500 | 490 410 | 400 345 | 340 300 | 295 265 | 260 230 | 225 200 | 195 175 | 174 160 | 157 145 | 140 130 | 127 117 | 116 105 | 105 100 | 99 95 | 93 88 | 88 84 | 83 80 |
| | Kupfer Copper | 930 620 | 590 450 | 430 340 | 335 285 | 280 240 | 239 210 | 205 185 | 182 160 | 155 140 | 137 125 | 122 110 | 108 100 | 98 90 | 89 81 | 80 75 | 74 70 | 69 65 | 65 62 | 62 59 | 58 56 |
| | Schienen Railtracks | 530 - | 500 380 | 360 300 | 290 265 | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - | - - |

GENAUIGKEIT DER BOHRUNG (RICHTWERTE) · EINGANG + 0,10 mm / AUSGANG ± 0 mm
PRECISION OF THE BOREHOLE (STANDARD VALUES) · ENTRANCE SIDE + 0,10 mm / EXIT SIDE ± 0 mm



Verwenden Sie Schneidöle siehe ab Seite 1143
Use coolants see from page 1143

1

2

3

4

5

6

7

8

9



BLUE-DRILL LINE PRO

BLUE-DRILL LINE

GOLD-DRILL LINE

SILVER-DRILL LINE

SILVER-DRILL LINE RAIL

MINI-LINE

MINI-CUT

388-393

394-403
452-467
494-496

404-413
468-487
498-500

420-425

514-517

426-427

590-591

| Ø | mm Zoll / Inch | 12-18 | 19-25 | 26-32 | 33-39 | 40-46 | 47-53 | 54-60 | 61-70 | 71-80 | 81-90 | 91-100 | 101-112 | 113-124 | 125-136 | 137-150 |
|---|------------------------------|-----------------|-----------|------------------|-------------------|-------------------|------------------|-----------------|-------------------|--------------------|-------------------|---------------------|---------------------|-------------------|---------------------|---------------------|
| | | 7/16" - 1.1/16" | 3/4" - 1" | 1.1/16" - 1.1/4" | 1.5/16" - 1.9/16" | 1.5/8" - 1.13/16" | 1.7/8" - 2.1/16" | 2.1/8" - 2.3/8" | 2.13/32" - 2.3/4" | 2.51/64" - 3.5/32" | 3.3/16" - 3.9/16" | 3.19/32" - 3.15/16" | 3.31/32" - 4.13/32" | 4.15/32" - 4.7/8" | 4.15/16" - 5.11/32" | 5.13/32" - 5.29/32" |
| | Stahl · Steel < 500 N | 660 | 420 | 305 | 240 | 195 | 165 | 145 | 125 | 110 | 95 | 85 | 75 | 68 | 63 | 57 |
| | | 440 | 320 | 250 | 200 | 170 | 150 | 130 | 115 | 100 | 90 | 80 | 70 | 65 | 58 | 50 |
| | Stahl · Steel < 750 N | 530 | 340 | 245 | 195 | 160 | 135 | 115 | 163 | 87 | 77 | 68 | 62 | 55 | 50 | 45 |
| | | 350 | 250 | 200 | 165 | 140 | 120 | 105 | 90 | 78 | 70 | 63 | 56 | 51 | 46 | 42 |
| | Stahl · Steel < 900 N | 340 | 250 | 185 | 145 | 120 | 100 | 88 | 78 | 67 | 58 | 52 | 47 | 41 | 38 | 34 |
| | | 265 | 190 | 150 | 125 | 105 | 90 | 80 | 68 | 59 | 53 | 48 | 42 | 39 | 35 | 31 |
| | Stahl · Steel < 1200 N | 265 | 165 | 125 | 95 | 79 | 67 | 58 | 52 | 44 | 39 | 34 | 31 | 27 | 25 | 22 |
| | | 175 | 130 | 100 | 80 | 70 | 60 | 53 | 45 | 40 | 35 | 32 | 28 | 26 | 23 | 21 |
| | Stahl · Steel < 1400 N | 185 | 117 | 85 | 67 | 55 | 47 | 41 | 36 | 30 | 26 | 23 | 21 | 18 | 16 | 16 |
| | | 125 | 90 | 70 | 57 | 48 | 42 | 37 | 31 | 27 | 24 | 22 | 19 | 17 | - | 14 |
| | Edelstahl Stainless steel | 320 | 200 | 145 | 115 | 90 | 80 | 70 | 62 | 53 | 46 | 41 | 37 | 32 | 29 | 27 |
| | | 210 | 150 | 120 | 95 | 85 | 72 | 63 | 54 | 47 | 42 | 38 | 33 | 30 | 28 | 25 |
| | Alu Aluminum | 980 | 620 | 455 | 360 | 295 | 250 | 220 | 193 | 165 | 145 | 129 | 116 | 104 | 94 | 85 |
| | | 655 | 470 | 370 | 305 | 255 | 225 | 195 | 170 | 150 | 130 | 117 | 105 | 95 | 86 | 78 |
| | Grauguss Grey cast iron | 480 | 300 | 200 | 175 | 143 | 122 | 106 | 93 | 80 | 70 | 62 | 56 | 50 | 45 | 41 |
| | | 320 | 230 | 180 | 147 | 125 | 108 | 95 | 81 | 71 | 63 | 57 | 51 | 46 | 42 | 38 |
| | Bronze Brass | 660 | 420 | 305 | 240 | 195 | 165 | 145 | 125 | 110 | 95 | 85 | 75 | 68 | 63 | 57 |
| | | 440 | 320 | 250 | 200 | 170 | 150 | 130 | 115 | 100 | 90 | 80 | 70 | 65 | 58 | 50 |
| | Kupfer Copper | 1060 | 670 | 490 | 390 | 320 | 270 | 235 | 205 | 178 | 157 | 138 | 127 | 110 | 100 | 90 |
| | | 700 | 510 | 400 | 330 | 280 | 240 | 210 | 180 | 160 | 140 | 130 | 115 | 105 | 95 | 85 |
| | Schienen Railtracks | 350 | 240 | 175 | 140 | - | - | - | - | - | - | - | - | - | - | - |
| | | 255 | 185 | 145 | 130 | - | - | - | - | - | - | - | - | - | - | - |
| | Hardox 400, 450 | 239 | 151 | 110 | 87 | - | - | - | - | - | - | - | - | - | - | - |
| | Hardox 400, 450 | 159 | 115 | 90 | 72 | - | - | - | - | - | - | - | - | - | - | - |

Kühlung beim Bearbeiten von Hardox siehe Seite 1214. Für die Bearbeitung von Hardox 500 siehe Art. 403045 Seite 651.
Achtung: Schnittdaten für Hardox nur anwendbar auf BLUE-DRILL LINE PRO, BLUE-DRILL LINE, GOLD-DRILL LINE.
Cooling advice while machining Hardox see page 1214. While machining Hardox 500 see Art. 403045 page 651.
Attention: Cutting data for Hardox only applicable to BLUE-DRILL LINE PRO, BLUE-DRILL LINE, GOLD-DRILL LINE.

GENAUIGKEIT DER BOHRUNG / FERTIGUNGSTOLERANZEN DER KERNDREHNER PRECISION OF THE BOREHOLE / PRODUCTION TOLERANCES OF THE CORE DRILLS








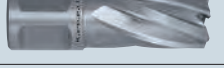
Die Genauigkeit der Bohrung ist abhängig von den Toleranzen der Kernbohrer und der Präzision der Maschine (Spindel). Kernbohrer werden hauptsächlich auf Magnet-Kernbohrmaschinen eingesetzt welche größtenteils hohe Spindel-Toleranzen aufweisen. In der Regel werden daher dort die Bohrungen etwas größer als der Durchmesser des Kernbohrers. Aus diesem Grunde werden die Kernbohrer in Minus-Toleranzen gefertigt (siehe Tabelle). Sollten Kernbohrer auf hochpräzisen Spindeln eingesetzt werden, ist ein Untermaß möglich.

The accuracy of the hole depends on the tolerances of the annular cutters and the precision of the machine (spindle). Core drills are mainly used on magnetic hole cutting machines which mostly have high spindle tolerances. Therefore, the holes are usually slightly larger than the diameter of the core drill. For this reason, the core drills are manufactured in minus tolerances (see table). If holes are made with an annular cutter on high-precision spindle machines, an undersize is therefore possible.



Durchmessertoleranz · Tolerance of outer diameter

| Durchmesser · Diameter | Toleranz · Tolerance |
|------------------------|----------------------|
| 10-18 | +0 -0,070 |
| 19-30 | +0 -0,084 |
| 31-50 | +0 -0,100 |
| 51-80 | +0 -0,120 |
| 81-120 | +0 -0,140 |
| 121-180 | +0 -0,160 |
| 181-250 | +0 -0,185 |

Vorschübe für alle Pulverstahl + HSS-XE Kernbohrer
Feed for all powder steel + HSS-XE annular cutters

| TYPE | MODEL |  |
|----------------------------|---|---|
| BLUE-DRILL LINE PRO |  | 388-393 |
| BLUE-DRILL LINE |  | 394-403 452-467 494-496 |
| GOLD-DRILL LINE |  | 404-413 468-487 498-500 |
| SILVER-DRILL LINE |  | 420-425 |
| MINI-LINE |  | 426-427 |
| MINI-CUT |  | 590-591 |
| RAIL-LINE |  | 514-517 |










Vorschübe für alle Hartmetall-bestückte Kernbohrer
Feed for all carbide-tipped annular cutters

| TYPE | MODEL |  |
|-----------------------|---|---|
| HARD-LINE |  | 364-373 436-451 490-493 |
| HARD-LINE RAIL |  | 506-509 |
| | | |
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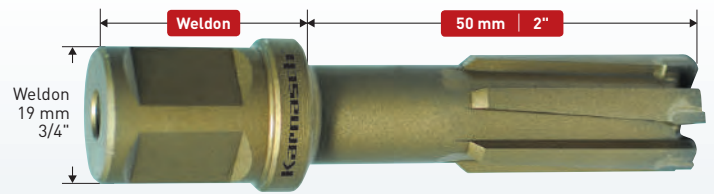
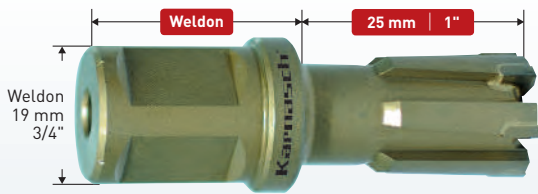
Verwenden Sie Schneidöle siehe ab Seite 1143

Use coolants see from page 1143

| | | |
|--|------------------------------------|----------|
|  | Stahl · Steel < 500 N | 0,15 |
|  | Stahl · Steel < 750 N | 0,18 |
|  | Stahl · Steel < 900 N | 0,16 |
|  | Stahl · Steel < 1200 N | 0,16 |
|  | Stahl · Steel < 1400 N | 0,17 |
|  | Edelstahl Stainless steel | 0,10 |
|  | Alu Aluminum | 0,25 |
|  | Grauguss Grey cast iron | 0,16 |
|  | Bronze Brass | 0,18 |
|  | Kupfer Copper | 0,21 |
|  | Schienen Railtracks | 0,1-0,14 |
|  | Hardox 400, 450 Hardox 400, 450 | 0,12 |

| | | |
|---|------------------------------|-----------|
|  | Stahl · Steel < 500 N | 0,10 |
|  | Stahl · Steel < 750 N | 0,10 |
|  | Stahl · Steel < 900 N | 0,10-0,12 |
|  | Stahl · Steel < 1200 N | 0,10-0,15 |
|  | Stahl · Steel < 1400 N | 0,16 |
|  | Edelstahl Stainless steel | 0,13 |
|  | Alu Aluminum | 0,24 |
|  | Grauguss Grey cast iron | 0,08-0,13 |
|  | Bronze Brass | 0,12 |
|  | Kupfer Copper | 0,12 |
|  | Schienen Railtracks | 0,08-0,1 |





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1. Korrekte Schnittgeschwindigkeit

Die beste Schnittgeschwindigkeit zum Bohren von Hardox liegt Vc zwischen 30 bis 35 m/min

Erklärung:

Falsche Schnittgeschwindigkeit ist der häufigste Fehler beim Bohren von HARDOX. Die Härte von HARDOX 400-500 ist sehr hoch. Oftmals reduziert daher der Anwender die Drehzahl, was leider falsch ist. Bei Schnittgeschwindigkeiten um Vc. 10 m/min kann z.B. keine Bohrung realisiert werden.

2. Empfehlung Vorschub

| Durchmesser Vf | (mm/min) | fz (mm/r) |
|----------------|----------|-----------|
| Ø 14-18 | 21-27 | 0,03-0,06 |
| Ø 19-25 | 24-30 | 0,04-0,07 |
| Ø 26-30 | 21-27 | 0,05-0,07 |
| Ø 31-36 | 18-24 | 0,05-0,08 |

Anwendungsbeispiel:

HARDOX Kernbohrer Durchmesser 18 mm in HARDOX-Platte Stärke 12 mm mit Vf = 24 mm/min.
Der Anwender muss in ca. 30 Sekunden die Bohrung getätigt haben.

Erklärung:

Am wichtigsten ist der Vorschub wegen der Härte / Zähigkeit und des hohen Mangananteils von HARDOX.
Ist der Vorschub zu gering gewählt schleifen/kratzen die Zähne des Bohrers an dem Material und verschleifen extrem schnell.

3. Kühlung

3.1. Bohren von HARDOX bis 12 mm: Bohrung ohne Kühlung möglich. Mit Kühlung erhöht die Standzeit. Verwenden Sie zur Kühlung nur ölhaltige Kühlmittel ohne Wasseranteile wie zum Beispiel: Karnasch Mecutoil 100 pur ohne Wasser oder pflanzliche Öle.

3.2. Bohren von HARDOX über 12 mm: Hier muss gekühlt werden. Verwenden Sie zur Kühlung nur ölhaltige Kühlmittel ohne Wasseranteile wie zum Beispiel: Karnasch Mecutoil 100 pur ohne Wasser oder pflanzliche Öle.

3.3. Die Zähne des Kernbohrers werden extrem heiß während des Bohrvorgangs in HARDOX (Späne leuchten rot-sichtbar im dunklen). Kühlmittel mit Wasseranteile erzeugen Risse an den Zähnen des Bohrers. Die Standzeit wird dabei erheblich reduziert.

1. Requirement of speed

The best line speed for HARDOX annular cutters is Vc between 30 up to 35 m/min

Explanation:

Wrong speed is the most common mistake operator do especially in combination with HARDOX steel. HARDOX steel 400-500 is very hard. Most operator thinks the harder the steel the lower should be the speed. This is exactly wrong with HARDOX steel. When using too low speed such as Vc 10 m/min cutting holes is almost not possible.

2. Recommended feed

| Diameter Vf | (mm/min) | fz (mm/r) |
|-------------|----------|-----------|
| Ø 14-18 | 21-27 | 0.03-0.06 |
| Ø 19-25 | 24-30 | 0.04-0.07 |
| Ø 26-30 | 21-27 | 0.05-0.07 |
| Ø 31-36 | 18-24 | 0.05-0.08 |

Application example:

HARDOX annular cutter diameter 18 mm cutting in HARDOX plate 12 mm with Vf = 24 mm/min.
Hole has to be done in approx. 30 seconds.

Explanation:

Feed is the key point, because hardness of HARDOX steel is tough and also with high manganese content.
If cutting with low feed, the cutting edges will slip in place and will wear out quickly.

3. Requirement of cooling

3.1. When cutting Hardox steel plate ≤12 mm thickness, operator can choose dry cutting. Using oily coolant (vegetable oil) for cooling will have better effect.

3.2. When cutting Hardox steel plate >12mm thickness, operator must choose oily coolant (vegetable oil) for cooling.

3.3. Aqueous coolant is not recommended because the temperature of Hardox cutter is very high during cutting. The removed chips are red (visible at night). Using aqueous coolant will cause crack for the teeth of Hardox cutter and shorten the tool life of Hardox cutter.

4. Empfohlene Schnittwerte, sowie Empfehlung entfernen der Späne für HARDOX-LINE Kernbohrer Art. 20 1680 / 20 1690
Recommended cutting parameter table and chip removal for HARDOX-LINE annular cutter Art. 20 1680 / 20 1690

| Ø mm | Ø Zoll / Inch | Material / Material to be cut | | Vorschub / Feed | | Kühlung Cooling | Späne entfernen bei HARDOX / Harte Stähle / Chips removal for HARDOX / hard steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------|---------------------|---|---|--|--|---|--|---|--|---|--|---|--|--|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|--|---|---|---|--|---|
| | | | | HARDOX 500/400 Harte Stähle / Hard steel 30-50 HRC | | | Dicke von HARDOX / Harte Stähle Thickness of HARDOX / hard steel ≤12 mm | | Dicke von HARDOX / Harte Stähle Thickness of HARDOX / hard steel ≤20 mm | | Dicke von HARDOX / Harte Stähle Thickness of HARDOX / hard steel ≤35 mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | HARDOX 500, Harte Stähle max. 50 HRC (U/min) / Hard steel max. 50 HRC (rpm) | HARDOX 400, Harte Stähle max. 40 HRC (U/min) / Hard steel max. 40 HRC (rpm) | Manueller Vorschub (mm/s) Manual feed (mm/s) | Manueller Vorschub (mm/U) Manual feed (mm/r) | | Schnitttiefe Bohrer 25 mm / cutting depth cutter 25 mm | Schnitttiefe Bohrer 50 mm / cutting depth cutter 50 mm | Schnitttiefe Bohrer 25 mm / cutting depth cutter 25 mm | Schnitttiefe Bohrer 50 mm / cutting depth cutter 50 mm | Schnitttiefe Bohrer 50 mm / cutting depth cutter 50 mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | 35/64" | 751 | 796 | 0.35-0.45 | 0.03-0.06 | Nur ölhaltige Kühlmittel verwenden, wie z.B. Karnasch Mecutoil 100 pur oder rein Pflanzliche Öle > 60 ml/min (keine Öl-Wasser Gemische) | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 13 mm Bohrtiefe, stoppen und Späne entfernen | Nach 25 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | 19/32" | 701 | 743 | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 25 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | 5/8" | 657 | 697 | | | | | | | 0.40-0.50 | 0.04-0.07 | Use only coolant such as Karnasch Mecutoil 100 pure or vegetable oil > 60 ml/min. No oil-water mixtures | Not necessary to remove chips | Not necessary to remove chips | Nach 15 mm Bohrtiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 17 | 43/64" | 618 | 656 | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | 45/64" | 584 | 619 | 0.35-0.45 | 0.05-0.07 | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 19 | 3/4" | 553 | 587 | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 25/32" | 525 | 557 | | | | | | | 0.30-0.40 | 0.05-0.08 | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 21 | 53/64" | 500 | 531 | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | 55/64" | 478 | 507 | 0.25-0.35 | 0.05-0.08 | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 | 29/32" | 457 | 485 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | 15/16" | 438 | 464 | | | | | | | 0.20-0.35 | 0.05-0.08 | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | 63/64" | 420 | 446 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | 1.1/32" | 404 | 429 | 0.18-0.3 | 0.05-0.08 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27 | 1.1/16" | 389 | 413 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | 1.7/64" | 375 | 398 | | | | | | | 0.16-0.3 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 | 1.9/64" | 362 | 384 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | 1.3/16" | 350 | 372 | 0.15-0.28 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 31 | 1.7/32" | 339 | 360 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | 1.17/64" | 328 | 348 | | | | | | | 0.15-0.28 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | 1.19/64" | 318 | 338 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | 1.11/32" | 309 | 328 | 0.15-0.28 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | 1.3/8" | 300 | 318 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | 1.27/64" | 292 | 310 | | | | | | | 0.15-0.28 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 37 | 1.29/64" | 284 | 301 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 | 1.1/2" | 277 | 293 | 0.15-0.28 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 39 | 1.17/32" | 269 | 286 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | 1.37/64" | 263 | 279 | | | | | | | 0.15-0.28 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 41 | 1.39/64" | 256 | 272 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 | 1.21/32" | 250 | 265 | 0.15-0.28 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 43 | 1.11/16" | 244 | 259 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 | 1.47/64" | 239 | 253 | | | | | | | 0.15-0.28 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 45 | 1.49/64" | 234 | 248 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 | 1.13/16" | 228 | 242 | 0.15-0.28 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 47 | 1.27/32" | 224 | 237 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 | 1.57/64" | 219 | 232 | | | | | | | 0.15-0.28 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 49 | 1.59/64" | 214 | 227 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 | 1.31/32" | 210 | 223 | 0.15-0.28 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | | | | | | | |
| 51 | 2.1/64" | 206 | 219 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | |
| 52 | 2.3/64" | 202 | 214 | | | | | | | 0.15-0.28 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | | | | | | | |
| 53 | 2.3/32" | 198 | 210 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | |
| 54 | 2.1/8" | 195 | 206 | 0.15-0.28 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | | | | | | | |
| 55 | 2.11/64" | 191 | 203 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | |
| 56 | 2.13/64" | 188 | 199 | | | | | | | 0.15-0.28 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | | | | | | |
| 57 | 2.1/4" | 184 | 196 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | |
| 58 | 2.9/32" | 181 | 192 | 0.15-0.28 | 0.05-0.09 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Entfernen der Späne nicht notwendig | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen | Not necessary to remove chips | Nach 15 mm Bohr- tiefe, stoppen und Späne entfernen |
| 59 | 2.21/64" | 178 | 189 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60 | 2.23/64" | 175 | 186 | | | | | | | Stop to remove chips when reaching 13 mm deep | Stop to remove chips when reaching 15 mm deep | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

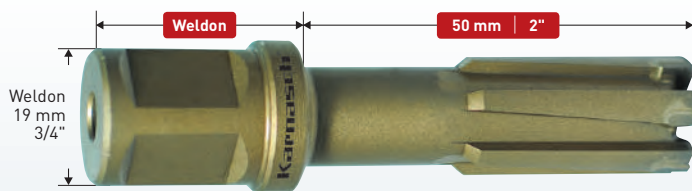
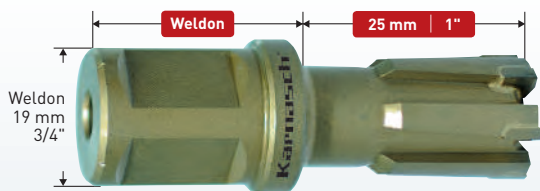
Erklärung:

Die Späne windet sich um den Kernbohrer. Der Anwender folgt obige Empfehlung „Entfernen der Späne“. Die Magnet-Kernbohrmaschine ist hierfür auszuschalten. Die Späne um den Kernbohrer sind zu entfernen. Danach die Kernbohrmaschine wieder einschalten und weiterbohren. Wird dies nicht beachtet blockieren die Späne den Spanfluss. Die Zähne bekommen Risse und verschleifen. Der Bohrer hat somit keine Standzeit.

Explanation:

The removed chips wind around the annular cutter. The operator must follow the above recommended parameter regarding chip removal. Operator should shut down the magnetic drilling machines and remove the chips around the annular cutter. Than re-start. Without removing chips will result block of chips and crack of teeth.





| Ø mm | Ø Zoll / Inch | Material / Material to be cut | Vorschub / Feed | | Kühlung / Cooling |
|------|---------------|-------------------------------|--|--|--|
| | | | Schienen / Rail | | |
| | | | Manueller Vorschub (mm/s) / Manual feed (mm/s) | Manueller Vorschub (mm/U) / Manual feed (mm/r) | |
| 14 | 35/64" | 864 | 0.6~1 | 0.06~0,08 | Nur ölhaltige Kühlmittel verwenden, wie z.B. Karnasch Mecutoil 100 pur oder rein Pflanzliche Öle > 60 ml/min (keine Öl-Wasser Gemische) Use only coolant such as Karnasch Mecutoil 100 pure or vegetable oil > 60 ml/min. No oil-water mixtures |
| 15 | 19/32" | 807 | | | |
| 16 | 5/8" | 756 | | | |
| 17 | 43/64" | 712 | | | |
| 18 | 45/64" | 672 | | | |
| 19 | 3/4" | 637 | | | |
| 20 | 25/32" | 605 | 0.5~0.95 | 0.08~0.1 | |
| 21 | 53/64" | 576 | | | |
| 22 | 55/64" | 550 | | | |
| 23 | 29/32" | 526 | | | |
| 24 | 15/16" | 504 | | | |
| 25 | 63/64" | 484 | | | |
| 26 | 1.1/32" | 465 | | | |
| 27 | 1.1/16" | 448 | | | |
| 28 | 1.7/64" | 432 | | | |
| 29 | 1.9/64" | 417 | | | |
| 30 | 1.3/16" | 403 | 0.4~0.65 | 0.08~0.1 | |
| 31 | 1.7/32" | 390 | | | |
| 32 | 1.17/64" | 378 | | | |
| 33 | 1.19/64" | 367 | | | |
| 34 | 1.11/32" | 356 | | | |
| 35 | 1.3/8" | 346 | | | |
| 36 | 1.27/64" | 336 | | | |
| 37 | 1.29/64" | 327 | | | |
| 38 | 1.1/2" | 318 | 0.3~0.6 | 0.08~0.12 | |
| 39 | 1.17/32" | 310 | | | |
| 40 | 1.37/64" | 303 | | | |
| 41 | 1.39/64" | 295 | | | |
| 42 | 1.21/32" | 288 | | | |
| 43 | 1.11/16" | 281 | | | |
| 44 | 1.47/64" | 275 | | | |
| 45 | 1.49/64" | 269 | | | |
| 46 | 1.13/16" | 263 | | | |
| 47 | 1.27/32" | 257 | | | |
| 48 | 1.57/64" | 252 | | | |
| 49 | 1.59/64" | 247 | | | |
| 50 | 1.31/32" | 242 | | | |
| 51 | 2.1/64" | 237 | | | |
| 52 | 2.3/64" | 233 | | | |
| 53 | 2.3/32" | 228 | | | |
| 54 | 2.1/8" | 224 | | | |
| 55 | 2.11/64" | 220 | | | |
| 56 | 2.13/64" | 216 | | | |
| 57 | 2.1/4" | 212 | | | |
| 58 | 2.9/32" | 209 | | | |
| 59 | 2.21/64" | 205 | | | |
| 60 | 2.23/64" | 202 | | | |

- 1
- 2
- 3
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- 5
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- 8
- 9



622

Schnittwerte für 20 1840
 Cutting parameter for 20 1840

| Werkstoff Material | mm | | | | | | | | | | | | | | |
|------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 2,5 | 3,4 | 4 | 4,3 | 5 | 6 | 6,8 | 7 | 8 | 8,5 | 9 | 10 | 10,3 | 11 | 12 |
| Stahl<500N Steel<500N | 3567 | 2623 | 2229 | 2074 | 1783 | 1486 | 1311 | 1274 | 1115 | 1049 | 991 | 892 | 866 | 811 | 743 |
| Stahl<750N Steel<750N | 2930 | 2154 | 1831 | 1703 | 1465 | 1221 | 1077 | 1046 | 916 | 862 | 814 | 732 | 711 | 666 | 610 |
| Stahl<900N Steel<900N | 1911 | 1405 | 1194 | 1111 | 955 | 796 | 703 | 682 | 597 | 562 | 531 | 478 | 464 | 434 | 398 |
| Stahl<1200N Steel<1200N | 1656 | 1218 | 1035 | 963 | 828 | 690 | 609 | 591 | 518 | 487 | 460 | 414 | 402 | 376 | 345 |
| Stahl<1400N Steel<1400N | 1274 | 937 | 796 | 741 | 637 | 531 | 468 | 455 | 398 | 375 | 354 | 318 | 309 | 290 | 265 |
| Edelstahl Stainless steel | 1911 | 1405 | 1194 | 1111 | 955 | 796 | 703 | 682 | 597 | 562 | 531 | 478 | 464 | 434 | 398 |
| Aluminium Aluminum | 5732 | 4215 | 3583 | 3333 | 2866 | 2389 | 2108 | 2047 | 1791 | 1686 | 1592 | 1433 | 1391 | 1303 | 1194 |
| Gusseisen Cast iron | 2930 | 2154 | 1831 | 1703 | 1465 | 1221 | 1077 | 1046 | 916 | 862 | 814 | 732 | 711 | 666 | 610 |
| Messing Brass | 3185 | 2342 | 1990 | 1852 | 1592 | 1327 | 1171 | 1137 | 995 | 937 | 885 | 796 | 773 | 724 | 663 |
| Kupfer Copper | 5096 | 3747 | 3185 | 2963 | 2548 | 2123 | 1873 | 1820 | 1592 | 1499 | 1415 | 1274 | 1237 | 1158 | 1062 |
| Schienenstahl Railtracks | 1656 | 1218 | 1035 | 963 | 828 | 690 | 609 | 591 | 518 | 487 | 460 | 414 | 402 | 376 | 345 |



DRILL-LINE

428-431

Schnittwerte für 20 1430 / 20 1465
 Cutting parameter for 20 1430 / 20 1465

| Material | | Schnittgeschwindigkeit Cutting speed V _c m/min | Vorschub / fz Feed / fz mm/u mm/rev |
|----------------|--------------------|---|---|
| Stahl | Steel | 500 N | 0,1-0,15 |
| Stahl | Steel | 750 N | 0,1-0,15 |
| Stahl | Steel | 900 N | 0,09-0,15 |
| Stahl | Steel | 1200 N | 0,09-0,15 |
| Stahl | Steel | 1400 N | 0,09-0,15 |
| Edelstahl | Stainless steel | 11-15 | 0,1-0,15 |
| Alu | Alu | 42-62 | 0,15-0,25 |
| Grauguss, Guss | Grey and cast iron | 22-42 | 0,15-0,25 |
| Kupfer | Copper | 32-52 | 0,15-0,2 |
| Messing | Brass | 32-52 | 0,15-0,2 |
| Schienenstahl | Rail tracks | 13-17 | 0,09-0,12 |
| Hardox 400 | Hardox 400 | 6 | 0,12 |

| Werkstoff Material | mm | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|------|------|------|------|------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|
| | 6 | 8 | 9,8 | 10,8 | 11 | 12 | 13 | 13,5 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 27,5 | 28 | 30 | 32 | 33 |
| Stahl<500N Steel<500N | 1327 | 995 | 812 | 737 | 724 | 663 | 612 | 590 | 569 | 531 | 498 | 468 | 442 | 419 | 398 | 379 | 362 | 346 | 332 | 318 | 306 | 295 | 290 | 284 | 265 | 249 | 241 |
| Stahl<750N Steel<750N | 1062 | 796 | 650 | 590 | 579 | 531 | 490 | 472 | 455 | 425 | 398 | 375 | 354 | 335 | 318 | 303 | 290 | 277 | 265 | 255 | 245 | 236 | 232 | 227 | 212 | 199 | 193 |
| Stahl<900N Steel<900N | 690 | 518 | 422 | 383 | 376 | 345 | 318 | 307 | 296 | 276 | 259 | 244 | 230 | 218 | 207 | 197 | 188 | 180 | 173 | 166 | 159 | 153 | 151 | 148 | 138 | 129 | 125 |
| Stahl<1200N Steel<1200N | 531 | 398 | 325 | 295 | 290 | 265 | 245 | 236 | 227 | 212 | 199 | 187 | 177 | 168 | 159 | 152 | 145 | 138 | 133 | 127 | 122 | 118 | 116 | 114 | 106 | 100 | 97 |
| Stahl<1400N Steel<1400N | 425 | 318 | 260 | 236 | 232 | 212 | 196 | 189 | 182 | 170 | 159 | 150 | 142 | 134 | 127 | 121 | 116 | 111 | 106 | 102 | 98 | 94 | 93 | 91 | 85 | 80 | 77 |
| Edelstahl Stainless steel | 637 | 478 | 390 | 354 | 347 | 318 | 294 | 283 | 273 | 255 | 239 | 225 | 212 | 201 | 191 | 182 | 174 | 166 | 159 | 153 | 147 | 142 | 139 | 136 | 127 | 119 | 116 |
| Aluminium Aluminum | 2389 | 1791 | 1462 | 1327 | 1303 | 1194 | 1102 | 1062 | 1024 | 955 | 896 | 843 | 796 | 754 | 717 | 682 | 651 | 623 | 597 | 573 | 551 | 531 | 521 | 512 | 478 | 448 | 434 |
| Gusseisen Cast iron | 955 | 717 | 585 | 531 | 521 | 478 | 441 | 425 | 409 | 382 | 358 | 337 | 318 | 302 | 287 | 273 | 261 | 249 | 239 | 229 | 220 | 212 | 208 | 205 | 191 | 179 | 174 |
| Messing Brass | 1327 | 995 | 812 | 737 | 724 | 663 | 612 | 590 | 569 | 531 | 498 | 468 | 442 | 419 | 398 | 379 | 362 | 346 | 332 | 318 | 306 | 295 | 290 | 284 | 265 | 249 | 241 |
| Kupfer Copper | 2123 | 1592 | 1300 | 1180 | 1158 | 1062 | 980 | 944 | 910 | 849 | 796 | 749 | 708 | 670 | 637 | 607 | 579 | 554 | 531 | 510 | 490 | 472 | 463 | 455 | 425 | 398 | 386 |
| Schienenstahl Railtracks | 690 | 518 | 422 | 383 | 376 | 345 | 318 | 307 | 296 | 276 | 259 | 244 | 230 | 218 | 207 | 197 | 188 | 180 | 173 | 166 | 159 | 153 | 151 | 148 | 138 | 129 | 125 |
| Hardox 400 Hardox 400 | 318 | 239 | 195 | 177 | 174 | 159 | 147 | 141 | 136 | 127 | 119 | 112 | 106 | 101 | 95 | 91 | 87 | 83 | 80 | 76 | 73 | 71 | 69 | 68 | 64 | 60 | - |

Kühlung beim Bearbeiten von Hardox siehe Seite 1214 / Cooling advice while machining Hardox see page 1214

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Index

ANWENDUNGSRICHTLINIEN

- Wählen Sie immer den möglichst kürzesten Halter.
- Beachten Sie, dass der Halter sicher gespannt ist und der Rundlauffehler 0,02 bis 0,07 mm nicht übersteigt.
- Der Außendurchmesser des Einsatzes muss mindestens 0,3 mm größer sein als der Halterdurchmesser.
- Empfohlenes Grundmaterial für Einsätze: Siehe Seite 1304
- Empfohlene Schnittgeschwindigkeit / Vorschub: Siehe Seite 1305
- Minimaler Kühlmittelbedarf: Siehe Seite 1307
- Benötigte Antriebsleistung, Vorschubkraft: Bitte fragen Sie uns bei Bedarf an.

Die angegebenen Schnittwerte gelten als **Richtwerte** für den allgemeinen Anwendungsfall. Maschinen- und Werkstückstabilität werden nicht berücksichtigt.

Die besten Ergebnisse erzielen Sie unter folgenden Voraussetzungen:

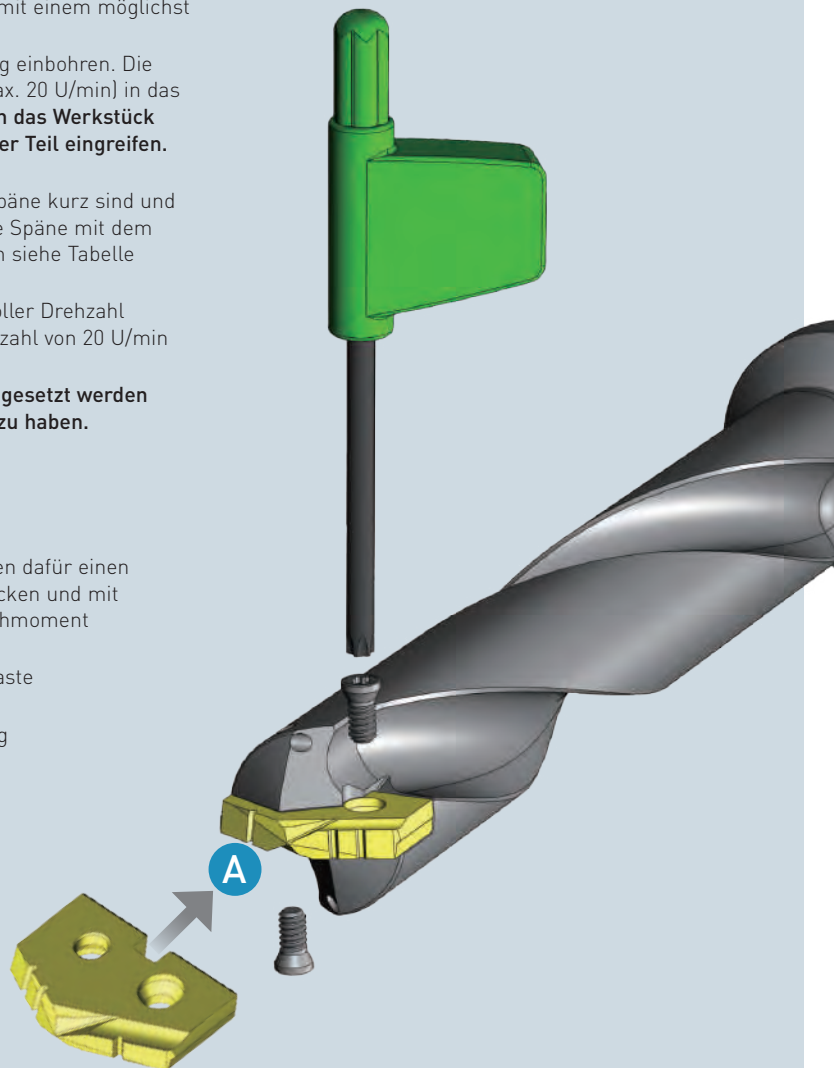
- Zuerst eine Pilotbohrung 1× Durchmesser tief bohren
- Späne sollten kurz und keine Verfärbungen aufweisen – keinesfalls strohfarben oder blau (falls doch siehe Tabelle „Problemlöser“ Seite 1308-1309)
- Bohrung messen. Falls Bohrungstoleranz in Ordnung kann weitergebohrt werden. Falls nicht siehe Tabelle „Problemlöser“ Seite 1308-1309
- Der Bohrungsprozess sollte ruhig und ohne Spänestau sein. Falls es zum Spänestau kommt den Bohrprozess anhalten und Tabelle „Problemlöser“ Seite 1308-1309 beachten.

Die besten Ergebnisse bei extrem langen Haltern 12×D, 15×D erhalten Sie unter folgenden Voraussetzungen:

- Zuerst eine Pilotbohrung mit dem benötigten Durchmesser, aber mit einem möglichst kurzen Halter mit Bohrtiefe 2-3× Durchmesser fertigen.
- Mit den extrem langen Haltern 12×D oder 15×D in die Pilotbohrung einbohren. Die Spindel soll entweder still stehen oder mit niedriger Drehzahl (max. 20 U/min) in das vorhandene Bohrloch eintauchen. **Niemals hochtourig drehend an das Werkstück ansetzen oder fortfahren ohne das Sie völlig in den Werkstoff oder Teil eingreifen. Es besteht Bruch- und Verletzungsgefahr.**
- Schnittdaten gemäß Tabellen erhöhen. Kontrollieren Sie, ob die Späne kurz sind und keine Verfärbungen aufweisen. Zu beachten ist weiterhin, dass die Späne mit dem Kühlmittel entlang der Bohrung abgeführt werden. Bei Problemen siehe Tabelle „Problemlöser“ Seite 1308-1309
- Am Ende des Bohrzyklus den Halter aus der Bohrung nicht mit voller Drehzahl ausfahren, sondern im Stillstand oder mit maximaler Spindeldrehzahl von 20 U/min hinausfahren.
- **Hartmetall-Einsätze sollten auf Haltern 12×D und 15×D nicht eingesetzt werden ohne vorher Karnasch über die Einsatzbedingungen konsultiert zu haben.**

Einsätze auf Halter montieren

- Die Einsätze haben eine Positionierungs-Nut (A). Die Halter haben dafür einen vorgesehenen Positionierungs-Stift. Beides bündig zusammenstecken und mit den mitgelieferten TORX Schrauben festziehen. Werte für das Drehmoment der Schrauben siehe Seite 309
- Bei Bedarf kann auf die TORX Schrauben eine Korrosionsschutzpaste aufgetragen werden z.B. NEVER SEEZ
- Der Plattensitz soll sauber, frei von Späne und ohne Beschädigung sein.



GUIDLINE FOR USE

- Take the shortest holder possible for the application.
- Be sure that the holder is held securely and is within 0,02 up to 0,07 mm of centerline.
- Ensure that the insert outer diameter is a minimum 0,3 mm larger than the holder body diameter.
- Recommended base material of inserts: see page 1304
- Recommended cutting speed and feed: see page 1305
- Minimum coolant requirements: see page 1307
- Machine power / thrust requirements: please ask us if required.

The mentioned cutting parameters are only **guidelines** and make no allowance for machine or component rigidity.

Follow below drilling process for best results:

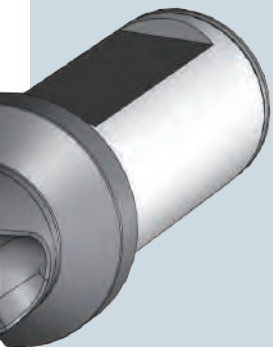
- Drill a short hole 1×diameter deep initially.
- The chips should be short in length, self colored, not bright or blue. (If not self colored see table "PROBLEM SOLVER" page 1310-1311)
- Measure the hole produced. If the hole is within the desired tolerance go on with the drilling process. If not see table "PROBLEM SOLVER" page 1310-1311
- Take care that the drilling process is quiet and smooth with no chip packing. If chip packing happens stop drilling process and see table "PROBLEM SOLVER" page 1310-1311

Follow below drilling process if using extended length holder 12×D, 15×D for best results:

- Drill a pilot hole using the same diameter drill insert in a **short** holder to a depth of 2-3 times the diameter deep.
- Enter the pilot hole with the 12×D or 15×D holder without spindle speed at all or at low rpm (10-20). **Never start or continue rotating of a 12×D, 15×D holder without proper engagement within a work piece or fixture. Disregarding could result in tool failure and/or body injury.**
- Increase speed and feed to recommended data in table. The chips should be short in length, self colored, not bright or blue. Furthermore take care that chips are being evacuated by coolant throughout the length of the hole. If problems occur please see table "PROBLEM SOLVER" page 1310-1311 or contact Karnasch.
- At the end of the drilling cycle do not remove the holder from the hole whilst at full rpm. Stop the spindle or reduce to low rpm. (10-20)
- **Carbide inserts should not be used in 12×D, 15×D holders without previous advice from Karnasch.**

Insert-installation on holders

- The insert should be installed in the slot of the holder. The insert has a location groove (A) which fits perfectly into the location-pin of the holder and is fixed with an included TORX screw.
- Use only the provided TORX Screws which should be tightened to the values listed on page 309
- When required place corrosion protection paste onto the TORX Screws for example NEVER SEEZ
- The holder slot should be clean and free from dirt or debris.



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| Material | Härte / Hardness | | | fz Vorschub mm pro Umdrehung / fz feed mm per revolution | | | | | | |
|---|------------------|---------|------------------|--|--------------|-------------|-------------|-----------|-------------|------------|
| | BHN | KG | Nmm ² | Ø 9,5-13,00 | Ø 13,5-17,50 | Ø 18,0-24,0 | Ø 25,0-35,0 | Ø 35,5-48 | Ø 48,5-65,0 | Ø 66,0-114 |
| Automatenstähle / Free Machining Steel 1118, 1215, 12L14 etc. | 100-150 | 38-50 | 370-500 | 0,15 | 0,21 | 0,28 | 0,35 | 0,43 | 0,49 | 0,60 |
| | 150-200 | 50-70 | 500-700 | 0,15 | 0,21 | 0,28 | 0,35 | 0,43 | 0,49 | 0,60 |
| | 200-250 | 70-88 | 700-870 | 0,13 | 0,21 | 0,28 | 0,35 | 0,43 | 0,49 | 0,60 |
| Stähle mit niedrigem Kohlenstoffgehalt / Low Carbon Steel 1010, 1020, 1025, 1522, 1144, etc. | 85-125 | 30-46 | 300-450 | 0,13 | 0,20 | 0,26 | 0,32 | 0,41 | 0,49 | 0,59 |
| | 125-175 | 46-62 | 450-600 | 0,13 | 0,20 | 0,26 | 0,32 | 0,41 | 0,49 | 0,59 |
| | 175-225 | 62-77 | 600-775 | 0,11 | 0,17 | 0,21 | 0,31 | 0,39 | 0,45 | 0,52 |
| | 225-275 | 77-96 | 775-940 | 0,11 | 0,17 | 0,21 | 0,31 | 0,39 | 0,45 | 0,52 |
| Stähle mit mittlerem Kohlenstoffgehalt / Medium Carbon Steel 1030, 1040, 1050, 1527, 1140, 1151 etc. | 125-175 | 46-62 | 450-600 | 0,13 | 0,20 | 0,26 | 0,32 | 0,41 | 0,49 | 0,59 |
| | 175-225 | 62-77 | 600-775 | 0,11 | 0,17 | 0,21 | 0,31 | 0,39 | 0,45 | 0,52 |
| | 225-275 | 77-96 | 775-940 | 0,11 | 0,17 | 0,21 | 0,31 | 0,39 | 0,45 | 0,52 |
| | 275-325 | 96-111 | 940-1090 | 0,09 | 0,15 | 0,20 | 0,26 | 0,35 | 0,41 | 0,48 |
| Legierte Stähle / Alloy Steel 4140, 5140, 8640, etc. | 125-175 | 46-62 | 450-600 | 0,13 | 0,17 | 0,21 | 0,31 | 0,37 | 0,41 | 0,48 |
| | 175-225 | 62-77 | 600-775 | 0,11 | 0,17 | 0,21 | 0,31 | 0,37 | 0,41 | 0,48 |
| | 225-275 | 77-96 | 775-940 | 0,11 | 0,15 | 0,21 | 0,31 | 0,37 | 0,41 | 0,48 |
| | 275-325 | 96-111 | 940-1090 | 0,09 | 0,13 | 0,20 | 0,26 | 0,32 | 0,37 | 0,43 |
| | 325-375 | 111-129 | 1090-1265 | 0,07 | 0,13 | 0,20 | 0,26 | 0,32 | 0,37 | 0,43 |
| Hochfeste Stähle / High Strength Alloy 4340, 4330V, 300M etc. | 225-300 | 77-104 | 600-1020 | 0,11 | 0,15 | 0,20 | 0,21 | 0,31 | 0,37 | 0,43 |
| | 300-350 | 104-121 | 1020-1180 | 0,09 | 0,15 | 0,20 | 0,21 | 0,31 | 0,37 | 0,43 |
| | 350-400 | 121-139 | 1180-1365 | 0,07 | 0,13 | 0,17 | 0,20 | 0,26 | 0,32 | 0,39 |
| Baustähle / Structural Steel A36, A285, A516, etc. | 100-150 | 38-50 | 370-500 | 0,13 | 0,21 | 0,26 | 0,31 | 0,39 | 0,45 | 0,56 |
| | 150-250 | 50-88 | 500-850 | 0,11 | 0,20 | 0,21 | 0,26 | 0,35 | 0,41 | 0,52 |
| | 250-350 | 88-121 | 850-1180 | 0,09 | 0,17 | 0,20 | 0,21 | 0,31 | 0,37 | 0,43 |
| Werkzeugstähle / Tool Steel H-13, H-21, A-4, 0-2, S-3, etc. | 150-200 | 50-70 | 500-700 | 0,09 | 0,13 | 0,17 | 0,21 | 0,26 | 0,32 | 0,37 |
| | 200-250 | 70-88 | 700-870 | 0,09 | 0,13 | 0,17 | 0,21 | 0,26 | 0,32 | 0,37 |
| Warmfeste Legierungen / High Temp. Alloy Hastelloy B, Inconel 600, etc. | 140-220 | 49-77 | 480-755 | 0,07 | 0,15 | 0,17 | 0,21 | 0,26 | 0,32 | - |
| | 223-310 | 77-101 | 755-990 | 0,07 | 0,13 | 0,15 | 0,17 | 0,21 | 0,26 | - |
| Titanlegierungen / Titanium Alloy | 140-220 | 49-77 | 480-755 | 0,07 | 0,15 | 0,17 | 0,21 | 0,26 | 0,32 | - |
| | 220-310 | 77-101 | 755-990 | 0,07 | 0,13 | 0,15 | 0,17 | 0,21 | 0,26 | - |
| Flugzeuglegierungen / Aerospace Alloy | 185-275 | 65-96 | 640-940 | 0,13 | 0,17 | 0,20 | 0,21 | 0,31 | 0,35 | 0,43 |
| | 275-350 | 96-121 | 940-1180 | 0,11 | 0,15 | 0,17 | 0,17 | 0,26 | 0,31 | 0,39 |
| Martensitstahl / Edelstahl 1.4016 (400er Serie 416, 420 etc.) Stainless Steel 400 Series 416, 420, etc. | 185-275 | 65-96 | 640-940 | 0,13 | 0,17 | 0,20 | 0,21 | 0,31 | 0,35 | 0,43 |
| | 275-350 | 96-121 | 940-1180 | 0,11 | 0,15 | 0,17 | 0,17 | 0,26 | 0,31 | 0,39 |
| Austenitstahl / Edelstahl 1.4301 (300er Serie 304, 316 etc.) Stainless Steel 300 Series 304,316, etc. | 135-185 | 49-65 | 480-640 | 0,07 | 0,15 | 0,17 | 0,21 | 0,31 | 0,35 | 0,43 |
| | 185-275 | 65-96 | 640-940 | 0,07 | 0,13 | 0,15 | 0,17 | 0,26 | 0,31 | 0,39 |
| Super Duplex Edelstahl / Super Duplex Stainless Steel | 135-185 | 49-65 | 480-640 | 0,07 | 0,15 | 0,17 | 0,21 | 0,31 | 0,35 | 0,43 |
| | 185-275 | 65-96 | 640-940 | 0,07 | 0,13 | 0,15 | 0,17 | 0,26 | 0,31 | 0,39 |
| Hardox / Wear Plate Hardox, AR400, T-1, etc. | 400 | 139 | 1365 | 0,07 | 0,13 | 0,17 | 0,20 | 0,26 | 0,35 | 0,39 |
| | 500 | 160 | 1600 | 0,04 | 0,11 | 0,15 | 0,17 | 0,21 | 0,26 | 0,35 |
| | 600 | 210 | 2000 | - | - | - | - | - | - | - |
| Gehärtete Stähle / Hardened Steel | 300-400 | 104-139 | 1020-1365 | 0,07 | 0,13 | 0,17 | 0,20 | 0,26 | 0,35 | 0,39 |
| | 400-500 | 139+ | 1365+ | 0,04 | 0,11 | 0,15 | 0,17 | 0,21 | 0,26 | 0,35 |
| GG/GGG/ Gusseisen SG- Grau- und Weißguss / Nodular, Grey, Ductil Cast Iron | 120-150 | 44-50 | 430-500 | 0,15 | 0,26 | 0,35 | 0,43 | 0,52 | 0,59 | 0,65 |
| | 150-200 | 50-70 | 500-700 | 0,13 | 0,24 | 0,31 | 0,39 | 0,48 | 0,54 | 0,60 |
| | 200-220 | 70-77 | 700-755 | 0,13 | 0,20 | 0,26 | 0,35 | 0,39 | 0,45 | 0,52 |
| | 220-260 | 77-90 | 755-890 | 0,11 | 0,15 | 0,20 | 0,26 | 0,31 | 0,37 | 0,43 |
| | 260-320 | 90-104 | 890-1020 | 0,09 | 0,13 | 0,15 | 0,20 | 0,26 | 0,31 | 0,35 |
| Aluminiumguss / Cast Aluminum | 30 | 10 | 100 | 0,17 | 0,28 | 0,35 | 0,43 | 0,48 | 0,54 | 0,54 |
| | 180 | 62 | 600 | 0,17 | 0,28 | 0,35 | 0,39 | 0,48 | 0,54 | 0,54 |
| Geschmiedetes Aluminium / Wrought Aluminum | 30 | 10 | 100 | 0,09 | 0,13 | 0,21 | 0,26 | 0,48 | 0,54 | 0,54 |
| | 180 | 62 | 600 | 0,17 | 0,28 | 0,35 | 0,39 | 0,48 | 0,54 | 0,54 |
| Aluminiumbronze / Aluminum Bronze | 100-200 | 38-68 | 370-670 | 0,13 | 0,24 | 0,31 | 0,39 | 0,48 | 0,56 | 0,60 |
| | 200-250 | 68-87 | 670-855 | 0,11 | 0,15 | 0,20 | 0,26 | 0,31 | 0,37 | 0,43 |
| Messing / Brass | 100 | 38 | 370 | 0,15 | 0,26 | 0,35 | 0,43 | 0,52 | 0,60 | 0,65 |
| Kupfer / Copper | 60 | 21 | 200 | 0,04 | 0,07 | 0,13 | 0,17 | 0,26 | 0,31 | 0,35 |
| GFK, CFK, Graphit / fibreglass, carbon fibre, graphite | - | - | - | 0,15 | 0,21 | 0,28 | 0,35 | 0,43 | 0,49 | 0,60 |
| | - | - | - | 0,15 | 0,21 | 0,28 | 0,35 | 0,43 | 0,49 | 0,60 |

Berechnung von Drehzahl (n) in Umdrehung pro Minute sowie Vorschubgeschwindigkeit (VF) in mm/min siehe Seite 1306

Achtung: Bei Haltern 8xD, 10xD, 12xD, 15xD

Beachten Sie hier bitte den Schnittdatenmultiplikator mit Berechnungsbeispiel auf Seite 1306

Schnittgeschwindigkeit Vc m/min / Cutting speed Vc m/min

| PULVERSTAHL · POWDER STEEL | | | | HARTMETALL · CARBIDE | | | |
|--|---|---|--|--|---|---|---|
| 22 2010 | 22 2510 | 22 3010 | 22 3510 | 22 4010 | 22 4510 | 22 5010 | 22 5510 |
| Pulverstahl 25 STEEL-TEC beschichtet Für Edelstahl, Stahl, Guss | Pulverstahl 15 STEEL-TEC beschichtet Für legierte Stähle, Edelstahl, Stahl, Guss | Pulverstahl 25 ALU-TEC beschichtet Für Alu, Messing, Kupfer | Pulverstahl 15 ALU-TEC beschichtet Für Alu, Messing, Kupfer | Hartmetall 20/30 STEEL-TEC beschichtet Für Edelstahl, hochfester Stahl, gehärteter Stahl | Hartmetall 20/30 STEEL-TEC beschichtet Für alle Gussarten | Hartmetall 20/30 ALU-TEC beschichtet Für Alu, Messing, Kupfer | Hartmetall 20/30 DJA-TEC beschichtet Für abrasive Materialien wie: GFK, CFK, Graphit |
| Powder steel 25 STEEL-TEC coated For stainless steel, steel, cast iron | Powder steel 15 STEEL-TEC coated For alloy steel, stainless steel, steel, cast iron | Powder steel 25 ALU-TEC coated For alu, brass, copper | Powder steel 15 ALU-TEC coated For alloy steel, steel, cast iron | Carbide 20/30 STEEL-TEC coated For stainless steel, high strength alloys, hardened steel | Carbide 20/30 STEEL-TEC coated For all kinds of cast iron | Carbide 20/30 ALU-TEC coated For alu, brass, copper | Carbide 20/30 DJA-TEC coated For abrasive materials such as: fiberglass, carbon fiber, graphite |
| 79 | 79 | 68 | 68 | 105 | - | 92 | - |
| 73 | 73 | 63 | 63 | 91 | - | 79 | - |
| 68 | 68 | 58 | 58 | 85 | - | 75 | - |
| 70 | 70 | 61 | 61 | 99 | - | 86 | - |
| 66 | 66 | 58 | 58 | 85 | - | 75 | - |
| 63 | 63 | 55 | 55 | 77 | - | 68 | - |
| 58 | 58 | 51 | 51 | 68 | - | 59 | - |
| 66 | 66 | 58 | 58 | 85 | - | 75 | - |
| 63 | 63 | 55 | 55 | 77 | - | 68 | - |
| 58 | 58 | 51 | 51 | 68 | - | 59 | - |
| 54 | 54 | 47 | 47 | 58 | - | 50 | - |
| 58 | 58 | 51 | 51 | 83 | - | 71 | - |
| 54 | 54 | 47 | 47 | 76 | - | 67 | - |
| 51 | 51 | 44 | 44 | 68 | - | 59 | - |
| 47 | 47 | 42 | 42 | 63 | - | 55 | - |
| 43 | 43 | 38 | 38 | 56 | - | 49 | - |
| 30 | 30 | 27 | 27 | 50 | - | 44 | - |
| 24 | 24 | 21 | 21 | 45 | - | 40 | - |
| 19 | 19 | 17 | 17 | 41 | - | 35 | - |
| 57 | 57 | 49 | 49 | 77 | - | 68 | - |
| 46 | 46 | 42 | 42 | 62 | - | 59 | - |
| 38 | 38 | 34 | 34 | 58 | - | 50 | - |
| 30 | 30 | 27 | 27 | 56 | - | 49 | - |
| 26 | 26 | 22 | 22 | 42 | - | 38 | - |
| 10 | 10 | 10 | 10 | 27 | - | 23 | - |
| 10 | 10 | 9 | 9 | 21 | - | 19 | - |
| 13 | 13 | 12 | 12 | 31 | - | 27 | - |
| 12 | 12 | 11 | 11 | 23 | - | 23 | - |
| 28 | 28 | 26 | 26 | 52 | - | 46 | - |
| 25 | 25 | 22 | 22 | 41 | - | 35 | - |
| 28 | 28 | 26 | 26 | 52 | - | 46 | - |
| 25 | 25 | 22 | 22 | 41 | - | 35 | - |
| 28 | 28 | 26 | 26 | 52 | - | 46 | - |
| 25 | 25 | 22 | 22 | 41 | - | 35 | - |
| 21 | 21 | 19 | 19 | 27 | - | 23 | - |
| 18 | 18 | 16 | 16 | 22 | - | 18 | - |
| 17 | 17 | 17 | 17 | 32 | - | 25 | - |
| 11 | 11 | 11 | 11 | 27 | - | 19 | - |
| - | - | - | - | 22 | - | 16 | - |
| 23 | 23 | 23 | 23 | 34 | - | 31 | - |
| 11 | 11 | 11 | 11 | 27 | - | 18 | - |
| 67 | 67 | 61 | 61 | - | 110 | - | - |
| 63 | 63 | 55 | 55 | - | 105 | - | - |
| 54 | 54 | 47 | 47 | - | 95 | - | - |
| 46 | 46 | 40 | 40 | - | 81 | - | - |
| 38 | 38 | 33 | 33 | - | 74 | - | - |
| - | - | 207 | 207 | 216 | - | 331 | - |
| - | - | 110 | 110 | 162 | - | 221 | - |
| 224 | 224 | 207 | 207 | 307 | - | 331 | - |
| 160 | 160 | 110 | 110 | 216 | - | 221 | - |
| 66 | 66 | 61 | 61 | 79 | - | 79 | - |
| 52 | 52 | 46 | 46 | 65 | - | 68 | - |
| 115 | 115 | 109 | 109 | 144 | - | 132 | - |
| 46 | 46 | 40 | 40 | 94 | - | 86 | - |
| - | - | - | - | - | - | - | 144 |
| - | - | - | - | - | - | - | 144 |



Calculation of speed (n) in revolutions per minute [rpm.] and feed rate (vf) in mm/min see page 1306
 Attention: If using extra long holder on 8xD, 10xD, 12xD, 15xD
 Note here please the cutting-data-multiplier with calculation example on page 1306

d: Schneidkreis – Durchmesser (diameter)
n: Drehzahl (rpm)

$n = \text{Drehzahl (rpm)}$ $V_c * 318,31 / d \text{ (1/min)}$
 $V_f = \text{Vorschubgeschwindigkeit (feed rate)}$ $f_z * n \text{ (mm/min)}$

Die Schnittdaten gelten für Standard Halter. Wenn Sie die Schnittdaten für längere Halter verwenden, nutzen Sie bitte die folgende Umrechnungstabelle:

The cutting parameter is connected with the length of holder. For longer holder, when choosing the cutting data, you should times the ratio in the following table:

| Parameter | Werkzeuflänge / Holder length | | | | | | |
|-------------------------------|---------------------------------|-----|-----|-----|------|------|------|
| | 3xD | 4xD | 5xD | 8xD | 10xD | 12xD | 15xD |
| Geschwindigkeit [Speed] V_c | siehe Tabelle / see above chart | | | 0,9 | 0,85 | 0,80 | 0,75 |
| Vorschub [Feed] f_z | siehe Tabelle / see above chart | | | | 0,95 | 0,90 | 0,90 |

Beispiel: 12xD Halter $f_z: 0,15 \times 0,90 \text{ (lt. Multiplikator)} = 0,14 \text{ mm/U}$
Material: Automatenstahl (370 N/mm²) $V_c: 79 \times 0,80 \text{ (lt. Multiplikator)} = 63,2 \text{ m/min}$
d: 9,5 mm

Example: 12xD holder $f_z: 0,15 \times 0,90 \text{ (acc. multiplier)} = 0,14 \text{ mm/U}$
Material: free masch. steel (370 N/mm²) $V_c: 79 \times 0,80 \text{ (acc. multiplier)} = 63,2 \text{ m/min}$
d: 9,5 mm



DRILL-LINE

354

Schnittwerte für 20 1430 / 20 1465
Cutting parameter for 20 1430 / 20 1465

| Material | | Schnittgeschwindigkeit Cutting speed V_c m/min | Vorschub / fz Feed / fz mm/u mm/rev |
|----------------|--------------------|--|---|
| Stahl | Steel | 500 N | 0,1-0,15 |
| Stahl | Steel | 750 N | 0,1-0,15 |
| Stahl | Steel | 900 N | 0,09-0,15 |
| Stahl | Steel | 1200 N | 0,09-0,15 |
| Stahl | Steel | 1400 N | 0,09-0,15 |
| Edelstahl | Stainless steel | | 0,1-0,15 |
| Alu | Alu | | 0,15-0,25 |
| Grauguss, Guss | Grey and cast iron | | 0,15-0,25 |
| Kupfer | Copper | | 0,15-0,2 |
| Messing | Brass | | 0,15-0,2 |
| Schienenstahl | Rail tracks | | 0,09-0,12 |
| Hardox 400 | Hardox 400 | 6 | 0,12 |

| Material | Härte / Hardness | | | Kühlmitteldruck (bar) / coolant pressure (bar) | | | | | | | | | | | | | | | | | | | | | |
|--|------------------|---------|------------------|---|--------------|-------------|-------------|-----------|-------------|------------|--------------------------------------|--------------|-------------|-------------|-----|------|------|------|------|-----|-----|------|------|------|------|
| | | | | Kühlmittelmenge (l/min) / coolant flow rate (l/min) | | | | | | | | | | | | | | | | | | | | | |
| | BHN | KG | Nmm ² | Pulverstahleinsätze / powder steel inserts | | | | | | | Hartmetalleinsätze / carbide inserts | | | | | | | | | | | | | | |
| | | | | Ø 9,5-13,00 | Ø 13,5-17,50 | Ø 18,0-24,0 | Ø 25,0-35,0 | Ø 35,5-48 | Ø 48,5-65,0 | Ø 66,0-114 | Ø 9,5-13,00 | Ø 13,5-17,50 | Ø 18,0-24,0 | Ø 25,0-35,0 | | | | | | | | | | | |
| Automatenstähle / Free Machining Steel 1118, 1215, 12L14 etc. | 100-250 | 38-88 | 370-870 | 12,8 | 8,3 | 9,6 | 7,9 | 6,9 | 3,5 | 6,2 | 20 | 16,5 | 16,5 | 15,2 | 9,6 | 11,4 | 19,7 | 30,3 | 53 | 125 | 167 | 12,2 | 16,3 | 25,2 | 41,5 |
| | | | | 11,8 | 6,2 | 6,6 | 5,5 | 5,2 | 2,8 | 4,5 | 17,5 | 11 | 11 | 11,8 | 9,5 | 9,8 | 15,9 | 26,5 | 45,4 | 114 | 144 | 11,4 | 13,3 | 20,6 | 36,5 |
| Stähle mit niedrigem Kohlenstoffgehalt / Low Carbon Steel 1010, 1020, 1025, 1522, 1144, etc. | 85-275 | 30-96 | 300-940 | 11,4 | 5,9 | 6,2 | 5,2 | 4,8 | 2,8 | 4,5 | 17,2 | 9,7 | 10,4 | 10,4 | 9,1 | 9,8 | 15,5 | 22,7 | 45,4 | 114 | 144 | 11,3 | 12,5 | 20 | 33,8 |
| | | | | 10,7 | 4,2 | 3,5 | 2 | 2 | 1,7 | 2 | 14,5 | 5,2 | 4,1 | 3,1 | 9,1 | 8,3 | 11,7 | 19 | 30 | 87 | 98 | 10,4 | 9,1 | 12,6 | 18,8 |
| Stähle mit mittlerem Kohlenstoffgehalt / Medium Carbon Steel 1030, 1040, 1050, 1527, 1140, 1151 etc. | 125-325 | 46-111 | 450-1090 | 11,4 | 5,2 | 5,5 | 4,8 | 4,2 | 2,4 | 3,5 | 16,5 | 9,3 | 9,7 | 7,9 | 9,1 | 9,1 | 14,8 | 22,7 | 41,6 | 106 | 125 | 11,1 | 12,3 | 19,3 | 30 |
| | | | | 11,4 | 5,9 | 5,5 | 3,8 | 3,5 | 2 | 3,5 | 15,8 | 9 | 7,9 | 6,9 | 9,1 | 9,8 | 14,8 | 23 | 38 | 98 | 125 | 10,8 | 12 | 17,5 | 27,8 |
| Legierte Stähle / Alloy Steel 4140, 5140, 8640, etc. | 125-375 | 46-129 | 450-1265 | 10,7 | 4,2 | 3,5 | 2 | 2 | 1,7 | 2 | 14,5 | 5,2 | 4,1 | 3,1 | 9,1 | 8,3 | 11,7 | 19 | 30 | 87 | 98 | 10,4 | 9,1 | 12,6 | 18,8 |
| | | | | 11,4 | 5,9 | 5,5 | 3,8 | 3,5 | 2 | 3,5 | 15,8 | 9 | 7,9 | 6,9 | 9,1 | 9,8 | 14,8 | 23 | 38 | 98 | 125 | 10,8 | 12 | 17,5 | 27,8 |
| Hochfeste Stähle / High Strength Alloy 4340, 4330V, 300M etc. | 225-400 | 77-139 | 600-1365 | 10,7 | 4,2 | 3,5 | 2 | 2 | 1,7 | 2 | 14,5 | 5,2 | 4,1 | 3,1 | 9,1 | 8,3 | 11,7 | 19 | 30 | 87 | 98 | 10,4 | 9,1 | 12,6 | 18,8 |
| | | | | 11,4 | 5,9 | 5,5 | 3,8 | 3,5 | 2 | 3,5 | 15,8 | 9 | 7,9 | 6,9 | 9,1 | 9,8 | 14,8 | 23 | 38 | 98 | 125 | 10,8 | 12 | 17,5 | 27,8 |
| Baustähle / Structural Steel A36, A285, A516, etc | 100-350 | 38-121 | 370-1180 | 10,7 | 4,2 | 3,5 | 2 | 2 | 1,7 | 2 | 14,5 | 5,2 | 4,8 | 3,4 | 9,1 | 8,3 | 11,7 | 19 | 30 | 87 | 98 | 10,4 | 9,1 | 13,6 | 19,7 |
| | | | | 10,7 | 4,2 | 3,5 | 2 | 2 | 1,7 | 2 | 14,5 | 5,2 | 4,8 | 3,4 | 9,1 | 8,3 | 11,7 | 19 | 30 | 87 | 98 | 10,4 | 9,1 | 13,6 | 19,7 |
| Werkzeugstähle / Tool Steel H-13, H-21, A-4, O-2, S-3, etc. | 150-250 | 50-88 | 500-870 | 10,7 | 4,2 | 3,5 | 2 | 2 | 1,7 | 2 | 14,5 | 5,2 | 4,8 | 3,4 | 9,1 | 8,3 | 11,7 | 19 | 30 | 87 | 98 | 10,4 | 9,1 | 13,6 | 19,7 |
| | | | | 10,7 | 4,2 | 3,5 | 2 | 2 | 1,7 | 2 | 14,5 | 5,2 | 4,8 | 3,4 | 9,1 | 8,3 | 11,7 | 19 | 30 | 87 | 98 | 10,4 | 9,1 | 13,6 | 19,7 |
| Warmfeste Legierungen / High Temp. Alloy Hastelloy B, Inconel 600, etc. | 140-310 | 49-101 | 480-990 | 10,7 | 4,5 | 3,8 | 2,4 | 2 | 2 | 3,1 | 16,5 | 11,4 | 12,4 | 11 | 9,1 | 8,7 | 12,1 | 18,9 | 30 | 98 | 125 | 11,1 | 13,5 | 21,9 | 35,4 |
| | | | | 10,7 | 4,5 | 3,8 | 2,4 | 2 | 2 | 3,1 | 16,5 | 11,4 | 12,4 | 11 | 9,1 | 8,7 | 12,1 | 18,9 | 30 | 98 | 125 | 11,1 | 13,5 | 21,9 | 35,4 |
| Titanlegierungen / Titanium Alloy | 140-310 | 49-101 | 480-990 | 10,7 | 4,5 | 3,8 | 2,4 | 2 | 2 | 3,1 | 16,5 | 11,4 | 12,4 | 11 | 9,1 | 8,7 | 12,1 | 18,9 | 30 | 98 | 125 | 11,1 | 13,5 | 21,9 | 35,4 |
| | | | | 10,7 | 4,5 | 3,8 | 2,4 | 2 | 2 | 3,1 | 16,5 | 11,4 | 12,4 | 11 | 9,1 | 8,7 | 12,1 | 18,9 | 30 | 98 | 125 | 11,1 | 13,5 | 21,9 | 35,4 |
| Martensitstahl / Edelstahl 1.4016 (400er Serie 416, 420 etc.) Stainless Steel 400 Series 416, 420, etc. | 185-350 | 65-121 | 640-1180 | 11,8 | 5,9 | 5,2 | 3,8 | 3,5 | 2 | 3,1 | 22,7 | 16,5 | 17,9 | 17,2 | 9,5 | 9,8 | 14 | 23 | 38 | 98 | 117 | 13 | 16,3 | 26,3 | 44,2 |
| | | | | 11,8 | 5,9 | 5,2 | 3,8 | 3,5 | 2 | 3,1 | 22,7 | 16,5 | 17,9 | 17,2 | 9,5 | 9,8 | 14 | 23 | 38 | 98 | 117 | 13 | 16,3 | 26,3 | 44,2 |
| Austenitstahl / Edelstahl 1.4301 (300er Serie 304, 316 etc.) Stainless Steel 300 Series 304,316, etc. | 135-275 | 49-96 | 480-940 | 11,8 | 5,9 | 5,2 | 3,8 | 3,5 | 2 | 3,1 | 22,7 | 16,5 | 17,9 | 17,2 | 9,5 | 9,8 | 14 | 23 | 38 | 98 | 117 | 13 | 16,3 | 26,3 | 44,2 |
| | | | | 11,8 | 5,9 | 5,2 | 3,8 | 3,5 | 2 | 3,1 | 22,7 | 16,5 | 17,9 | 17,2 | 9,5 | 9,8 | 14 | 23 | 38 | 98 | 117 | 13 | 16,3 | 26,3 | 44,2 |
| Super Duplex Edelstahl / Super Duplex Stainless Steel | 135-275 | 49-96 | 480-940 | 11,8 | 5,9 | 5,2 | 3,8 | 3,5 | 2 | 3,1 | 22,7 | 16,5 | 17,9 | 17,2 | 9,5 | 9,8 | 14 | 23 | 38 | 98 | 117 | 13 | 16,3 | 26,3 | 44,2 |
| | | | | 11,8 | 5,9 | 5,2 | 3,8 | 3,5 | 2 | 3,1 | 22,7 | 16,5 | 17,9 | 17,2 | 9,5 | 9,8 | 14 | 23 | 38 | 98 | 117 | 13 | 16,3 | 26,3 | 44,2 |
| Gehärtete Stähle / Hardened Steel | 300-500 | 104-139 | 1020-1365 | 10,7 | 4,2 | 3,5 | 2 | 2 | 1,7 | 2 | 14,5 | 5,2 | 4,8 | 3,4 | 9,1 | 8,3 | 11,7 | 19 | 30 | 87 | 98 | 10,4 | 9,1 | 13,6 | 19,7 |
| | | | | 10,7 | 4,2 | 3,5 | 2 | 2 | 1,7 | 2 | 14,5 | 5,2 | 4,8 | 3,4 | 9,1 | 8,3 | 11,7 | 19 | 30 | 87 | 98 | 10,4 | 9,1 | 13,6 | 19,7 |
| GG/GGG / Gusseisen SG- Grau- und Weißguss Nodular, Grey, Ductil Cast Iron | 120-320 | 44-104 | 430-1020 | 11 | 4,5 | 4,2 | 2,8 | 2,4 | 2 | 2,4 | 15,5 | 7,2 | 6,2 | 6,2 | 9,1 | 8,7 | 12,5 | 19 | 34 | 98 | 106 | 10,7 | 10,8 | 15,4 | 26,5 |
| | | | | 11 | 4,5 | 4,2 | 2,8 | 2,4 | 2 | 2,4 | 15,5 | 7,2 | 6,2 | 6,2 | 9,1 | 8,7 | 12,5 | 19 | 34 | 98 | 106 | 10,7 | 10,8 | 15,4 | 26,5 |
| Aluminiumguss / Cast Aluminum | 30-180 | 10-62 | 100-600 | 14,5 | 12,4 | 15,8 | 11 | 8,6 | 3,5 | 5,5 | 24,1 | 22 | 21,7 | 19,6 | 10 | 14 | 23 | 34 | 61 | 125 | 159 | 13,4 | 18,8 | 29 | 47,2 |
| | | | | 14,5 | 12,4 | 15,8 | 11 | 8,6 | 3,5 | 5,5 | 24,1 | 22 | 21,7 | 19,6 | 10 | 14 | 23 | 34 | 61 | 125 | 159 | 13,4 | 18,8 | 29 | 47,2 |
| Geschmiedetes Aluminium / Wrought Aluminum | 30-180 | 10-62 | 100-600 | 14,5 | 12,4 | 15,8 | 11 | 8,6 | 3,5 | 5,5 | 24,1 | 22 | 21,7 | 19,6 | 10 | 14 | 23 | 34 | 61 | 125 | 159 | 13,4 | 18,8 | 29 | 47,2 |
| | | | | 14,5 | 12,4 | 15,8 | 11 | 8,6 | 3,5 | 5,5 | 24,1 | 22 | 21,7 | 19,6 | 10 | 14 | 23 | 34 | 61 | 125 | 159 | 13,4 | 18,8 | 29 | 47,2 |
| Aluminiumbronze / Aluminum Bronze | 100-250 | 38-87 | 370-855 | 12,8 | 8,3 | 9,7 | 8 | 6,9 | 3,5 | 6,2 | 20 | 16,5 | 16,5 | 15,2 | 9,6 | 11,4 | 19,7 | 30,3 | 53 | 125 | 167 | 12,2 | 16,3 | 25,2 | 41,5 |
| | | | | 11 | 4,5 | 4,2 | 2,8 | 2,4 | 2 | 2,4 | 24,1 | 22 | 21,7 | 19,6 | 9,1 | 8,7 | 12,5 | 19 | 34 | 98 | 106 | 13,4 | 18,8 | 29 | 47,2 |
| Messing / Brass | 100 | 38 | 370 | 11 | 4,5 | 4,2 | 2,8 | 2,4 | 2 | 2,4 | 24,1 | 22 | 21,7 | 19,6 | 9,1 | 8,7 | 12,5 | 19 | 34 | 98 | 106 | 13,4 | 18,8 | 29 | 47,2 |
| | | | | 11 | 4,5 | 4,2 | 2,8 | 2,4 | 2 | 2,4 | 24,1 | 22 | 21,7 | 19,6 | 9,1 | 8,7 | 12,5 | 19 | 34 | 98 | 106 | 13,4 | 18,8 | 29 | 47,2 |
| Kupfer / Copper | 60 | 21 | 200 | 12,8 | 8,3 | 9,7 | 8 | 6,9 | 3,5 | 6,2 | 20 | 16,5 | 16,5 | 15,2 | 9,6 | 11,4 | 19,7 | 30,3 | 53 | 125 | 167 | 12,2 | 16,3 | 25,2 | 41,5 |
| | | | | 12,8 | 8,3 | 9,7 | 8 | 6,9 | 3,5 | 6,2 | 20 | 16,5 | 16,5 | 15,2 | 9,6 | 11,4 | 19,7 | 30,3 | 53 | 125 | 167 | 12,2 | 16,3 | 25,2 | 41,5 |
| GFK, CFK, Graphit / fibreglass, carbon fibre, graphite | 100-250 | 38-88 | 370-870 | 12,8 | 8,3 | 9,6 | 7,9 | 6,9 | 3,5 | 6,2 | 20 | 16,5 | 16,5 | 15,2 | 9,6 | 11,4 | 19,7 | 30,3 | 53 | 125 | 167 | 12,2 | 16,3 | 25,2 | 41,5 |
| | | | | 12,8 | 8,3 | 9,6 | 7,9 | 6,9 | 3,5 | 6,2 | 20 | 16,5 | 16,5 | 15,2 | 9,6 | 11,4 | 19,7 | 30,3 | 53 | 125 | 167 | 12,2 | 16,3 | 25,2 | 41,5 |

Multiplikator für Kühlmitteldruck und -menge / Coolant Multiplier

| Werkzeuglänge / Holder length | | | | | | |
|---------------------------------|-----|-----|-----|------|------|------|
| 3xD | 4xD | 5xD | 8xD | 10xD | 12xD | 15xD |
| siehe Tabelle / see above chart | | | 1,3 | 1,5 | 2 | 3 |

Kühlmitteldring
max. 30 bar
Cooling nozzle
max. 30 bar



Kühlmittelempfehlung

Beispiel: Bohrung Ø 25 mm mit Pulverstahleinsatz, Stahllegierung mit einer Festigkeit von 450-1265 N/mm²

5xD Halter: 4,8 bar; 22,7 l/min
12xD Halter: 4,8 bar × 2 = 9,6 bar; 22,7 l/min × 2 = 45,4 l/min
15xD Halter: 4,8 bar × 3 = 14,4 bar; 22,7 l/min × 3 = 68,1 l/min

Collant recommendation

Example: to drill 25 mm diameter hole with powder steel insert in alloy steel with a hardness value 125-375 BHN

5xD holder: 4,8 bar; 22,7 l/min
12xD holder: 4,8 bar × 2 = 9,6 bar; 22,7 l/min × 2 = 45,4 l/min
15xD holder: 4,8 bar × 3 = 14,4 bar; 22,7 l/min × 3 = 68,1 l/min

1



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| URsache UND LÖSUNG | PROBLEM | | | | | | | | | |
|---|--------------------------------------|--|----------------|-------------|----------------|--------------|----------------|--------------------------------|--|--|
| | Frühzeitiger Schneidkantenverschleiß | Riefen oder vergrößerter Durchmesser am Bohrungseintritt | Schneidenbruch | Blaue Späne | Aufbauschneide | Vibrationen | Spänestau | Ausbrüche an der Schneidspitze | Beschädigtes oder gebrochenes Werkzeug | |
| Einsatz von Standard- oder extrem langen Haltern | | 1,2,3,4,27 | | | | 1,2,3,4,27 | | 1,2,3,4,27 | | |
| Bohrungseintritt auf einer Schräge | | | | | | 1,3,4,5 | | 1,3,4,5 | 1,3,4,5 | |
| Ausgeschlagene oder nicht ausgerichtete Spindel | 2,6,7 | 2,6,7,27 | | | | 2,6,7 | | 2,6,7 | 2,6,7 | |
| Spindel mit geringer Steifigkeit | | 2,4,8,27 | 2,4,8,9 | | | 2,4,8 | | 2,4,8,9 | 2,4,8,9 | |
| Instabiler Werkstückaufbau | | 10,26,27 | 8,9,10,26 | | | 8,10,26 | | | 8,9,10 | |
| Externe Kühlmittelzufuhr – geringer Druck / Volumen | 11,12,13,19 | | | 11,12,13 | 11,12,13 | | 11,12,13,14 | | 9,11,12,13,14 | |
| Schnittunterbrechungen | | | 2,4,9,15,16,17 | | | 2,4,15,16,17 | | 2,9,15,16,17 | 2,4,15,16,17 | |
| Bohren von gehärteten Werkstoffen | 12,18,19,20 | | | 12,18,19,20 | 12,13,18,19,20 | | | | 12,18,19,20 | |
| Schlechte Gefügeeigenschaften | | | 9,20,21,22,23 | | 9,20,21,23 | | | | 9,20,21,23 | |
| Schlechter Spanbruch | | | | | | | 12,14,19,24,25 | | 12,19,24,25 | |
| Vorgebohrte Bohrungen | 2,23 | | 2,23 | | | 2,23 | | | | |
| Verschleißfester Schneidstoff | | | 9,26 | | | | | | 9,26 | |

LÖSUNG:

1. Verwenden Sie einen kurzen Halter, um eine Pilotbohrung min. 1x Durchmesser tief zu erstellen.
2. Zentrieren Sie die Bohrung mit einem kurzen Werkzeug an. Hierbei muss der Spitzenwinkel gleich oder größer als der verwendete Schneideinsatz sein.
3. Verringern Sie den Vorschub um min. 50% bis das Werkzeug mit dem vollen Durchmesser schneidet.
4. Beim Bearbeiten durch Bohrbuchsen kommen spezielle Halter mit Führungsleisten oder Chrom-Bohrbuchsen-Halter zum Einsatz.
5. Zentrieren Sie die Bohrung an, um einen geraden Bohrungseintritt zu gewährleisten.
6. Spindel oder Werkzeugaufnahme neu ausrichten.
7. Spindel instandsetzen.
8. Die Bohrgeschwindigkeit binnen den physialischen Grenzen der Maschine entsprechend reduzieren. Bitte beachten Sie, dass der Vorschub die Anforderungen für Spanbildung oder für Schnittgeschwindigkeit nicht unterschreitet.
9. Verwenden Sie einen zäheren Schneidstoff mit einer verschleißfesten Beschichtung. Z.B. aus Hartmetall wird Pulverstahl.
10. Werkstück zusätzlich unterstützen, bzw. zusätzlich spannen.
11. Innenkühlung bei Bohrtiefen größer 1x Durchmesser einsetzen.
12. Steigern Sie Kühlmitteldruck und Kühlmittelvolumen.
13. Die Bohrgeschwindigkeit binnen den physialischen Grenzen der Kühlmittelzufuhr entsprechend reduzieren. Bitte beachten Sie, dass der Vorschub die Anforderungen für Spanbildung oder für Schnittgeschwindigkeit nicht unterschreitet.
14. Verwenden Sie einen Spänezyklus um die Späne zu entfernen. Hierzu muss das Werkzeug nicht aus dem Werkstück entfernt werden.

PROBLEM

| Übermäßige Schneidkantenverrundung | Hoher Freiflächenverschleiß | Probleme am Bohrungseintritt | Bohrungsposition nicht korrekt | Bohrung unrund | Einkerbungen an der Schneide | Bohrung zu groß | Schlechte Bohroberfläche | Schlechte Standzeit | Schwankende Leistungsaufnahme | Rückzugsriefen | Eingebrannte Stufen am Schneideinsatz |
|------------------------------------|-----------------------------|------------------------------|--------------------------------|----------------|------------------------------|-----------------|--------------------------|---------------------|-------------------------------|----------------|---------------------------------------|
| | | 1,2,3,4,27 | 1,2,3,4,27 | | | | | | | 1,2,3,4,27 | |
| 1,3,4,5 | | 1,3,4,5 | | 1,3,4,5 | | | | | | 1,3,4,5 | |
| 2,6,7 | | 2,6,7,27 | | | | 2,6,7,27 | 2,6,7 | | | 2,6,7 | |
| | | 2,4,8 | 2,4,8 | | | | | | | 2,4,8 | |
| 8,9,10 | | | | 8,10,26,27 | | | 8,1 | | | 8,9,10,27 | |
| | 11,12,13,19,20 | | | | | 11,12,13,14 | 11,12,13,14 | 11,12,13,14,19,20 | 11,12,13,14 | | 11,12,13,18,20 |
| 2,15,16,17 | | 2,4,15,16,17,27 | 2,4,15,16,17,27 | 2,4,15,16,17 | | 2,15,16,17 | 2,15,16,17 | 2,15,16,17 | | | |
| | 12,18,19,20 | | | | | | | 12,18,19,20 | | | 12,18,19,20 |
| | 9,20,21,23 | 9,20,21,23 | | | 9,20,21,23 | | | 9,20,21,23 | | | |
| 12,19,24,25 | | 12,19,24,25 | | | | 12,19,24,25,27 | 12,19,24,25 | 12,14,19,24,25 | 12,19,24,25 | | |
| 12,19,24,25 | | 2,23,27 | | | 2,23 | | | 2,23 | | | |

15. Um Schnittunterbrechungen am Bohrungsein- bzw. austritt zu vermeiden, sollte die zu bearbeitende Fläche anzentriert oder plangefräst werden.
16. Beim Ein- bzw. Austritt in eine Schnittunterbrechung muss der Vorschub um min. 50% reduziert werden. Bei Vibrationen sollten Nyloc-Schrauben verwendet werden.
17. Verwenden Sie einen kurzen Halter.
18. Falls sich am Schneideinsatz eine Stufe eingebrannt hat, muss die Schnittgeschwindigkeit reduziert werden. Berechnen Sie die Schnittgeschwindigkeit anhand des eingebrannten Durchmessers. Reduzieren Sie diesen Wert um 10% und übertragen ihn nun auf den Bohrungsdurchmesser.
19. Verbessern Sie die Kühlschmierstoffqualität (min. 7-8% Kühlschmierstoffgehalt).
20. Wählen Sie einen verschleißfesteren Schneidstoff. Aus Pulverstahl 15 wird Pulverstahl 25. Aus Pulverstahl 25 wird Hartmetall. Verwenden Sie eine noch verschleißfestere Beschichtung (Fragen Sie uns an)
21. Falls alle Schneidwerkzeuge eine unbefriedigende Standzeit erzielen, sollten die Werkstücke normalisiert werden.
22. Bei harten Einschlüssen im Werkstück verwenden Sie einen zäheren Schneidstoff mit einer verschleißfesten Beschichtung. Aus Hartmetall wird Pulverstahl 25. Aus Pulverstahl 25 wird Pulverstahl 15. Für eine noch verschleißfestere Beschichtung fragen Sie uns an.
23. Reduzieren Sie den Vorschub, achten Sie hierbei aber auf einen ausreichenden Spanbruch.
24. Steigern Sie den Vorschub auf die empfohlenen Werte.
25. Kontaktieren Sie Karnasch. Ggf. muss auf eine Sondergeometrie zurückgegriffen werden.
26. Verbessern Sie die Stabilität.
27. Beschreiben Sie uns genau das Problem. Eventuell muss auf eine Spezialgeometrie zurückgegriffen werden.



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| CAUSE AND SOLUTION | PROBLEM | | | | | | | | | |
|--|-------------------------|--|-----------------|-------------|---------------------|--------------|----------------|-------------------|-------------------------|--|
| | Accelerated corner wear | Spiral or large diameter at hole start | Insert Chipping | Blue Chips | Built up Edge (BUE) | Chatter | Chip Packing | Chipping of point | Damaged or broken tools | |
| Use of Standard & Extended Holders | | 1,2,3,4,27 | | | | 1,2,3,4,27 | | 1,2,3,4,27 | | |
| Starting on an inclined surface | | | | | | 1,3,4,5 | | 1,3,4,5 | 1,3,4,5 | |
| Worn or misaligned spindle | 2,6,7 | 2,6,7,27 | | | | 2,6,7 | | 2,6,7 | 2,6,7 | |
| Use of low rigidity spindle | | 2,4,8,27 | 2,4,8,9 | | | 2,4,8 | | 2,4,8,9 | 2,4,8,9 | |
| Poor work piece support | | 10,26,27 | 8,9,10,26 | | | 8,10,26 | | | 8,9,10 | |
| External coolant – low pressure / volume | 11,12,13,19 | | | 11,12,13 | 11,12,13 | | 11,12,13,14 | | 9,11,12,13,14 | |
| Interrupted cuts | | | 2,4,9,15,16,17 | | | 2,4,15,16,17 | | 2,9,15,16,17 | 2,4,15,16,17 | |
| Drilling hardened materials | 12,18,19,20 | | | 12,18,19,20 | 12,13,18,19,20 | | | | 12,18,19,20 | |
| Poor material micro structure | | | 9,20,21,22,23 | | 9,20,21,23 | | | | 9,20,21,23 | |
| Poor chip control | | | | | | | 12,14,19,24,25 | | 12,19,24,25 | |
| Spot drilled holes | 2,23 | | 2,23 | | | 2,23 | | | | |
| High wear resistant tool grades | | | 9,26 | | | | | | 9,26 | |

SOLUTION:

1. Use a short holder to drill a pilot hole 1xD deep.
2. Spot hole with stub tool of same or greater included angle as the insert.
3. Decrease feed minimum 50% until full diameter established.
4. Use special holder with wear pads or chrome bearing area to work with drill bushing.
5. Spot face to provide flat entry surface.
6. Align spindle or turret or tailstock.
7. Repair spindle.
8. Reduce penetration rate to fall within physical limits of machine set up, but do not fall below feed threshold required to form a chip or speed threshold to cut material.
9. Use tougher grade tool steel with higher wear resistant coating (i.e. if using powder steel 15 use Powder steel 25. If using powder steel 25 use carbide.) Special coatings available on request.
10. Provide additional support for the workpiece.
11. Run coolant through holder when drilling greater than 1xD.
12. Increase coolant volume and pressure through the holder.
13. Reduce penetration rate to fall within coolant limitations, but do not fall below feed threshold required to form a chip or speed threshold to cut material
14. Add peck cycle to clear chips, do not remove insert from hole during peck.

PROBLEM

| Excessive margin wear | High flank wear | Hole lead off | Hole out of position | Hole out of round | Notching of insert | Oversize hole | Poor hole finish | Poor tool life | Power Fluctuation of load metre | Retraction spiral | Step burnt on insert |
|-----------------------|-----------------|-----------------|----------------------|-------------------|--------------------|----------------|------------------|-------------------|---------------------------------|-------------------|----------------------|
| | | 1,2,3,4,27 | 1,2,3,4,27 | | | | | | | 1,2,3,4,27 | |
| 1,3,4,5 | | 1,3,4,5 | | 1,3,4,5 | | | | | | 1,3,4,5 | |
| 2,6,7 | | 2,6,7,27 | | | | 2,6,7,27 | 2,6,7 | | | 2,6,7 | |
| | | 2,4,8 | 2,4,8 | | | | | | | 2,4,8 | |
| 8,9,10 | | | | 8,10,26,27 | | | 8,1 | | | 8,9,10,27 | |
| | 11,12,13,19,20 | | | | | 11,12,13,14 | 11,12,13,14 | 11,12,13,14,19,20 | 11,12,13,14 | | 11,12,13,18,20 |
| 2,15,16,17 | | 2,4,15,16,17,27 | 2,4,15,16,17,27 | 2,4,15,16,17 | | 2,15,16,17 | 2,15,16,17 | 2,15,16,17 | | | |
| | 12,18,19,20 | | | | | | | 12,18,19,20 | | | 12,18,19,20 |
| | 9,20,21,23 | 9,20,21,23 | | | 9,20,21,23 | | | 9,20,21,23 | | | |
| 12,19,24,25 | | 12,19,24,25 | | | | 12,19,24,25,27 | 12,19,24,25 | 12,14,19,24,25 | 12,19,24,25 | | |
| 12,19,24,25 | | 2,23,27 | | | 2,23 | | | 2,23 | | | |

15. Pre-mill or spot face entry or exit to remove interruption.
16. Decrease feed up to 50% through entry or exit interruption using Nyloc screws to retain insert.
17. Use short holders in low impact entry cuts.
18. Reduce speed if a step or burn diameter is worn on insert. Calculate the speed at worn diameter, reduce the velocity by 10% and apply to original tool diameter.
19. Improve quality and condition of coolant (water soluble preferred at 7-8% dilution with EP additive.)
20. Use more heat and wear resistant tool grade. If using powder steel 15 use powder steel 25. if using powder steel 25 use carbide. If micro structure problems presents, use more wear resistant coatings (ask us for special coatings)
21. Anneal or normalise parts if all cutting tools exhibiting poor tool life.
22. For hard spots, use tougher grade tool steel with high wear resistant coating (i.e. if using carbide use Powder steel 25. If using Powder steel 25 use powder steel 15. Use a special coating (available on request)
23. Reduce feed, but not below threshold of good chip formation.
24. Increase feed to recommended levels.
25. Contact Karnasch for special geometry on request.
26. Increase rigidity of set up.
27. Explain your problem for making a special geometry insert.



Karnasch® DREHZAHLN (U./min.) FÜR HARTMETALL-BESTÜCKTE LOCHSÄGEN SPEEDS (REV./min.) FOR CARBIDE-TIPPED HOLE SAWS



20 1010
POWER-MAX HEAVY-DUTY / 10

566-569

20 1015
POWER-MAX HEAVY-DUTY / 20

570-573

20 1130
POWER-MAX SUPER HEAVY-DUTY / 30

574-577

20 1141
POWER-MAX SUPER HEAVY-DUTY / 55

578-581

20 1020
EASY-CUT / 7

586-587

20 1025
EXTRA EASY-CUT / 7

588-589

| Ø mm | 12-18 | 19-25 | 26-32 | 33-39 | 40-46 | 47-53 | 54-60 | 61-70 | 71-80 | 81-90 | 91-100 | 101-112 | 113-124 | 125-136 | 137-150 |
|---|------------------|--------------|--------------------|---------------------|---------------------|--------------------|-------------------|---------------------|----------------------|---------------------|-----------------------|-----------------------|---------------------|-----------------------|-----------------------|
| Zoll / Inch | 7/16" - 1. 1/16" | 3/4" - 1" | 1. 1/16" - 1. 1/4" | 1. 5/16" - 1. 9/16" | 1. 5/8" - 1. 13/16" | 1. 7/8" - 2. 1/16" | 2. 1/8" - 2. 3/8" | 2. 13/32" - 2. 3/4" | 2. 51/64" - 3. 5/32" | 3. 3/16" - 3. 9/16" | 3. 19/32" - 3. 15/16" | 3. 31/32" - 4. 13/32" | 4. 15/32" - 4. 7/8" | 4. 15/16" - 5. 11/32" | 5. 13/32" - 5. 29/32" |
| Stahl · Steel < 500 N | 1475 885 | 838 637 | 612 498 | 483 408 | 398 346 | 338 300 | 295 265 | 261 227 | 224 199 | 197 177 | 175 159 | 158 142 | 141 128 | 127 117 | 116 106 |
| Stahl · Steel < 750 N | 1327 796 | 754 537 | 550 448 | 434 367 | 358 311 | 304 270 | 265 230 | 234 204 | 201 179 | 177 159 | 157 143 | 142 128 | 127 115 | 114 105 | 104 95 |
| Stahl · Steel < 900 N | 930 620 | 590 450 | 430 340 | 335 285 | 280 240 | 239 210 | 205 185 | 182 160 | 155 140 | 137 125 | 122 110 | 108 100 | 98 90 | 89 81 | 80 75 |
| Stahl · Steel < 1200 N | 795 530 | 500 380 | 370 300 | 290 245 | 240 265 | 200 180 | 175 160 | 155 135 | 135 120 | 117 105 | 104 95 | 94 85 | 84 77 | 76 70 | 69 63 |
| Stahl · Steel < 1400 N | 660 440 | 420 320 | 305 250 | 240 200 | 195 170 | 165 150 | 145 130 | 125 115 | 110 100 | 95 90 | 85 80 | 75 70 | 68 65 | 63 58 | 57 50 |
| Edelstahl Stainless steel | 530 350 | 340 250 | 245 200 | 195 165 | 160 140 | 135 120 | 115 105 | 103 90 | 87 78 | 77 70 | 68 63 | 62 56 | 55 51 | 56 46 | 45 42 |
| Alu Aluminum | 2390 1590 | 1510 1150 | 1100 895 | 870 735 | 715 625 | 610 540 | 530 480 | 470 410 | 405 360 | 355 320 | 315 285 | 283 255 | 253 230 | 229 210 | 209 190 |
| Grauguss Grey cast iron | 930 620 | 590 450 | 430 340 | 335 285 | 280 240 | 239 210 | 205 185 | 182 160 | 155 140 | 137 125 | 122 110 | 108 100 | 98 90 | 89 81 | 80 75 |
| Bronze Brass | 1325 885 | 840 635 | 615 500 | 490 410 | 400 345 | 340 300 | 295 265 | 260 230 | 225 200 | 195 175 | 174 160 | 157 145 | 140 130 | 127 117 | 116 105 |
| Kupfer Copper | 930 620 | 590 450 | 430 340 | 335 285 | 280 240 | 239 210 | 205 185 | 182 160 | 155 140 | 137 125 | 122 110 | 108 100 | 98 90 | 89 81 | 80 75 |
| Kunststoffe, Plexi- glas, Glasfaser Plastics, Plexi- glass, Fibreglass | 800 700 | 670 510 | 490 398 | 386 327 | 318 277 | 271 240 | 236 212 | 200 182 | 180 159 | 150 142 | 140 127 | 120 110 | 105 100 | 99 95 | 91 85 |

Einsatzhinweise:

- Nur drehend einsetzen. Keine Hammerfunktion verwenden
- Schläge / Stöße auf den Hartmetall-Schneiden vermeiden. Diese führen zu kleinen Absplitterungen welche die Standzeit stark vermindern.
- Lochsäge im Bohrloch nicht verkanten
- Bohrkern nach jeder Bohrung entfernen. Bohrmehl / Späne ebenfalls entfernen.

Notes on use:

- Use rotation only. Switch off impact or hammer drill.
- Avoid shock / impacts on the carbide tips. This leads to small carbide splinters which results to severe loss in performance
- Do not tilt the hole saw in the hole
- Remove the drill core after each operation. Do the same with chips and sawdust.

Verwenden Sie Schneidöle siehe ab Seite 1143 · Use coolants see from page 1143



20 1121
POWER-MAX
ALLROUND 60

582-585



20 1150
ALLROUND
ECO 60

596-598

| Ø mm Zoll / Inch | 18-35 | 36-50 | 51-75 | 76-100 | 101-125 | 126-150 | 20 1121 | 20 1150 |
|--|---------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|---------|---------|
| | 45/64" - 1. 3/8" | 1. 27/64" - 1. 31/32" | 2. 1/64" - 2. 61/64" | 2. 63/64" - 3. 15/16" | 3. 31/32" - 4. 59/64" | 4. 61/64" - 5. 29/32" | | |
| Holz, Spanplatten, Hartfaserplatten Wood, chipboards, hard fibre boards | 1000 900 | 800 700 | 600 500 | 400 300 | 200 150 | 130 100 | ✓ | ✓ |
| Kunststoffe, Plexiglas, Duro- und Thermoplaste Plastics, plexiglass, acrylics, duro- and thermoplastics | 800 400 | 400 290 | 290 190 | 190 140 | 140 125 | 125 100 | ✓ | ✓ |
| Ne-Metall wie Alu, Messing, Kupfer, Zinn Non ferrous materials like alu, copper, brass, tin | 1500 750 | 750 570 | 570 380 | 380 250 | 250 220 | 220 190 | ✓ | ✓ |
| Dünnbleche, Sandwich Material, Verbundstoffe Thin iron sheets, sandwich material, composites | 850 450 | 450 300 | 300 210 | 200 150 | 150 127 | 130 100 | ✓ | |

✓ geeignet · suitable
– nicht geeignet · not suitable

Einsatzhinweise:

- Nur drehend einsetzen. Keine Hammerfunktion verwenden
- Schläge / Stöße auf den Hartmetall-Schneiden vermeiden. Diese führen zu kleinen Absplitterungen welche die Standzeit stark vermindern.
- Lochsäge im Bohrloch nicht verkanten
- Bohrkern nach jeder Bohrung entfernen. Bohrmehl / Späne ebenfalls entfernen.
- Die 68 mm Lochsägen mit Randversenkung dürfen nicht im Auslauf angehalten werden.
- Feinfühligen Vorschub geben um ein Ausreißen der Schnittkanten zu vermeiden.

Notes on use:

- Use rotation only. Switch off impact or hammer drill.
- Avoid shock / impacts on the carbide tips. This leads to small carbide splinters which results to severe loss in performance
- Do not tilt the hole saw in the hole
- Remove the drill core after each operation. Do the same with chips and sawdust.
- The 68 mm hole saws with rim countersink may not be stopped before it is removed
- Advance with care to prevent the cut edges tearing.

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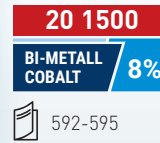
- * Für legierte Stähle/Edelstähle >750 N empfehlen wir unsere Power-Max Serie Seite 566-585
- * For alloyed steel / stainless steel >750 N we recommend our Power-Max range see page 566-585



20 1500
BI-METALL
COBALT 8%

592-595

| Ø mm | 14-20 | 21-27 | 28-33 | 35-41 | 43-48 | 50-55 | 57-65 | 67-75 | 76-89 | 92-102 | 105-121 | 127-152 | 160-210 | 220-265 | 279-305 |
|---|-----------------|------------------|--------------------|-----------------|-------------------|---------------------|------------------|-------------------|-----------------|-----------------|------------------|----------------|---------------------|---------------------|----------------------|
| Zoll/Inch | 9/16" - 25/32" | 53/64" - 1.1/16" | 1.7/64" - 1.19/64" | 1.3/8" - 1.5/8" | 1.11/16" - 1.7/8" | 1.31/32" - 2.11/64" | 2.1/4" - 2.9/16" | 2.5/8" - 2.61/64" | 3" - 3.1/2" | 3.5/8" - 4" | 4.9/64" - 4.3/4" | 5" - 6" | 6.19/64" - 8.17/64" | 8.21/32" - 10.7/16" | 10.63/64" - 12.1/64" |
| Stahl - Steel < 750 N | 682 - 480 | 455 - 354 | 341 - 290 | 273 - 233 | 222 - 199 | 190 - 180 | 168 - 147 | 143 - 130 | 126 - 111 | 104 - 94 | 91 - 79 | 75 - 63 | 60 - 45 | 40 - 30 | 28 - 20 |
| Dünobleche, Sandwich Material, Verbundstoffe Thin iron sheets, sandwich material, composites | 682 - 480 | 455 - 354 | 341 - 290 | 273 - 233 | 222 - 199 | 190 - 180 | 168 - 147 | 143 - 130 | 126 - 111 | 104 - 94 | 91 - 79 | 75 - 63 | 60 - 45 | 40 - 30 | 28 - 20 |
| Ne-Metall wie Alu, Messing, Kupfer, Zinn Non ferrous materials like alu, copper, brass, tin | 682 - 480 | 455 - 354 | 341 - 290 | 273 - 233 | 222 - 199 | 190 - 180 | 168 - 147 | 143 - 130 | 126 - 111 | 104 - 94 | 91 - 79 | 75 - 63 | 60 - 45 | 40 - 30 | 28 - 20 |
| Weichholz, Hartholz, Exotenholz, Furniere Soft wood, hard wood, exotic wood, veneers | 910 - 650 | 607 - 472 | 455 - 386 | 364 - 311 | 296 - 265 | 257 - 220 | 223 - 196 | 190 - 160 | 168 - 143 | 138 - 125 | 121 - 105 | 100 - 84 | 80 - 61 | 55 - 45 | 40 - 35 |
| Leimholz, Tischler- und Furniersperrholz Bonded wood, blockboard and veneer plywood | 910 - 650 | 607 - 472 | 455 - 386 | 364 - 311 | 296 - 265 | 257 - 220 | 223 - 196 | 190 - 160 | 168 - 143 | 138 - 125 | 121 - 105 | 100 - 84 | 80 - 61 | 55 - 45 | 40 - 35 |
| Spanplatten, Hartfaserplatten, Platten ohne Belag Chipboard, hard fibre board, boards without laminate | 910 - 650 | 607 - 472 | 455 - 386 | 364 - 311 | 296 - 265 | 257 - 220 | 223 - 196 | 190 - 160 | 168 - 143 | 138 - 125 | 121 - 105 | 100 - 84 | 80 - 61 | 55 - 45 | 40 - 35 |
| Spanplatten, Hartfaserplatten Kunststoff beschichtet/furniert, MDF, HDF Chipboard, hard fibre board, plastic-coated/veneered, MDF, HDF | 910 - 650 | 607 - 472 | 455 - 386 | 364 - 311 | 296 - 265 | 257 - 220 | 223 - 196 | 190 - 160 | 168 - 143 | 138 - 125 | 121 - 105 | 100 - 84 | 80 - 61 | 55 - 45 | 40 - 35 |
| Kunststoffe, Plexiglas, Duro- und Thermoplaste Plastics, plexiglass, acrylics, duro- and thermoplastics | 455 - 310 | 303 - 236 | 227 - 155 | 182 - 155 | 148 - 133 | 129 - 115 | 112 - 98 | 95 - 86 | 84 - 72 | 69 - 62 | 61 - 53 | 50 - 42 | 40 - 30 | 25 - 20 | 18 - 14 |
| Mineralkwerkstoff, Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid® Mineral material, Corian®, Noblan®, Hi-Macs®, Staron®, Rausolid® | 455 - 310 | 303 - 236 | 227 - 155 | 182 - 155 | 148 - 133 | 129 - 115 | 112 - 98 | 95 - 86 | 84 - 72 | 69 - 62 | 61 - 53 | 50 - 42 | 40 - 30 | 25 - 20 | 18 - 14 |
| HPL (Schichtstoffplatten) Trespa®, Resopal® HPL (High-Pressure-Laminate) Trespa®, Resopal® | 455 - 310 | 303 - 236 | 227 - 155 | 182 - 155 | 148 - 133 | 129 - 115 | 112 - 98 | 95 - 86 | 84 - 72 | 69 - 62 | 61 - 53 | 50 - 42 | 40 - 30 | 25 - 20 | 18 - 14 |
| Faserzementplatte, Eternit®, Stein-/Glaswolle, Rockwool®, Isover® Fibre cement panel, Eternit®, mineral/glass wool, Rockwool®, Isover® | 455 - 310 | 303 - 236 | 227 - 155 | 182 - 155 | 148 - 133 | 129 - 115 | 112 - 98 | 95 - 86 | 84 - 72 | 69 - 62 | 61 - 53 | 50 - 42 | 40 - 30 | 25 - 20 | 18 - 14 |



- 1 Beim Bohren von Metallen Schneidöl verwenden. (siehe ab Seite 1143). Sind die Zahnschneiden blau angelaufen, so wurde ohne Schneidöl oder mit zu hoher Schnittgeschwindigkeit gearbeitet.

Berechnung der Schnittgeschwindigkeit (Vc)

n = Drehzahl (U./min.) (siehe Seite 1314)
d = Werkzeugdurchmesser in mm
Vc = Schnittgeschwindigkeit (m/min.)

$$Vc = \frac{\pi \times d \times n}{1000}$$

- 2 Lochsäge im Bohrloch nicht verkanten
- 3 Werden große Lochsägendurchmesser mit Handbohrmahmaschinen eingesetzt, muss die Handbohrmaschine besonders gut fest gehalten werden. Nach Möglichkeit sollten Bohrstände benutzt werden. Wir empfehlen ab Durchmesser 100 mm unseren Aufnahmehalter (schwere Ausführung) Artikel 20 1528 (Seite 593).
- 4 Beim Schneiden von Holz, Spanplatten, Holzersatzwerkstoffen die Säge öfter lüften und das Sägemehl entfernen. Geschieht das nicht, verbrennen die Zahnschneiden und die Lochsäge klemmt im Schnittkanal.
- 5 Beim Schneiden von besonders starken / dicken Holz, Spanplatten, Holzersatzwerkstoffen empfehlen wir unsere Lochsagen: Artikel 20 1121 Seite 582-585.
- 6 **Vergroßerung existierender Löcher**
Bereits vorhandene Löcher ab 32 mm 1/4" können mit einem einfachen Trick erweitert werden. Nehmen Sie eine kleinere Lochsäge (ab 32 mm möglich) und schrauben Sie diese innerhalb der Lochsäge auf das hervorstehende Gewinde. (Siehe Bild). Passende Halter sind Artikel 20 1528, oder 20 1511. Die innere Lochsäge dient als Führungslochsäge, um existierende Löcher zu erweitern. Ggf. ist der Zentrierbohrer zu entfernen.

- 1 Use a good cutting oil when drilling metal. [see from page 1143]. If the tooth tips are blue, the saw has been used without cutting oil or at too high cutting speed.

Calculation of the cutting speed (Vc)

n = Speed (rev./min.) [see page 1314]
d = Hole saw diameter in mm
Vc = Cutting speed (m/min.)

$$Vc = \frac{\pi \times d \times n}{1000}$$

- 2 Do not tilt the hole saw in the hole
- 3 If large hole diameters are used in hand-held drills, the hand-held drill must be held particularly firmly. A drill stand should be used where possible. We recommend for hole saw diameter 100 mm and more our heavy duty arbour 20 1528 (page 593).
- 4 Lift the saw clear frequently when cutting timber, chipboard, and wood substitutes and remove the sawdust and chips. If this is not done, the tooth tips can burn and the hole saw will jam in the cut.
- 5 If cutting especially thick timber, chipboard and wooden substitutes we recommend our hole saws article 20 1121 page 582-585.
- 6 **Enlarging existing holes**
Existing holes (starting with diameter 32 mm) or more in diameter may be enlarged with a simply trick. Take a small hole saw (smallest 32 mm) and screw this inside the hole saw on the projecting thread (see picture). Suitable holder are article 20 1528 and 20 1511. The inner hole saw then acts as a kind of guiding hole saw for extending existing holes. If necessary, remove the center drill.





21 1500

DIAMOND GRIT

600-601

| Ø von-bis from-until | | Drehzahl minimum (U/min.) Number of revolution minimum (Rev./min.) | Drehzahl maximum (U/min.) Number of revolution maximum (Rev./min.) |
|-------------------------|------------------|---|---|
| mm | Zoll/Inch | | |
| 14-25 | 9/16" - 1" | 500 | 1000 |
| 27-51 | 1.1/16" - 2" | 250 | 500 |
| 52-83 | 2.1/16" - 3.1/4" | 150 | 300 |
| 86-152 | 3.3/8" - 6" | 100 | 200 |

Einsatzhinweise:

- Nur drehend einsetzen. Keine Hammerfunktion verwenden
- Lochsäge im Bohrloch nicht verkanten
- Bohrkern nach jeder Bohrung entfernen. Bohrmehl/Späne ebenfalls entfernen
- Um übermäßige Hitzeentwicklung zu vermeiden, sollte mit Wasser gekühlt werden

Notes on use:

- Use rotation only. Switch off impact or hammer drill.
- Do not tilt the hole saw in the hole
- Remove the drill core after each operation. Do the same with chips and sawdust
- Use water as a coolant to prevent heat build up on the cutting surface



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Index

Schafttoleranz h9
Shank tolerance h9



| | | | | | | |
|---|---|---|--|--|---|---|
| 40 4030 60°  638 | 40 3030 60°  639 | 40 4035 60°  640 | 40 3035 60°  641 | 20 1780 82°  642 | 20 1785 82°  643 | 20 1740 90°  646 |
| 20 1745 90°  647 | 20 1750 90°  648 | 20 1760 90°  652 | 20 1765 90°  653 | 20 1720 90°  654 | 20 1725 90°  656 | 20 1770 90°  655 |
| 20 1775 90°  657 | 20 1790 90°  658 | 20 1795 90°  659 | 40 4040 120°  662 | 40 3040 120°  663 | 20 1295 90°  524 | 20 1195 90°  524 |

| Material | | Unleg. Baustahl | Unleg. Baustahl | Leg. Stahl | Guss-eisen | Guss-eisen | Edel-stahl | CuZn Leg. Spröde | CuZn Leg. Zäh | Alu. Leg. bis | Thermo-plaste | Duro-plaste | Hardox 400, 450 |
|----------|---------------|-------------------------|-------------------------|------------------------|------------------------|------------------------|--------------------------|--------------------|------------------|------------------|----------------|--------------|-----------------|
| | | Mild steel | Mild steel | Alloy steel | Cast iron | Cast iron | Stainless steel | CuZn alloy brittle | CuZn alloy tough | Alu. Alloy up to | Thermo-plastic | Duro-plastic | Hardox 400, 450 |
| | | < 700 N/mm ² | > 700 N/mm ² | 1000 N/mm ² | < 250 Nmm ² | > 250 Nmm ² | < 1000 N/mm ² | | | 11% Si | | | |
| Vc m/min | | 15 | 10 | 6 | 12 | 8 | 6 | 20 | 15 | 25 | 20 | 15 | 6 |
| Ø mm | Ø Zoll / Inch | U/min rpm | U/min rpm | U/min rpm | U/min rpm | U/min rpm | U/min rpm | U/min rpm | U/min rpm | U/min rpm | U/min rpm | U/min rpm | U/min rpm |
| 4,3 | 11/64" | 1100 | 740 | 440 | 890 | 590 | 400 | 1480 | 1110 | 1850 | 1480 | 1110 | 402 |
| 5,0 | 13/64" | 950 | 640 | 380 | 760 | 510 | 340 | 1270 | 950 | 1590 | 1270 | 950 | 348 |
| 5,3 | 13/64" | 900 | 600 | 360 | 720 | 480 | 320 | 1200 | 900 | 1500 | 1200 | 900 | 332 |
| 5,8 | 15/64" | 820 | 550 | 330 | 660 | 440 | 290 | 1100 | 820 | 1370 | 1100 | 820 | 301 |
| 6,0 | 15/64" | 800 | 530 | 320 | 640 | 420 | 280 | 1060 | 800 | 1330 | 1060 | 800 | 286 |
| 6,3 | 1/4" | 760 | 510 | 300 | 610 | 400 | 260 | 1010 | 760 | 1260 | 1010 | 760 | 274 |
| 7,0 | 9/32" | 680 | 450 | 270 | 550 | 360 | 230 | 910 | 680 | 1140 | 910 | 680 | 249 |
| 7,3 | 9/32" | 650 | 440 | 260 | 520 | 350 | 220 | 870 | 650 | 1090 | 870 | 650 | 239 |
| 8,0 | 5/16" | 600 | 400 | 240 | 480 | 320 | 200 | 800 | 600 | 990 | 800 | 600 | 221 |
| 8,3 | 21/64" | 580 | 380 | 230 | 460 | 310 | 190 | 770 | 580 | 960 | 770 | 580 | 211 |
| 9,4 | 3/8" | 510 | 340 | 200 | 410 | 270 | 160 | 680 | 510 | 850 | 680 | 510 | 186 |
| 10,0 | 25/64" | 480 | 320 | 190 | 380 | 250 | 150 | 640 | 480 | 800 | 640 | 480 | 164 |
| 10,4 | 13/32" | 460 | 310 | 180 | 370 | 240 | 140 | 610 | 460 | 770 | 610 | 460 | 159 |
| 11,5 | 29/64" | 420 | 280 | 170 | 330 | 220 | 130 | 550 | 420 | 690 | 550 | 420 | 149 |
| 12,4 | 31/64" | 390 | 260 | 150 | 310 | 210 | 110 | 510 | 390 | 640 | 510 | 390 | 138 |
| 13,4 | 17/32" | 360 | 240 | 140 | 290 | 190 | 100 | 480 | 360 | 590 | 480 | 360 | 129 |
| 14,4 | 9/16" | 340 | 220 | 130 | 270 | 170 | 90 | 450 | 320 | 550 | 450 | 320 | 119 |
| 15,0 | 19/32" | 320 | 210 | 130 | 250 | 170 | 90 | 420 | 320 | 530 | 420 | 320 | 116 |
| 16,5 | 21/32" | 290 | 190 | 120 | 230 | 150 | 80 | 390 | 290 | 480 | 390 | 290 | 106 |
| 19,0 | 3/4" | 250 | 170 | 100 | 200 | 130 | 60 | 340 | 250 | 420 | 340 | 250 | 94 |
| 20,5 | 13/16" | 230 | 160 | 90 | 190 | 120 | 50 | 310 | 230 | 390 | 310 | 230 | 85 |
| 23,0 | 29/32" | 210 | 140 | 80 | 170 | 110 | 50 | 280 | 210 | 350 | 280 | 210 | 76 |
| 25,0 | 63/64" | 190 | 130 | 80 | 150 | 100 | 50 | 250 | 190 | 320 | 250 | 190 | 70 |
| 26,0 | 1.1/32" | 180 | 120 | 70 | 150 | 100 | 40 | 240 | 180 | 310 | 240 | 180 | 67 |
| 28,0 | 1.7/64" | 170 | 110 | 70 | 140 | 90 | 40 | 230 | 170 | 280 | 230 | 170 | 62 |
| 30,0 | 1.3/16" | 160 | 110 | 60 | 130 | 80 | 40 | 210 | 160 | 270 | 210 | 160 | 58 |
| 31,0 | 1.7/32" | 150 | 100 | 60 | 120 | 80 | 30 | 210 | 150 | 260 | 210 | 150 | 55 |
| 32,0 | 1.17/64" | 150 | 100 | 60 | 120 | 80 | 30 | 210 | 150 | 260 | 210 | 150 | - |
| 34,0 | 1.11/32" | 140 | 90 | 60 | 110 | 70 | 30 | 190 | 140 | 230 | 190 | 140 | - |
| 37,0 | 1.29/64" | 130 | 90 | 50 | 100 | 70 | 30 | 170 | 130 | 220 | 170 | 130 | - |
| 40,0 | 1.37/64" | 120 | 80 | 50 | 100 | 60 | 30 | 160 | 120 | 200 | 160 | 120 | - |
| 50,0 | 1.31/32" | 100 | 60 | 40 | 80 | 50 | 20 | 130 | 100 | 160 | 130 | 100 | - |
| 63,0 | 2.31/64" | 80 | 50 | 30 | 60 | 40 | 20 | 100 | 80 | 130 | 100 | 80 | - |
| 80,0 | 3.5/32" | 60 | 40 | 20 | 50 | 30 | 20 | 80 | 60 | 100 | 80 | 60 | - |

Verwenden Sie für alle Metalle Schneidöle siehe ab Seite 1143. Für Kunststoffe kann zur Kühlung Wasser oder Druckluft verwendet werden. Hinweise zur Kühlung beim Bearbeiten von Hardox siehe Seite 1214. Für die Bearbeitung von Hardox 500 siehe Art. 40 3045 Seite 651.

Use coolant for all metals see from page 1143. For plastic materials use for cooling water or compressed air. Cooling advice while machining Hardox see page 1214. While machining Hardox 500 see Art. 40 3045 page 651.





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180° 666

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180° 666

20 1793
180° 666

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180° 667

20 1892
180° 667

20 1893
180° 667

| Werkstoff Material | Aluminium langspanend / Aluminum long chipping | | Aluminium kurz spanend / Aluminum short chipping | | Stahl <500 N/mm ² Steel <500 N/mm ² | | Stahl <800 N/mm ² Steel <800 N/mm ² | | Stahl <1000 N/mm ² Steel <1000 N/mm ² | | INOX <900 N/mm ² Stainless steel <900 N/mm ² | | INOX >900 N/mm ² Stainless steel >900 N/mm ² | | Gusseisen Cast iron | |
|-----------------------|---|-------------|---|-------------|--|-------------|--|-------------|--|-------------|--|-------------|--|-------------|------------------------|-------------|
| | d1 | Vc m/min | f mm/U | Vc m/min | f mm/U | Vc m/min | f mm/U | Vc m/min | f mm/U | Vc m/min | f mm/U | Vc m/min | f mm/U | Vc m/min | f mm/U | Vc m/min |
| M3 | 80-90 | 0,150-0,200 | 30-40 | 0,150 | 30 | 0,150 | 30 | 0,150 | 20-30 | 0,100-0,150 | 10-16 | 0,100 | 8-12 | 0,100 | 15-25 | 0,100-0,150 |
| M4 | 80-90 | 0,170-0,220 | 30-41 | 0,170 | 30 | 0,170 | 30 | 0,170 | 20-30 | 0,130-0,170 | 10-16 | 0,130 | 8-12 | 0,130 | 15-25 | 0,130-0,170 |
| M6 | 80-90 | 0,190-0,240 | 30-42 | 0,190 | 30 | 0,190 | 30 | 0,190 | 20-30 | 0,150-0,190 | 10-16 | 0,150 | 8-12 | 0,150 | 15-25 | 0,150-0,190 |
| M8 | 80-90 | 0,200-0,250 | 30-43 | 0,200 | 30 | 0,200 | 30 | 0,200 | 20-30 | 0,150-0,160 | 10-16 | 0,160 | 8-12 | 0,160 | 15-25 | 0,160-0,200 |
| M10 | 80-90 | 0,220-0,260 | 30-44 | 0,220 | 30 | 0,220 | 30 | 0,220 | 20-30 | 0,170-0,220 | 10-16 | 0,170 | 8-12 | 0,170 | 15-25 | 0,170-0,220 |
| M12 | 80-90 | 0,230-0,280 | 30-45 | 0,230 | 30 | 0,230 | 30 | 0,230 | 20-30 | 0,190-0,230 | 10-16 | 0,190 | 8-12 | 0,190 | 15-25 | 0,190-0,230 |

Verwenden Sie für alle Metalle Schneidöle siehe ab Seite 1143. Für Kunststoffe kann zur Kühlung Wasser oder Druckluft verwendet werden.

Use coolant for all metals see from page 1143. For plastic materials use for cooling water or compressed air.

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
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|-----------------------------|-----------------------------|-----------------------------|----------------------------|-----------------------------|----------------------------|----------------------------|
| 40 1010 90° 670 | 40 1020 180° 670 | 40 1030 90° 670 | 40 2010 90° 671 | 40 2020 180° 671 | 40 2030 90° 671 | 40 1040 90° 672 |
| 40 1050 180° 672 | 40 2040 90° 673 | 40 2050 180° 673 | 40 1060 90° 674 | 40 1070 90° 674 | 40 2060 90° 675 | 40 2070 90° 675 |

| Werkstoff Material | Aluminium langspanend / Aluminum long chipping | | Aluminium kurz spanend / Aluminum short chipping | | Stahl <500 N/mm ² Steel <500 N/mm ² | | Stahl <800 N/mm ² Steel <800 N/mm ² | | Stahl <1000 N/mm ² Steel <1000 N/mm ² | | INOX <900 N/mm ² Stainless steel <900 N/mm ² | | INOX >900 N/mm ² Stainless steel >900 N/mm ² | | Gusseisen Cast iron | | |
|-----------------------|---|-------------|---|-------------|--|-------------|--|-------------|--|-------------|--|-------------|--|-------------|------------------------|-------------|-------------|
| | d1 | Vc m/min | f mm/U | Vc m/min | f mm/U | Vc m/min | f mm/U | Vc m/min | f mm/U | Vc m/min | f mm/U | Vc m/min | f mm/U | Vc m/min | f mm/U | Vc m/min | f mm/U |
| M3 | | 45 | 0,100 | 60-70 | 0,125 | 35-40 | 0,065 | 25-30 | 0,030- 0,060 | 25-30 | 0,040-0,050 | 8 | 0,040 | 5-6 | 0,040 | 25 | 0,080-0,100 |
| M4 | | 45 | 0,125 | 60-70 | 0,160 | 35-40 | 0,080 | 25-30 | 0,040- 0,080 | 25-30 | 0,050-0,063 | 8 | 0,050 | 5-6 | 0,050 | 25 | 0,100-0,125 |
| M6 | | 45 | 0,160 | 60-70 | 0,200 | 35-40 | 0,100 | 25-30 | 0,070- 0,100 | 25-30 | 0,080 | 8 | 0,065 | 5-6 | 0,065 | 25 | 0,125-0,160 |
| M8 | | 45 | 0,200 | 60-70 | 0,250 | 35-40 | 0,125 | 25-30 | 0,100- 0,125 | 25-30 | 0,100 | 8 | 0,080 | 5-6 | 0,080 | 25 | 0,160-0,200 |
| M10 | | 45 | 0,250 | 60-70 | 0,315 | 35-40 | 0,160 | 25-30 | 0,100- 0,160 | 25-30 | 0,120 | 8 | 0,100 | 5-6 | 0,100 | 25 | 0,200-0,250 |
| M12 | | 45 | 0,250 | 60-70 | 0,315 | 35-40 | 0,160 | 25-30 | 0,100- 0,160 | 25-30 | 0,140 | 8 | 0,100 | 5-6 | 0,100 | 25 | 0,200-0,250 |

Verwenden Sie für alle Metalle Schneidöle siehe ab Seite 1143. Für Kunststoffe kann zur Kühlung Wasser oder Druckluft verwendet werden.

Use coolant for all metals see from page 1143. For plastic materials use for cooling water or compressed air.

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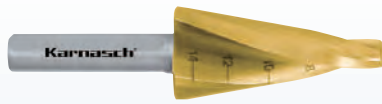
9



Index



610-615



619-620



611-616

| Material | Unleg. Baustahl | Unleg. Baustahl | Leg. Stahl | Guss-eisen | Guss-eisen | Edel-stahl | CuZn Leg. Spröde | CuZn Leg. Zäh | Alu. Leg. bis | Thermo-plaste | Duro-plaste |
|-----------|-------------------------|-------------------------|------------------------|------------------------|------------------------|--------------------------|--------------------|------------------|------------------|----------------|--------------|
| | Mild steel | Mild steel | Alloy steel | Cast iron | Cast iron | Stainless steel | CuZn alloy brittle | CuZn alloy tough | Alu. Alloy up to | Thermo-plastic | Duro-plastic |
| | < 700 N/mm ² | > 700 N/mm ² | 1000 N/mm ² | < 250 Nmm ² | > 250 Nmm ² | < 1000 N/mm ² | | | 11% Si | | |
| Vc m/min | 15 | 10 | 6 | 12 | 8 | 6 | 20 | 15 | 25 | 20 | 15 |
| Ø mm | U/min rpm | U/min rpm | U/min rpm | U/min rpm | U/min rpm | U/min rpm | U/min rpm | U/min rpm | U/min rpm | U/min rpm | U/min rpm |
| 4,0-12,0 | 1900-600 | 1700-580 | 1550-520 | 1190-400 | 800-250 | 400-130 | 4700-1550 | 2750-920 | 2350-790 | 1550-520 | 1190-400 |
| 4,0-20,0 | 1900-400 | 1700-350 | 1550-300 | 1190-240 | 800-160 | 400-80 | 4700-950 | 2750-550 | 2350-470 | 1550-300 | 1190-240 |
| 12,0-20,0 | 600-400 | 600-350 | 520-300 | 400-240 | 250-160 | 130-80 | 1550-950 | 920-550 | 790-470 | 520-300 | 400-240 |
| 4,0-24,0 | 1900-300 | 1700-280 | 1550-250 | 1190-200 | 800-130 | 400-65 | 4700-790 | 2750-460 | 2350-400 | 1550-250 | 1190-200 |
| 6,0-30,0 | 1300-250 | 1200-230 | 1000-200 | 780-150 | 530-100 | 250-50 | 3150-630 | 1850-370 | 1590-310 | 1000-200 | 780-150 |
| 20,0-30,0 | 400-250 | 350-230 | 300-200 | 230-150 | 160-100 | 80-50 | 950-630 | 550-370 | 470-310 | 300-200 | 230-150 |
| 6,0-36,0 | 1300-220 | 1200-200 | 1000-170 | 780-130 | 530-90 | 250-45 | 3150-530 | 1850-300 | 1590-260 | 1000-170 | 780-130 |
| 30,0-40,0 | 250-200 | 230-180 | 200-150 | 150-120 | 100-80 | 50-40 | 630-470 | 370-280 | 310-240 | 200-150 | 150-120 |
| 40,0-50,0 | 200-160 | 180-140 | 150-125 | 120-90 | 80-65 | 40-30 | 470-380 | 280-220 | 240-190 | 150-125 | 120-90 |
| 50,0-60,0 | 160-130 | 140-110 | 125-100 | 90-80 | 65-50 | 30-25 | 380-310 | 220-185 | 190-150 | 125-100 | 90-80 |

Karnasch Stufenbohrer

Karnasch Stufenbohrer sind entwickelt um einwandfreie kreisrunde und gleichzeitig entgratete Löcher in Blechen von 4 mm Dicke zu bohren. Der Übergang bildet einen Radius, der gleichzeitig zum Anfasen oder Entgraten der Bohrung dient. Während man mit Blechschälbohrern leicht kegelige Löcher bohrt, erreicht man mit unseren Karnasch Stufenbohrer eine zylindrische Bohrung. Die Bohrer sind axial-radial gefertigt und können an der Zahnbrust leicht nachgeschliffen werden.

In regelbaren Handbohrmaschinen können kleinere Stufenbohrer (bis ca. Stufe 30 mm) problemlos eingesetzt werden. Für größere Modelle empfehlen wir den Einsatz von stationären Maschinen.

Karnasch Blechschälbohrer

Durch den schälenden Schnitt werden die Löcher beidseitig gratfrei. Schälbohrer sind zum Bohren dünner Materialien, vergrößern bestehender Bohrungen und bohren schräger sowie ineinandergelagerter Löcher geeignet. Sie sind für jede Handbohrmaschine geeignet zum Bohren von PVC, Polystrol, Polyester, Plexiglas, Stahl, Hartpapier, Sperrholz und ähnlichen Werkstoffen. Bei schonender Behandlung mehrfach nachschleifbar. Verwenden Sie für alle Metalle Kühlschmiermittel (siehe ab Seite 1143).

Karnasch Step Drills

Karnasch step drills were developed to drill perfectly round and simultaneously deburred holes in iron sheets of 4 mm thickness. The radius transition simultaneously bevels or deburrs the boreholes. While conical drills bore slightly conical holes, our Karnasch step drills bore cylindrical holes. The drills are axial-radially relieved and can be resharpened at the tooth face.

While using a hand drill machine we recommend small step drills (up to diameter 30 mm).

For bigger models we recommend the application of stationary drilling machines.

Karnasch Conical Drills

The holes are deburred on both sides by the preturning cut. Karnasch conical drills are developed to boreholes in thin materials, enlarge existing holes, drill angular holes and make holes penetrating each other. They are suitable for every hand drill machine to drill PVC, polystrol, polyester, plexiglas, steel, card, ply wood and similar materials. These conical drills can be resharpened many times, if treated carefully.

Use for all metals cooling lubricants (see from page 1143).



- Um eine optimale Leistung zu erreichen, kann es erforderlich sein, dass die angegebenen Drehzahlwerte geringfügig geregelt werden müssen.
- Härtere Materialien erfordern geringere Drehzahlen.
- Kleiner Fräser erfordern höhere Drehzahlen.
- Extralange (Länge >150 mm) erfordern geringere Drehzahlen.
- Beim Arbeiten die Bewegung konstant halten und leichten Druck aufbringen.
- Arbeiten unter der optimalen Drehzahl begünstigt das Aussplittern.
- Arbeiten über der optimalen Drehzahl führt zum verstärkten Zahnverschleiß.
- Wenn man das Werkzeug zu heiß werden lässt, kann die Hartlötverbindung schmelzen und der Kopf löst sich vom Schaft.
- Durch die Benutzung verschlissener Werkzeuge und Klemmhülsen wird das Aussplittern begünstigt.
- Den Fräser nicht mehr als ein Drittel seines Umfangs in das Material senken.

- It may be necessary to adjust the speeds shown to achieve optimum performance.
- Harder materials require slower speeds.
- Smaler burrs require faster speeds.
- Extra long burrs (>150 mm long) require slower speeds.
- Apply constant movement and light pressure when in use.
- Running below the optimum speed will encourage chipping.
- Running above the optimum speed will cause tooth wear.
- Allowing the tool to become too hot may cause the braze to melt and detach the head from the shank.
- Using tools and collets that have become worn will encourage chipping.
- Do not sink the burr for more than one third of its periphery.

SICHERHEITSEMPFEHLUNGEN SAFETY RECOMMENDATIONS



Gehörschutz tragen
Wear ear protection



Schutzhandschuhe tragen
Wear protective gloves



Gesichtsschutzmaske tragen
Wear protective mask



Anleitung lesen
Read instructions



Schutzbrille tragen
Wear safety glasses

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10 7000

886



Einsatzhinweise

CERMET-BESTÜCKTE KREISSÄGEBLÄTTER (10 7000)

Ein spezieller Verbundwerkstoff der aus Materialien wie Keramikpulver, Siliziumnitriden, Siliziumcarbiden, Siliziumoxyden und hitzebeständigen Metalloxyden wie Titanium, Chrom, Wolfram, Aluminium, Nickel und Cobalt besteht.

Karnasch hat sich vor Jahren entschlossen in enger Zusammenarbeit mit einem japanischen Hersteller diese High-End Kreissägeblätter zu entwickeln. Japan ist bekannt für seine hervorragenden Schneidwerkzeuge und zählt bis heute zu einem der fortschrittlichsten Länder auf diesem Gebiet. Das Resultat dieser Zusammenarbeit sind extrem widerstandsfähige Kreissägeblätter welche durch Ihre enorme Härte, Schlagfestigkeit höchste Standzeiten garantieren und auch unter schwierigsten Bedingungen und hoher Hitze hervorragende Schnittergebnisse liefern.

Diese Kreissägeblätter werden mit niedrigen Schnittgeschwindigkeiten ($V_c = 100-120$ m/min) auf Maschinen wie TSUNE, NISHIJIMA, NORITAKE, AMADA, KASTO, BEHRINGER-EISELE, KALTENBACH, MEGA, FONG HO, EVERSING und SOCO KENTAI, etc. zum Sägen von Profilen und Vollmaterial (Rechteck, Sechskant und Rund) aus Stahl eingesetzt.

Vorteile:

- Enorme Härte für höchste Standzeiten
- Hohe Hitzebeständig
- Korrosionsbeständig
- Schlagfest
- Extreme Kerbschlagzähigkeit
- Hervorragende Schnittgüte
- Optimierte Spanführung durch spezielle Zahngeometrie mit Spanteilerrillen
- High-Tech aus Japan

Application guidelines

CERMET TIPPED CIRCULAR SAW BLADES (10 7000)

A special composite material consisting of materials such as ceramic powders, silicon nitrides, silicon carbides, silicon oxides and heat-resistant metal oxides such as titanium, chromium, tungsten, aluminum, nickel and cobalt.

Karnasch decided years ago to develop these high-end circular saw blades in close cooperation with a Japanese manufacturer. Japan is known for its outstanding cutting tools and is still one of the most advanced countries in the field today. The result of this cooperation are extremely resistant circular saw blades which guarantee maximum tool life due to their enormous hardness, impact strength and excellent cutting results even under the most difficult conditions and high heat.

These circular saw blades are used at low cutting speeds ($V_c = 100-120$ m/min) on machines such as TSUNE, NISHIJIMA, NORITAKE, AMADA, KASTO, BEHRINGER-EISELE, KALTENBACH, MEGA, FONG HO, EVERSING and SOCO KENTAI, etc. for cutting profiles and solid material (rectangle, hexagon and round) made of steel.

Advantages:

- Enormous hardness for maximum tool life
- High heat resistant
- Corrosion resistant
- Impact toughness
- Extreme impact toughness
- Excellent cutting quality
- Optimized chip guidance through special tooth geometry with chip breaker
- High-tech from Japan



Index

10 7001



887

10 7002



888



Einsatzhinweise

HARTMETALL-BESTÜCKTE KREISSÄGEBLÄTTER TIALN-BESCHICHTET (10 7001)

Diese Kreissägeblätter werden mit hohen Schnittgeschwindigkeiten ($V_c > 200$ m/min) auf Maschinen wie FECEP, TAKEDA, TSUNE, NISHIJIMAX, AMADA, KASTO, BEHRINGER, KALTENBACH, MEGA, FONG HO, EVERSING und SOCO KENTAI, etc. zum Sägen von Profilen und Vollmaterial (Rechteck, Sechskant und Rund) aus Stahl eingesetzt. Zum Sägen von Stahl in H-Form empfehlen wir Maschinen wie FICEP oder TAKEDA.

HARTMETALL-BESTÜCKTE KREISSÄGEBLÄTTER TIALN-BESCHICHTET (10 7002)

Diese Kreissägeblätter werden auf Maschinen wie FECEP, TAKEDA, TSUNE, NISHIJIMAX, AMADA, KASTO, BEHRINGER, KALTENBACH, MEGA, FONG HO, EVERSING und SOCO KENTAI, etc. zum Sägen von Profilen und Vollmaterial (Rechteck, Sechskant und Rund) aus Edelstahl eingesetzt.

Zum Sägen von Edelstahl in H-Form empfehlen wir Maschinen wie FICEP oder TAKEDA.

Die optimale Schnittgeschwindigkeit und der Vorschub für das Sägen von Edelstahl sind abhängig von der Maschine. Für TSUNE, NISHIJIMAX, NORITAKE, AMADA, KASTO, BEHRINGER, KALTENBACH, MEGA, FONG HO, EVERSING und SOCO KENTAI empfehlen wir $V_c = 65$ m/min, $f_z = 0,03$ mm/Zahn.

Für RATTUNDE, BEWO, SINICO, RAS, ADIGE, OMP empfehlen wir $V_c = 80-140$ m/min, $f_z = 0,03-0,08$ mm/Zahn.

Vorteile:

- Hervorragende Schnittgüte
- Hohe Hitzebeständigkeit durch TiAlN-Beschichtung
- Spezielles Hartmetall abgestimmt auf das zu sägende Material
- Spezielle Beschichtung abgestimmt auf das zu sägende Material
- Optimierte Spanführung durch spezielle Zahngeometrie mit Spanleitstufe und Spanbrecher

Kühlung:

Wir empfehlen ein Öl-Nebel-System.

Sägen von Stahl: Nichtwassermischbares pflanzliches Öl verwenden wie unser MECUT MMKS MQL Art. 60 1154 / 60 1153 siehe Seite 1144.

Sägen von Edelstahl: Nichtwassermischbares Mineralöl auf Schwefelbasis mit hoher Viskosität verwenden wie unser MECUT MMKS MQL Art. 60 1163 / 60 1162 siehe Seite 1144.

Sägen von Nichteisenmetallen: Nichtwassermischbares pflanzliches Öl mit niedriger Viskosität verwenden wie unser MECUT MMKS MQL Art. 60 1154 / 60 1153 siehe Seite 1144.

Application guidelines

CARBIDE TIPPED CIRCULAR SAW BLADES TIALN COATED (10 7001)

These circular saw blades are used with high cutting speeds ($V_c > 200$ m/min) on machines such as FECEP, TAKEDA, TSUNE, NISHIJIMAX, AMADA, KASTO, BEHRINGER, KALTENBACH, MEGA, FONG HO, EVERSING and SOCO KENTAI, etc. for cutting profiles and solid material (rectangle, hexagon and round) made of steel. For cutting steel in H-shape we recommend machines such as FICEP or TAKEDA.

CARBIDE TIPPED CIRCULAR SAW BLADES TIALN COATED (10 7002)

These circular saw blades are used on machines such as FECEP, TAKEDA, TSUNE, NISHIJIMAX, AMADA, KASTO, BEHRINGER, KALTENBACH, MEGA, FONG HO, EVERSING and SOCO KENTAI, etc. for cutting profiles and solid material (rectangle, hexagon and round) made of stainless steel.

For cutting stainless steel in H-shape, we recommend machines such as FICEP or TAKEDA.

The optimal cutting speed and the feed rate for sawing stainless steel depend on the machine. For TSUNE, NISHIJIMAX, NORITAKE, AMADA, KASTO, BEHRINGER, KALTENBACH, MEGA, FONG HO, EVERSING and SOCO KENTAI we recommend $V_c = 65$ m/min, $f_z = 0.03$ mm/tooth.

For RATTUNDE, BEWO, SINICO, RAS, ADIGE, OMP we recommend $V_c = 80-140$ m/min, $f_z = 0.03-0.08$ mm/tooth.

Advantages:

- Excellent cutting quality
- High heat resistant by TiAlN coating
- Special carbide matched to the material to be cut
- Optimized chip guidance through special tooth geometry with chip breaker

Cooling:

We recommend an oil mist system.

Cutting steel: Use non-water-soluble vegetable oil like our MECUT MMKS MQL Art. 60 1154 / 60 1153 see page 1144.

Sawing stainless steel: Use high viscosity, non-water-soluble mineral oil based on sulfur such as our MECUT MMKS MQL Art. 60 1163 / 60 1162 see page 1144.

Sawing of non-ferrous metals: Use non-water-soluble vegetable oil with low viscosity like our MECUT MMKS MQL Art. 60 1154 / 60 1153 see page 1144.

1



2



3



4



5



6



7



8



9



Index

9 | INDEX

SUCHE ARTIKEL NACH ARTIKELNUMMER AUFSTEIGEND (INDEX)
SEARCH PRODUCTS BY ARTICLE NUMBER ASCENDING (INDEX)



9.1

1327-1334

1



2



3



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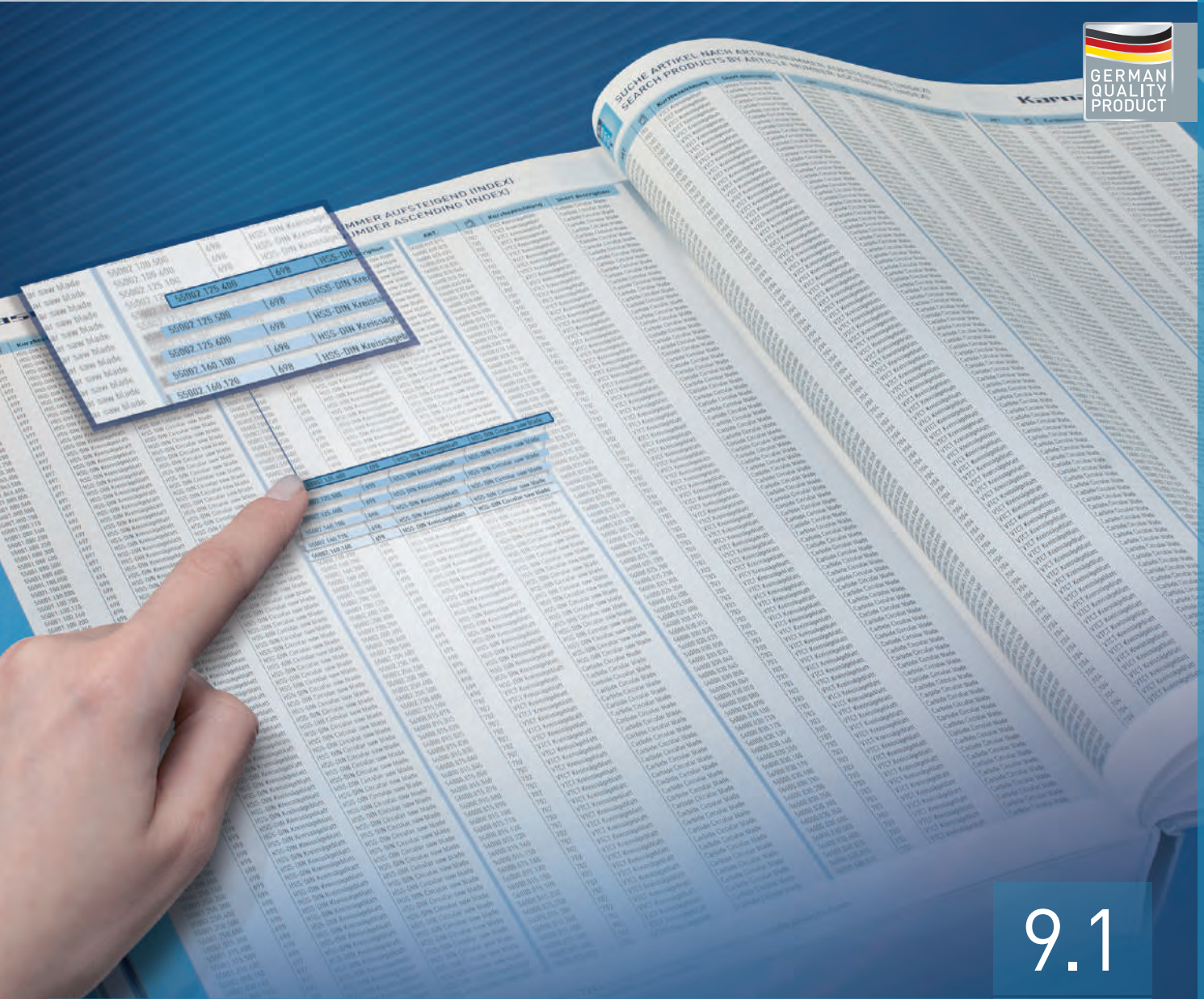
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Ihre Notizen & Zeichnungen
Your notices & drafts



SUCHE ARTIKEL NACH ARTIKELNUMMER AUFSTEIGEND (INDEX)

SEARCH PRODUCTS BY ARTICLE NUMBER ASCENDING (INDEX)



9.1

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mail@karnasch.tools
+49 (0) 33675 - 7265-0

ONLINE



| ART. | Kurzbezeichnung | Short description | ART. | Kurzbezeichnung | Short description | ART. | Kurzbezeichnung | Short description |
|------------|-------------------------------------|-------------------------------|------------|------------------------------|--------------------------------|---------|--------------------------|------------------------|
| 5 1000 200 | 1053 HSS Kreissägeblatt | HSS circular saw blade | 5 6000 063 | 1066 VHM Kreissägeblatt | Carbide circular saw blade | 11 3022 | 717 Frässtift WRC/HP-4 | Rotary burr WRC/HP-4 |
| 5 1000 210 | 1053 HSS Kreissägeblatt | HSS circular saw blade | 5 6000 080 | 1066-1067 VHM Kreissägeblatt | Carbide circular saw blade | 11 3023 | 741 Frässtift WRC/HP-5 | Rotary burr WRC/HP-5 |
| 5 1000 225 | 1053-1053 HSS Kreissägeblatt | HSS circular saw blade | 5 6000 100 | 1067 VHM Kreissägeblatt | Carbide circular saw blade | 11 3024 | 749 Frässtift WRC/HP-6 | Rotary burr WRC/HP-6 |
| 5 1000 250 | 1053-1054 HSS Kreissägeblatt | HSS circular saw blade | 5 6000 125 | 1067 VHM Kreissägeblatt | Carbide circular saw blade | 11 3025 | 725 Frässtift WRC/HP-7 | Rotary burr WRC/HP-7 |
| 5 1000 275 | 1054-1055 HSS Kreissägeblatt | HSS circular saw blade | 5 6000 160 | 1067 VHM Kreissägeblatt | Carbide circular saw blade | 11 3026 | 782 Frässtift WRC/Mini | Rotary burr WRC/Mini |
| 5 1000 300 | 1055 HSS Kreissägeblatt | HSS circular saw blade | 5 6001 015 | 1064 VHM Kreissägeblatt | Carbide circular saw blade | 11 3027 | 733 Frässtift WRC/HP-1 | Rotary burr WRC/HP-1 |
| 5 1000 315 | 1055-1057 HSS Kreissägeblatt | HSS circular saw blade | 5 6001 020 | 1064 VHM Kreissägeblatt | Carbide circular saw blade | 11 3030 | 707 Frässtift KUD/HP-2 | Rotary burr KUD/HP-2 |
| 5 1000 325 | 1057 HSS Kreissägeblatt | HSS circular saw blade | 5 6001 025 | 1064-1065 VHM Kreissägeblatt | Carbide circular saw blade | 11 3031 | 697 Frässtift KUD/HP-2 | Rotary burr KUD/HP-2 |
| 5 1000 350 | 1057-1058 HSS Kreissägeblatt | HSS circular saw blade | 5 6001 030 | 1065 VHM Kreissägeblatt | Carbide circular saw blade | 11 3032 | 718 Frässtift KUD/HP-4 | Rotary burr KUD/HP-4 |
| 5 1000 360 | 1058 HSS Kreissägeblatt | HSS circular saw blade | 5 6001 040 | 1065 VHM Kreissägeblatt | Carbide circular saw blade | 11 3033 | 741 Frässtift KUD/HP-5 | Rotary burr KUD/HP-5 |
| 5 1000 370 | 1058-1059 HSS Kreissägeblatt | HSS circular saw blade | 5 6001 050 | 1066 VHM Kreissägeblatt | Carbide circular saw blade | 11 3034 | 749 Frässtift KUD/HP-6 | Rotary burr KUD/HP-6 |
| 5 1000 400 | 1059 HSS Kreissägeblatt | HSS circular saw blade | 5 6001 063 | 1066 VHM Kreissägeblatt | Carbide circular saw blade | 11 3035 | 725 Frässtift KUD/HP-7 | Rotary burr KUD/HP-7 |
| 5 1000 425 | 1059-1060 HSS Kreissägeblatt | HSS circular saw blade | 5 6001 080 | 1066-1067 VHM Kreissägeblatt | Carbide circular saw blade | 11 3036 | 782 Frässtift KUD/Mini | Rotary burr KUD/Mini |
| 5 1000 450 | 1060 HSS Kreissägeblatt | HSS circular saw blade | 5 6001 100 | 1067 VHM Kreissägeblatt | Carbide circular saw blade | 11 3037 | 733 Frässtift KUD/HP-1 | Rotary burr KUD/HP-1 |
| 5 1000 500 | 1060 HSS Kreissägeblatt | HSS circular saw blade | 5 6001 125 | 1067 VHM Kreissägeblatt | Carbide circular saw blade | 11 3040 | 708 Frässtift TRE/HP-2 | Rotary burr TRE/HP-2 |
| 5 1040 210 | 1053 HSS Kreissägeblatt Kx | HSS circular saw blade Kx | 5 6100 | 1080 Sägeblattaufnahme | Circular saw blade tool holder | 11 3041 | 698 Frässtift TRE/HP-3 | Rotary burr TRE/HP-3 |
| 5 1040 225 | 1053 HSS Kreissägeblatt Kx | HSS circular saw blade Kx | 5 6101 | 1080 Sägeblattaufnahme | Circular saw blade tool holder | 11 3042 | 718 Frässtift TRE/HP-4 | Rotary burr TRE/HP-4 |
| 5 1040 250 | 1053-1053 HSS Kreissägeblatt Kx | HSS circular saw blade Kx | 5 6110 | 1080 Abstandsringe | Distance ring | 11 3043 | 742 Frässtift TRE/HP-5 | Rotary burr TRE/HP-5 |
| 5 1040 275 | 1053-1054 HSS Kreissägeblatt Kx | HSS circular saw blade Kx | 5 6111 | 1080 Mutter | Nut | 11 3044 | 750 Frässtift TRE/HP-6 | Rotary burr TRE/HP-6 |
| 5 1040 300 | 1054-1055 HSS Kreissägeblatt Kx | HSS circular saw blade Kx | 5 6120 | 1080 Abstandsringe | Distance ring | 11 3045 | 726 Frässtift TRE/HP-7 | Rotary burr TRE/HP-7 |
| 5 1040 315 | 1055 HSS Kreissägeblatt Kx | HSS circular saw blade Kx | 5 6121 | 1080 Mutter | Nut | 11 3046 | 782 Frässtift TRE/Mini | Rotary burr TRE/Mini |
| 5 1040 350 | 1055-1057 HSS Kreissägeblatt Kx | HSS circular saw blade Kx | 10 7000 | 886 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3047 | 734 Frässtift TRE/HP-1 | Rotary burr TRE/HP-1 |
| 5 1040 370 | 1057 HSS Kreissägeblatt Kx | HSS circular saw blade Kx | 10 7001 | 887 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3050 | 708 Frässtift RBF/HP-2 | Rotary burr RBF/HP-2 |
| 5 1300 210 | 1053 HSS-C05 Kreissägeblatt | HSS-C05 circular saw blade | 10 7002 | 888 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3051 | 699 Frässtift RBF/HP-3 | Rotary burr RBF/HP-3 |
| 5 1300 225 | 1053-1053 HSS-C05 Kreissägeblatt | HSS-C05 circular saw blade | 10 7050 | 889 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3052 | 719 Frässtift RBF/HP-4 | Rotary burr RBF/HP-4 |
| 5 1300 250 | 1053-1054 HSS-C05 Kreissägeblatt | HSS-C05 circular saw blade | 10 7100 | 892 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3053 | 742 Frässtift RBF/HP-5 | Rotary burr RBF/HP-5 |
| 5 1300 275 | 1054-1055 HSS-C05 Kreissägeblatt | HSS-C05 circular saw blade | 10 7130 | 893 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3054 | 750 Frässtift RBF/HP-6 | Rotary burr RBF/HP-6 |
| 5 1300 300 | 1055 HSS-C05 Kreissägeblatt | HSS-C05 circular saw blade | 10 7150 | 894 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3055 | 726 Frässtift RBF/HP-7 | Rotary burr RBF/HP-7 |
| 5 1300 315 | 1055-1057 HSS-C05 Kreissägeblatt | HSS-C05 circular saw blade | 10 7300 | 896 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3056 | 782 Frässtift RBF/Mini | Rotary burr RBF/Mini |
| 5 1300 325 | 1057 HSS-C05 Kreissägeblatt | HSS-C05 circular saw blade | 10 7400 | 897 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3057 | 734 Frässtift RBF/HP-1 | Rotary burr RBF/HP-1 |
| 5 1300 350 | 1057-1058 HSS-C05 Kreissägeblatt | HSS-C05 circular saw blade | 10 8000 | 902 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3060 | 709 Frässtift SPG/HP-2 | Rotary burr SPG/HP-2 |
| 5 1300 370 | 1058-1059 HSS-C05 Kreissägeblatt | HSS-C05 circular saw blade | 10 8055 | 899 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3061 | 710 Frässtift SPG/HP-3 | Rotary burr SPG/HP-3 |
| 5 1300 400 | 1059 HSS-C05 Kreissägeblatt | HSS-C05 circular saw blade | 10 8056 | 898 Schutzhaube | Protection cover | 11 3062 | 719 Frässtift SPG/HP-4 | Rotary burr SPG/HP-4 |
| 5 1300 425 | 1059-1060 HSS-C05 Kreissägeblatt | HSS-C05 circular saw blade | 10 9050 | 923 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3063 | 743 Frässtift SPG/HP-5 | Rotary burr SPG/HP-5 |
| 5 1300 450 | 1060 HSS-C05 Kreissägeblatt | HSS-C05 circular saw blade | 11 1000 | 905 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3064 | 751 Frässtift SPG/HP-6 | Rotary burr SPG/HP-6 |
| 5 1300 500 | 1060 HSS-C05 Kreissägeblatt | HSS-C05 circular saw blade | 11 1050 | 907 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3065 | 727 Frässtift SPG/HP-7 | Rotary burr SPG/HP-7 |
| 5 1340 250 | 1053-1054 HSS-C05 Kreissägeblatt Kx | HSS-C05 circular saw blade Kx | 11 1100 | 911 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3066 | 782 Frässtift SPG/Mini | Rotary burr SPG/Mini |
| 5 1340 275 | 1054-1055 HSS-C05 Kreissägeblatt Kx | HSS-C05 circular saw blade Kx | 11 1120 | 913 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3067 | 735 Frässtift SPG/HP-1 | Rotary burr SPG/HP-1 |
| 5 1340 300 | 1055 HSS-C05 Kreissägeblatt Kx | HSS-C05 circular saw blade Kx | 11 1130 | 915 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3070 | 709 Frässtift H/HP-2 | Rotary burr H/HP-2 |
| 5 1340 315 | 1055-1057 HSS-C05 Kreissägeblatt Kx | HSS-C05 circular saw blade Kx | 11 1150 | 1039 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3071 | 701 Frässtift H/HP-3 | Rotary burr H/HP-3 |
| 5 1340 350 | 1057-1058 HSS-C05 Kreissägeblatt Kx | HSS-C05 circular saw blade Kx | 11 1170 | 1039 HSS Kreissägeblatt | HSS circular saw blade | 11 3072 | 720 Frässtift H/HP-4 | Rotary burr H/HP-4 |
| 5 3950 | 1078 GF Kreissägeblatt | GF circular saw blade | 11 1200 | 1018 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3073 | 743 Frässtift H/HP-5 | Rotary burr H/HP-5 |
| 5 3951 | 1079 GF Kreissägeblatt | GF circular saw blade | 11 1215 | 1019 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3074 | 751 Frässtift H/HP-6 | Rotary burr H/HP-6 |
| 5 3952 | 1079 GF Kreissägeblatt | GF circular saw blade | 11 1220 | 1020 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3075 | 727 Frässtift H/HP-7 | Rotary burr H/HP-7 |
| 5 3960 | 1078 GF Kreissägeblatt | GF circular saw blade | 11 1230 | 1021 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3077 | 735 Frässtift H/HP-1 | Rotary burr H/HP-1 |
| 5 3961 | 1078 GF Kreissägeblatt | GF circular saw blade | 11 1232 | 1022 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3080 | 710 Frässtift KEL/HP-2 | Rotary burr KEL/HP-2 |
| 5 3965 | 1077 GF Kreissägeblatt | GF circular saw blade | 11 1235 | 1023 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3081 | 701 Frässtift KEL/HP-3 | Rotary burr KEL/HP-3 |
| 5 3970 | 1079 GF Kreissägeblatt | GF circular saw blade | 11 1238 | 1024 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3082 | 720 Frässtift KEL/HP-4 | Rotary burr KEL/HP-4 |
| 5 3980 | 1076 GF Kreissägeblatt | GF circular saw blade | 11 1239 | 1025 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3083 | 744 Frässtift KEL/HP-5 | Rotary burr KEL/HP-5 |
| 5 3990 | 1076 GF Kreissägeblatt | GF circular saw blade | 11 1250 | 964 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3084 | 752 Frässtift KEL/HP-6 | Rotary burr KEL/HP-6 |
| 5 4000 | 1076 GF Kreissägeblatt | GF circular saw blade | 11 1260 | 965 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3085 | 728 Frässtift KEL/HP-7 | Rotary burr KEL/HP-7 |
| 5 4010 | 1076 GF Kreissägeblatt | GF circular saw blade | 11 1300 | 991 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3087 | 736 Frässtift KEL/HP-1 | Rotary burr KEL/HP-1 |
| 5 5000 020 | 1072 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1320 | 935 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3090 | 710 Frässtift SKM/HP-2 | Rotary burr SKM/HP-2 |
| 5 5000 025 | 1072 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1340 | 1040 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3091 | 702 Frässtift SKM/HP-3 | Rotary burr SKM/HP-3 |
| 5 5000 032 | 1072 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1345 | 1041 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3092 | 721 Frässtift SKM/HP-4 | Rotary burr SKM/HP-4 |
| 5 5000 040 | 1072-1073 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1350 | 937 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3093 | 744 Frässtift SKM/HP-5 | Rotary burr SKM/HP-5 |
| 5 5000 050 | 1073 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1370 | 938 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3094 | 752 Frässtift SKM/HP-6 | Rotary burr SKM/HP-6 |
| 5 5000 063 | 1073 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1400 | 1035-1036 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3095 | 728 Frässtift SKM/HP-7 | Rotary burr SKM/HP-7 |
| 5 5000 080 | 1073 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1425 | 941 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3096 | 702 Frässtift WKN/HP-3 | Rotary burr WKN/HP-3 |
| 5 5000 100 | 1073-1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1430 | 943 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3097 | 736 Frässtift SKM/HP-1 | Rotary burr SKM/HP-1 |
| 5 5000 125 | 1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1450 | 945 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3098 | 721 Frässtift WKN/HP-4 | Rotary burr WKN/HP-4 |
| 5 5000 160 | 1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1460 | 947 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3099 | 711 Frässtift WKN/HP-2 | Rotary burr WKN/HP-2 |
| 5 5000 200 | 1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1470 | 949 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3100 | 711 Frässtift KSJ/HP-2 | Rotary burr KSJ/HP-2 |
| 5 5000 250 | 1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1480 | 1037 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3101 | 703 Frässtift KSJ/HP-3 | Rotary burr KSJ/HP-3 |
| 5 5000 315 | 1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1510 | 983 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3110 | 712 Frässtift KSK/HP-2 | Rotary burr KSK/HP-2 |
| 5 5001 050 | 1073 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1520 | 983 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3111 | 703 Frässtift KSK/HP-3 | Rotary burr KSK/HP-3 |
| 5 5001 063 | 1073 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1600 | 1005 HM Kreissägeblatt | T.C.T. circular saw blade | 11 3196 | 782 Frässtift SKK/Mini | Rotary burr SKK/Mini |
| 5 5001 080 | 1073 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1602 | 1007 HM Kreissägeblatt | T.C.T. circular saw blade | 11 4010 | 695 Frässtift ZYA/Radius | Rotary burr ZYA/Radius |
| 5 5001 100 | 1073-1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1604 | 1009 HM Kreissägeblatt | T.C.T. circular saw blade | 11 4011 | 780 Frässtift S/HP-2 | Rotary burr S/HP-2 |
| 5 5001 125 | 1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1610 | 1011 HM Kreissägeblatt | T.C.T. circular saw blade | 11 4019 | 786 Frässtift Curve/ZYA | Rotary burr Curve/ZYA |
| 5 5001 160 | 1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1615 | 1012 HM Kreissägeblatt | T.C.T. circular saw blade | 11 4020 | 787 Frässtift Curve/ZYB | Rotary burr Curve/ZYB |
| 5 5001 200 | 1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 1630 | 1042 Reduzierring | Reduction ring | 11 4021 | 788 Frässtift Curve/WRC | Rotary burr Curve/WRC |
| 5 5001 250 | 1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 3000 | 706 Frässtift ZYA/HP-2 | Rotary burr ZYA/HP-2 | 11 4022 | 789 Frässtift Curve/WRC | Rotary burr Curve/WRC |
| 5 5001 315 | 1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 3001 | 692 Frässtift ZYA/HP-3 | Rotary burr ZYA/HP-3 | 11 4023 | 790 Frässtift Curve/RBF | Rotary burr Curve/RBF |
| 5 5002 050 | 1073 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 3002 | 716 Frässtift ZYA/HP-4 | Rotary burr ZYA/HP-4 | 11 4024 | 791 Frässtift Curve/SPG | Rotary burr Curve/SPG |
| 5 5002 063 | 1073 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 3003 | 740 Frässtift ZYA/HP-5 | Rotary burr ZYA/HP-5 | 11 4025 | 792 Frässtift Curve/KEL | Rotary burr Curve/KEL |
| 5 5002 080 | 1073 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 3004 | 748 Frässtift ZYA/HP-6 | Rotary burr ZYA/HP-6 | 11 4026 | 793 Frässtift Curve/KSJ | Rotary burr Curve/KSJ |
| 5 5002 100 | 1073-1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 3005 | 724 Frässtift ZYA/HP-7 | Rotary burr ZYA/HP-7 | 11 4027 | 794 Frässtift Curve/KSK | Rotary burr Curve/KSK |
| 5 5002 125 | 1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 3006 | 782 Frässtift ZYA/Mini | Rotary burr ZYA/Mini | 11 4031 | 756 Frässtift ZYA/HP-9 | Rotary burr ZYA/HP-9 |
| 5 5002 160 | 1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 3007 | 732 Frässtift ZYA/HP-1 | Rotary burr ZYA/HP-1 | 11 4033 | 757 Frässtift WRC/HP-9 | Rotary burr WRC/HP-9 |
| 5 5002 200 | 1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 3010 | 706 Frässtift ZYB/HP-2 | Rotary burr ZYB/HP-2 | 11 4034 | 757 Frässtift KUD/HP-9 | Rotary burr KUD/HP-9 |
| 5 5002 250 | 1074 HSS-DIN Kreissägeblatt | HSS-DIN circular saw blade | 11 3011 | 693 | | | | |

| ART. | Kurzbezeichnung | Short description | ART. | Kurzbezeichnung | Short description | ART. | Kurzbezeichnung | Short description | | | |
|----------|-----------------|-----------------------------|--------------------------|-----------------|-------------------|--------------------------------|---------------------------|-------------------|-----|------------------------------|----------------------------------|
| 11 4044 | 765 | Frässtift KUD/HP-8 | Rotary burr KUD/HP-8 | 11 4934 | 818 | Frässtift Set 10/12 mm 10 Stk. | Burr set 10/12 mm 10 pcs. | 11 5096 | 702 | Frässtift WKN/HP-3 | Rotary burr WKN/HP-3 |
| 11 4045 | 766 | Frässtift TRE/HP-8 | Rotary burr TRE/HP-8 | 11 4934U | 818 | Frässtift Set 10/12 mm 10 Stk. | Burr set 10/12 mm 10 pcs. | 11 5097 | 736 | Frässtift SKM/HP-1 | Rotary burr SKM/HP-1 |
| 11 4046 | 766 | Frässtift RBF/HP-8 | Rotary burr RBF/HP-8 | 11 4935U | 818 | Frässtift Set 10/12 mm 10 Stk. | Burr set 10/12 mm 10 pcs. | 11 5098 | 721 | Frässtift WKN/HP-4 | Rotary burr WKN/HP-4 |
| 11 4047 | 767 | Frässtift SGP/HP-8 | Rotary burr SGP/HP-8 | 11 4942 | 819 | Frässtift Set 12 mm 10 Stk. | Burr set 12 mm 10 pcs. | 11 5099 | 711 | Frässtift WKN/HP-2 | Rotary burr WKN/HP-2 |
| 11 4048 | 767 | Frässtift H/HP-8 | Rotary burr H/HP-8 | 11 4942U | 819 | Frässtift Set 12 mm 10 Stk. | Burr set 12 mm 10 pcs. | 11 5100 | 701 | Frässtift KSJ/HP-2 | Rotary burr KSJ/HP-2 |
| 11 4049 | 768 | Frässtift KEL/HP-8 | Rotary burr KEL/HP-8 | 11 4943U | 819 | Frässtift Set 12 mm 10 Stk. | Burr set 12 mm 10 pcs. | 11 5101 | 703 | Frässtift KSJ/HP-3 | Rotary burr KSJ/HP-3 |
| 11 4051 | 798 | Frässtift Combi + Form | Rotary burr Combi + Form | 11 4945 | 810 | Frässtift Display leer | Burr display empty | 11 5110 | 712 | Frässtift KSK/HP-2 | Rotary burr KSK/HP-2 |
| 11 4052 | 798 | Frässtift Combi + Form | Rotary burr Combi + Form | 11 4947 | 816 | Frässtift Koffer leer | Burr set empty | 11 5111 | 703 | Frässtift KSK/HP-3 | Rotary burr KSK/HP-3 |
| 11 4053 | 799 | Frässtift Combi + Form | Rotary burr Combi + Form | 11 4948 | 811 | Frässtift Display leer | Burr display empty | 11 5196 | 782 | Frässtift SKM/Mini | Rotary burr SKM/Mini |
| 11 4058 | 799 | Frässtift Combi + Form | Rotary burr Combi + Form | 11 4950 | 818 | Frässtift Koffer leer | Burr set empty | 11 6001 | 200 | GFK/CFK Fräser | GFRP/CFRP router |
| 11 4059 | 800 | Frässtift Combi + Form | Rotary burr Combi + Form | 11 4952 | 814 | Frässtift Koffer leer | Burr set empty | 11 6001 | 781 | GFK/CFK Fräser | GFRP/CFRP router |
| 11 4060 | 800 | Frässtift Combi + Form | Rotary burr Combi + Form | 11 4953 | 815 | Frässtift Koffer leer | Burr set empty | 11 6002 | 200 | GFK/CFK Fräser | GFRP/CFRP router |
| 11 4061 | 801 | Frässtift Combi + Form | Rotary burr Combi + Form | 11 4954 | 822 | Frässtift Koffer leer | Burr set empty | 11 6002 | 781 | GFK/CFK Fräser | GFRP/CFRP router |
| 11 4062 | 801 | Frässtift Combi + Form | Rotary burr Combi + Form | 11 4955 | 811 | Frässtift Display leer | Burr display empty | 11 6003 | 200 | GFK/CFK Fräser | GFRP/CFRP router |
| 11 4063 | 802 | Frässtift Combi + Form | Rotary burr Combi + Form | 11 5000 | 706 | Frässtift ZYA/HP-2 | Rotary burr ZYA/HP-2 | 11 6003 | 781 | GFK/CFK Fräser | GFRP/CFRP router |
| 11 4070 | 804 | Frässtift Reifenreparatur | Rotary burr tire repair | 11 5001 | 692 | Frässtift ZYA/HP-3 | Rotary burr ZYA/HP-3 | 11 6004 | 200 | GFK/CFK Fräser | GFRP/CFRP router |
| 11 4071 | 804 | Frässtift Reifenreparatur | Rotary burr tire repair | 11 5002 | 716 | Frässtift ZYA/HP-4 | Rotary burr ZYA/HP-4 | 11 6004 | 781 | GFK/CFK Fräser | GFRP/CFRP router |
| 11 4072 | 804 | Frässtift ZYA/HP-2 | Rotary burr ZYA/HP-2 | 11 5003 | 740 | Frässtift ZYA/HP-5 | Rotary burr ZYA/HP-5 | 11 6010 | 695 | Frässtift ZYA/Radius | Rotary burr ZYA/Radius |
| 11 4073 | 804 | Frässtift Reifenreparatur | Rotary burr tire repair | 11 5004 | 748 | Frässtift ZYA/HP-6 | Rotary burr ZYA/HP-6 | 11 6011 | 780 | Frässtift S/HP-2 | Rotary burr S/HP-2 |
| 11 4074 | 805 | Frässtift Reifenreparatur | Rotary burr tire repair | 11 5005 | 724 | Frässtift ZYA/HP-7 | Rotary burr ZYA/HP-7 | 11 6019 | 786 | Frässtift Curve/ZYA | Rotary burr Curve/ZYA |
| 11 4075 | 805 | Frässtift Reifenreparatur | Rotary burr tire repair | 11 5006 | 782 | Frässtift ZYA/Mini | Rotary burr ZYA/Mini | 11 6020 | 787 | Frässtift Curve/ZYB | Rotary burr Curve/ZYB |
| 11 4076 | 806 | Frässtift Reifenreparatur | Rotary burr tire repair | 11 5007 | 732 | Frässtift ZYA/HP-1 | Rotary burr ZYA/HP-1 | 11 6021 | 788 | Frässtift Curve/WRC | Rotary burr Curve/WRC |
| 11 4077 | 806 | Frässtift Reifenreparatur | Rotary burr tire repair | 11 5010 | 706 | Frässtift ZYB/HP-2 | Rotary burr ZYB/HP-2 | 11 6022 | 789 | Frässtift Curve/WRC | Rotary burr Curve/WRC |
| 11 4078 | 807 | Frässtift Reifenreparatur | Rotary burr tire repair | 11 5011 | 693 | Frässtift ZYB/HP-3 | Rotary burr ZYB/HP-3 | 11 6023 | 790 | Frässtift Curve/RBF | Rotary burr Curve/RBF |
| 11 4080 | 772 | Frässtift ZYA/HP-11 | Rotary burr ZYA/HP-11 | 11 5012 | 716 | Frässtift ZYB/HP-4 | Rotary burr ZYB/HP-4 | 11 6024 | 791 | Frässtift Curve/SPG | Rotary burr Curve/SPG |
| 11 4081 | 772 | Frässtift ZYB/HP-11 | Rotary burr ZYB/HP-11 | 11 5013 | 740 | Frässtift ZYB/HP-5 | Rotary burr ZYB/HP-5 | 11 6025 | 792 | Frässtift Curve/KEL | Rotary burr Curve/KEL |
| 11 4082 | 773 | Frässtift WRC/HP-11 | Rotary burr WRC/HP-11 | 11 5014 | 748 | Frässtift ZYB/HP-6 | Rotary burr ZYB/HP-6 | 11 6026 | 793 | Frässtift Curve/KSJ | Rotary burr Curve/KSJ |
| 11 4083 | 773 | Frässtift KUD/HP-11 | Rotary burr KUD/HP-11 | 11 5015 | 724 | Frässtift ZYB/HP-7 | Rotary burr ZYB/HP-7 | 11 6027 | 794 | Frässtift Curve/KSK | Rotary burr Curve/KSK |
| 11 4084 | 774 | Frässtift RBF/HP-11 | Rotary burr RBF/HP-11 | 11 5017 | 732 | Frässtift ZYB/HP-1 | Rotary burr ZYB/HP-1 | 11 6031 | 756 | Frässtift ZYA/HP-9 | Rotary burr ZYA/HP-9 |
| 11 4085 | 774 | Frässtift SPG/HP-11 | Rotary burr SPG/HP-11 | 11 5020 | 707 | Frässtift WRC/HP-2 | Rotary burr WRC/HP-2 | 11 6031 | 757 | Frässtift WRC/HP-9 | Rotary burr WRC/HP-9 |
| 11 4701 | 778 | Bohrfräser | Bor for key services | 11 5021 | 696 | Frässtift WRC/HP-3 | Rotary burr WRC/HP-3 | 11 6034 | 757 | Frässtift KUD/HP-9 | Rotary burr KUD/HP-9 |
| 11 4702 | 778 | HM-Lochsäge | T.C.T. hole saw | 11 5022 | 717 | Frässtift WRC/HP-4 | Rotary burr WRC/HP-4 | 11 6035 | 758 | Frässtift TRE/HP-9 | Rotary burr TRE/HP-9 |
| 11 4703 | 1116 | Geradschleifer | Straight grinder | 11 5023 | 741 | Frässtift WRC/HP-5 | Rotary burr WRC/HP-5 | 11 6036 | 758 | Frässtift RBF/HP-9 | Rotary burr RBF/HP-9 |
| 11 4704 | 1126 | Geradschleifer | Straight grinder | 11 5024 | 749 | Frässtift WRC/HP-6 | Rotary burr WRC/HP-6 | 11 6037 | 759 | Frässtift SGP/HP-9 | Rotary burr SGP/HP-9 |
| 11 4705 | 1112 | Geradschleifer | Straight grinder | 11 5025 | 725 | Frässtift WRC/HP-7 | Rotary burr WRC/HP-7 | 11 6038 | 759 | Frässtift H/HP-9 | Rotary burr H/HP-9 |
| 11 4706 | 1118 | Geradschleifer | Straight grinder | 11 5026 | 782 | Frässtift WRC/Mini | Rotary burr WRC/Mini | 11 6039 | 760 | Frässtift KEL/HP-9 | Rotary burr KEL/HP-9 |
| 11 4707 | 1120 | Geradschleifer | Straight grinder | 11 5027 | 733 | Frässtift WRC/HP-1 | Rotary burr WRC/HP-1 | 11 6041 | 764 | Frässtift ZYA/HP-8 | Rotary burr ZYA/HP-8 |
| 11 4708 | 1122 | Geradschleifer | Straight grinder | 11 5030 | 707 | Frässtift KUD/HP-2 | Rotary burr KUD/HP-2 | 11 6042 | 764 | Frässtift ZYB/HP-8 | Rotary burr ZYB/HP-8 |
| 11 4709 | 1122 | Geradschleifer | Straight grinder | 11 5031 | 697 | Frässtift KUD/HP-3 | Rotary burr KUD/HP-3 | 11 6043 | 765 | Frässtift WRC/HP-8 | Rotary burr WRC/HP-8 |
| 11 4710 | 1130 | Geradschleifer | Straight grinder | 11 5032 | 718 | Frässtift KUD/HP-4 | Rotary burr KUD/HP-4 | 11 6044 | 765 | Frässtift KUD/HP-8 | Rotary burr KUD/HP-8 |
| 11 4711 | 1132 | Geradschleifer | Straight grinder | 11 5033 | 741 | Frässtift KUD/HP-5 | Rotary burr KUD/HP-5 | 11 6045 | 766 | Frässtift TRE/HP-8 | Rotary burr TRE/HP-8 |
| 11 4712 | 1134 | Geradschleifer | Straight grinder | 11 5034 | 749 | Frässtift KUD/HP-6 | Rotary burr KUD/HP-6 | 11 6046 | 766 | Frässtift RBF/HP-8 | Rotary burr RBF/HP-8 |
| 11 4713 | 1135 | Geradschleifer | Straight grinder | 11 5035 | 725 | Frässtift KUD/HP-7 | Rotary burr KUD/HP-7 | 11 6047 | 767 | Frässtift SGP/HP-8 | Rotary burr SGP/HP-8 |
| 11 4714 | 1114 | Geradschleifer | Straight grinder | 11 5036 | 782 | Frässtift KUD/Mini | Rotary burr KUD/Mini | 11 6048 | 767 | Frässtift H/HP-8 | Rotary burr H/HP-8 |
| 11 4750 | 1113 | Spannzange | Collet | 11 5037 | 733 | Frässtift KUD/HP-1 | Rotary burr KUD/HP-1 | 11 6049 | 768 | Frässtift KEL/HP-8 | Rotary burr KEL/HP-8 |
| 11 4751 | 1121 | Spannzange | Collet | 11 5040 | 708 | Frässtift TRE/HP-2 | Rotary burr TRE/HP-2 | 11 6051 | 798 | Frässtift Combi + Form | Rotary burr Combi + Form |
| 11 4752 | 1121 | Spannzange | Collet | 11 5041 | 698 | Frässtift TRE/HP-3 | Rotary burr TRE/HP-3 | 11 6052 | 798 | Frässtift Combi + Form | Rotary burr Combi + Form |
| 11 4753 | 1131 | Spannzange | Collet | 11 5042 | 718 | Frässtift TRE/HP-4 | Rotary burr TRE/HP-4 | 11 6053 | 799 | Frässtift Combi + Form | Rotary burr Combi + Form |
| 11 4754 | 1131 | Spannzange | Collet | 11 5043 | 742 | Frässtift TRE/HP-5 | Rotary burr TRE/HP-5 | 11 6058 | 799 | Frässtift Combi + Form | Rotary burr Combi + Form |
| 11 4760 | 1113 | Zuluftschlauch | Air supply hose | 11 5044 | 750 | Frässtift TRE/HP-6 | Rotary burr TRE/HP-6 | 11 6059 | 800 | Frässtift Combi + Form | Rotary burr Combi + Form |
| 11 4761 | 1117 | Abluftschlauch | Exhaust hose | 11 5045 | 726 | Frässtift TRE/HP-7 | Rotary burr TRE/HP-7 | 11 6060 | 800 | Frässtift Combi + Form | Rotary burr Combi + Form |
| 11 4762 | 1117 | Schlauchset | Hose set | 11 5046 | 782 | Frässtift TRE/Mini | Rotary burr TRE/Mini | 11 6061 | 801 | Frässtift Combi + Form | Rotary burr Combi + Form |
| 11 4763 | 1125 | Abluftschlauch | Exhaust hose | 11 5047 | 734 | Frässtift TRE/HP-1 | Rotary burr TRE/HP-1 | 11 6063 | 802 | Frässtift Combi + Form | Rotary burr Combi + Form |
| 11 4764 | 1127 | Zuluftschlauch | Air supply hose | 11 5050 | 708 | Frässtift RBF/HP-2 | Rotary burr RBF/HP-2 | 11 6080 | 772 | Frässtift ZYA/HP-11 | Rotary burr ZYA/HP-11 |
| 11 4765 | 1125 | Schlauchset | Hose set | 11 5051 | 699 | Frässtift RBF/HP-3 | Rotary burr RBF/HP-3 | 11 6081 | 772 | Frässtift ZYB/HP-11 | Rotary burr ZYB/HP-11 |
| 11 4766 | 1131 | Abluftschlauch | Exhaust hose | 11 5052 | 719 | Frässtift RBF/HP-4 | Rotary burr RBF/HP-4 | 11 6082 | 773 | Frässtift WRC/HP-11 | Rotary burr WRC/HP-11 |
| 11 4767 | 1131 | Schlauchset | Hose set | 11 5053 | 742 | Frässtift RBF/HP-5 | Rotary burr RBF/HP-5 | 11 6083 | 773 | Frässtift KUD/HP-11 | Rotary burr KUD/HP-11 |
| 11 4768 | 1131 | Zuluftschlauch | Air supply hose | 11 5054 | 750 | Frässtift RBF/HP-6 | Rotary burr RBF/HP-6 | 11 6084 | 774 | Frässtift RBF/HP-11 | Rotary burr RBF/HP-11 |
| 11 4770 | 1138 | Schwenkverbindung | Swivel connector | 11 5055 | 726 | Frässtift RBF/HP-7 | Rotary burr RBF/HP-7 | 11 6085 | 774 | Frässtift SPG/HP-11 | Rotary burr SPG/HP-11 |
| 11 4771 | 1138 | Wartungsgerät | Vitalizer unit | 11 5056 | 782 | Frässtift RBF/Mini | Rotary burr RBF/Mini | 20 1001 | 585 | Auswurfeder | Ejector spring |
| 11 4772 | 1139 | Ersatzhebel | Lever | 11 5057 | 734 | Frässtift RBF/HP-1 | Rotary burr RBF/HP-1 | 20 1002 | 585 | Auswurfeder | Ejector spring |
| 11 4773 | 1139 | Ersatzhebel | Lever | 11 5060 | 709 | Frässtift SPG/HP-2 | Rotary burr SPG/HP-2 | 20 1003 | 585 | Auswurfeder | Ejector spring |
| 11 4774 | 1139 | Punsch | Punch | 11 5061 | 710 | Frässtift SPG/HP-3 | Rotary burr SPG/HP-3 | 20 1005 | 585 | Auswurfeder | Ejector spring |
| 11 4805 | 812 | Frässtift-Set Mini 10 Stk. | Burr set „Mini“ 10 pcs. | 11 5062 | 709 | Frässtift SPG/HP-4 | Rotary burr SPG/HP-4 | 20 1006 | 585 | Auswurfeder | Ejector spring |
| 11 4805U | 812 | Frässtift-Set Mini 10 Stk. | Burr set „Mini“ 10 pcs. | 11 5063 | 743 | Frässtift SPG/HP-5 | Rotary burr SPG/HP-5 | 20 1007 | 585 | Auswurfeder | Ejector spring |
| 11 4820 | 813 | Frässtift-Set Mini 50 Stk. | Burr set „Mini“ 50 pcs. | 11 5064 | 751 | Frässtift SPG/HP-6 | Rotary burr SPG/HP-6 | 20 1010 | 567 | Lochsäge Power-Max 10 | Hole saw Power-Max 10 |
| 11 4820U | 813 | Frässtift-Set Mini 50 Stk. | Burr set „Mini“ 50 pcs. | 11 5065 | 727 | Frässtift SPG/HP-7 | Rotary burr SPG/HP-7 | 20 1010A | 567 | Lochsäge Power-Max 10 | Hole saw Power-Max 10 |
| 11 4837 | 815 | Frässtift Set 3 mm 50 Stk. | Burr set 3 mm 50 pcs. | 11 5066 | 782 | Frässtift SPG/Mini | Rotary burr SPG/Mini | 20 1015 | 571 | Lochsäge Power-Max 20 | Hole saw Power-Max 20 |
| 11 4837U | 815 | Frässtift Set 3 mm 50 Stk. | Burr set 3 mm 50 pcs. | 11 5067 | 735 | Frässtift SPG/HP-1 | Rotary burr SPG/HP-1 | 20 1015A | 571 | Lochsäge Power-Max 20 | Hole saw Power-Max 20 |
| 11 4838U | 815 | Frässtift Set 3 mm 50 Stk. | Burr set 3 mm 50 pcs. | 11 5070 | 709 | Frässtift H/HP-2 | Rotary burr H/HP-2 | 20 1020 | 587 | Lochsäge Easy-Cut 5 | Hole saw Easy-Cut 5 |
| 11 4853 | 810 | Frässtift Display 40 Stk. | Burr display 40 pcs. | 11 5071 | 701 | Frässtift H/HP-3 | Rotary burr H/HP-3 | 20 1025 | 589 | Lochsäge Easy-Cut 3 | Hole saw Easy-Cut 3 |
| 11 4853U | 810 | Frässtift Display 40 Stk. | Burr display 40 pcs. | 11 5072 | 720 | Frässtift H/HP-4 | Rotary burr H/HP-4 | 20 1113 | 580 | Zentrierbohrer | Center drill |
| 11 4854U | 810 | Frässtift Display 40 Stk. | Burr display 40 pcs. | 11 5073 | 743 | Frässtift H/HP-5 | Rotary burr H/HP-5 | 20 1114 | 586 | Zentrierbohrer | Center drill |
| 11 4855 | 811 | Frässtift Display 64 Stk. | Burr display 64 pcs. | 11 5074 | 751 | Frässtift H/HP-6 | Rotary burr H/HP-6 | 20 1115 | 580 | Zentrierbohrer | Center drill |
| 11 4855U | 811 | Frässtift Display 64 Stk. | Burr display 64 pcs. | 11 5075 | 727 | Frässtift H/HP-7 | Rotary burr H/HP-7 | 20 1116 | 586 | Zentrierbohrer | Center drill |
| 11 4856U | 811 | Frässtift Display 64 Stk. | Burr display 64 pcs. | 11 5077 | 735 | Frässtift H/HP-1 | Rotary burr H/HP-1 | 20 1121 | 583 | Lochsäge Power-Max 60 | Hole saw Power-Max 60 |
| 11 4903 | 814 | Frässtift Set 3 mm 10 Stk. | Burr set 3 mm 10 pcs. | 11 5080 | 710 | Frässtift KEL/HP-2 | Rotary burr KEL/HP-2 | 20 1121A | 583 | Lochsäge Power-Max 60 | Hole saw Power-Max 60 |
| 11 4904 | 814 | Frässtift Set 3 mm 10 Stk. | Burr set 3 mm 10 pcs. | 11 5081 | 701 | Frässtift KEL/HP-3 | Rotary burr KEL/HP-3 | 20 1123 | 568 | Schaft SDS | Shank SDS |
| 11 4904U | 814 | Frässtift Set 12 mm 10 Stk. | Burr set 12 mm 10 pcs. | 11 5082 | 720 | Frässtift KEL/HP-4 | Rotary burr KEL/HP-4 | 20 1124 | 374 | Auswerferstift | Ejector pin |
| 11 4907 | 820 | Frässtift Set 12 mm 5 Stk. | Burr set 12 mm 5 pcs. | 11 5083 | 744 | Frässtift KEL/HP-5 | Rotary burr KEL/HP-5 | 20 1125 | 466 | Kernbohrer BLUE-DRILL L/NE80 | Annular cutter BLUE-DRILL L/NE80 |
| 11 4907U | 820 | Frässtift Set 12 mm 5 Stk. | Burr set 12 mm 5 pcs. | 11 5084 | 752 | Frässtift KEL/HP-6 | Rotary burr KEL/HP-6 | 20 1127 | 585 | Zentrierbohrer | Center drill |
| 11 4911 | 821 | Frässtift Set 12 mm 10 Stk. | Burr set 12 mm 10 pcs. | 11 5085 | 728 | Frässtift KEL/HP-7 | Rotary burr KEL/HP-7 | 20 1130 | 575 | Lochsäge Power-Max 30 | Hole saw Power-Max 30 |
| 11 4911U | 821 | Frässtift Set 12 mm 10 Stk. | Burr set 12 mm 10 pcs. | 11 5087 | 736 | Frässtift KEL/HP-1 | Rotary burr KEL/HP-1 | 20 1130A | 575 | Lochsäge Power-Max 30 | Hole saw Power-Max 30 |
| 11 4918 | 816 | Frässtift Set 10 mm 5 Stk. | Burr set 10 mm 5 pcs. | 11 5090 | 710 | Frässtift SKM/HP-2 | Rotary burr SKM/HP-2 | 20 1131 | 568 | Schaft | Shank |
| | | | | | | | | | | | |



| ART. | Kurzbezeichnung | Short description | ART. | Kurzbezeichnung | Short description | ART. | Kurzbezeichnung | Short description | | | |
|----------|-----------------|--------------------------------|------------------------------------|-----------------|-------------------|------------------------------|----------------------------------|-------------------|-----|-------------------------------|---------------------------------|
| 20 1138 | 534 | Kernbohrer Koffer leer | Annular cutter set empty | 20 1310 | 522 | Aufnahmehalter | Tool holder | 20 1441 | 568 | Zentrierbohrer | Center drill |
| 20 1139 | 534 | Kernbohrer Koffer leer | Annular cutter set empty | 20 1311 | 367 | Adapter | Adapter | 20 1442 | 569 | Adapter | Adapter |
| 20 1141 | 579 | Lochsäge Power-Max 55 | Hole saw Power-Max 55 | 20 1312 | 396 | Kernbohrer BLUE-DRILL LINE30 | Annular cutter BLUE-DRILL LINE30 | 20 1443 | 569 | Adapter | Adapter |
| 20 1141A | 579 | Lochsäge Power-Max 55 | Hole saw Power-Max 55 | 20 1312N | 454 | Kernbohrer BLUE-DRILL LINE30 | Annular cutter BLUE-DRILL LINE30 | 20 1444 | 569 | Adapter | Adapter |
| 20 1146 | 496 | Kernbohrer BLUE-DRILL LINE40 | Annular cutter BLUE-DRILL LINE40 | 20 1313 | 398 | Kernbohrer BLUE-DRILL LINE35 | Annular cutter BLUE-DRILL LINE35 | 20 1445 | 572 | Zentrierbohrer | Center drill |
| 20 1146U | 500 | Kernbohrer GOLD-DRILL LINE40 | Annular cutter GOLD-DRILL LINE40 | 20 1313N | 456 | Kernbohrer BLUE-DRILL LINE55 | Annular cutter BLUE-DRILL LINE55 | 20 1446 | 572 | Zentrierbohrer | Center drill |
| 20 1147 | 492 | Kernbohrer HARD-LINE40 | Annular cutter HARD-LINE40 | 20 1314 | 367 | Adapter | Adapter | 20 1447 | 610 | Stufenbohrer | Step drill |
| 20 1148 | 493 | Kernbohrer HARD-LINE55 | Annular cutter HARD-LINE55 | 20 1315 | 366 | Kernbohrer HARD-LINE40 | Annular cutter HARD-LINE40 | 20 1447U | 610 | Stufenbohrer | Step drill |
| 20 1149 | 366 | Auswerferstift | Ejector pin | 20 1315N | 438 | Kernbohrer HARD-LINE40 | Annular cutter HARD-LINE40 | 20 1448 | 610 | Stufenbohrer | Step drill |
| 20 1150 | 596 | Lochsäge Allround 60 ECO | Hole saw Allround 60 Eco | 20 1316 | 368 | Kernbohrer HARD-LINE55 | Annular cutter HARD-LINE55 | 20 1448U | 610 | Stufenbohrer | Step drill |
| 20 1151 | 438 | Auswerferstift | Ejector pin | 20 1316N | 440 | Kernbohrer HARD-LINE55 | Annular cutter HARD-LINE55 | 20 1449 | 610 | Stufenbohrer | Step drill |
| 20 1152 | 373 | Auswerferstift | Ejector pin | 20 1317 | 392 | Kernbohrer BLUE-DRILL LINE55 | Annular cutter BLUE-DRILL LINE55 | 20 1449U | 610 | Stufenbohrer | Step drill |
| 20 1153 | 422 | Set Kernbohrer 39 Stk. | Set annular cutter 39 pcs. | 20 1318 | 367 | Auswerferstift | Ejector pin | 20 1450 | 613 | Stufenbohrer | Step drill |
| 20 1154 | 493 | Auswerferstift | Ejector pin | 20 1322 | 406 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1450U | 613 | Stufenbohrer | Step drill |
| 20 1156 | 576 | Schaft | Shank | 20 1324 | 470 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1451 | 615 | Stufenbohrer | Step drill |
| 20 1158 | 422 | Set Kernbohrer 44 Stk. | Set annular cutter 44 pcs. | 20 1325 | 396 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1451U | 615 | Stufenbohrer | Step drill |
| 20 1159 | 597 | Aufnahmehalter | Tool holder | 20 1326 | 472 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1452 | 610 | Stufenbohrer Set Leer | Step drill set empty |
| 20 1160 | 493 | Auswerferstift | Ejector pin | 20 1327 | 528 | Kühlmittel-Druckflasche | Cooling pressure bottle | 20 1453 | 525 | Adapter | Adapter |
| 20 1161 | 367 | Adapter | Adapter | 20 1328 | 398 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1455 | 525 | Ersatz Schraube | Spare screw |
| 20 1163 | 573 | Adapter | Adapter | 20 1329 | 438 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1456 | 604 | Ersatz Schraube | Spare screw |
| 20 1164 | 573 | Auswerferstift | Ejector pin | 20 1330 | 427 | Schraube | Screw | 20 1457 | 604 | Ersatz Schraube | Spare screw |
| 20 1165 | 581 | Auswerferstift | Ejector pin | 20 1331 | 390 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1458 | 577 | Adapter | Adapter |
| 20 1166 | 597 | Aufnahmehalter | Tool holder | 20 1332 | 408 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1459 | 577 | Morsekonus | Morse taper |
| 20 1167 | 597 | Aufnahmehalter | Tool holder | 20 1333 | 496 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1460 | 514 | Schieneb. SILVER-DRILL LINE30 | Rail cutter SILVER-DRILL LINE30 |
| 20 1169 | 593 | Aufnahmehalter | Tool holder | 20 1334 | 392 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1464 | 604 | Auswurfeder | Ejector spring |
| 20 1170 | 597 | Zentrierbohrer | Center drill | 20 1335 | 500 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1465 | 431 | Kernbohrer DRILL-LINE50 | Annular cutter DRILL-LINE50 |
| 20 1171 | 597 | Zentrierbohrer | Center drill | 20 1336 | 390 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1466 | 610 | Set Stufenbohrer 3 Stk. | Set step drill 3 pcs. |
| 20 1173 | 593 | Zentrierbohrer | Center drill | 20 1337 | 492 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1467 | 604 | Auswurfeder | Ejector spring |
| 20 1180N | 440 | Kernbohrer BLUE-DRILL LINE110 | Annular cutter BLUE-DRILL LINE110 | 20 1338 | 440 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1469 | 577 | Morsekonus | Morse taper |
| 20 1185N | 458 | Kernbohrer BLUE-DRILL LINE80 | Annular cutter BLUE-DRILL LINE80 | 20 1339 | 368 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1470 | 613 | Stufenbohrer | Step drill |
| 20 1195 | 524 | Kegelsenker | Countersink | 20 1340 | 585 | Schraube | Screw | 20 1470U | 613 | Stufenbohrer | Step drill |
| 20 1221 | 422 | Auswerferstift | Ejector pin | 20 1343 | 530 | Schraube | Screw | 20 1471 | 615 | Stufenbohrer | Step drill |
| 20 1226 | 424 | Auswerferstift | Ejector pin | 20 1344 | 540 | Set Kernbohrer 44 Stk. | Set annular cutter 44 pcs. | 20 1471U | 615 | Stufenbohrer | Step drill |
| 20 1230 | 426 | Kernbohrer MINI-LINE8 | Annular cutter MINI-LINE8 | 20 1346 | 534 | Lochwand | Hole wall | 20 1472 | 620 | Blechsälbohrer | Tube and sheet drill |
| 20 1232 | 427 | Auswerferstift | Ejector pin | 20 1348 | 454 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1472U | 620 | Blechsälbohrer | Tube and sheet drill |
| 20 1233 | 427 | Auswerferstift | Ejector pin | 20 1349 | 456 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1473 | 620 | Blechsälbohrer | Tube and sheet drill |
| 20 1234 | 427 | Adapter | Adapter | 20 1353 | 530 | Schraube | Screw | 20 1473U | 620 | Blechsälbohrer | Tube and sheet drill |
| 20 1235 | 427 | Aufnahmehalter | Tool holder | 20 1354 | 493 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1474 | 422 | Blechsälbohrer | Tube and sheet drill |
| 20 1237 | 427 | Auswurfeder | Ejector spring | 20 1356 | 396 | Set Kernbohrer 39 Stk. | Set annular cutter 39 pcs. | 20 1475 | 547 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. |
| 20 1238 | 427 | Körner | Punch | 20 1360 | 406 | Set Kernbohrer 39 Stk. | Set annular cutter 39 pcs. | 20 1476 | 478 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. |
| 20 1239 | 427 | Inbusschlüssel | Allen key | 20 1363 | 398 | Set Kernbohrer 39 Stk. | Set annular cutter 39 pcs. | 20 1477 | 480 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. |
| 20 1240 | 484 | Kernbohrer GOLD-DRILL LINE30 | Annular cutter GOLD-DRILL LINE30 | 20 1365 | 408 | Set Kernbohrer 39 Stk. | Set annular cutter 39 pcs. | 20 1478 | 446 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. |
| 20 1241 | 484 | Kernbohrer GOLD-DRILL LINE30 | Annular cutter GOLD-DRILL LINE30 | 20 1366 | 390 | Set Kernbohrer 39 Stk. | Set annular cutter 39 pcs. | 20 1479 | 448 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. |
| 20 1242 | 486 | Kernbohrer GOLD-DRILL LINE55 | Annular cutter GOLD-DRILL LINE55 | 20 1369 | 368 | Set Kernbohrer 39 Stk. | Set annular cutter 39 pcs. | 20 1480 | 516 | Schieneb. SILVER-DRILL LINE55 | Rail cutter SILVER-DRILL LINE55 |
| 20 1243 | 486 | Kernbohrer GOLD-DRILL LINE55 | Annular cutter GOLD-DRILL LINE55 | 20 1372 | 528 | Adapter | Adapter | 20 1481 | 591 | Lochsägen Koffer Leer | Hole saw set empty |
| 20 1250 | 581 | Auswerferstift | Ejector pin | 20 1375 | 528 | Schnellspannbohrfutter | Quick release chuck | 20 1482 | 462 | Auswerferstift | Ejector pin |
| 20 1251 | 427 | Set Kernbohrer 11 Stk. | Set annular cutter 11 pcs. | 20 1377 | 427 | Kernbohrer Koffer leer | Annular cutter set empty | 20 1483 | 547 | Set Kernbohrer 39 Stk. | Set annular cutter 39 pcs. |
| 20 1255 | 422 | Kernbohrer SILVER-DRILL LINE25 | Annular cutter SILVER-DRILL LINE25 | 20 1384 | 528 | Adapter | Adapter | 20 1485 | 464 | Auswerferstift | Ejector pin |
| 20 1260N | 470 | Kernbohrer GOLD-DRILL LINE30 | Annular cutter GOLD-DRILL LINE30 | 20 1385 | 492 | Adapter | Adapter | 20 1486 | 370 | Auswerferstift | Ejector pin |
| 20 1260U | 406 | Kernbohrer GOLD-DRILL LINE30 | Annular cutter GOLD-DRILL LINE30 | 20 1386 | 367 | Adapter | Adapter | 20 1492 | 610 | Set Stufenbohrer 3 Stk. | Set step drill 3 pcs. |
| 20 1261 | 390 | Auswerferstift | Ejector pin | 20 1387 | 367 | Verlängerung | Extension | 20 1500 | 592 | Lochsäge Bi-Metal | Hole saw Bi-Metal |
| 20 1263 | 367 | Adapter | Adapter | 20 1388 | 492 | Auswerferstift | Ejector pin | 20 1501 | 595 | Set Bi-Metal Lochsägen | Set Bi-Metal hole saws |
| 20 1265 | 424 | Kernbohrer SILVER-DRILL LINE50 | Annular cutter SILVER-DRILL LINE50 | 20 1390 | 367 | Auswerferstift | Ejector pin | 20 1502 | 595 | Set Bi-Metal Lochsägen | Set Bi-Metal hole saws |
| 20 1270N | 472 | Kernbohrer GOLD-DRILL LINE55 | Annular cutter GOLD-DRILL LINE55 | 20 1393 | 367 | Auswerferstift | Ejector pin | 20 1503 | 593 | Aufnahmehalter | Tool holder |
| 20 1270U | 408 | Kernbohrer GOLD-DRILL LINE55 | Annular cutter GOLD-DRILL LINE55 | 20 1395 | 523 | Aufnahmehalter | Tool holder | 20 1504 | 595 | Set Bi-Metal Lochsägen | Set Bi-Metal hole saws |
| 20 1271 | 368 | Auswerferstift | Ejector pin | 20 1396 | 369 | Auswerferstift | Ejector pin | 20 1505 | 593 | Zentrierbohrer | Center drill |
| 20 1272 | 367 | Auswerferstift | Ejector pin | 20 1399 | 369 | Auswerferstift | Ejector pin | 20 1506 | 593 | Ersatz-Auswurfeder | Spare ejector-spring |
| 20 1273 | 390 | Auswerferstift | Ejector pin | 20 1400 | 355 | Morsekonus | Morse taper | 20 1507 | 593 | Aufnahmehalter | Tool holder |
| 20 1280 | 402 | Kernbohrer BLUE-DRILL LINE110 | Annular cutter BLUE-DRILL LINE110 | 20 1401 | 355 | Morsekonus | Morse taper | 20 1508 | 594 | Verlängerung | Extension |
| 20 1280N | 476 | Kernbohrer GOLD-DRILL LINE110 | Annular cutter GOLD-DRILL LINE110 | 20 1402 | 367 | Verlängerung | Extension | 20 1509 | 593 | Aufnahmehalter | Tool holder |
| 20 1280U | 412 | Kernbohrer GOLD-DRILL LINE110 | Annular cutter GOLD-DRILL LINE110 | 20 1403 | 369 | Auswerferstift | Ejector pin | 20 1510 | 593 | Aufnahmehalter | Tool holder |
| 20 1283 | 522 | Aufnahmehalter | Tool holder | 20 1404 | 586 | Schraube | Screw | 20 1511 | 593 | Aufnahmehalter | Tool holder |
| 20 1284 | 390 | Kernbohrer BLUE-DRILL LINE30 | Annular cutter BLUE-DRILL LINE30 | 20 1405 | 367 | Auswerferstift | Ejector pin | 20 1512 | 593 | Zentrierbohrer | Center drill |
| 20 1285 | 400 | Kernbohrer BLUE-DRILL LINE80 | Annular cutter BLUE-DRILL LINE80 | 20 1406 | 439 | Verlängerung | Extension | 20 1513 | 595 | Set Bi-Metal Lochsägen | Set Bi-Metal hole saws |
| 20 1285N | 474 | Kernbohrer GOLD-DRILL LINE80 | Annular cutter GOLD-DRILL LINE80 | 20 1407 | 439 | Verlängerung | Extension | 20 1514 | 595 | Set Bi-Metal Lochsägen | Set Bi-Metal hole saws |
| 20 1285U | 410 | Kernbohrer GOLD-DRILL LINE80 | Annular cutter GOLD-DRILL LINE80 | 20 1408 | 367 | Auswerferstift | Ejector pin | 20 1515 | 528 | Morsekonus | Morse taper |
| 20 1286 | 523 | Aufnahmehalter | Tool holder | 20 1409 | 439 | Verlängerung | Extension | 20 1516 | 595 | Set Bi-Metal Lochsägen | Set Bi-Metal hole saws |
| 20 1287 | 522 | Aufnahmehalter | Tool holder | 20 1411 | 369 | Auswerferstift | Ejector pin | 20 1517 | 595 | Set Bi-Metal Lochsägen | Set Bi-Metal hole saws |
| 20 1289 | 522 | Aufnahmehalter | Tool holder | 20 1414 | 369 | Auswerferstift | Ejector pin | 20 1519 | 595 | Set Bi-Metal Lochsägen | Set Bi-Metal hole saws |
| 20 1290 | 523 | Aufnahmehalter | Tool holder | 20 1417 | 367 | Verlängerung | Extension | 20 1520 | 595 | Set Bi-Metal Lochsägen | Set Bi-Metal hole saws |
| 20 1291 | 522 | Aufnahmehalter | Tool holder | 20 1420 | 367 | Auswerferstift | Ejector pin | 20 1521 | 593 | Aufnahmehalter | Tool holder |
| 20 1292 | 523 | Aufnahmehalter | Tool holder | 20 1421 | 430 | Adapter | Adapter | 20 1522 | 594 | Verlängerung | Extension |
| 20 1293 | 522 | Aufnahmehalter | Tool holder | 20 1422 | 430 | Adapter | Adapter | 20 1523 | 586 | Sechskantschraube | Hexagon screw |
| 20 1294 | 532 | Auswurfeder | Ejector spring | 20 1423 | 367 | Auswerferstift | Ejector pin | 20 1524 | 528 | Morsekonus | Morse taper |
| 20 1295 | 524 | Kegelsenker | Countersink | 20 1426 | 369 | Auswerferstift | Ejector pin | 20 1525 | 528 | Bohrfutter | Drill chuck |
| 20 1296 | 532 | Auswurfeder | Ejector spring | 20 1427 | 370 | Auswerferstift | Ejector pin | 20 1526 | 568 | Power Drill 4000 | Power Drill 4000 |
| 20 1297 | 532 | Auswurfeder | Ejector spring | 20 1428 | 370 | Auswerferstift | Ejector pin | 20 1527 | 568 | Auswerferstift | Ejector pin |
| 20 1298 | 532 | Auswurfeder | Ejector spring | 20 1429 | 369 | Auswerferstift | Ejector pin | 20 1528 | 593 | Aufnahmehalter | Tool holder |
| 20 1299 | 532 | Auswurfeder | Ejector spring | 20 1430 | 430 | Kernbohrer DRILL-LINE30 | Annular cutter DRILL-LINE30 | 20 1529 | 594 | Randversenker | Rim countersink |
| 20 1300 | 532 | Schraube | Screw | 20 1431 | 430 | Adapter | Adapter | 20 1530 | 572 | Power Drill 4000 | Power Drill 4000 |
| 20 1301 | 521 | Aufnahmehalter | Tool holder | 20 1432 | 515 | Adapter | Adapter | 20 1531 | 572 | Auswerferstift | Ejector pin |
| 20 1302 | 370 | Auswerferstift | Ejector pin | 20 1433 | 391 | Auswerferstift | Ejector pin | 20 1532 | 580 | Power Drill 4000 | Power Drill 4000 |
| 20 1303 | 521 | Aufnahmehalter | Tool holder | 20 1434 | 430 | Adapter | Adapter | 20 1533 | 580 | Auswerferstift | Ejector pin |
| 20 1304 | 372 | Auswerferstift | Ejector pin | 20 1435 | 430 | Bolzen | Pin | 20 1602 | 406 | Set Kernbohrer 44 Stk. | Set annular cutter 44 pcs. |
| 20 1305 | 532 | Schraube | Screw | 20 1436 | 370 | Auswerferstift | Ejector pin | 20 1603 | 396 | Set Kernbohrer 44 Stk. | Set annular cutter 44 pcs. |
| 20 1306 | 506 | Kernbohrer RAIL-LINE30 | Annular cutter RAIL-LINE30 | 20 1437 | 521 | Aufnahmehalter | Tool holder | 20 1604 | 366 | Set Kernbohrer 44 Stk. | Set annular cutter 44 pcs. |
| 20 1307 | 521 | Aufnahmehalter | Tool holder | 20 1438 | 373 | Auswerferstift | Ejector pin | 20 1607 | 547 | Set Kernbohrer 44 Stk. | Set annular cutter 44 pcs. |
| 20 1308 | 528 | Kühlmittel-Druckflasche | Cooling pressure bottle | 20 1439 | 369 | Auswerferstift | Ejector pin | 20 1608 | 408 | Set Kernbohrer 44 Stk. | Set annular cutter 44 pcs. |
| 20 1309 | 508 | Kernbohrer RAIL-LINE55 | Annular cutter RAIL-LINE55 | 20 1440 | 568 | Zentrierbohrer | Center drill | 20 1609 | 398 | Set Kernbohrer 44 Stk. | Set annular cutter 44 pcs. |

| ART. | Kurzbezeichnung | Short description | ART. | Kurzbezeichnung | Short description | ART. | Kurzbezeichnung | Short description | | | |
|-------------|-----------------|------------------------------|----------------------------------|-----------------|-------------------|------------------------------|----------------------------------|-------------------|------|--------------------------|--------------------------|
| 20 1610 | 478 | Kernbohrer GOLD-DRILL LINE30 | Annular cutter GOLD-DRILL LINE30 | 20 1917 | 537 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 20 8020 | 1093 | Kernbohrmaschine | Hole cutting machine |
| 20 1611 | 462 | Kernbohrer BLUE-DRILL LINE30 | Annular cutter BLUE-DRILL LINE30 | 20 1918 | 548 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 8021 | 1094 | Kernbohrmaschine | Hole cutting machine |
| 20 1611W | 462 | Kernbohrer BLUE-DRILL LINE30 | Annular cutter BLUE-DRILL LINE30 | 20 1919 | 548 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 20 8022 | 1095 | Kernbohrmaschine | Hole cutting machine |
| 20 1620 | 480 | Kernbohrer GOLD-DRILL LINE55 | Annular cutter GOLD-DRILL LINE55 | 20 1920 | 416 | Kernbohrer GOLD-DRILL LINE55 | Annular cutter GOLD-DRILL LINE55 | 20 8023 | 1096 | Kernbohrmaschine | Hole cutting machine |
| 20 1621 | 464 | Kernbohrer BLUE-DRILL LINE55 | Annular cutter BLUE-DRILL LINE55 | 20 1921 | 548 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 20 8024 | 1097 | Kernbohrmaschine | Hole cutting machine |
| 20 1624 | 368 | Set Kernbohrer 44 Stk. | Set annular cutter 44 pcs. | 20 1922 | 549 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 8025 | 1098 | Kernbohrmaschine | Hole cutting machine |
| 20 1625 | 482 | Kernbohrer GOLD-DRILL LINE80 | Annular cutter GOLD-DRILL LINE80 | 20 1923 | 549 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 20 8026 | 1099 | Kernbohrmaschine | Hole cutting machine |
| 20 1630 | 446 | Kernbohrer HARD-LINE40 | Annular cutter HARD-LINE40 | 20 1924 | 549 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 20 8027 | 1100 | Kernbohrmaschine | Hole cutting machine |
| 20 1640 | 448 | Kernbohrer HARD-LINE55 | Annular cutter HARD-LINE55 | 20 1925 | 418 | Kernbohrer GOLD-DRILL LINE80 | Annular cutter GOLD-DRILL LINE80 | 20 8028 | 1101 | Kernbohrmaschine | Hole cutting machine |
| 20 1641 | 646 | Set Kegelsenker | Set countersink | 20 1926 | 550 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 8029 | 1102 | Kernbohrmaschine | Hole cutting machine |
| 20 1642 | 646 | Set Kegelsenker | Set countersink | 20 1927 | 550 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 20 8030 | 1103 | Kernbohrmaschine | Hole cutting machine |
| 20 1643 | 647 | Set Kegelsenker | Set countersink | 20 1928 | 550 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 20 8031 | 1104 | Kernbohrmaschine | Hole cutting machine |
| 20 1644 | 647 | Set Kegelsenker | Set countersink | 20 1929 | 551 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 8032 | 1105 | Kernbohrmaschine | Hole cutting machine |
| 20 1645 | 648 | Set Kegelsenker | Set countersink | 20 1930 | 376 | Kernbohrer HARD-LINE40 | Annular cutter HARD-LINE40 | 20 8033 | 1106 | Kernbohrmaschine | Hole cutting machine |
| 20 1646 | 648 | Set Kegelsenker | Set countersink | 20 1931 | 551 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0001 | 529 | Magnetstab | Magnetic stick |
| 20 1647 | 649 | Set Kegelsenker | Set countersink | 20 1932 | 551 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0002 | 591 | Halter/Mini-Cut | Arbor/Mini-Cut |
| 20 1648 | 649 | Set Kegelsenker | Set countersink | 20 1933 | 558 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 0003 | 591 | Halter/Mini-Cut | Arbor/Mini-Cut |
| 20 1649 | 651 | Set Kegelsenker | Set countersink | 20 1934 | 558 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0004 | 531 | Inbusschraube | Allen screw |
| 20 1650 | 370 | Kernbohrer HARD-LINE80 | Annular cutter HARD-LINE80 | 20 1935 | 558 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0005 | 531 | Halter-Körper | Arbor body |
| 20 1650N | 442 | Kernbohrer HARD-LINE80 | Annular cutter HARD-LINE80 | 20 1940 | 378 | Kernbohrer HARD-LINE50 | Annular cutter HARD-LINE50 | 21 0006 | 531 | Auswurfeder | Ejector spring |
| 20 1651 | 652 | Set Kegelsenker | Set countersink | 20 1941 | 559 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 0007 | 531 | Stahlkugel | Round steel bead |
| 20 1652 | 652 | Set Kegelsenker | Set countersink | 20 1942 | 559 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0008 | 531 | Unterlegscheibe | Flat washer |
| 20 1653 | 653 | Set Kegelsenker | Set countersink | 20 1943 | 559 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0009 | 531 | Konkave Distanzscheibe | Concave gasket |
| 20 1654 | 653 | Set Kegelsenker | Set countersink | 20 1944 | 538 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 0010 | 531 | Auswerferstift | Ejector pin |
| 20 1660 | 372 | Kernbohrer HARD-LINE110 | Annular cutter HARD-LINE110 | 20 1945 | 538 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0011 | 531 | Inbusschlüssel | Allen key |
| 20 1660N | 444 | Kernbohrer HARD-LINE110 | Annular cutter HARD-LINE110 | 20 1946 | 538 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0012 | 531 | Inbusschraube | Allen screw |
| 20 1665 | 374 | Kernbohrer HARD-LINE150 | Annular cutter HARD-LINE150 | 20 1947 | 539 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 0013 | 531 | Auswurfeder | Ejector pin |
| 20 1670 | 450 | Kernbohrer HARD-LINE80 | Annular cutter HARD-LINE80 | 20 1948 | 539 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0014 | 531 | Halter-Körper | Arbor body |
| 20 1680 | 384 | Kernbohrer HARDOX-LINE25 | Annular cutter HARDOX-LINE25 | 20 1949 | 539 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0015 | 531 | Auswerferstift | Ejector pin |
| 20 1690 | 386 | Kernbohrer HARDOX-LINE55 | Annular cutter HARDOX-LINE55 | 20 1950 | 540 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 0016 | 531 | Inbusschraube | Allen screw |
| 20 1695 | 642 | Set Kegelsenker | Set countersink | 20 1951 | 540 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0017 | 531 | Unterlegscheibe | Flat washer |
| 20 1696 | 642 | Set Kegelsenker | Set countersink | 20 1952 | 540 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0025 | 528 | Sprühnebeldüse | Atomized nozzle |
| 20 1697 | 643 | Set Kegelsenker | Set countersink | 20 1953 | 540 | Set Kernbohrer 50 Stk. | Set annular cutter 50 pcs. | 21 0026 | 601 | Halter/Diamond-Grit | Arbor/Diamond-Grit |
| 20 1698 | 643 | Set Kegelsenker | Set countersink | 20 1954 | 541 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 0027 | 601 | Halter/Diamond-Grit | Arbor/Diamond-Grit |
| 20 1710 | 432 | Kernbohrer DRILL-LINE30 | Annular cutter DRILL-LINE30 | 20 1955 | 541 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0028 | 601 | Halter/Diamond-Grit | Arbor/Diamond-Grit |
| 20 1720 | 654 | Kegelsenker | Countersink | 20 1956 | 541 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0029 | 601 | Halter/Diamond-Grit | Arbor/Diamond-Grit |
| 20 1725 | 656 | Kegelsenker | Countersink | 20 1957 | 541 | Set Kernbohrer 50 Stk. | Set annular cutter 50 pcs. | 21 0030 | 601 | Halter/Diamond-Grit | Arbor/Diamond-Grit |
| 20 1740 | 646 | Kegelsenker | Countersink | 20 1958 | 552 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 0031 | 601 | Halter/Diamond-Grit | Arbor/Diamond-Grit |
| 20 1745 | 647 | Kegelsenker | Countersink | 20 1959 | 552 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0032 | 601 | Zentrierbohrer | Center drill |
| 20 1750 | 648 | Kegelsenker | Countersink | 20 1960 | 552 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0034 | 588 | Zentrierbohrer + Feder | Center drill with spring |
| 20 1755 | 649 | Kegelsenker | Countersink | 20 1961 | 553 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 0035 | 588 | Sechskantschraube | Hexagon screw |
| 20 1760 | 652 | Kegelsenker | Countersink | 20 1962 | 553 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0036 | 354 | Morsekonus | Morse taper |
| 20 1765 | 653 | Kegelsenker | Countersink | 20 1963 | 553 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0037 | 618 | Blechsälbohrer | Tube and sheet drill |
| 20 1770 | 655 | Kegelsenker | Countersink | 20 1964 | 560 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 0038 | 618 | Blechsälbohrer | Tube and sheet drill |
| 20 1775 | 657 | Kegelsenker | Countersink | 20 1965 | 560 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0039 | 618 | Blechsälbohrer | Tube and sheet drill |
| 20 1776 045 | 527 | Kegelsenker | Countersink | 20 1966 | 560 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0040 | 618 | Blechsälbohrer | Tube and sheet drill |
| 20 1777 | 527 | Führungsstift | Pilot pin | 20 1967 | 542 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 0041 | 604 | Auswurfeder | Ejector spring |
| 20 1780 | 642 | Kegelsenker | Countersink | 20 1968 | 542 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0042 | 646 | Leeres Set/Kegelsenker | Empty set/countersink |
| 20 1785 | 643 | Kegelsenker | Countersink | 20 1969 | 542 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0043 | 646 | Leeres Set/Kegelsenker | Empty set/countersink |
| 20 1786 045 | 526 | Kegelsenker | Countersink | 20 1970 | 380 | Kernbohrer HARD-LINE80 | Annular cutter HARD-LINE80 | 21 0044 | 532 | Auswurfeder | Ejector pin |
| 20 1787 | 526 | Führungsstift, Platten | Pilot pin, inserts | 20 1971 | 542 | Set Kernbohrer 50 Stk. | Set annular cutter 50 pcs. | 21 0045 | 530 | Ersatz Schraube | Spare screw |
| 20 1790 | 658 | Kegelsenker | Countersink | 20 1972 | 543 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 0046 | 601 | Ersatz Zentrierbohrer | Spare center drill |
| 20 1791 | 666 | Flachsenker | Counterbores | 20 1973 | 543 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0047 | 521 | Kühlmittelschlauchhalter | Coolant hose holder |
| 20 1792 | 666 | Flachsenker | Counterbores | 20 1974 | 543 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 0048 | 367 | Adapter | Adapter |
| 20 1793 | 666 | Flachsenker | Counterbores | 20 1976 | 544 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 0049 | 530 | Ersatz Schraube | Spare screw |
| 20 1795 | 659 | Kegelsenker | Countersink | 20 1977 | 545 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 0051 | 569 | Morsekonus | Morse taper |
| 20 1796 | 525 | Kegelsenker | Countersink | 20 1978 | 536 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 0052 | 523 | Reduzierhülse | Reduction sleeve |
| 20 1797 | 525 | Führungsstift | Pilot | 20 1979 | 537 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 0053 | 523 | Reduzierhülse | Reduction sleeve |
| 20 1798 | 525 | Führungsstift | Pilot | 20 1980 | 543 | Set Kernbohrer 50 Stk. | Set annular cutter 50 pcs. | 21 0055 | 531 | Inbusschlüssel klein | Allen key small |
| 20 1799 | 525 | Führungsstift | Pilot | 20 1981 | 556 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 1000 | 591 | Lochsäge | Hole saw |
| 20 1800 | 623 | Gewinde-Adapter | Tapping adapter | 20 1982 | 556 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 1500 | 600 | Lochsäge Diamond Grit | Hole saw Diamond Grit |
| 20 1820 | 623 | Gewindebohrer | Tabs | 20 1983 | 556 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 1780 | 525 | Führungsstift | pilot pin |
| 20 1830 | 433 | Spiralbohrer-Adapter | Twist drills adapter | 20 1984 | 557 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 1781 | 525 | Führungsstift | pilot pin |
| 20 1840 | 433 | Spiralbohrer | Twist drills | 20 1985 | 557 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 1782 | 525 | Führungsstift | pilot pin |
| 20 1841 | 522 | Aufnahmehalter | Tool holder | 20 1986 | 557 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 1783 | 525 | Führungsstift | pilot pin |
| 20 1842 | 522 | Aufnahmehalter | Tool holder | 20 1987 | 554 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 1784 | 525 | Führungsstift | pilot pin |
| 20 1843 | 522 | Aufnahmehalter | Tool holder | 20 1988 | 554 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 1785 | 525 | Führungsstift | pilot pin |
| 20 1844 | 523 | Aufnahmehalter | Tool holder | 20 1989 | 554 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 1786 | 525 | Führungsstift | pilot pin |
| 20 1845 | 523 | Aufnahmehalter | Tool holder | 20 1990 | 555 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 1787 | 525 | Führungsstift | pilot pin |
| 20 1846 | 523 | Aufnahmehalter | Tool holder | 20 1991 | 555 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 1788 | 525 | Führungsstift | pilot pin |
| 20 1860 | 628 | Gewindebohrer-Ausbohrer | Drills remove jammed taps | 20 1992 | 555 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 2000 | 591 | Set Lochsagen 20 Stk. | Set hole saws 20 pcs. |
| 20 1865 | 628 | Set Gewindebohrer | Set taps | 20 1993 | 544 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 3001 | 611 | Stufenbohrer | Step drill |
| 20 1891 | 667 | Flachsenker | Counterbores | 20 1994 | 544 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 3002 | 611 | Stufenbohrer | Step drill |
| 20 1892 | 667 | Flachsenker | Counterbores | 20 1995 | 544 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 3003 | 611 | Stufenbohrer | Step drill |
| 20 1893 | 667 | Flachsenker | Counterbores | 20 1996 | 545 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 3004 | 611 | Stufenbohrer | Step drill |
| 20 1901 | 534 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 1997 | 545 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 3005 | 611 | Stufenbohrer | Step drill |
| 20 1902 | 534 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 20 1998 | 545 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 3006 | 611 | Stufenbohrer | Step drill |
| 20 1903 | 534 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 20 1999 | 561 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 3007 | 611 | Set Stufenbohrer 3 Stk. | Set step drill 3 pcs. |
| 20 1904 | 534 | Set Kernbohrer 50 Stk. | Set annular cutter 50 pcs. | 20 2001 | 561 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 3008 | 611 | Set Stufenbohrer 3 Stk. | Set step drill 3 pcs. |
| 20 1905 | 535 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 2002 | 561 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 3009 | 616 | Stufenbohrer | Step drill |
| 20 1906 | 535 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 20 2003 | 546 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 3010 | 617 | Stufenbohrer | Step drill |
| 20 1907 | 535 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 20 2004 | 546 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 3011 | 617 | Stufenbohrer | Step drill |
| 20 1908 | 535 | Set Kernbohrer 50 Stk. | Set annular cutter 50 pcs. | 20 2005 | 546 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 3012 | 616 | Stufenbohrer | Step drill |
| 20 1909 | 536 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 2006 | 546 | Set Kernbohrer 50 Stk. | Set annular cutter 50 pcs. | 21 3013 | 617 | Stufenbohrer | Step drill |
| 20 1910 | 414 | Kernbohrer GOLD-DRILL LINE30 | Annular cutter GOLD-DRILL LINE30 | 20 2007 | 547 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 21 3014 | 617 | Stufenbohrer | Step drill |
| 20 1911 | 536 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 20 2008 | 547 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 3015 | 619 | Blechsälbohrer | Tube and sheet drill |
| 20 1914 | 536 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 20 2009 | 547 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 21 3016 | 619 | Blechsälbohrer | Tube and sheet drill |
| 20 1915 | 537 | Set Kernbohrer 6 Stk. | Set annular cutter 6 pcs. | 20 2010 | 547 | Set Kernbohrer 50 Stk. | Set annular cutter 50 pcs. | 21 3017 | 619 | Blechsälbohrer | Tube and sheet drill |
| 20 1916 | 537 | Set Kernbohrer 12 Stk. | Set annular cutter 12 pcs. | 20 8013 | 1087 | Kernbohrmaschine | Hole cutting machine | 21 3018 | 619 | Blechsälbohrer | Tube and sheet drill |





| ART. | | Kurzbezeichnung | Short description | ART. | | Kurzbezeichnung | Short description | ART. | | Kurzbezeichnung | Short description |
|-----------|---------|---------------------|------------------------|---------|---------|------------------------|------------------------|-------------|----------|--|--|
| 29 1753 | 41 | VHM-Fräser | Solid carbide end mill | 30 6432 | 89 | VHM-Fräser | Solid carbide end mill | 40 3030 | 639 | Kegelsenker | Countersink |
| 29 1753 | 195 | VHM-Fräser | Solid carbide end mill | 30 6433 | 90 | VHM-Fräser | Solid carbide end mill | 40 3035 | 641 | Kegelsenker | Countersink |
| 29 1761 | 196 | VHM-Fräser | Solid carbide end mill | 30 6434 | 91 | VHM-Fräser | Solid carbide end mill | 40 3040 | 663 | Kegelsenker | Countersink |
| 29 1762 | 196 | VHM-Fräser | Solid carbide end mill | 30 6435 | 91 | VHM-Fräser | Solid carbide end mill | 40 3045 | 651 | Kegelsenker | Countersink |
| 29 1763 | 197 | VHM-Fräser | Solid carbide end mill | 30 6436 | 92 | VHM-Fräser | Solid carbide end mill | 40 3090 010 | 655 | Kegelsenker Set | Countersink set |
| 29 1771 | 197 | VHM-Fräser | Solid carbide end mill | 30 6437 | 93 | VHM-Fräser | Solid carbide end mill | 40 3090 020 | 657 | Kegelsenker Set | Countersink set |
| 29 1783 | 198 | VHM-Fräser | Solid carbide end mill | 30 6438 | 92 | VHM-Fräser | Solid carbide end mill | 40 3090 030 | 639 | Kegelsenker Set | Countersink set |
| 29 1784 | 198 | VHM-Fräser | Solid carbide end mill | 30 6439 | 93 | VHM-Fräser | Solid carbide end mill | 40 3090 040 | 639 | Kegelsenker Set | Countersink set |
| 29 1790C | 199 | VHM-Fräser | Solid carbide end mill | 30 6446 | 94 | VHM-Fräser | Solid carbide end mill | 40 3090 050 | 663 | Kegelsenker Set | Countersink set |
| 29 6510 | 202 | VHM-Fräser | Solid carbide end mill | 30 6447 | 94 | VHM-Fräser | Solid carbide end mill | 40 3090 060 | 663 | Kegelsenker Set | Countersink set |
| 29 6521 | 202 | VHM-Fräser | Solid carbide end mill | 30 6456 | 95 | VHM-Fräser | Solid carbide end mill | 40 4030 | 638 | Kegelsenker | Countersink |
| 29 6522 | 203 | VHM-Fräser | Solid carbide end mill | 30 6460 | 96 | VHM-Fräser | Solid carbide end mill | 40 4035 | 640 | Kegelsenker | Countersink |
| 29 6523 | 204 | VHM-Fräser | Solid carbide end mill | 30 6474 | 99 | VHM-Fräser | Solid carbide end mill | 40 4040 | 662 | Kegelsenker | Countersink |
| 29 6524 | 205 | VHM-Fräser | Solid carbide end mill | 30 6475 | 99 | VHM-Fräser | Solid carbide end mill | 40 4090 010 | 654 | Kegelsenker Set | Countersink set |
| 29 6525 | 205 | VHM-Fräser | Solid carbide end mill | 30 6476 | 100 | VHM-Fräser | Solid carbide end mill | 40 4090 020 | 656 | Kegelsenker Set | Countersink set |
| 29 6526 | 206 | VHM-Fräser | Solid carbide end mill | 30 6477 | 100 | VHM-Fräser | Solid carbide end mill | 40 4090 030 | 638 | Kegelsenker Set | Countersink set |
| 29 6553 | 206 | VHM-Fräser | Solid carbide end mill | 30 6478 | 101 | VHM-Fräser | Solid carbide end mill | 40 4090 040 | 638 | Kegelsenker Set | Countersink set |
| 29 6562 | 207 | VHM-Fräser | Solid carbide end mill | 30 6479 | 101 | VHM-Fräser | Solid carbide end mill | 40 4090 050 | 662 | Kegelsenker Set | Countersink set |
| 29 6572 | 208 | VHM-Fräser | Solid carbide end mill | 30 6485 | 103 | VHM-Fräser | Solid carbide end mill | 40 4090 060 | 662 | Kegelsenker Set | Countersink set |
| 29 6573 | 209 | VHM-Fräser | Solid carbide end mill | 30 6486 | 102 | VHM-Fräser | Solid carbide end mill | 60 1100 10 | 1144 | Schneidöl 10 Ltr. | Cutting oil 10 litre |
| 29 6574 | 209 | VHM-Fräser | Solid carbide end mill | 30 6489 | 103 | VHM-Fräser | Solid carbide end mill | 60 1100 25 | 1144 | Schneidöl 2,5 Ltr. | Cutting oil 2,5 litre |
| 29 6600 | 210 | VHM-Fräser | Solid carbide end mill | 30 6490 | 104 | VHM-Fräser | Solid carbide end mill | 60 1100 5 | 1144 | Schneidöl 5 Ltr. | Cutting oil 5 litre |
| 29 6610 | 210 | CVD Wendeplatte | CVD Inserts | 30 6491 | 104 | VHM-Fräser | Solid carbide end mill | 60 1150 | 1144 | Schneidspray 500 ml | Cutting spray 500 ml |
| 29 6615 | 210 | CVD Wendeplatte | CVD Inserts | 30 6492 | 105 | VHM-Fräser | Solid carbide end mill | 60 1152 | 1144 | Schaum spray 400 ml | Foam spray 400 ml |
| 29 6617 | 210 | CVD Wendeplatte | CVD Inserts | 30 6493 | 80 | VHM-Fräser | Solid carbide end mill | 60 1153 | 1144 | Minimalmengenschmieröl 5 Ltr. | Minimal quantity lubrication oil 5 litre |
| 29 6618 | 210 | Torx-Schrauben | Torx Screw | 30 6493 | 105 | VHM-Fräser | Solid carbide end mill | 60 1154 | 1144 | Minimalmengenschmieröl 10 Ltr. | Minimal quantity lubrication oil 10 litre |
| 29 6619-1 | 210 | Schraubendreher | Screwdriver | 30 6494 | 106 | VHM-Fräser | Solid carbide end mill | 60 1157 | 1146 | Universal-Schneidpaste | Universal cutting paste |
| 29 6619-2 | 210 | Schraubendreher | Screwdriver | 30 6495 | 106 | VHM-Fräser | Solid carbide end mill | 60 1157 | 166, 283 | Schneidwachs | Cutting paste |
| 29 6620 | 211 | VHM-Fräser | Solid carbide end mill | 30 6497 | 107 | VHM-Fräser | Solid carbide end mill | 60 1159 | 1146 | Universal-Schneidpaste | Universal cutting paste |
| 29 6621 | 211 | PKD Vorschneider | PCD read cutter | 30 6522 | 219 | VHM-Fräser | Solid carbide end mill | 60 1159 | 166, 283 | Schneidwachs | Cutting paste |
| 29 6622 | 211 | MKD Fertigschneider | MCD finishing insert | 30 6523 | 220 | VHM-Fräser | Solid carbide end mill | 60 1160 | 1148 | Metallentfettungs-Reinigungskonzentrat 5 Ltr. | Metal degreasing and cleaning concentrate 5 litre |
| 29 6623 | 211 | MKD Fertigschneider | MCD finishing insert | 30 6524 | 221 | VHM-Fräser | Solid carbide end mill | 60 1161 | 1148 | Metallentfettungs-Reinigungskonzentrat 10 Ltr. | Metal degreasing and cleaning concentrate 10 litre |
| 29 6624 | 211 | MKD Fertigschneider | MCD finishing insert | 30 6528 | 222 | VHM-Fräser | Solid carbide end mill | 60 1162 | 1144 | Minimalmengenschmieröl 5 Ltr. | Minimal quantity lubrication oil 5 litre |
| 29 6625 | 211 | MKD Fertigschneider | MCD finishing insert | 30 6534 | 222 | VHM-Fräser | Solid carbide end mill | 60 1163 | 1144 | Minimalmengenschmieröl 10 Ltr. | Minimal quantity lubrication oil 10 litre |
| 29 6811 | 212 | VHM-Fräser | Solid carbide end mill | 30 6539 | 109 | VHM-Fräser | Solid carbide end mill | 60 1200 | 1148 | Schneidwachs | Cutting wax |
| 29 6837 | 213 | MKD-Fräser | MCD end mill | 30 6540 | 109 | VHM-Fräser | Solid carbide end mill | 60 1300 | 1139 | Hydrauliköl | Hydraulic oil |
| 29 6838 | 214 | MKD-Fräser | MCD end mill | 30 6542 | 114-115 | VHM-Fräser | Solid carbide end mill | | | | |
| 29 6839 | 215 | MKD-Fräser | MCD end mill | 30 6544 | 116-117 | VHM-Fräser | Solid carbide end mill | | | | |
| 29 6840 | 216 | MKD-Fräser | MCD end mill | 30 6545 | 118-119 | VHM-Fräser | Solid carbide end mill | | | | |
| 29 6841 | 217 | MKD-Fräser | MCD end mill | 30 6546 | 120-121 | VHM-Fräser | Solid carbide end mill | | | | |
| 29 6843 | 218 | VHM-Fräser | Solid carbide end mill | 30 6551 | 124-125 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 5955 | 98 | VHM-Fräser | Solid carbide end mill | 30 6552 | 126 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 5958 | 98 | VHM-Fräser | Solid carbide end mill | 30 6553 | 128-129 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6200 | 25 | VHM-Fräser | Solid carbide end mill | 30 6554 | 130-131 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6202 | 28-29 | VHM-Fräser | Solid carbide end mill | 30 6557 | 132 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6203 | 30-31 | VHM-Fräser | Solid carbide end mill | 30 6560 | 121 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6204 | 32-33 | VHM-Fräser | Solid carbide end mill | 30 6561 | 133 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6209 | 35 | VHM-Fräser | Solid carbide end mill | 30 6572 | 134 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6212 | 36-37 | VHM-Fräser | Solid carbide end mill | 30 6573 | 135 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6213 | 38-39 | VHM-Fräser | Solid carbide end mill | 30 6574 | 135 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6215 | 42 | VHM-Fräser | Solid carbide end mill | 30 6591 | 136 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6217 | 42 | VHM-Fräser | Solid carbide end mill | 30 6592 | 136 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6222 | 44 | VHM-Fräser | Solid carbide end mill | 30 6593 | 137 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6223 | 44 | VHM-Fräser | Solid carbide end mill | 30 6632 | 138-139 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6224 | 45 | VHM-Fräser | Solid carbide end mill | 30 6633 | 140-141 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6228 | 43 | VHM-Fräser | Solid carbide end mill | 30 7320 | 26 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6232 | 45 | VHM-Fräser | Solid carbide end mill | 30 7415 | 146 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6233 | 47 | VHM-Fräser | Solid carbide end mill | 30 7421 | 146 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6234 | 47 | VHM-Fräser | Solid carbide end mill | 30 7425 | 147 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6255 | 52-53 | VHM-Fräser | Solid carbide end mill | 30 7428 | 147 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6256 | 54-55 | VHM-Fräser | Solid carbide end mill | 30 7431 | 148 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6257 | 56-57 | VHM-Fräser | Solid carbide end mill | 30 7432 | 148 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6261 | 58-59 | VHM-Fräser | Solid carbide end mill | 30 7485 | 150 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6262 | 60 | VHM-Fräser | Solid carbide end mill | 30 7486 | 150 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6264 | 62-63 | VHM-Fräser | Solid carbide end mill | 30 7487 | 151 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6265 | 66-67 | VHM-Fräser | Solid carbide end mill | 30 8011 | 48-49 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6266 | 68-69 | VHM-Fräser | Solid carbide end mill | 30 8012 | 50-51 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6267 | 72-73 | VHM-Fräser | Solid carbide end mill | 31 6840 | 149 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6268 | 74 | VHM-Fräser | Solid carbide end mill | 31 6868 | 149 | VHM-Fräser | Solid carbide end mill | | | | |
| 30 6269 | 71 | VHM-Fräser | Solid carbide end mill | 40 1010 | 670 | Mehrfasen-Stufenbohrer | Subland drill | | | | |
| 30 6271 | 75, 113 | VHM-Fräser | Solid carbide end mill | 40 1020 | 670 | Mehrfasen-Stufenbohrer | Subland drill | | | | |
| 30 6274 | 76-77 | VHM-Fräser | Solid carbide end mill | 40 1030 | 670 | Mehrfasen-Stufenbohrer | Subland drill | | | | |
| 30 6274 | 122-123 | VHM-Fräser | Solid carbide end mill | 40 1040 | 672 | Kurzstufenbohrer | Stub subland drill | | | | |
| 30 6276 | 64 | VHM-Fräser | Solid carbide end mill | 40 1050 | 672 | Kurzstufenbohrer | Stub subland drill | | | | |
| 30 6284 | 78 | VHM-Fräser | Solid carbide end mill | 40 1060 | 674 | Kurzstufenbohrer | Stub jobber drill | | | | |
| 30 6286 | 78 | VHM-Fräser | Solid carbide end mill | 40 1070 | 674 | Kurzstufenbohrer | Stub subland drill | | | | |
| 30 6296 | 79 | VHM-Fräser | Solid carbide end mill | 40 1791 | 667 | Flachsenker Set | Counterbores set | | | | |
| 30 6297 | 79 | VHM-Fräser | Solid carbide end mill | 40 1792 | 667 | Flachsenker Set | Counterbores set | | | | |
| 30 6331 | 82 | VHM-Fräser | Solid carbide end mill | 40 1793 | 667 | Flachsenker Set | Counterbores set | | | | |
| 30 6332 | 82 | VHM-Fräser | Solid carbide end mill | 40 1794 | 666 | Flachsenker Set | Counterbores set | | | | |
| 30 6341 | 83 | VHM-Fräser | Solid carbide end mill | 40 1797 | 666 | Flachsenker Set | Counterbores set | | | | |
| 30 6342 | 83 | VHM-Fräser | Solid carbide end mill | 40 1798 | 666 | Flachsenker Set | Counterbores set | | | | |
| 30 6345 | 84 | VHM-Fräser | Solid carbide end mill | 40 2010 | 671 | Mehrfasen-Stufenbohrer | Subland drill | | | | |
| 30 6346 | 84 | VHM-Fräser | Solid carbide end mill | 40 2020 | 671 | Mehrfasen-Stufenbohrer | Subland drill | | | | |
| 30 6353 | 86 | VHM-Fräser | Solid carbide end mill | 40 2030 | 671 | Mehrfasen-Stufenbohrer | Subland drill | | | | |
| 30 6355 | 86 | VHM-Fräser | Solid carbide end mill | 40 2040 | 673 | Kurzstufenbohrer | Stub subland drill | | | | |
| 30 6356 | 87 | VHM-Fräser | Solid carbide end mill | 40 2050 | 673 | Kurzstufenbohrer | Stub subland drill | | | | |
| 30 6358 | 87 | VHM-Fräser | Solid carbide end mill | 40 2060 | 675 | Kurzstufenbohrer | Stub jobber drill | | | | |
| 30 6425 | 88 | VHM-Fräser | Solid carbide end mill | 40 2070 | 675 | Kurzstufenbohrer | Stub subland drill | | | | |

Kundenservice: +49 (0) 33675 - 7265 422

Reparaturformular – Kernbohrmaschinen / Geradschleifer

Versand an:

bitte pro Maschine ein Formular ausfüllen

Karnasch Professional Tools GmbH

Straße des Friedens 10

D-15848 Görzdorf

| | | | | |
|--|--|--|--|--|
| | | | | |
|--|--|--|--|--|

Kunden-Nr. – bitte angeben

Lieferschein-/Rechnungs-Nr.

Auftraggeber/Ansprechpartner (für Rückfragen):

Versandanschrift:

Firma/Abteilung

Firma/Abteilung

Straße

Straße

PLZ, Ort

PLZ, Ort

Tel

E-Mail

Name (Ansprechpartner)

Vorname

Wir wünschen:

Reparatur sofort

Bis zu _____ €, ansonsten erfolgt ein Kostenvoranschlag

Kostenvoranschlag erbeten

Bei Rückversand der unreparierten Maschine werden die anfallenden Prüfkosten pauschal mit 20 € zzgl. Porto berechnet. Die Maschine bleibt unrepariert und demontiert.

Gewährleistung

Wenn das Kaufdatum innerhalb der letzten 12 Monate liegt. (Unbedingt eine Rechnungskopie beilegen.)

Artikelnummer

Seriennummer

Fehlerbeschreibung:

(bitte verwendetes Werkzeug angeben)

Wurde die o. g. Maschine bereits einmal repariert? Ja Nein

Falls JA, bitte das Reparaturdatum mitteilen: _____

Es gelten die allgemeinen Geschäftsbedingungen von Karnasch Professional Tools, einsehbar und herunterzuladen unter www.karnasch.tools.

Innerhalb Deutschlands können Sie unseren Abholservice nutzen. Dafür berechnen wir Ihnen einen Betrag von 12 € netto.

Bitte senden Sie uns dazu eine Mail an mail@karnasch.tools unter Angabe der Abholadresse und des Bruttogewichts.

Bitte verpacken Sie die Maschine und legen Sie eine Kopie dieses Reparaturauftrages bei.

Rücksendungen müssen frei Haus erfolgen, unfreie Rücksendungen werden nicht entgegengenommen.

Datum

Unterschrift



Download

Customer service: +49 (0) 33675 - 7265 422

Repair form – core drilling machines / straight grinders

Dispatch to:

Please fill out only one form for each machine

Karnasch Professional Tools GmbH

Straße des Friedens 10

D-15848 Görzdorf

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
|--|--|--|--|--|--|

Customer number – Please indicate

Delivery note/Invoice number

Invoice dated within 12 months

Customer/Contact person (for queries):

Shipping address:

Company/Department

Company/Department

Street

Street

Postcode/Town

Postcode/Town

Tel

Email

Surname (contact person)

First name

We want:

Immediate repair

Up to _____ €, otherwise with a cost estimate

Cost estimate

In case of return shipment of the not repaired machine, we charge 20 € inspection costs in general plus postage. The machine remains unrepaired and disassembled.

Warranty

If the invoice date is within 12 months. (Attached invoice copy absolutely necessary.)

Item number

Serial number

Description of the defect:

(please note the used tool)

Has this machine already been repaired once?

Yes No

In case YES, date of the repair: _____

All services are subject to the general terms and conditions of Karnasch Professional Tools. Please consult or download these at www.karnasch.tools.

Return of goods can only be made free to factory, the return of unfree goods is not accepted.

Date

Signature



Download

Customer service: +49 (0) 6203 - 4039 0

Return of goods (only for tools) except complaints

Dispatch to:

Karnasch Professional Tools GmbH
 Siemensstraße 1
 D-68542 Heddeshheim

| | | | | |
|--|--|--|--|--|
| | | | | |
|--|--|--|--|--|

Customer number - Please indicate

Delivery note/Invoice number

Return of goods can be made only for unused and current catalog items in their undamaged original packaging. Excluded are sale or discontinued items, items which are not conform to the current technical design as well as special tools. In case of reasons for returning indicated with **X**, we charge a 15% processing fee from the value of goods, but a minimum of 15€ net.

Customer/Contact person (for queries):

Shipping address:

Company/Department

Company/Department

Street

Street

Postcode/Town

Postcode/Town

Tel

Email

Surname (contact person)

First name

Reasons of return *Please check as appropriate*

Remarks

- Order placed in error (X)
- Wrong delivery
- No use (X)
 (-> phone contacting in advance required)

| |
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| Quantity | Item number |
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All services are subject to the general terms and conditions of Karnasch Professional Tools. Please consult or download these at www.karnasch.tools.

Return of goods can only made free to factory, the return of unfree goods is not accepted.

Date

Signature



ALLGEMEINE GESCHÄFTSBEDINGUNGEN VON KARNASCH PROFESSIONAL TOOLS GMBH GEGENÜBER UNTERNEHMERN (B2B) – KAUFVERTRAG

§ 1 Geltungsbereich

(1) Die vorliegenden Geschäftsbedingungen der Karnasch Professional Tools GmbH, Siemensstraße 1, 68542 Heddeshem gelten für alle Bestellungen von Unternehmern in unserem Onlineshop oder aus unseren Katalogen, soweit diese nicht durch schriftliche Vereinbarungen (insbesondere bei Abrufverträgen) zwischen den Parteien abgeändert werden. Abweichende oder entgegenstehende Bedingungen werden von uns nicht anerkannt, sofern wir diesen nicht ausdrücklich zugestimmt haben.
 (2) Änderungen dieser Geschäftsbedingungen werden Ihnen schriftlich, per Telefax oder per E-Mail mitgeteilt. Widersprechen Sie dieser Änderung nicht innerhalb von vier Wochen nach Zugang der Mitteilung, gelten die Änderungen als durch Sie anerkannt. Auf das Widerspruchsrecht und die Rechtsfolgen des Schweigens werden Sie im Falle der Änderung der Geschäftsbedingungen noch gesondert hingewiesen.

§ 2 Registrierung als Nutzer bei Bestellungen im Onlineshop

(1) Ihre Registrierung als Gewerbetreibende in unserem Handelssystem erfolgt kostenlos. Ein Anspruch auf Zulassung zu unserem Handelssystem besteht nicht. Teilnahmeberechtigt sind ausschließlich unbeschränkt geschäftsfähige Unternehmer im Sinne des § 14 BGB. Auf unser Verlangen haben Sie uns eine Kopie Ihres Personalausweises oder eine Bestätigung Ihrer Eigenschaft als Unternehmer zuzusenden. Zur Zulassung füllen Sie elektronisch das auf unserer Website vorhandene Anmeldeformular aus und mailen uns dieses zu. Die für die Anmeldung erforderlichen Daten sind von Ihnen vollständig und wahrheitsgemäß anzugeben. Mit der Anmeldung wählen Sie einen persönlichen Nutzernamen (E-Mail-Adresse) und ein Passwort. Der Nutzername darf weder gegen Rechte Dritter noch gegen sonstige Namens- und Markenrechte oder die guten Sitten verstoßen. Sie sind verpflichtet, das Passwort geheim zu halten und dieses Dritten keinesfalls mitzuteilen.
 (2) Abgesehen von der Erklärung Ihres Einverständnisses mit der Geltung dieser Allgemeinen Geschäftsbedingungen ist Ihre Registrierung mit keinerlei Verpflichtungen verbunden. Sie können Ihren Eintrag jederzeit wieder unter „Mein Benutzerkonto“ löschen. Allein mit der Eintragung bei uns besteht keinerlei Kaufverpflichtung hinsichtlich der von uns angebotenen Waren.
 (3) Soweit sich Ihre persönlichen Angaben ändern, sind Sie selbst für deren Aktualisierung verantwortlich. Alle Änderungen können online nach Anmeldung unter „Mein Benutzerkonto“ vorgenommen werden.

§ 3 Datenschutz

(1) Sämtliche von Ihnen mitgeteilten personenbezogenen Daten (z. B. Anrede, Name, Anschrift, Geburtsdatum, E-Mail-Adresse, Telefonnummer, Telefaxnummer, Bankverbindung, Kreditkartennummer) werden von uns ausschließlich gemäß den Bestimmungen des deutschen Datenschutzes erhoben, verarbeitet und gespeichert.
 (2) Soweit über die gesetzlichen Erlaubnistatbestände hinaus eine Erhebung, Verarbeitung oder Speicherung personenbezogener Daten beabsichtigt ist, erfolgt diese nur bei Vorliegen einer gesonderten Einwilligung von Ihnen.
 (3) Weiterführende Hinweise zum Datenschutz werden dem Kunden im Rahmen der Datenschutzerklärung im Onlineshop zur Verfügung gestellt.

§ 4 Vertragsschluss

(1) Die Präsentation unserer Waren im Onlineshop oder in unseren Katalogen stellt kein bindendes Angebot unsererseits dar. Erst die Bestellung einer Ware durch Sie ist ein bindendes Angebot nach § 145 BGB. Im Falle der Annahme dieses Angebots versenden wir an Sie innerhalb von 5 Werktagen eine Auftragsbestätigung.
 (2) Eine Garantie übernehmen wir nur nach Maßgabe einer gesonderten und ausdrücklich als solchen bezeichneten Garantieerklärung.

§ 5 Lieferung auf Abruf / Rahmenverträge

(1) Bei der Vereinbarung einer Lieferung auf Abruf wird ein Rahmenvertrag sowie jeweils Einzelverträge pro Abruf geschlossen. Die Rahmenverträge haben grundsätzlich eine Laufzeit von maximal 12 Monaten.
 (2) Nach einer entsprechenden Anfrage durch Sie senden wir Ihnen ein Angebot in Form eines Rahmenvertrages zu. Rahmenverträge wie auch Einzelverträge gelten erst mit einer Auftragsbestätigung von uns als angenommen und wirksam.

§ 6 Preise

(1) Alle Preisangaben erfolgen in Euro. Die Preise verstehen sich als Nettopreise zuzüglich der jeweils gültigen gesetzlichen Mehrwertsteuer.
 (2) Die Preise gelten ab Werk ohne Verpackung und Transportkosten.
 (3) Für die Anfertigung von Sonderwerkzeugen ist eine Anzahlung in Höhe von 50 % zu leisten. Dies gilt auch bei Abschluss eines Abrufvertrages.
 (4) Alle von uns aufgeführten Preise gelten für die im Onlineshop oder im Katalog bezeichnete bzw. dargestellte Ausführung und Abmessung. Soweit Sie bei Ihrer Bestellung hiervon abweichen, führt dies auch ohne ausdrückliche vorherige Ankündigung zu einer neuen Preisbemessung durch uns.
 (5) An Sonderangebote sind wir nur bis einschließlich des 14. Tages ab dem Datum der Veröffentlichung gebunden, es sei denn im konkreten Angebot ist etwas Gegenteiliges ausgewiesen.
 (6) Im Falle des Abschlusses einer Lieferung auf Abruf (§ 5) gelten die im Rahmenvertrag vereinbarten Preise. Tritt bei Rahmenverträgen oder Langfristverträgen (unbefristete Verträge oder Verträge von mehr als 12 Monaten Laufzeit) eine wesentliche Änderung der Lohn-, Material- oder Energiekosten ein, so ist jeder Vertragspartner berechtigt, eine angemessene Anpassung des Preises unter Berücksichtigung der neuen Gegebenheiten zu verlangen.

§ 7 Zahlungsbedingungen und Aufrechnung

(1) Die Zahlung der Ware erfolgt auf Rechnung per Nachname oder gegen Vorkasse.
 (2) Die Bezahlung der Lieferung hat innerhalb von 30 Tagen ab Rechnungsdatum in bar ohne jeden Abzug zu erfolgen. Dies gilt nicht, wenn zwischen den Parteien eine Sonderabrede besteht, die wir in der Auftragsbestätigung schriftlich bestätigt haben.
 (3) Reparatur- und Schärfaufträge sind entgegen Abs. 2 nach Erhalt der Rechnung sofort ohne jeden Abzug zahlbar.
 (4) Sofern Sie ihren Sitz außerhalb der EU Mitgliedsstaaten haben gilt folgendes: Sämtliche Bankgebühren, die im Rahmen der Zahlung anfallen, sind von Ihnen zu tragen. Sofern diese Gebühren uns belastet werden, sind wir berechtigt, Ihnen diese in Rechnung zu stellen.
 (5) Bei Zahlungsverzug sind wir berechtigt, Zinsen gemäß § 288 Abs. 2 BGB geltend zu machen.
 (6) Ist eine Teilzahlungsabrede getroffen und kommen Sie mit mehr als zwei Teilzahlungen in Verzug, so wird der Restbetrag gesamtfällig. Das gleiche gilt auch für den Fall, dass uns Umstände bekannt werden, die die Sicherheit der Forderung als gefährdet erscheinen lassen.
 (7) Rechnungen können sowohl postalisch als auch in elektronischer Form an den Kunden übermittelt werden.
 (8) Aufrechnungsrechte stehen Ihnen nur zu, wenn Ihre Gegenansprüche rechtskräftig festgestellt, unbestritten oder von uns anerkannt sind. Bei Mängeln der Lieferung bleiben die Gegenrechte des Käufers unberührt.

§ 8 Lieferbedingungen

(1) Wir liefern die Ware gemäß den mit Ihnen getroffenen Vereinbarungen. Liefertermine und Lieferfristen sind nur verbindlich, wenn sie von uns schriftlich bestätigt wurden.
 (2) Soweit wir die Lieferung der Ware nicht oder nicht vertragsgemäß erbringen, müssen Sie uns zur Bewirkung der Leistung eine Nachfrist setzen. Ansonsten sind Sie nicht berechtigt, vom Vertrag zurückzutreten.
 (3) Innerhalb Deutschlands liefern wir bei einem Auftragswert von über € 1.000,- netto inklusive Porto und Verpackung (Sonderanfertigungen, Expresslieferungen ausgeschlossen).
 (4) Bei Auslandslieferungen gelten die Preise exklusive Verpackung und Porto, unverzollt und unversichert. Weitere Kosten gehen ebenfalls zu Ihren Lasten, sofern nicht ausdrücklich eine andere Regelung getroffen wurde.
 (5) Anfallende Versandkosten werden von uns gesondert auf der Rechnung ausgewiesen.
 (6) Der Mindestauftragswert beträgt € 50,- netto.
 (7) Bei bruch- bzw. kälteempfindlichen Werkzeugen sowie Sonderanfertigungen behalten wir uns vor, von der bestellten Menge eine Über- oder Unterlieferung bis zu 10 % auch ohne gesonderte Vereinbarung vorzunehmen. Berechnet wird die Liefermenge.
 (8) Beim Eintritt und während der Dauer höherer Gewalt werden die vertraglichen Rechte und Pflichten suspendiert. Die betroffene Partei informiert die andere Partei unverzüglich über Eintritt, Ursache der Verzögerung und später über deren Beendigung. Falls die höhere Gewalt ununterbrochen über einen Zeitraum von mindestens 6 Monaten andauert, treffen beide Parteien eine Vereinbarung über die weitere Abwicklung des Vertrages. Falls eine Einigung nicht zustande kommt, entscheidet das vorgesehene Schiedsgericht.

§ 9 Gefährübergang, Abnahme

(1) Die Gefahr geht auf den Besteller über, wenn der Liefergegenstand das Werk bzw. den Versendungsort verlassen hat, und zwar auch dann, wenn Teillieferungen erfolgen oder der Lieferer noch andere Leistungen, z. B. die Aufstellung des Liefergegenstandes übernommen hat. Soweit eine Abnahme zu erfolgen hat, ist diese für den Gefahrübergang maßgebend. Sie muss unverzüglich zum Abnahmetermin, hilfsweise nach der Meldung des Lieferers über die Abnahmebereitschaft durchgeführt werden. Sie

dürfen die Abnahme bei Vorliegen eines nicht wesentlichen Mangels nicht verweigern.
 (2) Verzögert sich oder unterbleibt der Versand bzw. die Abnahme infolge von Umständen, die uns nicht zuzurechnen sind, geht die Gefahr vom Tage der Meldung der Versand- bzw. Abnahmebereitschaft auf Sie über.
 (3) Teillieferungen sind zulässig, soweit dies für Sie zumutbar ist.

§ 10 Eigentumsvorbehalt

(1) Die Ware bleibt bis zur vollständigen Bezahlung unser Eigentum. Geraten Sie mit der Zahlung länger als 10 Tage in Verzug, haben wir das Recht, vom Vertrag zurückzutreten und die Ware zurückzufordern.
 (2) Sie sind zur Weiterveräußerung der unter Eigentumsvorbehalt stehenden Ware im gewöhnlichen Geschäftsverkehr berechtigt. In diesem Falle treten Sie jedoch in Höhe des Rechnungswertes unserer Forderung bereits jetzt alle Forderungen aus einer solchen Weiterveräußerung, gleich ob diese vor oder nach einer evtl. Verarbeitung der unter Eigentumsvorbehalt gelieferten Ware erfolgt, an uns ab. Unbeschadet unserer Befugnis, die Forderung selbst einzuziehen, bleiben Sie auch nach der Abtretung zum Einzug der Forderung ermächtigt. In diesem Zusammenhang verpflichten wir uns, die Forderung nicht einzuziehen, so lange und so weit Sie Ihren Zahlungsverpflichtungen nachkommen, kein Antrag auf Eröffnung eines Insolvenz- oder ähnlichen Verfahrens gestellt ist und keine Zahlungseinstellung vorliegt. Insoweit die oben genannten Sicherheiten die zu sichernden Forderungen um mehr als 10 % übersteigen, sind wir verpflichtet, die Sicherheiten nach unserer Auswahl auf Ihr Verlangen freizugeben.

§ 11 Sachmängel

(1) Alle diejenigen Teile sind nach unserer Wahl nachzubessern oder mangelfrei zu ersetzen, die sich infolge eines vor dem Gefahrübergang liegenden Umstandes als mangelhaft herausstellen. Die Feststellung solcher Mängel ist uns unverzüglich schriftlich anzuzeigen. Ersetzte Teile werden unser Eigentum.
 (2) Die Verjährungsfrist von Gewährleistungsansprüchen für die gelieferte Ware beträgt – außer im Fall von Schadensersatzansprüchen – zwölf Monate ab Erhalt der Ware.
 (3) Die Nacherfüllung beinhaltet weder den Ausbau der mangelhaften Sache noch den erneuten Einbau, wenn wir ursprünglich nicht zum Einbau verpflichtet waren.
 (4) In allen Fällen unberührt bleiben die gesetzlichen Sondervorschriften bei Endlieferung der Ware an einen Verbraucher (Lieferantenregress gem. §§ 478, 479 BGB).
 (5) Zur Vornahme aller uns notwendig erscheinenden Nachbesserungen und Ersatzlieferungen haben Sie uns nach Absprache die erforderliche Zeit und Gelegenheit zu geben; andernfalls sind wir von der Haftung für die daraus entstehenden Folgen befreit. Nur in dringenden Fällen der Gefährdung der Betriebssicherheit bzw. zur Abwehr unverhältnismäßig großer Schäden – in diesen Fällen sind wir sofort zu verständigen – haben Sie das Recht, den Mangel selbst oder durch Dritte beseitigen zu lassen und von uns Ersatz der erforderlichen Aufwendungen zu verlangen.
 (6) Sie haben im Rahmen der gesetzlichen Vorschriften ein Recht zum Rücktritt vom Vertrag, wenn wir – unter Berücksichtigung der gesetzlichen Ausnahmefälle – eine gesetzte angemessene Frist für die Nachbesserung oder Ersatzlieferung wegen eines Sachmangels fruchtlos verstreichen lassen. Liegt nur ein unerheblicher Mangel vor, steht Ihnen lediglich ein Recht zur Minderung des Vertragspreises zu. Das Recht auf Minderung des Vertragspreises bleibt ansonsten ausgeschlossen.
 (7) Keine Gewährleistung wird insbesondere übernommen bei ungeeigneter oder unsachgemäßer Verwendung, fehlerhafter Montage bzw. Inbetriebsetzung durch Sie oder Dritte, natürlicher Abnutzung, fehlerhafter oder nachlässiger Behandlung, nicht ordnungsgemäßer Wartung, Nutzung ungeeigneter Betriebsmittel, chemischer, elektrochemischer oder elektrischer Einflüsse – sofern solche nicht von uns verantworten sind.
 (8) Bessern Sie oder ein Dritter unsachgemäß nach, haften wir nicht für die daraus resultierenden Folgen. Gleiches gilt für Änderungen des Liefergegenstandes ohne unsere vorherige Zustimmung.
 (9) Die Rücksendung der Ware ist Ihnen nur nach vorheriger schriftlicher Vereinbarung mit uns gestattet. Ohne eine solche schriftliche Vereinbarung sind die Kosten der Rücksendung von Ihnen zu tragen. Wir sind berechtigt, unfrei zugesandte Rücksendungen nicht anzunehmen.
 (10) Sonderanfertigungen werden grundsätzlich nicht zurückgenommen.
 (11) Sofern wir Ihnen eine Warengutschrift gewähren, ergibt sich die Höhe der Gutschrift aus dem Betrag der Originalrechnung abzüglich 15 % Bearbeitungsgebühr. Die Mindestbearbeitungsgebühr beträgt € 15,-.
 (12) Im Falle einer Warengutschriftvereinbarung haben Sie die Ware auf Ihre Kosten an uns zurückzusenden.

§ 12 Rechtsmängel

(1) Führt die Benutzung des Liefergegenstandes zur Verletzung von gewerblichen Schutzrechten oder Urheberrechten im Inland, werden wir versuchen, Ihnen auf unsere Kosten das Recht zum weiteren Gebrauch zu verschaffen oder den Liefergegenstand in für Sie zumutbarer Weise daran zu modifizieren, dass die Schutzrechtsverletzung nicht mehr besteht. Ist dies zu wirtschaftlich angemessenen Bedingungen in angemessener Frist nicht möglich, sind Sie zum Rücktritt vom Vertrag berechtigt. Unter den genannten Voraussetzungen steht auch uns ein Recht zum Rücktritt vom Vertrag zu.
 (2) Die Verjährungsfrist von Gewährleistungsansprüchen für die gelieferte Ware beträgt – außer im Fall von Schadensersatzansprüchen – zwölf Monate ab Erhalt der Ware.
 (3) Voraussetzung für die Geltendmachung Ihrer Ansprüche ist, dass
 • Sie uns unverzüglich von geltend gemachten Schutz- oder Urheberrechtsverletzungen unterrichtet haben,
 • Sie uns in angemessenem Umfang bei der Abwehr der geltend gemachten Ansprüche unterstützt bzw. uns die Durchführung der Modifizierungsmaßnahmen ermöglicht haben,
 • uns alle Abwehrmaßnahmen einschließlich außergerichtlicher Regelungen vorbehalten bleiben,
 • der Rechtsmangel nicht auf der Eigenart Ihrer Anweisung / Bestellung beruht und
 • die Rechtsverletzung nicht dadurch verursacht wurde, dass Sie den Liefergegenstand eigenmächtig geändert oder in einer nicht vertragsgemäßen Weise verwendet haben.

§ 13 Haftungsausschluss

(1) Wir haften für Vorsatz und grobe Fahrlässigkeit. Ferner haften wir für die fahrlässige Verletzung von Pflichten, deren Erfüllung die ordnungsgemäße Durchführung des Vertrages überhaupt erst ermöglicht, deren Verletzung die Erreichung des Vertragszwecks gefährdet und auf deren Einhaltung Sie als Kunde regelmäßig vertrauen. Im letztgenannten Fall haften wir jedoch nur für den vorhersehbaren, vertragstypischen Schaden. Wir haften nicht für die leicht fahrlässige Verletzung anderer als der in den vorstehenden Sätzen genannten Pflichten.
 Die vorstehenden Haftungsausschlüsse gelten nicht bei Verletzung von Leben, Körper und Gesundheit. Die Haftung nach Produkthaftungsgesetz und aus einer etwaigen Garantie bleibt unberührt.

§ 14 Verjährung

(1) Ihre Ansprüche – gleich aus welchem Rechtsgrund – verjähren innerhalb von 12 Monaten ab Ablieferung. Für vorsätzliches oder arglistiges Verhalten, im Falle schuldhafter Verletzung von Leben, Körper und Gesundheit sowie bei Ansprüchen nach dem Produkthaftungsgesetz gelten die gesetzlichen Fristen. Sie gelten auch für Mängel eines Bauwerks oder für Liefergegenstände, die entsprechend ihrer üblichen Verwendungsweise für ein Bauwerk verwendet wurden und dessen Mangelhaftigkeit verursacht haben.
 (2) Soweit im Rahmen unserer Mängelbeseitigung Rechte von Ihnen wegen Sachmängeln neu entstehen, verjähren sämtliche Ansprüche spätestens in 24 Monaten ab Lieferung des ursprünglichen Lieferteils.

§ 15 Schlussbestimmungen

(1) Es gilt das Recht der Bundesrepublik Deutschland unter Ausschluss des UN-Kaufrechts.
 (2) Erfüllungsort ist unser Geschäftssitz.
 (3) Sollten diese AGB den Bestimmungen in Abrufverträgen (Rahmenvertrag und/oder Einzelvertrag) widersprechen, dann gelten im Zweifel die vertraglichen Vereinbarungen.
 (4) Ausschließlicher Gerichtsstand für alle Streitigkeiten aus oder im Zusammenhang mit diesem Vertrag ist der Sitz unseres Unternehmens.

Informationspflichten

(1) Die für den Vertragsabschluss zur Verfügung stehende Sprache ist Deutsch und Englisch.
 (2) Abbildungen im Online-Shop dienen lediglich der Produktpäsentation und stellen kein rechtsverbindliches Angebot von uns dar. Änderungen und Irrtümer bleiben vorbehalten.
 Ein Vertragsschluss zwischen Ihnen und uns über im Online-Shop angebotene Waren setzt voraus, dass Sie das gewünschte Produkt zunächst in den virtuellen Warenkorb legen, den virtuellen Warenkorb anklicken und sodann den Bestellvorgang mit dem Button „zur Kasse gehen“ einleiten. Erst durch Anklicken des im weiteren Verlauf erscheinenden Bestellbuttons „kostenpflichtig bestellen“ bereiten Sie den Abschluss der Bestellung vor und geben ein rechtsverbindliches Angebot zum Abschluss eines Kaufvertrages ab.
 (3) Wir speichern den Vertragstext und senden Ihnen die Bestelldaten und unsere AGB per E-Mail zu.
 (4) Etwaige Eingabefehler bei Abgabe Ihrer Bestellung können Sie bei der abschließenden Bestätigung vor der Kasse erkennen und mit Hilfe der Löschen- und Änderungsfunktion vor Abschendung der Bestellung jederzeit korrigieren. Ihre Bestelldaten sind aus Sicherheitsgründen nicht mehr über das Internet zugänglich.
 (5) Speziellen und vorstehend nicht erwähnten Verhaltenskodizes unterliegen wir nicht.
 (6) Im Übrigen verweisen wir auf unsere Allgemeinen Geschäftsbedingungen.

GENERAL TERMS & CONDITIONS OF BUSINESS OF KARNASCH PROFESSIONAL TOOLS GMBH FOR TRANSACTING WITH ENTREPRENEURS (B2B) – SALES CONTRACT

Section 1 – Scope of validity

(1) These General Terms & Conditions of Business [“GTGB”] of Karnasch Professional Tools GmbH Siemensstrasse 1, D-68542 Heddeshheim apply to all orders which entrepreneurs place in our online shop or from our catalogues, save they have been amended by written agreements (notably delivery-on-call agreements) between the Contract Parties. Divergent or contrary provisions shall not be recognised by us in the absence of our express written consent thereto.
(2) Amendments to these GTGB shall be communicated to you in writing, by fax or e-mail. Your failure to object to said amendments within 4 (four) weeks of receiving notification thereof shall be construed as your tacit acceptance thereof. The right of objection and the legal consequences of silence shall be indicated to you again in the case of an amendment of the GTGB.

Section 2 – Registration as a user for placing orders in the online shop

(1) Your registration as a business customer in our trading system is free of charge. An entitlement to registration in our trading system does not exist. Eligible for registration are exclusively entrepreneurs with unlimited legal capacity within the meaning of Section 14 of the German Civil Code (Bürgerliches Gesetzbuch, BGB). Upon our request, you shall send us a copy of your identity card, an alternative official identification document or a confirmation of your capacity as an entrepreneur. To register, you should complete electronically the application form on our website and send this to us by e-mail. The registration data you provide us must be complete and truthful. To register, you must choose a personal user name (e-mail address) and password. The user name may violate neither third-party, nor any other name or brand, rights, nor moral principles. You shall maintain the confidentiality of the password and under no circumstances disclose it to third parties.
(2) Besides your declaration of consent to the applicability of these General Terms & Conditions of Business, your registration does not engender any other obligations whatsoever. You may delete your entry at any time under “My user account”. Your registration with our website, alone, engenders no undertaking to purchase any merchandise we offer.
(3) Should your personal details change, you, yourself shall be responsible for updating these. All changes can be made online, after signing on, under “My user account”.

Section 3 – Data privacy

(1) All of the personal data you impart to us [e.g. salutation, name, address, date of birth, e-mail address, telephone number, fax number, bank connection, credit card number] are collected, processed and stored by us exclusively in compliance with the provisions of Germany’s data privacy laws.
(2) Any intended collection, processing or storage of personal data extending beyond that permitted by statute shall occur exclusively subject to separate provision of your express consent.
(3) Customers can find further information on data privacy in the Data Privacy Declaration in the online shop.

Section 4 – Conclusion of contract

(1) The presentation of merchandise in the online shop or in our catalogues does not constitute a binding offer on our part. Only your placement of an order for merchandise engenders a binding offer under Section 145 BGB. Upon our acceptance of said offer, we shall send you an order confirmation within 5 (five) workdays.
(2) We will only provide a guarantee subject to a separate guarantee declaration which has been expressly designated as such.

Section 5 – Delivery-on-call and framework agreements

(1) In the case of a delivery-on-call agreement, a framework agreement, as well as individual agreements for each requisition, shall be entered into. All framework agreements have a maximum contractual period of 12 (twelve) months.
(2) Upon your request therefor, we shall send you a non-binding offer in the form of a framework agreement. Framework agreements and individual agreements shall only be deemed accepted by us and effective following an order confirmation.

Section 6 – Prices

(1) All prices are quoted in euros (EUR). The prices are net and subject additionally to the prevailing rate of statutory value added tax (VAT).
(2) Prices are quoted ex works, and do not include the cost of packaging and transportation.
(3) A fifty (50) percent prepayment is payable for the production of special tools. The same applies to the conclusion of delivery-on-call agreements.
(4) All quoted prices apply to the specifications and dimensions described or shown in the online shop or in our catalogue. Any orders that you place with deviating specifications and / or dimensions shall engender a price reassessment without our express prior notification thereof.
(5) Special offers shall only honoured up to and including the 14th day starting from the date of publication, save alternative arrangements are provided for in the offer concerned.
(6) For orders requisitioned on a delivery-on-call basis (Section 5), the prices quoted in the framework agreement shall apply. If, in the event of a framework agreement or long-term contract (contract which has no specific end-date or runs for a period exceeding twelve (12) months), substantial changes occur in wage, material or energy costs, either Contract Party shall be entitled to demand a reasonable adjustment of the prices to accommodate the new circumstances.

Section 7 – Terms of payment, offsetting

(1) Merchandise is paid for on account, by cash on delivery (COD) or against prepayment.
(2) Deliveries shall be paid for within 30 (thirty) days of the invoice date in cash, without any deduction, save when special arrangements between the Contract Parties have been provided for, which we have confirmed in writing in the order confirmation.
(3) Contrary to Clause [2], repair and sharpening orders are payable immediately upon receipt of the invoice, without any deduction.
(4) If your legal entity is located outside EU (European Union), the following rule applies: All bank charges incurred in connection with payment shall be borne by you. We shall be entitled to invoice you for any such fees we sustain.
(5) We shall be entitled to charge interest in accordance with Section 288 [2] BGB for overdue payments.
(6) If an agreement on instalment payments has been concluded, and more than 2 (two) instalments are overdue, the total outstanding amount shall fall due. The same applies, should we gain knowledge of circumstances that would appear to jeopardise the safety of our claim.
(7) Invoices may be sent to the customer by regular mail or electronically.
(8) You will be only entitled to offset rights if your counterclaims have been legally established, are indisputable or have been recognized by us. Defects in delivery shall not impair the counter-rights of the customer.

Section 8 – Terms of delivery

(1) Merchandise shall be delivered in accordance with our mutually reached agreements. Delivery times and deadlines shall only be binding subject to our written confirmation thereof.
(2) In the event of an abortive delivery of goods, or a delivery that is not contractually accordant, you shall set us a follow-up deadline for us to discharge our obligations. By failing to do so, you shall surrender your entitlement to withdraw from contract.
(3) For orders within Germany with a net value of EUR 1,000.00 and above, we shall deliver free of freight charges to the recipient’s railway station.
(4) For orders outside Germany, the cost of postage, packaging, custom duties and insurance shall be additionally charged. Other costs shall also be borne by you, save these have been expressly provided for by separate agreement.
(5) Incurred shipping costs shall be itemised separately on the invoice.
(6) The minimum order value is EUR 50.00 net.
(7) For tools that are sensitive to cold or susceptible to breakage, as well as for custom-made orders, we reserve the right, without special agreement, to over- or under-deliver by up to 10 (ten) percent of the ordered quantity. The delivered quantity shall be invoiced.
(8) Upon occurrence, and for the duration, of force majeure, the contractual rights and undertakings of the Contract Parties shall be suspended. The affected Contract Party shall inform the respective other Contract Party forthwith of the occurrence, cause of delay and, subsequently, the end of the force majeure. If the force majeure continues uninterrupted for a period of at least 6 (six) months, both Contract Parties shall reach an agreement on the future implementation of their contract. If an agreement cannot be reached, the intended court of arbitration shall decide.

Section 9 – Passage of risk, formal acceptance

(1) The risk passes to the order party when the deliverable leaves the factory or place of dispatch, also if partial deliveries are involved or the supplier has undertaken to render additional services such as installation of the deliverable. If formal acceptance is required, this shall be decisive for the passage of risk. Acceptance shall be conducted immediately per the agreed acceptance date or, alternatively, upon notification by the supplier of acceptance-readiness. Acceptance may not be refused by the customer on the grounds of a minor defect.

(2) If shipping or acceptance are delayed or not accomplishable due to reasons beyond our control, risk shall pass to you on the day on which you were notified that the deliverable was ready for shipping or acceptance.

(3) Partial deliveries are admissible if reasonable for you.

Section 10 – Retention of title

(1) We hold ownership of the merchandise until full payment thereof. If you are in arrears with payment for more than 10 (ten) days, we shall be entitled to rescind the contract and to claim back the merchandise we have delivered.
(2) In the normal course of business, you may resell the merchandise that is subject to the retention of title. In such case, however, you, already now, and in the amount of the invoice value of our claim, assign to us all claims from such a resale, irrespective of whether this occurs prior or subsequent to a possible further processing of the delivered merchandise that is subject to the retention of title. Notwithstanding our right to collect the claims directly, you, too, shall also be entitled to collect the assigned claim. In this connection, we undertake to refrain from demanding payment on the assigned claims to the extent that you meet all your payment obligations, do not become subject to an application for insolvency or similar proceedings, or to any stay of payments. Should the aforementioned collaterals exceed the claims to be secured by more than 10 (ten) percent, we undertake, upon your request, to release collaterals elected at our discretion.

Section 11 – Material defects

(1) We shall, at our free discretion, either repair, or replace without defects, all those parts which transpire to be defective for causes preceding the passage of risk. The discovery of such defects shall be notified forthwith in writing. Ownership of replaced parts shall revert to us.
(2) Except in the case of claims for damages, the limitation period for warranty claims for the delivered goods is 12 (twelve) months from the time of receipt of the goods.
(3) Follow-up performance shall encompass neither the removal of the defective item, nor the renewed installation, if we had not been charged with the original installation.
(4) In all cases, the special statutory guidelines on final delivery of merchandise to a consumer (supplier recourse under Sections 478, 479 BGB) remain unaffected.
(5) Subject to prior agreement, you shall give us the time and opportunity needed to implement the improvements and deliver the spare parts that appear necessary; in failure thereof, we shall be released from liability for the ensuing consequences. Only in urgent cases in which operating safety is jeopardised, or disproportionately severe damage is to be avoided, may the defect be rectified by yourself or a third party engaged by yourself, and the ensuing outlays presented to us for reimbursement; in such cases, we are to be notified forthwith.
(6) In the framework of the statutory provisions, you may rescind the contract if – while taking account of the statutory exemptions – we allow to elapse fruitlessly a reasonably-set deadline to subsequently improve or replace a delivery due to a quality defect. If existing, a minor defect shall only entitle you to a reduction in the purchase price. In all other cases, the entitlement to a reduction in the purchase price is excluded.
(7) No warranty is provided by us, particularly in the case of unsuitable or improper use, incorrect assembly or commissioning by you or a third party, natural wear and tear, incorrect or negligent handling, improper maintenance, use of inappropriate operating equipment, chemical, electrochemical or electrical influences – provided that we are not responsible therefor.
(8) If you or a third party perform an improper rectification, we cannot be held liable for the consequences incurred. The same applies to alterations made to the deliverable without our prior consent.
(9) Merchandise may only be returned with our prior, written consent. Without such a written agreement, the cost of returning the merchandise shall be borne by you. We reserve the right to refuse delivery of shipments sent freight collect.
(10) Specially produced merchandise is principally not taken back.
(11) If we decide to issue a refund, it will be calculated as the originally invoiced amount for the item concerned less a 15 (fifteen) percent handling fee. The minimum handling fee is EUR 15.00 (fifteen euros).
(12) If we agree to issue a refund, the cost of returning the merchandise to us shall be borne by you.

Section 12 – Defects of title

(1) If the use of the deliverable causes a breach of commercial property right or domestic copyright in the Federal Republic of Germany, we shall at our own expense attempt to either provide for your right to continue to use the deliverable, or to modify it in such a way that is reasonable to you and ensures that the property right is no longer breached. If this is not feasible on commercially reasonable terms or within a reasonable period of time, you shall be entitled to rescind the contract. In such case, we, too, shall be entitled to rescind the contract.
(2) Except in the case of claims for damages, the limitation period for warranty claims for the delivered goods is 12 (twelve) months from the time of receipt of the goods.
(3) For the assertion of your claims to be recognised, it is necessary that:
• you have notified us immediately of the assertion of commercial property right or copyright infringements;
• you have given us reasonable support in warding off the asserted claims and enabled us to perform the necessary modifications;
• we have retained the right to execute all measures required for warding off the claims, including out-of-court settlement;
• the infringement is not ascribable to peculiarities of your instructions / order; and
• the infringement was not ascribable to your unauthorised modification of the deliverable or by your use of it in a non-contractual fashion.

Section 13 – Liability waiver

(1) We shall be liable for intentional or gross negligence. Furthermore, we shall be liable for the negligent breach of obligations, the performance of which first make the proper performance of the contract possible to begin with, the breach of which jeopardises achieving the contract purpose, and the observance of which you as a customer generally rely upon. In the last stated case, we shall be liable however only for the foreseeable damages typical for this type of contract. We shall not be liable for a slightly negligent breach of duties other than those stated in the sentences above. The foregoing liability exemptions shall not apply to injuries to life, body and health. Liability in accordance with the German Product Liability Act (Produkthaftungsgesetz, ProdHaftG) or arising from a guarantee shall remain unaffected.

Section 14 – Limitation period

(1) All claims, irrespective of their legal grounds, shall lapse after twelve months of delivery. In the case of deliberate or malicious conduct, or in cases of culpably caused injury to life, body or health, or claims under ProdHaftG, the statutory limitations shall apply. They shall also apply to defects in a structure and to deliverable which, in keeping with their customary mode of use, were used in a structure and caused its defectiveness.
(2) If, in the course of our remedial action, new rights arise on your part on account of material defects, all claims shall lapse at the latest 24 (twenty-four) months after delivery of the original deliverable.

Section 15 – Miscellaneous provisions

(1) The law of the Federal Republic of Germany shall apply, i.e. excluding the convention of the United Nations concerning contracts on the international purchase of goods (CISG).
(2) The place of performance is our registered place of business.
(3) Should these GTGB conflict with the provisions of delivery-on-call agreements (framework agreement and / or individual contract), the contractual agreements shall have precedence.
(4) The location of our company’s registered place of business shall be the sole place of jurisdiction for all disputes arising from and in connection with this agreement.

Information obligations

(1) Contracts may be entered into in German and English.
(2) Images in the online shop serve solely to present our products and do not constitute a legally binding offer by us. Changes and errors are reserved.
A conclusion of contract between yourself and ourselves for merchandise offered in the online shop is conditional upon you initially placing the required product in the virtual shopping basket, clicking on the virtual shopping basket, and then initiating the order process by clicking the “Proceed to checkout” button. Only by clicking on the subsequently displayed order button “Buy now” do you prepare the way to complete the order and submit a legally binding offer to enter into a purchase agreement.
(3) We save the contractual text and send you the order data, along with our GTGB, by e-mail.
(4) During the final confirmation before the checkout, you can identify any input errors contained in your order, and correct these at any time using the “Delete” and “Change” functions before submitting the order. For security reasons, your order data are no longer accessible over the Internet.
(5) We are not bound by any special or hitherto unmentioned codes of conduct.
(6) We additionally refer you to our General Terms & Conditions of Business (Allgemeine Geschäftsbedingungen, AGBs).

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