

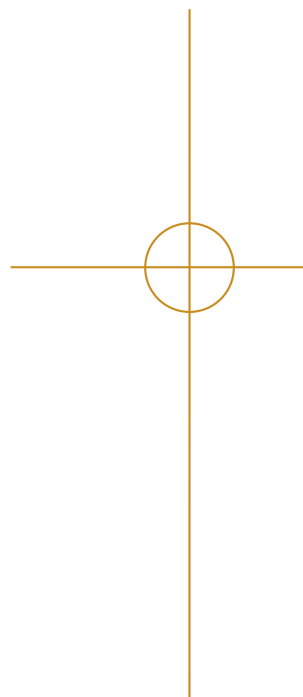
EINEN SCHNITT VORAUSS.
HUFSCHMIED
ONE CUT AHEAD.

HUFSCHMIED
ZERSpanungSSYSTEME



HAUPTKATALOG
KUNSTSTOFF-ZERSPANUNG

CATALOGUE
PLASTIC-MACHINING



Ausgabe 12/2019

Dieser Katalog ist urheberrechtlich geschützt.
Nachdruck, auch auszugsweise, nur mit unserer ausdrücklichen schriftlichen Genehmigung erlaubt.
Technische Änderungen unserer Produkte und Änderungen des Lieferprogramms im Zuge der Weiterentwicklung behalten wir uns vor.

Printed in Germany 2019

Print version 12/2019

*This catalogue is copyright protected.
Reprints, also in parts, is possible with our permission only.
Technical changes in our products within research and development are possible at any time.*

Printed in Germany 2019



EINEN SCHNITT VORAUSS. HUF SCHMIED ONE CUT AHEAD.

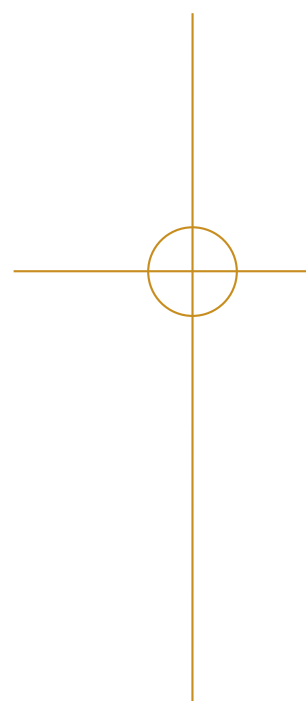
Mit dem Erscheinen dieses Kataloges werden alle vorherigen Exemplare, Preislisten und Preisvereinbarungen ungültig.
Sollten sich Typen- und Maßänderungen oder sonstige Konstruktionsänderungen ergeben, so behalten wir uns vor, entsprechend diesen Änderungen, die vorher nicht besonders angezeigt zu werden brauchen, zu liefern!

*With the appearance of this catalogue all previous copies, price lists and price agreements become invalid.
In case of modifications in model and measure or other modifications in construction, we reserve our right to supply corresponding to these modifications that do not have to be displayed particularly!*



HAUPTKATALOG
KUNSTSTOFF-ZERSPANUNG

CATALOGUE
PLASTIC-MACHINING



VORWORT P R E F A C E



DAS HUFSCHMIED-TEAM

Wir haben über 25 Jahre Erfahrung in der Entwicklung und Fertigung von Zerspanwerkzeugen für nichteisenhaltige Werkstoffe. Zusammen mit unseren Kunden optimieren wir damit die spanende Bearbeitung, senken die Fertigungskosten und erhöhen die Rentabilität in der Fertigung der Kunden. Mit dieser Fokussierung haben wir einen Spitzenplatz in der Kunststoffzerspanung in Europa erreicht.

DIE LÖSUNG IHRER FERTIGUNGSPROBLEME

Durch den Dialog mit Hochschulen und intensiver Werkzeugentwicklung schaffen wir die Grundlagen für erstklassige Präzisionswerkzeuge. Durch Einsatz modernster Technik in Konstruktion und Produktion sind wir in der Lage, selbst höchste Anforderungen bezüglich des Schneidverhaltens, der Standzeit und der Bearbeitungsqualität zu erfüllen. Sprechen Sie uns an. Gemeinsam mit Ihnen optimieren wir Ihre Fertigung Schritt für Schritt.

DURCH KUNDENNÄHE ZUM ERFOLG

Kundennähe ist die Voraussetzung für eine optimale Zusammenarbeit. Auf Wunsch begleiten wir Ihren gesamten Bearbeitungsprozess von der Angebotsabgabe, über den Erstversuch, das Erstmuster bis hin zur Produktion in Serie. Auch das Toolmanagement und die Werkzeugpflege gehören zu unseren Dienstleistungen.

IMMER EINEN SCHNITT VORAUSS

Gemeinsam mit Ihnen werden wir das volle Potential für einen kosten-, zeit- und qualitätsoptimierten Serienprozess mit Ihren Anlagen erschließen, um Ihre Wettbewerbsfähigkeit nachweisbar und erheblich zu steigern. Nutzen Sie unser Technologie-Potential in der Kunststoffzerspanung. Wir unterstützen Sie gerne.

THE HUFSCHMIED-TEAM

We have collected over 25 years of experience in development and manufacturing of milling tools for non-irony materials. Thus we optimize the milling processing together with our customers, reduce the production costs and boost the productivity at the manufacturing of our customers. We reached a top position with this focus in synthetic milling in Europe.

THE SOLUTION FOR FABRICATION PROBLEMS

We create the basis for first-class precision tools in the dialogue with academic institutions and an intensive tool development. We are even in the position of meeting the highest requirements regarding cutting behavior, the durability and the processing quality by using the most modern technology of construction and production. Ask us. We optimize your fabrication step by step and together with you.

SUCCESS THROUGH PROXIMITY TO CUSTOMERS

Proximity to customers is the condition for an optimized collaboration. We accompany your whole production process, from submitting an offer, the first trial, the first pattern to the series production. The tool management and the tool maintenance are also part of our service.

ONE CUT AHEAD

We develop the full potential for a series process together with you with your equipment optimized in costs, time and quality to increase your competitiveness verifiably and considerably. Please use our technological potential in synthetic milling. We gladly support you.

itt voraus.

HUFSCHMIED

ZERSPANUNGSSYSTEME

LEITSÄTZE T H E S I S

QUALITÄTSLEITSÄTZE

Unser Ziel: Zufriedene Kunden, die uns als verlässlichen Partner wertschätzen.

Jeder Mitarbeiter unseres Hauses trägt in seinem Verantwortungsbereich zum Erreichen dieses Ziels bei und sieht darin seine wichtigste Aufgabe.

Den Maßstab für die Qualität unserer Produkte und des Service definiert der Kunde.

Das verpflichtet uns zu bestmöglicher Qualität und höchstem Standard beim Service.

PRINCIPLES OF QUALITY

Our aim: Pleased customers who value us as reliable partners.

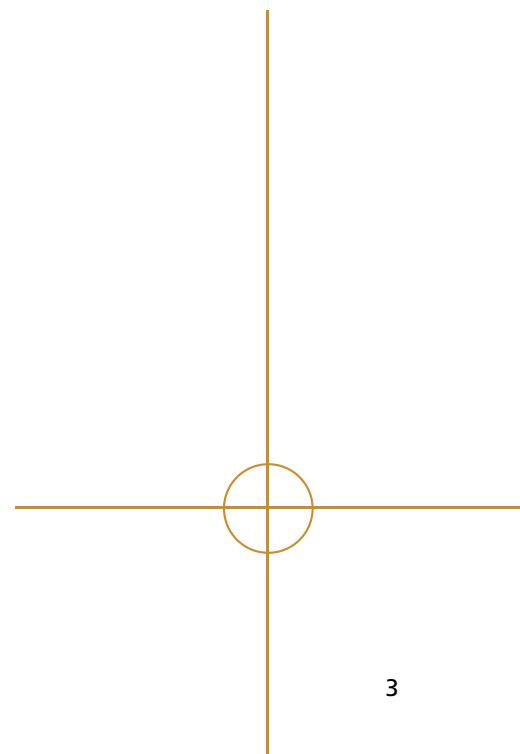
Every member of our team contributes to the achievement of this aim in the corresponding area of responsibility and realizes this as most important target.

Our customers set the scale for our quality and service.

This aim obliges us to guarantee the best quality and the highest standards of service.



Ihr Hufschmied-Team
Sincerely yours Hufschmied-Team



Fräsen Per Plex®

KUNSTSTOFF-FRÄSEN MIT SYSTEM

MILLING PLASTIC WITH A SYSTEM

- HSC-Fräser Z1 Gerade / Rechts / Links auch abgesetzt
- HSC-Fräser Z2 Gerade / Rechts / Links auch abgesetzt
- HSC-Fräser Z3 Gerade / Rechts / Links auch abgesetzt
- Gewindefräser Z1
- Schaumfräser Z3, Schaft- und Halbradiusfräser
- HSC-Fräser Z4 für medizinische Anwendungen
- Kunststoffbohrwerkzeuge Z2
- Form- und Scheibenfräser



- HSC-End mill 1F straight / right / left also set free
- HSC-End mill 2F straight / right / left also set free
- HSC-End mill 3F straight / right / left also set free
- Threadmill 1F
- Foam mill 3F, end mill and half circle end mill
- HSC-End mill 4F for medical technology
- Plastic drill tools 2F
- Form and disc mill

- HSC-Fräser Z1 Gerade / Rechts / Links auch abgesetzt
- HSC-Fräser Z2 Rechts / Links auch abgesetzt



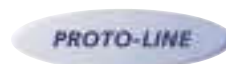
- HSC-End mill 1F straight / right / left also set free
- HSC-End mill 2F right / left also set free

- FPE-Fräser Z1 Rechts, auch abgesetzt
- FPP A1-MINI Z1
- FPE-Vollradiusfräser Z1
- Formfräser Z2
- V-Nutenfräser Z1



- FPE-End mill 1F right, also set free
- FPP A1-MINI 1F
- FPE-Ball end mill 1F
- Form mill 2F
- Slot milling 1F

- MINI-Fräser Z2 Vollradius / Torus
- HSC-Fräser Z2 Vollradius / Torus



- MINI end mill 2F Ball end mill / Toric end mill
- HSC-end mill 2F Ball end mill / Toric end mill

DIP® Diamond for Industrial Production - patented

Fräsen Per Plex[®]

KUNSTSTOFF-FRÄSEN MIT SYSTEM

MILLING PLASTIC WITH A SYSTEM

- Carbon-Fräser N / WD / GR-verzahnt
- Honeycombs-Fräser
- HEXA CUT[®]-Fräser
- SMC-Fräser
- CARB STAR[®]-Fräser Z10 / Z12
- Kompression-Fräser
- FIBER-DRILLS
- FIBER-DRILLS FVK / Metall



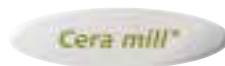
- Carbon-mill N / WD / GR-toothed
- Honeycombs-mill
- HEXA CUT[®]-mill
- SMC-mill
- CARB STAR[®]-mill 10F / 12F
- Compression-mill
- FIBER-DRILLS
- FIBER-DRILLS FRP / Metal

- PKD-Vollradius-Fräser Z2
- PKD-Schaftfräser Z2 / Z3
- PKD-Fräser mit TEC SHARK[®]-Lasierung
- gedrallte PKD-Fräser
- PKD-Mehrzahnfräser
- PKD-Spiralbohrer mit Voll-PKD-Kopf
- PKD-Bohrsenker



- PCD-Ball end mill 2F
- PCD-End mill 2F / 3F
- PCD-mill with TEC SHARK[®]-lasering
- PCD-mill with helix
- PCD-Multi tooth mill 4F
- PCD-Top drill bit with full-PCD-head
- PCD-drill and counter sinks

- Fräser Z1 / Z2
- Fräser WD-verzahnt
- Fräser HEXA CUT[®]-Geometrie



- Mill 1F / 2F
- Mill WD-toothed
- Mill with HEXA CUT[®]-geometry

- Airbag-Schneidklingen
- Trennklingen



- Airbag cutting blades
- Peel blades

Optimale Fräserauswahl · How to choose the best tool

| Material material | | UNIVERSAL-LINE | SHARP-LINE | Oberfläche surface | Standzeit life path | Oberfläche surface | Standzeit life path |
|----------------------|-------------------|----------------|------------|-----------------------|------------------------|-----------------------|------------------------|
| Polyolefine | PE | | | ● ● ● | ● ● | ● ● | ● ● |
| | PP | | | ● ● ● | ● ● ● | ● ● ● | ● ● ● |
| | PVC | | | ● ● ● | ● ● ● | | |
| Styrol | PS | | | ● ● | ● ● | ● ● ● | ● ● ● |
| | SAN | | | ● ● | ● ● | ● ● ● | ● ● ● |
| | ABS | | | ● ● ● | ● ● ● | ● ● ● | ● ● ● |
| | PMMA | | | ● ● | ● ● | | |
| | Acryl | | | ● ● | ● ● | | |
| | PC | | | ● ● | ● ● | | |
| | POM | | | ● ● ● | ● ● ● | | |
| Fluor | PTFE | | | ● ● | ● ● | | |
| | FEP | | | ● ● | ● ● | | |
| | PVDF | | | ● ● ● | ● ● | | |
| Polyamide | PA | | ● ● | ● ● ● | ● ● ● | ● ● ● | |
| Polyester | PET | | ● ● | ● ● | | | |
| Thermoplaste | PPE | | ● ● | ● ● ● | | | |
| | PEEK | | | | | | |
| | PU | | | ● ● ● | ● ● | ● ● ● | ● ● ● |
| Polysulfon | PSU | | | ● ● ● | ● ● ● | | |
| | PES | | | ● ● | ● ● ● | | |
| | PPS | | | ● ● | ● ● | | |
| | PI | | | ● ● | ● ● | | |
| | PAI | | | ● ● | ● ● | | |
| | PEI | | | ● ● | ● ● ● | | |
| Duroplaste | PF | | | ● ● | ● ● | | |
| | MF | | | ● ● ● | ● ● | | |
| | MPF | | | ● ● | ● ● | | |
| | UF | | | ● ● | ● ● | | |
| | SI | | | ● ● | ● ● | | |
| Elastomere | Gummi | | | | | ● ● ● | ● ● |
| | Latex | | | ● ● | | ● ● | ● ● |
| | Kautschuk | | | ● ● | ● ● | ● ● | ● ● |
| Epoxid | EP | | | ● ● | ● ● | | |
| Ureol | Phenolharze | | | ● ● | | | |
| | PUR | | | ● ● ● | ● ● ● | | |
| | Weichschäume | | | ● ● ● | ● ● | | |
| | Hartschäume | | | ● ● ● | ● ● ● | | |
| Aluminium | Aluminium Dibond® | | | ● ● ● | ● ● ● | | |

Optimale Fräserauswahl · How to choose the best tool

| Fräsen Per Plex® | | PROTO-LINE | | FIBER-LINE | | Cera mill® | | POWER BLADE | |
|--------------------|---------------------|--------------------|---------------------|--------------------|---------------------|--------------------|---------------------|--------------------|---------------------|
| Oberfläche surface | Standzeit life path | Oberfläche surface | Standzeit life path | Oberfläche surface | Standzeit life path | Oberfläche surface | Standzeit life path | Oberfläche surface | Standzeit life path |
| | | ●●● | ●●● | | | | | | |
| | | ●●● | ●● | | | | | | |
| | | ●●● | ●● | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| ●●● | ●●● | | | | | | | | |
| ●●● | ●●● | | | | | | | | |
| ●●● | ●●● | | | | | | | | |
| ●●● | ●●● | ●● | ●● | | | | | | |
| | | ●●● | ●●● | | | | | | |
| | | ●●● | ●●● | | | | | | |
| | | ●●● | ●● | | | | | | |
| | | ●●● | ●● | | | | | | |
| ●●● | ●● | | | | | | | | |
| | | ●● | ●● | | | | | | |
| | | ●●● | ●●● | | | | | | |
| | | ●●● | ●● | | | | | | |
| | | ●●● | ●●● | | | | | | |
| | | ●● | ●● | | | | | | |
| | | ●● | ●●● | | | | | | |
| | | ●● | ●●● | | | | | | |
| | | ●● | ●●● | | | | | | |
| | | ●●● | ●●● | | | | | | |
| | | ●● | ●● | | | | | | |
| | | ●● | ●● | | | | | | |
| | | ●● | ●●● | | | | | | |
| | | ●● | ●● | | | | | | |
| | | | | | | | | | |
| | | ●●● | ●●● | ●●● | ●●● | | | | |
| | | ●●● | ●● | | | | | | |
| | | | | | | | | | |
| | | | | ●●● | ●● | | | | |
| | | | | ●● | ●● | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Optimale Fräserauswahl · How to choose the best tool

| Material material | | UNIVERSAL-LINE | | SHARP-LINE | | |
|----------------------------|---|------------------------|------------------------|-----------------------|------------------------|--|
| | | Oberfläche surface | Standzeit life path | Oberfläche surface | Standzeit life path | |
| GFK | Faser- verbund- werkstoffe | GFK-pulverspanend | | | | |
| | | GFK-kurzspanend | | | | |
| | | GFK-langspanend | | | | |
| | | Organoblech | | | | |
| | | Glasgewebe | | | | |
| | | GMT | | | | |
| | | LFT | ● ● ● ● | ● ● | | |
| | | LFI | ● ● ● ● | ● ● | | |
| | | SMC | | | | |
| | CFK | | Hartgewebe | ● ● | ● ● | |
| CFK bis 30% | | | ● ● ● ● | ● ● | | |
| CFK 30%- 60% | | | | | | |
| | | CFK über 60% | | | | |
| | | CFK-Duroplast-Matrix | | | | |
| | | CFK-Thermoplast-Matrix | ● ● ● ● | ● ● | ● ● ● ● | |
| | | Struktur-CFK | | | | |
| | | Prepreg | ● ● | ● ● | | |
| | | RTM | ● ● | ● ● | | |
| | | SMC-CF | | | | |
| | | BMC | | | | |
| Mineral gefüllt | | Reincarbon | | | | |
| | | NF-PU | | | | |
| | | CFC | | | | |
| | | CMC | | | | |
| | Grünlinge Hartmetall | | | | | |
| | Grünlinge Keramik | | | | | |
| | Korian | ● ● ● ● | ● ● ● ● | | | |
| | Aramidfasern | | | | | |
| | KEVLAR | ● ● ● ● | ● ● ● ● | | | |
| Honycomb | Papier | | | | | |
| | Glas | | | | | |
| Holz | MDF | | | | | |
| | | | | | | |

Optimale Fräserauswahl · How to choose the best tool

| Fräsen Per Plex® | | PROTO-LINE | | FIBER-LINE | | Cera mill® | | POWER-BLADE | |
|-----------------------|------------------------|-----------------------|------------------------|-----------------------|------------------------|-----------------------|------------------------|-----------------------|------------------------|
| Oberfläche surface | Standzeit life path | Oberfläche surface | Standzeit life path | Oberfläche surface | Standzeit life path | Oberfläche surface | Standzeit life path | Oberfläche surface | Standzeit life path |
| | | | | ● ● ● | ● ● ● | | | | |
| | | | | ● ● ● | ● ● ● | | | | |
| | | | | ● ● ● | ● ● ● | | | | |
| | | ● ● ● | ● ● ● | | | | | | |
| | | | | ● ● | ● ● ● | | | | |
| | | | | ● ● ● | ● ● ● | | | | |
| | | | | ● ● | ● ● ● | | | | |
| | | | | ● ● ● | ● ● ● | | | | |
| | | ● ● ● | ● ● | ● ● | ● ● ● | | | | |
| | | ● ● | ● ● | ● ● ● | ● ● ● | | | | |
| | | | | ● ● ● | ● ● ● | | | | |
| | | | | ● ● ● | ● ● ● | | | | |
| ● ● ● | | | | ● ● ● | ● ● ● | | | | |
| | | | | ● ● ● | ● ● ● | | | | |
| | | | | ● ● ● | ● ● ● | | | | |
| | | ● ● | ● ● | ● ● ● | ● ● ● | | | | |
| | | ● ● | ● ● | ● ● ● | ● ● ● | | | | |
| | | ● ● ● | ● ● ● | ● ● | ● ● ● | | | | |
| | | | | ● ● ● | ● ● ● | | | | |
| | | ● ● ● | ● ● | ● ● | ● ● | | | | |
| | | ● ● ● | ● ● | ● ● | ● ● ● | | | | |
| | | ● ● ● | ● ● ● | ● ● ● | ● ● ● | | | | |
| | | ● ● | ● ● | ● ● ● | ● ● | | | | |
| | | ● ● | ● ● | ● ● ● | ● ● ● | | | | |
| | | | | ● ● ● | ● ● ● | | | ● ● ● | ● ● ● |
| | | | | ● ● ● | ● ● ● | | | ● ● ● | ● ● ● |
| | | | | ● ● ● | ● ● ● | | | | |

UNIVERSAL-LINE



| FORM FORM | WERKZEUG TOOL | SEITE PAGE |
|--------------|------------------|---------------|
|--------------|------------------|---------------|

UNIVERSELL EINSETZBARE FRÄSWERKZEUGE FÜR THERMO-, DUROPLASTE UND ELASTOMERE ALL-PURPOSE MILLING TOOLS FOR THERMOPLASTICS, CURABLE PLASTICS AND ELASTOMERS

| | | |
|------------------|--|---------|
| 112/132 | HSC-Fräser Z1 GR · gerade - rechtsschneidend <i>HSC-End mill 1F GR · straight - right cutting</i> | 20 - 21 |
| 110/130 | HSC-Fräser Z1 ZR · rechtsdrall - rechtsschneidend <i>HSC-End mill 1F ZR · right helix - right cutting</i> | 22 - 23 |
| 111/131 | HSC-Fräser Z1 SR · linksdrall - rechtsschneidend <i>HSC-End mill 1F SR · left helix - right cutting</i> | 24 - 25 |
| 130M | Mini-HSC-Fräser Z1 · rechtsdrall - rechtsschneidend <i>Mini-HSC-End mill 1F · right helix - right cutting</i> | 26 |
| 130FAS | HSC-Bohrsenkräser Z1 · rechtsdrall - rechtsschneidend <i>HSC-Drill counter sink mill 1F · right helix - right cutting</i> | 27 |
| 100 | HSC-Fräser Z2 GR · gerade - rechtsschneidend <i>HSC-End mill 2F GR · straight - right cutting</i> | 28 |
| 102 | HSC-Fräser Z2 ZR · rechtsdrall - rechtsschneidend <i>HSC-End mill 2F ZR · right helix - right cutting</i> | 29 |
| 104 | HSC-Fräser Z2 SR · linksdrall - rechtsschneidend <i>HSC-End mill 2F SR · left helix - right cutting</i> | 30 |
| 101/101DK | HSC-Fräser Z3 GR · gerade - rechtsschneidend <i>HSC-End mill 3F GR · straight - right cutting</i> | 31 |
| 103 | HSC-Fräser Z3 ZR · rechtsdrall - rechtsschneidend <i>HSC-End mill 3F ZR · right helix - right cutting</i> | 32 |
| 105/105DK | HSC-Fräser Z3 SR · linksdrall - rechtsschneidend <i>HSC-End mill 3F SR · left helix - right cutting</i> | 33 |

FÜR BEARBEITUNG VON SCHAUM, PE UND PU / FOR THE MACHINING OF FOAM, PE AND PU

| | | |
|----------------|---|----|
| 103DFOR | HSC-Radiusfräser Z3 · rechtsdrall - rechtsschneidend <i>HSC-Ball end mill 3F · right helix - right cutting</i> | 35 |
| 103DFO | HSC-Torusfräser Z3 · rechtsdrall - rechtsschneidend <i>HSC-Toric end mill 3F · right helix - right cutting</i> | 36 |

MEDIZINTECHNIK / MEDICAL TECHNOLOGY

| | | |
|-------------|--|----|
| 95PE | HSC-Radiusfräser Z4 · rechtsdrall - rechtsschneidend <i>HSC-Ball end mill 4F · right helix - right cutting</i> | 39 |
| 91PE | HSC-Schaftfräser Z4 · rechtsdrall - rechtsschneidend <i>HSC-End mill 4F · right helix - right cutting</i> | 40 |
| 91BD | Bulldozer-HPC-Fräser Z4 · rechtsdrall - rechtsschneidend <i>Bulldozer-HPC-End mill 4F · right helix - right cutting</i> | 41 |

SCHEIBENFRÄSER / DISC MILL

| | | |
|--------------|---|----|
| 120 | Scheibenfräser Z4 · rechtsdrall - rechtsschneidend <i>Disc mill 4F · right helix - right cutting</i> | 44 |
| 120GM | Scheibenfräser Z4 · rechtsdrall - rechtsschneidend <i>Disc mill 4F · right helix - right cutting</i> | 45 |
| 120P | Profil-Scheibenfräser Z2 · gerade - rechtsschneidend <i>Profil Disc mill 2F · straight - right cutting</i> | 46 |
| 1130 | Scheibenfräser · rechts- oder linksschneidend <i>Disc mill · right or left cutting</i> | 47 |

| FORM FORM | WERKZEUG TOOL | SEITE PAGE |
|--------------|------------------|---------------|
|--------------|------------------|---------------|

BOHREN UND GEWINDEN / DRILLING AND THREADING

| | | |
|--------------|---|----|
| KD201 | VHM-Spiralbohrer Z2 · rechtsdrall - rechtsschneidend <i>Twist drill 2F · right helix - right cutting</i> | 51 |
| KD202 | VHM-Stufenbohrer Z2 · rechtsdrall - rechtsschneidend <i>Step drill 2F · right helix - right cutting</i> | 52 |
| KD203 | VHM-Stufenbohrer Z2 · mehrstufig <i>Step drill 2F · multi stage</i> | 53 |
| 110GF | Gewindefräser Z1 <i>Thread mill 1F</i> | 54 |



FÜR ANWENDUNGEN IM HÖHEREN DREHZAHLBEREICH FOR USE ON HIGHER REVOLUTIONS

| | | |
|--------------|--|----|
| 112SH | SHARP-LINE Fräser Z1 GR · gerade - rechtsschneidend <i>SHARP-LINE End mill 1F GR · straight - right cutting</i> | 58 |
| 110SH | SHARP-LINE Fräser Z1 ZR · rechtsdrall - rechtsschneidend <i>SHARP-LINE End mill 1F ZR · right helix - right cutting</i> | 59 |
| 111SH | SHARP-LINE Fräser Z1 SR · linksdrall - rechtsschneidend <i>SHARP-LINE End mill 1F SR · left helix - right cutting</i> | 60 |
| 102SH | SHARP-LINE Fräser Z2 ZR · rechtsdrall - rechtsschneidend <i>SHARP-LINE End mill 2F ZR · right helix - right cutting</i> | 61 |
| 104SH | SHARP-LINE Fräser Z2 SR · linksdrall - rechtsschneidend <i>SHARP-LINE End mill 2F SR · left helix - right cutting</i> | 62 |



KLARE KANTEN BEIM FRÄSEN VON ACRYL UND PMMA CLEAR EDGES AT MILLING ACRYLIC AND PMMA

| | | |
|------------------|---|----|
| 110FPRV | Per Plex-Schaftfräser Z1 · rechtsdrall - rechtsschneidend <i>Per Plex-End mill 1F · right helix - right cutting</i> | 65 |
| 110FPER | Per Plex-Radiusfräser Z1 · rechtsdrall - rechtsschneidend <i>Per Plex-Ball end mill 1F · right helix - right cutting</i> | 66 |
| 110FPRM | Per Plex-Mini-Radiusfräser Z1 · rechtsdrall - rechtsschneidend <i>Per Plex-Mini Ball end mill 1F · right helix - right cutting</i> | 67 |
| 110FPP | Per Plex-Fräser Z1 · rechtsdrall - rechtsschneidend <i>Per Plex-End mill 1F · right helix - right cutting</i> | 68 |
| PEG-SR | Stegplattenfräser Z1 SR 8° · linksdrall - rechtsschneidend <i>End mill for multi-skin sheets 1F SR 8° · left helix - right cutting</i> | 69 |
| 110V | V-Nutenfräser Z1 · rechtsdrall - rechtsschneidend <i>V-Slot milling 1F · right helix - right cutting</i> | 70 |
| 110W | V-Nutenfräser Z1 · rechtsdrall - rechtsschneidend <i>V-Slot milling 1F · right helix - right cutting</i> | 71 |
| 94/60 | Gravierstichel 60° <i>Gravers 60°</i> | 72 |
| 94/90 | Gravierstichel 90° <i>Gravers 90°</i> | 73 |
| 126R/127R | Halbrundfräser Z2 · gerade - rechtsschneidend <i>Semicircular end mill 2F · straight - right cutting</i> | 74 |
| HV31 | Viertelkreisfräser Z4 · gerade - rechtsschneidend <i>Quarter round end mill 4F · straight - right cutting</i> | 75 |



PROTO-LINE



| FORM FORM | WERKZEUG TOOL | SEITE PAGE |
|--------------|------------------|---------------|
|--------------|------------------|---------------|

FÜR DEN MODELL- UND PROTOTYPENBAU FOR MODELBUILDING AND PROTOTYPING

| | | |
|--------------|---|---------|
| HM915 | Mini-Radiusfräser Z2 · rechtsdrall - rechtsschneidend <i>Mini-Ball end mill 2F · right helix - right cutting</i> | 80 - 81 |
| HM905 | Mini-Torusfräser Z2 · rechtsdrall - rechtsschneidend <i>Mini-Toric end mill 2F · right helix - right cutting</i> | 82 - 83 |
| HC402 | HSC-Torusfräser Z2 · rechtsdrall - rechtsschneidend <i>HSC-Toric end mill 2F · right helix - right cutting</i> | 84 - 86 |
| HC452 | Radiusfräser Z2 · rechtsdrall - rechtsschneidend <i>Ball end mill 2F · right helix - right cutting</i> | 87 |

FIBER-LINE



FÜR GFK-/CFK-MATERIALIEN, VERSTÄRKTE WERKSTOFFE UND SCHAUMWERKSTOFFE FOR GFK-/CFK-MATERIALS, REINFORCED MATERIALS, FOAM MATERIALS

| | | |
|--------------|--|----|
| 106 | Carbon-Fräser · flache Stirn <i>Carbon-End mill · flat forehead</i> | 93 |
| 107R | Carbon-Fräser · runde Stirn <i>Carbon-End mill · ball nose</i> | 94 |
| 107 | Carbon-Fräser · stirnverzahnt <i>Carbon-End mill · spur cut</i> | 95 |
| 108 | Carbon-Fräser Z2 · zum Nuten <i>Carbon-End mill 2F · end mill style</i> | 96 |
| 108SC | Carbon-Fräser Z2 · Umfangsschneide schiebend <i>Carbon-End mill 2F · end mill style - push cut</i> | 97 |
| 109 | Carbon-Fräser Z2 · mit 135° Bohrspitze <i>Carbon-End mill · 135° drill style</i> | 98 |
| 109SC | Carbon-Fräser Z2 · mit 135° Bohrspitze - Umfangsschneide schiebend <i>Carbon-End mill · 135° drill style - push cut</i> | 99 |

SMC/BMC FRÄSER / SMC/BMC MILLING CUTTER



| | | |
|---------------|---|-----|
| 066SMC | SMC-Schaftfäser Z6 · gerade - rechtsschneidend <i>SMC-End mill 6F · straight - right cutting</i> | 102 |
|---------------|---|-----|

HONEYCOMBS / HONEYCOMBS














































| | | |
|---------------|--|-----|
| 065AHO | HONEYCOMB-Fräser · rechtsdrall - rechtsschneidend, für Aluminiumwaben <i>HONEYCOMB-End mill · right helix - right cutting, for Aluminium honeycombs</i> | 104 |
| 068PW | HONEYCOMB-Fräser PW · rechtsdrall - rechtsschneidend, für Papierwaben <i>HONEYCOMB-End mill PW · right helix - right cutting, for paper honeycombs</i> | 105 |
| 078PW | HONEYCOMB-Fräser PW · rechtsdrall - rechtsschneidend, für Papierwaben <i>HONEYCOMB-End mill PW · right helix - right cutting, for paper honeycombs</i> | 106 |

HEXA CUT® / HEXA CUT®

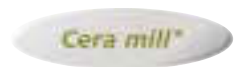


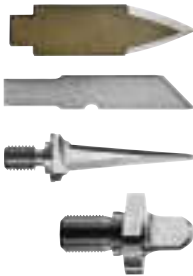
| | | |
|--------------|--|-----|
| 066HO | HEXA CUT®-Fräser · gerade - rechtsschneidend <i>HEXA CUT®-End mill · straight - right cutting</i> | 109 |
| 068HO | HEXA CUT®-Fräser · rechtsdrall - rechtsschneidend <i>HEXA CUT®-End mill · right helix - right cutting</i> | 110 |
| 067HO | HEXA CUT®-Fräser Z6-10 · linksdrall - rechtsschneidend <i>HEXA CUT®-End mill 6-10F · left helix - right cutting</i> | 111 |
| 076HO | HEXA CUT®-Fräser · gerade - rechtsschneidend <i>HEXA CUT®-End mill · straight - right cutting</i> | 112 |
| 078HO | HEXA CUT®-Fräser · rechtsdrall - rechtsschneidend <i>HEXA CUT®-End mill · right helix - right cutting</i> | 113 |

| FORM FORM | WERKZEUG TOOL | SEITE PAGE | |
|--|--|---------------|---|
| HEXA CUT® / HEXA CUT® | | | |
| 077HO | HEXA CUT®-Fräser · linksdrall - rechtsschneidend HEXA CUT®-End mill · left helix - right cutting | 114 |  |
| 067HOR | HEXA CUT®-Fräser · linksdrall - rechtsschneidend HEXA CUT®-End mill · left helix - right cutting | 115 |  |
| 068HOPC DIP® | HEXA CUT®-Fräser · rechtsdrall - rechtsschneidend HEXA CUT®-End mill · right helix - right cutting | 116 |  |
| CARB STAR® / CARB STAR® | | | |
| HC650 | CARB STAR® CARB STAR® | 119 |  |
| HC660BD | CARB STAR® Twister Z4+4 · links - gerade - rechtsschneidend CARB STAR® Twister 4F+4 · left - straight - right cutting | 120 |  |
| HC670BD | CARB STAR® Twister Z4+4 · rechts - gerade - rechtsschneidend CARB STAR® Twister 4F+4 · right - straight - right cutting | 121 |  |
| T-REX / T-REX | | | |
| 194 | T-REX Schaftfräser Z2+2 · rechtsschneidend T-REX-End mill 2F+2 · right cutting | 125 |  |
| KOMPRESSIOWERKZEUGE / COMPRESSION TOOLS | | | |
| 161 | Doublecut Z1+1 · rechtsschneidend, mit „W“-Ausspitzung Doublecut 1F+1 · right cutting, with „W“-shaped point thinning | 129 |  |
| 161F | Doublecut Z1+1 · rechtsschneidend, mit Fräserausspitzung Doublecut 1F+1 · right cutting, with end mill point thinning | 130 |  |
| 161R | Doublecut Z1+1 · rechtsschneidend, mit Vollradius Doublecut 1F+1 · right cutting, with ball end | 131 |  |
| 193 | Doublecut Z2+2 · rechtsschneidend, mit Fräserausspitzung Doublecut 2F+2 · right cutting, with end mill point thinning | 132 |  |
| 160DK | Butterfly Z1+1 · rechtsschneidend Butterfly 1F+1 · right cutting | 133 |  |
| 165DK | Butterfly Z2+2 · rechtsschneidend Butterfly 2F+2 · right cutting | 134 |  |
| 191 | Butterfly Z4+4 · rechtsschneidend Butterfly 4F+4 · right cutting | 135 |  |
| 191BA | Bogenfräser Z6 · rechtsschneidend Bend mill 6F · right cutting | 136 |  |
| BOHRWERKZEUGE / DRILLING TOOLS | | | |
| FB162 | Fiber-Drill Z2 · rechtsschneidend Fiber drill 2F · right cutting | 139 |  |
| FD162 | Fiber-Drill Z2 · rechtsschneidend Fiber drill 2F · right cutting | 140 |  |
| FB164 | Fiber-Drill Z4 · rechtsschneidend Fiber drill 4F · right cutting | 141 |  |
| FD164 | Fiber-Drill Z4 · rechtsschneidend Fiber drill 4F · right cutting | 142 |  |
| FB264 | Fiber-Drill Z4 · rechtsschneidend Fiber drill 4F · right cutting | 143 |  |
| FD264 | Fiber-Drill Z4 · rechtsschneidend Fiber drill 4F · right cutting | 144 |  |

| FORM FORM | WERKZEUG TOOL | SEITE PAGE |
|---|---|---------------|
| BOHREN / DRILLING | | |
|  | FB660BD Fiber-Drill Z4+4 · rechtsschneidend <i>Fiber drill 4F+4 · right cutting</i> | 145 |
|  | FB662 Fiber-Drill Z2 · rechtsschneidend, mit Senkstufe <i>Fiber drill 2F · right cutting, with countersink steps</i> | 146 |
|  | FD662 Fiber-Drill Z2 · rechtsschneidend <i>Fiber drill 2F · right cutting</i> | 147 |
|  | FB664 Fiber-Drill Z4 · rechtsschneidend, MPAC <i>Fiber drill 4F · right cutting, MPAC</i> | 148 |
|  | FD664 Fiber-Drill Z4 · rechtsschneidend, MPAC <i>Fiber drill 4F · right cutting, MPAC</i> | 149 |
|  | 119 Kevlar-Bohrer · rechtsschneidend, mit „W“-Spitze <i>Kevlar-drill · right cutting, with „W“-shaped point thinning</i> | 150 |
|  | 118 CNC-Kalibrierbohrer · rechtsschneidend <i>CNC-Calibration drill · right cutting</i> | 151 |
| FVK - METALL / FRP - METAL | | |
|  | FB162AC/CA Fiber-Drill Z2 · rechtsschneidend <i>Fiber drill 2F · right cutting</i> | 155 |
|  | FD162AC/CA Fiber-Drill Z2 · rechtsschneidend <i>Fiber drill 2F · right cutting</i> | 156 |
|  | FB162TC/CT Fiber-Drill Z2 · rechtsschneidend <i>Fiber drill 2F · right cutting</i> | 157 |
|  | FD162TC/CT Fiber-Drill Z2 · rechtsschneidend <i>Fiber drill 2F · right cutting</i> | 158 |
|  | FB662AC/CA Fiber-Drill Z2 · rechtsschneidend <i>Fiber drill 2F · right cutting</i> | 159 |
|  | FD662AC/CA Fiber-Drill Z2 · rechtsschneidend <i>Fiber drill 2F · right cutting</i> | 160 |
|  | FB662TC/CT Fiber-Drill Z2 · rechtsschneidend <i>Fiber drill 2F · right cutting</i> | 161 |
|  | FD662TC/CT Fiber-Drill Z2 · rechtsschneidend <i>Fiber drill 2F · right cutting</i> | 162 |
| FÜR HANDMASCHINEN / FOR MANUAL DRILLING MACHINES | | |
|  | 118HA CFK-Handlaufbohrer · rechtsschneidend, für Handmaschinen <i>CFK-Handtrail drill · right cutting, for manual drilling machines</i> | 165 |
|  | FB162HA CFK-Bohrer · rechtsschneidend, für manuellen Betrieb <i>CFK-Handtrail drill · right cutting, for manual drilling machines</i> | 166 |
|  | FB262HA CFK-Stufenbohrer · rechtsschneidend, für manuellen Betrieb <i>CFK-Step drill · right cutting, for manual drilling machines</i> | 167 |
|  | FB662HA CFK-Bohrer · rechtsschneidend, für manuellen Betrieb <i>CFK-Handtrail drill · right cutting, for manual drilling machines</i> | 168 |
|  | FB664HA CFK-Stufenbohrer · rechtsschneidend, für manuellen Betrieb <i>CFK-Step drill · right cutting, for manual drilling machines</i> | 169 |
| PKD / PCD | | |
|  | P100RG PKD-Radiusfräser Z2 · gerade · rechtsschneidend <i>PCD-Ball end mill 2F · straight · right cutting</i> | 173 |
|  | P100G PKD-Torusfräser Z2 · gerade · rechtsschneidend <i>PCD-Toric end mill 2F · straight · right cutting</i> | 174 |

| FORM FORM | WERKZEUG TOOL | SEITE PAGE |
|--|--|---------------|
| PKD / PKD | | |
| P100Z | PKD-Torusfräser Z2 · ziehend - rechtsschneidend <i>PCD-Toric end mill 2F · pull - right cutting</i> | 175 |
| P100SC | PKD-Torusfräser Z2 · schiebend- rechtsschneidend <i>PCD-Toric end mill 2F · push- right cutting</i> | 176 |
| PTW100G | TEC SHARK®-W-Torusfräser Z2 · gerade - rechtsschneidend <i>TEC SHARK®-W-Toric end mill 2F · straight - right cutting</i> | 177 |
| PTW100Z | TEC SHARK®-W-Torusfräser Z2 · positiv angestellt - rechtsschneidend <i>TEC SHARK®-W-Toric end mill 2F · positiv - right cutting</i> | 178 |
| PTW100SC | TEC SHARK®-W-Torusfräser Z2 · negativ angestellt - rechtsschneidend <i>TEC SHARK®-W-Toric end mill 2F · negativ - right cutting</i> | 179 |
| PTF100G | TEC SHARK®-F-Torusfräser Z2 · gerade - rechtsschneidend <i>TEC SHARK®-F-Toric end mill 2F · straight - right cutting</i> | 180 |
| PTF100Z | TEC SHARK®-F-Torusfräser Z2 · positiv angestellt - rechtsschneidend <i>TEC SHARK®-F-Toric end mill 2F · positiv - right cutting</i> | 181 |
| PTF100SC | TEC SHARK®-F-Torusfräser Z2 · negativ angestellt - rechtsschneidend <i>TEC SHARK®-F-Toric end mill 2F · negativ - right cutting</i> | 182 |
| PKD91 | PKD-Fräser Z4 · rechtsdrall - rechtsschneidend <i>PCD-End mill 4F · right helix - right cutting</i> | 183 |
| PKD92 | PKD-Fräser Z4 · linksdrall - rechtsschneidend <i>PCD-End mill 4F · left helix - right cutting</i> | 184 |
| PKD150 | PKD-Mehrzahnfräser · gerade - rechtsschneidend <i>PCD-Multi-toothed mill · straight - right cutting</i> | 185 |
| PKD-BOHRER / PCD-DRILLING | | |
| P201 | PKD-Spiralbohrer Z2 · rechts - rechtsschneidend <i>PCD-Top drill 2F · right - right cutting</i> | 187 |
| P128 | PKD-Bohrsenker Z2 · gerade - rechtsschneidend <i>PCD-drill and counter sinks 2F · straight - right cutting</i> | 188 |
| P138 | PKD-Bohrsenker Z3 · gerade - rechtsschneidend <i>PCD-drill and counter sinks 3F · straight - right cutting</i> | 189 |
| FRÄSER AUS KERAMIK ZUR BEARBEITUNG VON KUNSTSTOFFEN UND NICHEISENWERKSTOFFEN END MILLS MADE OUT OF CERAMIC FOR MILLING OF PLASTICS AND NONE-FERROUS MATERIALS | | |
| 112CT | Cera mill®-Fräser Z1 GR · gerade - rechtsschneidend <i>Cera mill®-End mill 1F GR · straight - right cutting</i> | 193 |
| 110CT | Cera mill®-Fräser Z1 ZR · rechtsdrall - rechtsschneidend <i>Cera mill®-End mill 1F ZR · right helix - right cutting</i> | 194 |
| 111CT | Cera mill®-Fräser Z1 SR · linksdrall - rechtsschneidend <i>Cera mill®-End mill 1F SR · left helix - right cutting</i> | 195 |
| 102CT | Cera mill®-Fräser Z2 ZR · rechtsdrall - rechtsschneidend <i>Cera mill®-End mill 2F ZR · right helix - right cutting</i> | 196 |
| 104CT | Cera mill®-Fräser Z2 SR · linksdrall - rechtsschneidend <i>Cera mill®-End mill 2F SR · left helix - right cutting</i> | 197 |
| 108CT | Cera mill®-Fräser · HEXA CUT® - rechtsschneidend <i>Cera mill®-End mill · HEXA CUT® - right cutting</i> | 198 |
| 068HOCT | Cera mill®-HEXA CUT®-Fräser · rechtsdrall - rechtsschneidend <i>Cera mill®-HEXA CUT®-End mill · right helix - right cutting</i> | 199 |





| FORM FORM | WERKZEUG TOOL | SEITE PAGE |
|--------------|------------------|---------------|
|--------------|------------------|---------------|

SCHNEIDKLINGEN AUS HARTMETALL ODER KERAMIK PRECISE CUTTING BLADES MADE OF TUNGSTEN CARBIDE OR CERAMIC

| | | |
|-------------------|---|-----|
| USK-27-8,5 | Ultraschallklingen <i>Ultra sonic blades</i> | 203 |
| USK-6012 | Ultraschallklingen <i>Ultra sonic blades</i> | 204 |
| USK-GFM | Ultraschallklingen <i>Ultra sonic blades</i> | 205 |
| USK-6022 | Ultraschallklingen <i>Ultra sonic blades</i> | 206 |

TECHNISCHE DATEN TECHNICAL INFORMATION

| | | |
|--|--|-----------|
| | Schnittwerte für Kunststoff <i>Cutting parameters for plastics</i> | 208 - 209 |
| | Fräsertoleranzen <i>End mill tolerances</i> | 210 |
| | Problemlösungen <i>Trouble shooting</i> | 211 - 216 |
| | Prüf- und Mess-Protokoll für Standard-Fräswerkzeuge <i>Test and measurement record for standing milling cutters</i> | 217 |
| | Engineering <i>Engineering</i> | 218 - 219 |
| | Zertifizierung <i>Certification</i> | 220 |
| | Icons <i>Icons</i> | 221 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

UNIVERSAL-LINE

UNIVERSELL EINSETZBARE
FRÄSWERKZEUGE FÜR
THERMO-, DUROPLASTE
UND ELASTOMERE

*ALL-PURPOSE MILLING
TOOLS FOR
THERMOPLASTICS,
CURABLE PLASTICS AND
ELASTOMERS*



POM
POM

PA
PA

PE
PE

PP
PP

PVC
PVC

ABS
ABS

PS
PS

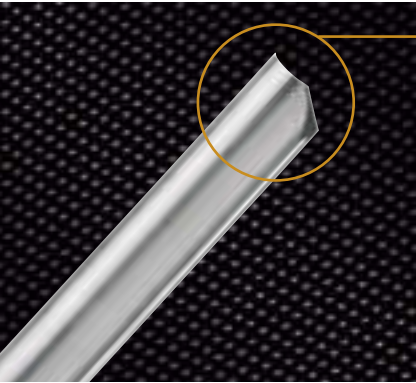
PUR
PUR

Gummi
Rubber

Latex
Latex

HUFSCHMIED
ZERSpanungSSYSTEME

UNIVERSAL-LINE

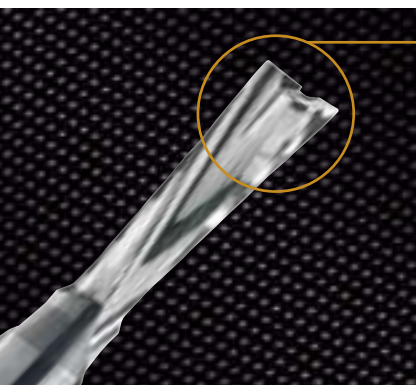


FRÄSER MIT EINER SCHNEIDE

MILLS WITH 1 FLUTE

Sie sind für Werkstoffkombinationen aus harten, weichen und gering verstärkten Kunststoffen ausgelegt. Sie erbringen in mittleren bis hohen Schnittgeschwindigkeitsbereichen hervorragende Ergebnisse.

They are designed for material combinations of strong, weak and slight intensified synthetics. They work in mid and high range cutting speeds and have the best results.



FRÄSER MIT ZWEI SCHNEIDEN

MILLS WITH TWO FLUTES

Sie werden bei der Kunststoffzerspanung im niederen bis mittleren Schnittgeschwindigkeitsbereich eingesetzt. Werkzeuge mit einer Spirale im Winkel von 45 Grad wurden für die Zerspanung von leder- oder textilkaschierten Bauteilen entwickelt.

They work in synthetic milling in low and mid-range cutting speeds. Tools with a helix in the angle of 45 ° were developed for the milling of leather- or textile-clad components.



FRÄSER MIT DREI SCHNEIDEN

MILLS WITH THREE FLUTES

Diese Werkzeuge werden für Gummi und für Kombinationen aus weichen und schmierenden Werkstoffen mit Werkstoffen, die einen mittleren bis hohen Fasergehalt aufweisen, eingesetzt. Diese können im Verhältnis von bis zu 50:50 gemischt sein.

These tools should be used for rubber and for combinations of soft and greasing materials together with materials which have a mid and high percentage of fiber. These can be mixed in the proportion 50:50.

UNIVERSAL-LINE



WIR FERTIGEN AUCH
linksschneidige Werkzeuge
auf Anfrage

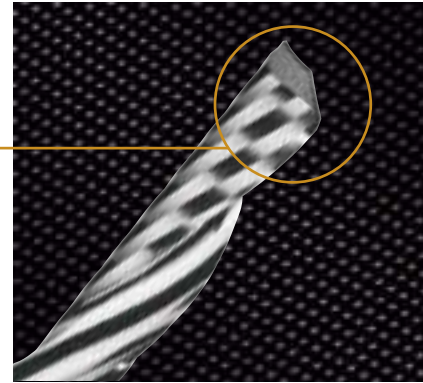
WE ALSO MANUFACTURE
*left hand cutting tools
on demand*

140

UNIVERSAL-Line-Fräser Z1 SL
rechtsdrall - linksschneidend

140

UNIVERSAL-Line-end mill 1F SL
right helix - left cutting

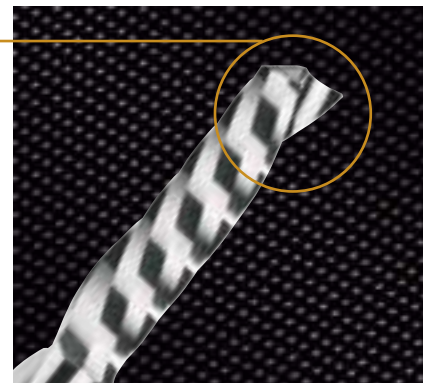


141

UNIVERSAL-Line-Fräser Z1 ZL
linksdrahl - linksschneidend

141

UNIVERSAL-Line-end mill 1F ZL
left helix - left cutting

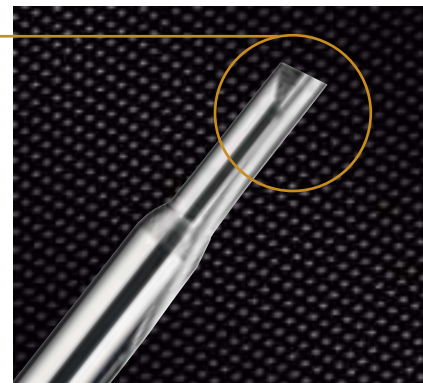


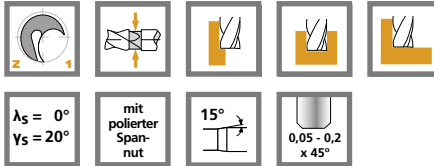
142

UNIVERSAL-Line-Fräser Z1 GL
gerade - linksschneidend

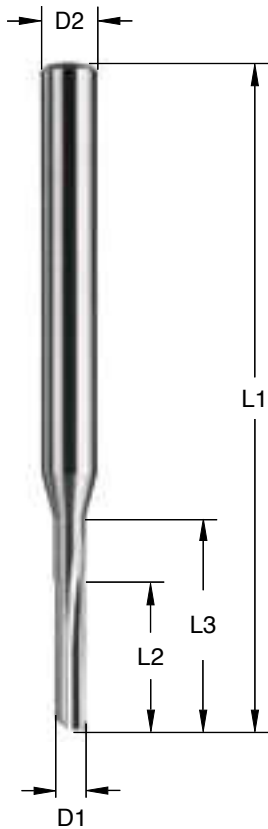
142

UNIVERSAL-Line-end mill 1F GL
straight - left cutting




 $\lambda_s = 0^\circ$
 $\gamma_s = 20^\circ$
mit
polierter
Span-
nut

15°

0,05 - 0,2
x 45°

Durchmesserbereich:
1,0 bis 20,0 mm
diameter range:
1,0 to 20,0 mm

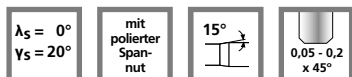
Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

| | BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | ER mm |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------------|----------|----------|
| 1,0 | 132KK010 | 1 | 3 | 2 | 50 | | |
| | 132010030 | 1 | 3 | 5 | 50 | | |
| 2,0 | 112K020020 | 2 | 2 | 6 | 50 | | |
| | 112020020 | 2 | 2 | 10 | 40 | | |
| | 112H020020 | 2 | 2 | 12 | 60 | | |
| | 112L020020 | 2 | 2 | 14 | 75 | | |
| | 132KK020 | 2 | 3 | 3 | 50 | | |
| | 132K020030 | 2 | 3 | 8 | 40 | | |
| | 132020030 | 2 | 3 | 10 | 60 | | |
| | 132L020030 | 2 | 3 | 10 | 75 | | |
| 3,0 | 112KK030 | 3 | 3 | 4 | 50 | | |
| | 112K030030 | 3 | 3 | 8 | 50 | | |
| | 112030030 | 3 | 3 | 12 | 40 | | |
| | 112H030030 | 3 | 3 | 15 | 60 | | |
| | 112L030030 | 3 | 3 | 18 | 75 | | |
| | 132K030060 | 3 | 6 | 8 | 50 | | |
| | 132030060 | 3 | 6 | 18 | 60 | | |
| | 132L030060 | 3 | 6 | 18 | 75 | | |
| 3,17 / 1/8" | 1120317317 | 3,17 / 1/8" | 3,17 / 1/8" | 12 | 38 | | |
| | 112L0317317 | 3,17 / 1/8" | 3,17 / 1/8" | 18 | 75 | | |
| 4,0 | 112040040 | 4 | 4 | 15 | 40 | | |
| | 112KK040 | 4 | 4 | 5 | 50 | | |
| | 112K040040 | 4 | 4 | 12 | 50 | | |
| | 112H040040 | 4 | 4 | 18 | 60 | | |
| | 112L040040 | 4 | 4 | 20 | 75 | | |
| | 132K040060 | 4 | 6 | 12 | 50 | | |
| | 132040060 | 4 | 6 | 20 | 60 | | |
| | 132L040060 | 4 | 6 | 20 | 75 | | |
| 4,76 / 3/16" | 1120476476 | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 50 | | |
| | 112L0476476 | 4,76 / 3/16" | 4,76 / 3/16" | 20 | 75 | | |
| 5,0 | 112KK050 | 5 | 5 | 6 | 50 | | |
| | 112050050 | 5 | 5 | 16 | 50 | | |
| | 112H050050 | 5 | 5 | 20 | 60 | | |
| | 112L050050 | 5 | 5 | 28 | 75 | | |
| | 132K050060 | 5 | 6 | 16 | 50 | | |
| | 132050060 | 5 | 6 | 28 | 60 | | |
| | 132L050060 | 5 | 6 | 28 | 75 | | |
| | 132L050080 | 5 | 8 | 20 | 95 | 30 | |
| 6,0 | 112KK060 | 6 | 6 | 7 | 50 | | |
| | 112K060060 | 6 | 6 | 16 | 50 | | |
| | 112060060 | 6 | 6 | 20 | 60 | | |
| | 112L060060 | 6 | 6 | 35 | 75 | | |
| | 132K060080 | 6 | 8 | 18 | 63 | | |
| | 132060080 | 6 | 8 | 35 | 75 | | |
| | 132L060080 | 6 | 8 | 20 | 95 | 30 | |
| 6,35 / 1/4" | 1120635635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 63 | | |
| | 112L0635635 | 6,35 / 1/4" | 6,35 / 1/4" | 35 | 75 | | |

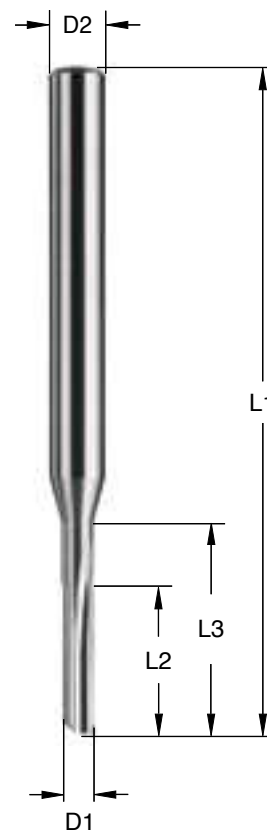
Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 112H080080 und wenn gewünscht Beschichtung: z.B. TLX.

Please indicate order number: e.g. 132K060080 and if wanted COATING: e.g. TLX.



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | ER mm |
|--------------------------------|-------------|-----------------|-----------------------|----------|----------------|----------|----------|
| 7,93 / 5/16" | 1120793793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 63 | | |
| | 112L0793793 | 7,93 / 5/16" | 7,93 / 5/16" | 35 | 75 | | |
| 8,0 | 112KK080 | 8 | 8 | 9 | 50 | | |
| | 112K080080 | 8 | 8 | 18 | 50 | | |
| | 112080080 | 8 | 8 | 22 | 63 | | |
| | 112H080080 | 8 | 8 | 30 | 75 | | |
| | 112L080080 | 8 | 8 | 40 | 100 | | |
| | 132080100 | 8 | 10 | 40 | 100 | | |
| 9,52 / 3/8" | 1120952952 | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 | | |
| | 112L0952952 | 9,52 / 3/8" | 9,52 / 3/8" | 40 | 100 | | |
| 10,0 | 112100100 | 10 | 10 | 25 | 72 | | |
| | 112L100100 | 10 | 10 | 55 | 100 | | |
| 12,0 | 112120120 | 12 | 12 | 30 | 83 | | |
| 12,7 / 1/2" | 112127127 | 12,7 / 1/2" | 12,7 / 1/2" | 30 | 75 | | |
| 14,0 | 112140140 | 14 | 14 | 30 | 83 | | |
| 16,0 | 112160160 | 16 | 16 | 35 | 92 | | |
| 18,0 | 112180180 | 18 | 18 | 35 | 92 | | |
| 20,0 | 112200200 | 20 | 20 | 40 | 104 | | |

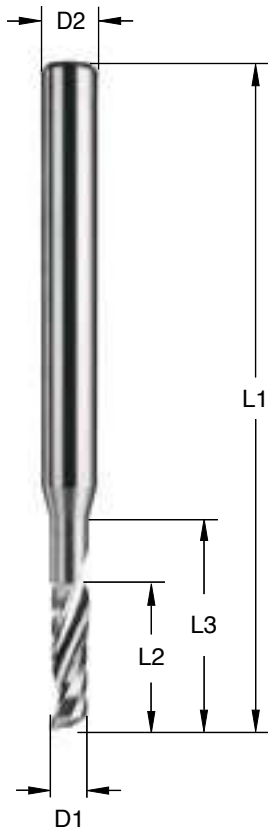
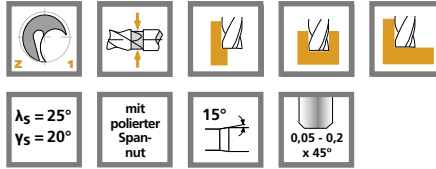


Durchmesserbereich:
1,0 bis 20,0 mm
diameter range:
1,0 to 20,0 mm

Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 112H080080 und wenn gewünscht Beschichtung: z.B. TLX.
Please indicate order number: e.g. 112L080080 and if wanted COATING: e.g. TLX.



Durchmesserbereich:
1,0 bis 20,0 mm
diameter range:
1,0 to 20,0 mm

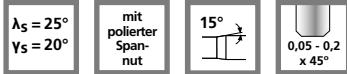
Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

| | BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | ER mm |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------------|----------|----------|
| 1,0 | 130KK010 | 1 | 3 | 2 | 50 | | |
| | 130010030 | 1 | 3 | 5 | 50 | | |
| 2,0 | 110K020020 | 2 | 2 | 6 | 50 | | |
| | 110020020 | 2 | 2 | 10 | 40 | | |
| | 110H020020 | 2 | 2 | 12 | 60 | | |
| | 110L020020 | 2 | 2 | 14 | 75 | | |
| | 130KK020 | 2 | 3 | 3 | 50 | | |
| | 130K020030 | 2 | 3 | 8 | 40 | | |
| | 130K020-025 | 2 | 3 | 6 | 40 | | 0,25 |
| | 130020030 | 2 | 3 | 10 | 60 | | |
| | 130020-025 | 2 | 3 | 10 | 60 | | 0,25 |
| | 130L020030 | 2 | 3 | 10 | 75 | | |
| 3,0 | 110KK030 | 3 | 3 | 4 | 50 | | |
| | 110K030030 | 3 | 3 | 8 | 50 | | |
| | 110030030 | 3 | 3 | 12 | 40 | | |
| | 110030-025 | 3 | 3 | 12 | 40 | | 0,25 |
| | 110H030030 | 3 | 3 | 15 | 60 | | |
| | 110L030030 | 3 | 3 | 18 | 75 | | |
| | 130K030060 | 3 | 6 | 8 | 50 | | |
| | 130K030-025 | 3 | 6 | 8 | 50 | | 0,25 |
| | 130030060 | 3 | 6 | 18 | 60 | | |
| | 130030-025 | 3 | 6 | 18 | 60 | | 0,25 |
| 130L030060 | 3 | 6 | 18 | 75 | | | |
| 3,17 / 1/8" | 1100317317 | 3,17 / 1/8" | 3,17 / 1/8" | 12 | 38 | | |
| | 110L0317317 | 3,17 / 1/8" | 3,17 / 1/8" | 18 | 75 | | |
| 4,0 | 110KK040 | 4 | 4 | 5 | 50 | | |
| | 110K040040 | 4 | 4 | 12 | 50 | | |
| | 110040040 | 4 | 4 | 15 | 40 | | |
| | 110040-025 | 4 | 4 | 15 | 40 | | 0,25 |
| | 110H040040 | 4 | 4 | 18 | 60 | | |
| | 110L040040 | 4 | 4 | 20 | 75 | | |
| | 130K040060 | 4 | 6 | 12 | 50 | | |
| | 130K040-050 | 4 | 6 | 12 | 50 | | 0,5 |
| | 130040060 | 4 | 6 | 20 | 60 | | |
| | 130040-050 | 4 | 6 | 20 | 60 | | 0,5 |
| 130L040060 | 4 | 6 | 20 | 75 | | | |
| 130L040080 | 4 | 8 | 20 | 95 | 30 | | |
| 4,76 / 3/16" | 1100476476 | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 50 | | |
| | 110L0476476 | 4,76 / 3/16" | 4,76 / 3/16" | 20 | 75 | | |
| 5,0 | 110KK050 | 5 | 5 | 6 | 50 | | |
| | 110050050 | 5 | 5 | 16 | 50 | | |
| | 110050-050 | 5 | 5 | 16 | 50 | | 0,5 |
| | 110H050050 | 5 | 5 | 20 | 60 | | |
| | 110L050050 | 5 | 5 | 28 | 75 | | |
| | 130K050060 | 5 | 6 | 16 | 50 | | |
| | 130K050-050 | 5 | 6 | 16 | 50 | | 0,5 |
| | 130050060 | 5 | 6 | 28 | 60 | | |
| | 130L050060 | 5 | 6 | 28 | 75 | | |
| | 130L050080 | 5 | 8 | 20 | 95 | 30 | |

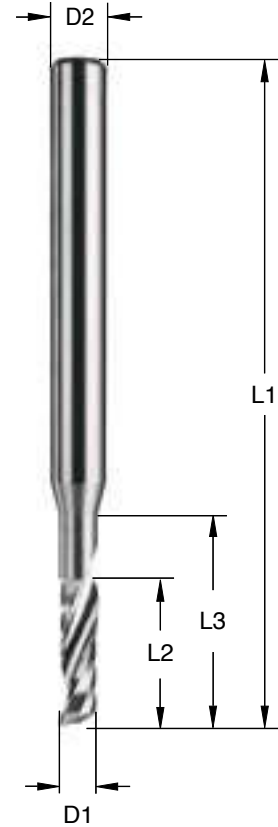
Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 130K050060 und wenn gewünscht Beschichtung: z.B. TLX.

Please indicate order number: e.g. 1130L050080 and if wanted COATING: e.g. TLX.



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | ER mm |
|--------------------------------|-------------|-----------------|-----------------------|----------|----------------|----------|----------|
| 6,0 | 110KK060 | 6 | 6 | 7 | 50 | | |
| | 110K060060 | 6 | 6 | 16 | 50 | | |
| | 110K060-050 | 6 | 6 | 16 | 50 | | 0,5 |
| | 110060060 | 6 | 6 | 20 | 60 | | |
| | 110060-050 | 6 | 6 | 20 | 60 | | 0,5 |
| | 110L060060 | 6 | 6 | 35 | 75 | | |
| | 130K060080 | 6 | 8 | 18 | 63 | | |
| | 130060080 | 6 | 8 | 35 | 75 | | |
| | 130L060080 | 6 | 8 | 20 | 95 | 30 | |
| 6,35 / 1/4" | 1100635635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 63 | | |
| | 110L0635635 | 6,35 / 1/4" | 6,35 / 1/4" | 35 | 75 | | |
| 7,93 / 5/16" | 1100793793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 63 | | |
| | 110L0793793 | 7,93 / 5/16" | 7,93 / 5/16" | 40 | 100 | | |
| 8,0 | 110KK080 | 8 | 8 | 9 | 50 | | |
| | 110K080080 | 8 | 8 | 18 | 50 | | |
| | 110K080-050 | 8 | 8 | 18 | 50 | | 0,5 |
| | 110080080 | 8 | 8 | 22 | 63 | | |
| | 110080-050 | 8 | 8 | 22 | 63 | | 0,5 |
| | 110H080080 | 8 | 8 | 30 | 75 | | |
| | 110L080080 | 8 | 8 | 40 | 100 | | |
| | 130080100 | 8 | 10 | 40 | 100 | | |
| 9,52 / 3/8" | 1100952952 | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 | | |
| | 110L0952952 | 9,52 / 3/8" | 9,52 / 3/8" | 55 | 100 | | |
| 10,0 | 110100100 | 10 | 10 | 25 | 72 | | |
| | 110L100100 | 10 | 10 | 55 | 100 | | |
| | 110FL100100 | 10 | 10 | 30 | 150 | 70 | |
| 12,0 | 110120120 | 12 | 12 | 30 | 83 | | |
| | 110FL120120 | 12 | 12 | 40 | 150 | 80 | |
| 12,7 / 1/2" | 110127127 | 12,7 / 1/2" | 12,7 / 1/2" | 30 | 75 | | |
| 14,0 | 110140140 | 14 | 14 | 30 | 83 | | |
| 16,0 | 110160160 | 16 | 16 | 35 | 92 | | |
| | 110FL160160 | 16 | 16 | 50 | 150 | 100 | |
| 18,0 | 110180180 | 18 | 18 | 35 | 92 | | |
| 20,0 | 110200200 | 20 | 20 | 40 | 104 | | |
| | 110FL200200 | 20 | 20 | 50 | 150 | 100 | |

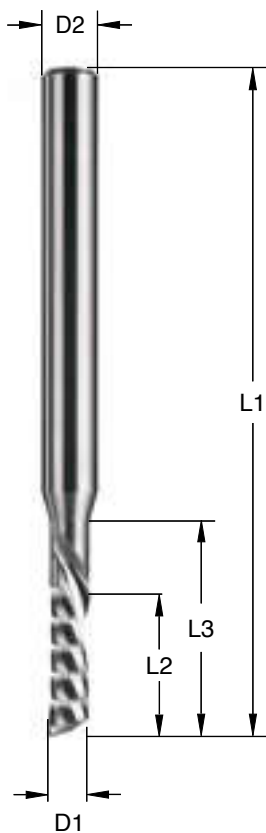
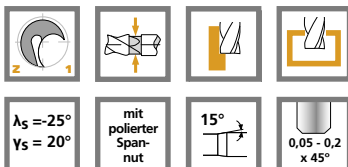


Durchmesserbereich:
1,0 bis 20,0 mm
diameter range:
1,0 to 20,0 mm

Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 110FL160160 und wenn gewünscht Beschichtung: z.B. TLX.
Please indicate order number: e.g. 110FL200200 and if wanted COATING: e.g. TLX.



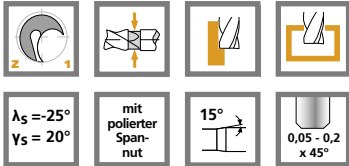
Durchmesserbereich:
1,0 bis 20,0 mm
diameter range:
1,0 to 20,0 mm

Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

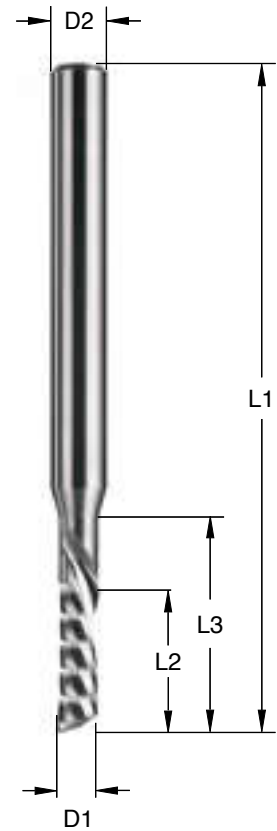
| | BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | ER mm |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------------|----------|----------|
| 1,0 | 131KK010 | 1 | 3 | 2 | 50 | | |
| | 131010030 | 1 | 3 | 5 | 50 | | |
| 2,0 | 111K020020 | 2 | 2 | 6 | 50 | | |
| | 111020020 | 2 | 2 | 10 | 40 | | |
| | 111H020020 | 2 | 2 | 12 | 60 | | |
| | 111L020020 | 2 | 2 | 14 | 75 | | |
| | 131KK020 | 2 | 3 | 3 | 50 | | |
| | 131K020030 | 2 | 3 | 8 | 40 | | |
| | 131020030 | 2 | 3 | 10 | 60 | | |
| | 131L020030 | 2 | 3 | 10 | 75 | | |
| 3,0 | 111KK030 | 3 | 3 | 4 | 50 | | |
| | 111K030030 | 3 | 3 | 8 | 50 | | |
| | 111030030 | 3 | 3 | 12 | 40 | | |
| | 111H030030 | 3 | 3 | 15 | 60 | | |
| | 111L030030 | 3 | 3 | 18 | 75 | | |
| | 131K030060 | 3 | 6 | 8 | 50 | | |
| | 131030060 | 3 | 6 | 18 | 60 | | |
| | 131L030060 | 3 | 6 | 18 | 75 | | |
| 3,17 / 1/8" | 1110317317 | 3,17 / 1/8" | 3,17 / 1/8" | 12 | 38 | | |
| | 111L0317317 | 3,17 / 1/8" | 3,17 / 1/8" | 18 | 75 | | |
| 4,0 | 111KK040 | 4 | 4 | 5 | 50 | | |
| | 111K040040 | 4 | 4 | 12 | 50 | | |
| | 111040040 | 4 | 4 | 15 | 40 | | |
| | 111H040040 | 4 | 4 | 18 | 60 | | |
| | 111L040040 | 4 | 4 | 20 | 75 | | |
| | 131K040060 | 4 | 6 | 12 | 50 | | |
| | 131040060 | 4 | 6 | 20 | 60 | | |
| | 131L040060 | 4 | 6 | 20 | 75 | | |
| 4,76 / 3/16" | 1110476476 | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 50 | | |
| | 111L0476476 | 4,76 / 3/16" | 4,76 / 3/16" | 20 | 75 | | |
| 5,0 | 111KK050 | 5 | 5 | 6 | 50 | | |
| | 111050050 | 5 | 5 | 16 | 50 | | |
| | 111H050050 | 5 | 5 | 20 | 60 | | |
| | 111L050050 | 5 | 5 | 28 | 75 | | |
| | 131K050060 | 5 | 6 | 16 | 50 | | |
| | 131050060 | 5 | 6 | 28 | 60 | | |
| | 131L050060 | 5 | 6 | 28 | 75 | | |
| | 131L050080 | 5 | 8 | 20 | 95 | 30 | |
| 6,0 | 111KK060 | 6 | 6 | 7 | 50 | | |
| | 111K060060 | 6 | 6 | 16 | 50 | | |
| | 111060060 | 6 | 6 | 20 | 60 | | |
| | 111L060060 | 6 | 6 | 35 | 75 | | |
| | 131K060080 | 6 | 8 | 18 | 63 | | |
| | 131060080 | 6 | 8 | 35 | 75 | | |
| | 131L060080 | 6 | 8 | 20 | 95 | 30 | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 131K050060 und wenn gewünscht Beschichtung: z.B. TLX.
Please indicate order number: e.g. 111L050050 and if wanted COATING: e.g. TLX.



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | ER mm |
|--------------------------------|-------------|-----------------|-----------------------|----------|----------------|----------|----------|
| 6,35 / 1/4" | 1110635635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 63 | | |
| | 111L0635635 | 6,35 / 1/4" | 6,35 / 1/4" | 35 | 75 | | |
| 7,93 / 5/16" | 1110793793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 63 | | |
| | 111L0793793 | 7,93 / 5/16" | 7,93 / 5/16" | 40 | 100 | | |
| 8,0 | 111KK080 | 8 | 8 | 9 | 50 | | |
| | 111K080080 | 8 | 8 | 18 | 50 | | |
| | 111080080 | 8 | 8 | 22 | 63 | | |
| | 111H080080 | 8 | 8 | 30 | 75 | | |
| | 111L080080 | 8 | 8 | 40 | 100 | | |
| | 131080100 | 8 | 10 | 40 | 100 | | |
| 9,52 / 3/8" | 1110952952 | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 | | |
| | 111L0952952 | 9,52 / 3/8" | 9,52 / 3/8" | 40 | 100 | | |
| 10,0 | 111100100 | 10 | 10 | 25 | 72 | | |
| | 111L100100 | 10 | 10 | 55 | 100 | | |
| 12,0 | 111120120 | 12 | 12 | 30 | 83 | | |
| 12,7 / 1/2" | 111127127 | 12,7 / 1/2" | 12,7 / 1/2" | 30 | 76 | | |
| 14,0 | 111140140 | 14 | 14 | 30 | 83 | | |
| 16,0 | 111160160 | 16 | 16 | 35 | 92 | | |
| 18,0 | 111180180 | 18 | 18 | 35 | 92 | | |
| 20,0 | 111200200 | 20 | 20 | 40 | 104 | | |

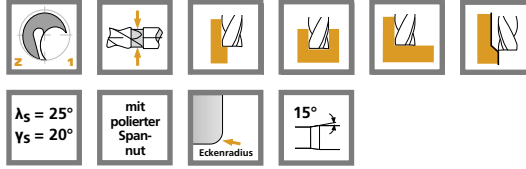


Durchmesserbereich:
1,0 bis 20,0 mm
diameter range:
1,0 to 20,0 mm

Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

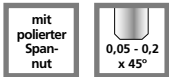
Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 131K050060 und wenn gewünscht Beschichtung: z.B. TLX.
Please indicate order number: e.g. 111L050050 and if wanted COATING: e.g. TLX.



Durchmesserbereich:
0,2 bis 1,0 mm
diameter range:
0,2 to 1,0 mm

Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | ER mm | | |
|-----|--------------------------------|----------|----------------|----------|----------------|----------|----------|--|--|
| 0,2 | 130M002030 | 0,2 | 3 | 0,2 | 40 | | 0,05 | | |
| | 130M002030-2 | 0,2 | 3 | 0,2 | 40 | 2 | 0,05 | | |
| | 130MK002030 | 0,2 | 3 | 0,6 | 40 | | 0,05 | | |
| 0,3 | 130M003030 | 0,3 | 3 | 0,3 | 40 | | 0,05 | | |
| | 130M003030-3 | 0,3 | 3 | 0,3 | 40 | 3 | 0,05 | | |
| | 130MK003030 | 0,3 | 3 | 0,6 | 40 | | 0,05 | | |
| 0,4 | 130M004030 | 0,4 | 3 | 0,6 | 40 | | 0,05 | | |
| | 130M004030-4 | 0,4 | 3 | 0,6 | 40 | 4 | 0,05 | | |
| 0,5 | 130M005030 | 0,5 | 3 | 0,8 | 40 | | 0,05 | | |
| | 130MK005030 | 0,5 | 3 | 0,8 | 40 | 1,2 | 0,05 | | |
| | 130M005030-5 | 0,5 | 3 | 0,8 | 40 | 5 | 0,05 | | |
| | 130ML005030 | 0,5 | 3 | 2 | 40 | | 0,05 | | |
| 0,6 | 130M006030 | 0,6 | 3 | 1,2 | 40 | | 0,05 | | |
| | 130M006030-6 | 0,6 | 3 | 1,2 | 40 | 6 | 0,05 | | |
| | 130ML006030 | 0,6 | 3 | 2,4 | 40 | | 0,05 | | |
| 0,8 | 130M008030 | 0,8 | 3 | 1,5 | 40 | | 0,05 | | |
| | 130M008030-8 | 0,8 | 3 | 1,5 | 40 | 8 | 0,05 | | |
| | 130ML008030 | 0,8 | 3 | 3 | 40 | | 0,05 | | |
| 1,0 | 130M010030 | 1 | 3 | 2 | 40 | | 0,05 | | |
| | 130M010030-10 | 1 | 3 | 2 | 40 | 10 | 0,05 | | |
| | 130ML010030 | 1 | 3 | 4 | 40 | | 0,05 | | |



| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | D3 mm | L2 mm | L1 +2 mm | W° | | |
|-----|--------------------------------|----------|----------------|----------|----------|----------------|-----|--|--|
| 2,0 | 130FAS90-020-2 | 2 | 6 | 6 | 2 | 60 | 90 | | |
| | 130FAS90-020-3 | 2 | 6 | 6 | 3 | 60 | 90 | | |
| | 130FAS90-020-5 | 2 | 6 | 6 | 5 | 60 | 90 | | |
| | 130FAS90-020-8 | 2 | 6 | 6 | 8 | 60 | 90 | | |
| 3,0 | 130FAS90-030-3 | 3 | 6 | 6 | 3 | 60 | 90 | | |
| | 130FAS90-030-4 | 3 | 6 | 6 | 4 | 60 | 90 | | |
| | 130FAS90-030-5 | 3 | 6 | 6 | 5 | 60 | 90 | | |
| | 130FAS90-030-7 | 3 | 6 | 6 | 7 | 60 | 90 | | |
| | 130FAS90-030-10 | 3 | 6 | 6 | 10 | 60 | 90 | | |
| 3,2 | 130FAS120-032-8 | 3,2 | 6 | 6 | 8 | 60 | 120 | | |
| 4,0 | 130FAS90-040-3 | 4 | 6 | 6 | 3 | 60 | 90 | | |
| | 130FAS90-040-4 | 4 | 6 | 6 | 4 | 60 | 90 | | |
| | 130FAS90-040-6 | 4 | 6 | 6 | 6 | 60 | 90 | | |
| | 130FAS90-040-10 | 4 | 6 | 6 | 10 | 60 | 90 | | |
| | 130FAS90-840-10 | 4 | 8 | 8 | 10 | 63 | 90 | | |
| 4,3 | 130FAS120-043-12 | 4,3 | 8 | 8 | 12 | 63 | 120 | | |
| 5,3 | 130FAS120-053-12 | 5,3 | 10 | 10 | 12 | 72 | 120 | | |
| 6,0 | 130FAS90-060-10 | 6 | 8 | 8 | 10 | 63 | 90 | | |
| | 130FAS90-10060-10 | 6 | 10 | 10 | 10 | 72 | 90 | | |
| 6,4 | 130FAS120-064-12 | 6,4 | 12 | 10 | 12 | 83 | 120 | | |



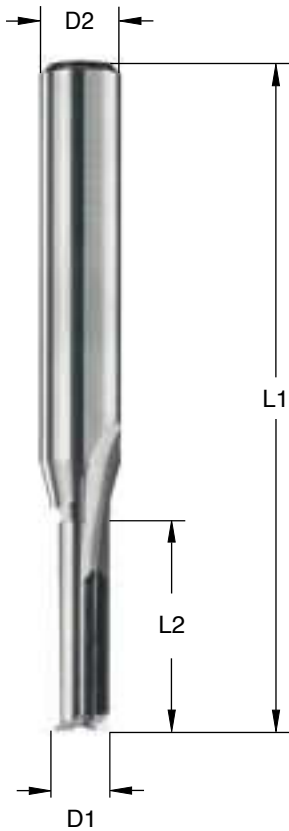
Durchmesserbereich:
2,0 bis 6,4 mm
diameter range:
2,0 to 6,4 mm

Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

Andere Senkwinkel auf Anfrage.
Special countersink angle on demand.

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 130FAS90-040-3 und wenn gewünscht Beschichtung: z.B. TLX.
Please indicate order number: e.g. 130FAS90-060-10 and if wanted COATING: e.g. TLX.



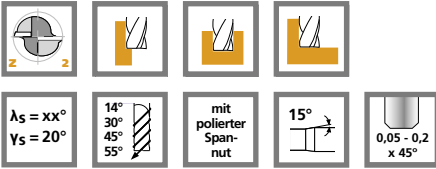
Durchmesserbereich:
2,0 bis 20,0 mm
diameter range:
2,0 to 20,0 mm

Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

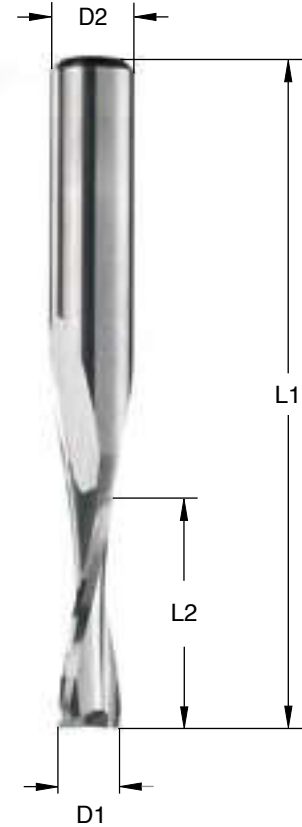
| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | | | | |
|------|--------------------------------|----------|----------------|----------|----------------|--|--|--|--|
| 2,0 | 100020020 | 2 | 2 | 8 | 40 | | | | |
| | 100KK020 | 2 | 3 | 3 | 50 | | | | |
| | 100A020030 | 2 | 3 | 10 | 50 | | | | |
| 3,0 | 100030030 | 3 | 3 | 12 | 40 | | | | |
| | 100KK030 | 3 | 3 | 4 | 50 | | | | |
| | 100K030030 | 3 | 3 | 10 | 50 | | | | |
| | 100L030030 | 3 | 3 | 16 | 60 | | | | |
| | 100A030060 | 3 | 6 | 12 | 50 | | | | |
| 4,0 | 100040040 | 4 | 4 | 14 | 40 | | | | |
| | 100KK040 | 4 | 4 | 5 | 50 | | | | |
| | 100K040040 | 4 | 4 | 12 | 50 | | | | |
| | 100L040040 | 4 | 4 | 18 | 60 | | | | |
| | 100A040060 | 4 | 6 | 14 | 50 | | | | |
| 5,0 | 100KK050 | 5 | 5 | 6 | 50 | | | | |
| | 100050050 | 5 | 5 | 16 | 50 | | | | |
| | 100H050050 | 5 | 5 | 20 | 60 | | | | |
| | 100L050050 | 5 | 5 | 25 | 75 | | | | |
| 6,0 | 100A050060 | 5 | 6 | 16 | 50 | | | | |
| | 100KK060 | 6 | 6 | 7 | 50 | | | | |
| | 100060060 | 6 | 6 | 18 | 50 | | | | |
| | 100H060060 | 6 | 6 | 25 | 65 | | | | |
| | 100L060060 | 6 | 6 | 35 | 75 | | | | |
| 8,0 | 100A060080 | 6 | 8 | 20 | 63 | | | | |
| | 100KK080 | 8 | 8 | 9 | 50 | | | | |
| | 100080080 | 8 | 8 | 20 | 63 | | | | |
| 10,0 | 100H080080 | 8 | 8 | 30 | 75 | | | | |
| | 100L080080 | 8 | 8 | 40 | 100 | | | | |
| 10,0 | 100100100 | 10 | 10 | 25 | 72 | | | | |
| 12,0 | 100120120 | 12 | 12 | 30 | 83 | | | | |
| 16,0 | 100160160 | 16 | 16 | 35 | 92 | | | | |
| 20,0 | 100200200 | 20 | 20 | 45 | 104 | | | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 100KK080 und wenn gewünscht Beschichtung: z.B. TLX.
Please indicate order number: e.g. 100A060080 and if wanted COATING: e.g. TLX.



| BESTELL-NUMMER ORDER NUMBER | Spirale helix ° / λs | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm |
|--------------------------------|-------------------------|----------|----------------|----------|----------------|
| 2,0 | 102020020- | 2 | 2 | 8 | 40 |
| | 102KK020- | 2 | 3 | 3 | 50 |
| | 102A020030- | 2 | 3 | 10 | 50 |
| 3,0 | 102030030- | 3 | 3 | 12 | 40 |
| | 102KK030- | 3 | 3 | 4 | 50 |
| | 102K030030- | 3 | 3 | 10 | 50 |
| | 102L030030- | 3 | 3 | 16 | 60 |
| | 102A030060- | 3 | 6 | 12 | 50 |
| 4,0 | 102040040- | 4 | 4 | 14 | 40 |
| | 102KK040- | 4 | 4 | 5 | 50 |
| | 102K040040- | 4 | 4 | 12 | 50 |
| | 102L040040- | 4 | 4 | 18 | 60 |
| | 102A040060- | 4 | 6 | 14 | 50 |
| 5,0 | 102KK050- | 5 | 5 | 6 | 50 |
| | 102050050- | 5 | 5 | 16 | 50 |
| | 102H050050- | 5 | 5 | 20 | 60 |
| | 102L050050- | 5 | 5 | 25 | 75 |
| | 102A050060- | 5 | 6 | 16 | 50 |
| 6,0 | 102KK060- | 6 | 6 | 7 | 50 |
| | 102060060- | 6 | 6 | 18 | 50 |
| | 102H060060- | 6 | 6 | 25 | 65 |
| | 102L060060- | 6 | 6 | 35 | 75 |
| | 102A060080- | 6 | 8 | 20 | 63 |
| 8,0 | 102KK080- | 8 | 8 | 9 | 50 |
| | 102080080- | 8 | 8 | 20 | 63 |
| | 102H080080- | 8 | 8 | 30 | 75 |
| | 102L080080- | 8 | 8 | 40 | 100 |
| 10,0 | 102100100- | 10 | 10 | 25 | 72 |
| 12,0 | 102120120- | 12 | 12 | 30 | 83 |
| 16,0 | 102160160- | 16 | 16 | 35 | 92 |
| 20,0 | 102200200- | 20 | 20 | 45 | 104 |

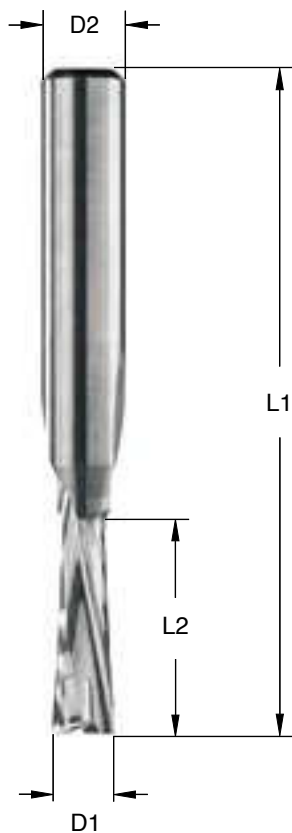


Durchmesserbereich:
2,0 bis 20,0 mm
diameter range:
2,0 to 20,0 mm

Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 102L080080-30 und wenn gewünscht Beschichtung: z.B. TLX.
Please indicate order number: e.g. 102KK080-55 and if wanted COATING: e.g. TLX.



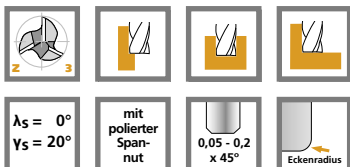
Durchmesserbereich:
2,0 bis 20,0 mm
diameter range:
2,0 to 20,0 mm

Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

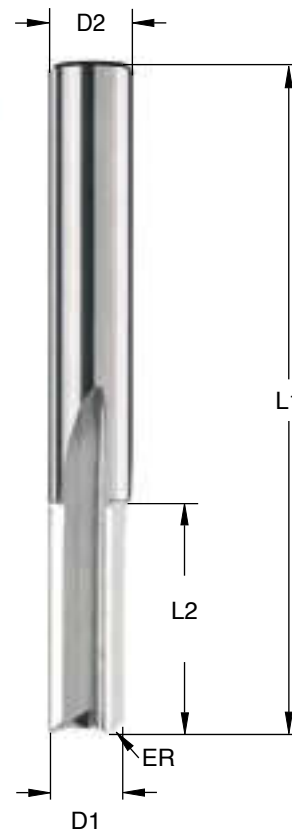
| | BESTELL-NUMMER ORDER NUMBER | Spirale helix ° / λ_s | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | |
|------|--------------------------------|----------------------------------|----------|----------------|----------|----------------|--|
| 2,0 | 104020020- | 14 / 30 / 45 | 2 | 2 | 8 | 40 | |
| | 104KK020- | 14 / 30 / 45 | 2 | 3 | 3 | 50 | |
| | 104A020030- | 14 / 30 / 45 | 2 | 3 | 10 | 50 | |
| 3,0 | 104030030- | 14 / 30 / 45 | 3 | 3 | 12 | 40 | |
| | 104KK030- | 14 / 30 / 45 | 3 | 3 | 4 | 50 | |
| | 104K030030- | 14 / 30 / 45 | 3 | 3 | 10 | 50 | |
| | 104L030030- | 14 / 30 / 45 | 3 | 3 | 16 | 60 | |
| | 104A030060- | 14 / 30 / 45 | 3 | 6 | 12 | 50 | |
| 4,0 | 104040040- | 14 / 30 / 45 | 4 | 4 | 14 | 40 | |
| | 104KK040- | 14 / 30 / 45 | 4 | 4 | 5 | 50 | |
| | 104K040040- | 14 / 30 / 45 | 4 | 4 | 12 | 50 | |
| | 104L040040- | 14 / 30 / 45 | 4 | 4 | 18 | 60 | |
| | 104A040060- | 14 / 30 / 45 | 4 | 6 | 14 | 50 | |
| 5,0 | 104KK050- | 14 / 30 / 45 | 5 | 5 | 6 | 50 | |
| | 104050050- | 14 / 30 / 45 | 5 | 5 | 16 | 50 | |
| | 104H050050- | 14 / 30 / 45 | 5 | 5 | 20 | 60 | |
| | 104L050050- | 14 / 30 / 45 | 5 | 5 | 25 | 75 | |
| | 104A050060- | 14 / 30 / 45 | 5 | 6 | 16 | 50 | |
| 6,0 | 104KK060- | 14 / 30 / 45 | 6 | 6 | 7 | 50 | |
| | 104060060- | 14 / 30 / 45 | 6 | 6 | 18 | 50 | |
| | 104H060060- | 14 / 30 / 45 | 6 | 6 | 25 | 65 | |
| | 104L060060- | 14 / 30 / 45 | 6 | 6 | 35 | 75 | |
| | 104A060080- | 14 / 30 / 45 | 6 | 8 | 20 | 63 | |
| 8,0 | 104KK080- | 14 / 30 / 45 | 8 | 8 | 9 | 50 | |
| | 104080080- | 14 / 30 / 45 | 8 | 8 | 20 | 63 | |
| | 104H080080- | 14 / 30 / 45 | 8 | 8 | 30 | 75 | |
| | 104L080080- | 14 / 30 / 45 | 8 | 8 | 40 | 100 | |
| 10,0 | 104100100- | 14 / 30 / 45 | 10 | 10 | 25 | 72 | |
| 12,0 | 104120120- | 14 / 30 / 45 | 12 | 12 | 30 | 83 | |
| 16,0 | 104160160- | 14 / 30 / 45 | 16 | 16 | 35 | 92 | |
| 20,0 | 104200200- | 14 / 30 / 45 | 20 | 20 | 45 | 104 | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 104100100-14 und wenn gewünscht Beschichtung: z.B. TLX.
Please indicate order number: e.g. 104160160-45 and if wanted COATING: e.g. TLX.



| BESTELL-NUMMER ORDER NUMBER | | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | ER mm | | | |
|--------------------------------|-------------|----------|----------------|----------|----------------|----------|--|--|--|
| 3,0 | 101030030 | 3 | 3 | 12 | 40 | | | | |
| | 101DK030030 | 3 | 3 | 12 | 40 | 0,2 | | | |
| | 101K030030 | 3 | 3 | 10 | 50 | | | | |
| | 101L030030 | 3 | 3 | 16 | 60 | | | | |
| 4,0 | 101040040 | 4 | 4 | 14 | 40 | | | | |
| | 101DK040040 | 4 | 4 | 14 | 40 | 0,2 | | | |
| | 101K040040 | 4 | 4 | 12 | 50 | | | | |
| | 101L040040 | 4 | 4 | 16 | 60 | | | | |
| 5,0 | 101050050 | 5 | 5 | 16 | 50 | | | | |
| | 101DK050050 | 5 | 5 | 16 | 50 | 0,2 | | | |
| | 101L050050 | 5 | 5 | 28 | 60 | | | | |
| 6,0 | 101060060 | 6 | 6 | 18 | 50 | | | | |
| | 101DK060060 | 6 | 6 | 18 | 50 | 0,2 | | | |
| | 101L060060 | 6 | 6 | 35 | 75 | | | | |
| 8,0 | 101080080 | 8 | 8 | 20 | 63 | | | | |
| | 101DK080080 | 8 | 8 | 20 | 63 | 0,2 | | | |
| | 101L080080 | 8 | 8 | 40 | 100 | | | | |
| 10,0 | 101100100 | 10 | 10 | 25 | 72 | | | | |
| | 101DK100100 | 10 | 10 | 25 | 72 | 0,2 | | | |
| 12,0 | 101120120 | 12 | 12 | 30 | 83 | | | | |
| 16,0 | 101160160 | 16 | 16 | 35 | 92 | | | | |
| 20,0 | 101200200 | 20 | 20 | 45 | 104 | | | | |



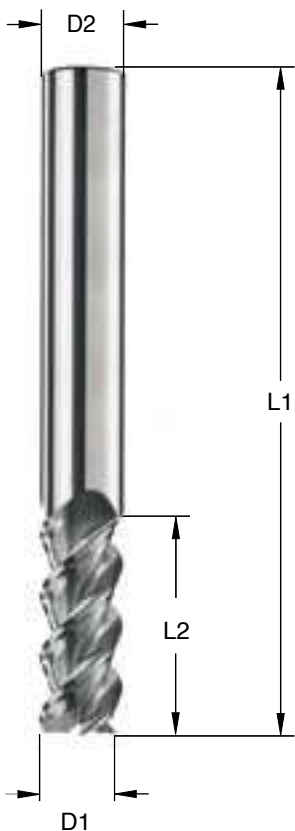
Durchmesserbereich:
3,0 bis 20,0 mm
diameter range:
3,0 to 20,0 mm

Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 101DK030030 und wenn gewünscht Beschichtung: z.B. TLX.
Please indicate order number: e.g. 101160160 and if wanted COATING: e.g. TLX.

UNIVERSAL-LINE



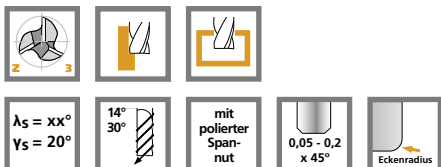
| BESTELL-NUMMER ORDER NUMBER | | Spirale helix ° / λ _s | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | ER mm | |
|--------------------------------|------------|-------------------------------------|----------|----------------|----------|----------------|----------|--|
| 3,0 | 103030030- | 30 / 45 / 55 | 3 | 3 | 12 | 40 | | |
| 4,0 | 103040040- | 30 / 45 / 55 | 4 | 4 | 14 | 40 | | |
| 5,0 | 103050050- | 30 / 45 / 55 | 5 | 5 | 16 | 50 | | |
| 6,0 | 103060060- | 30 / 45 / 55 | 6 | 6 | 18 | 50 | | |
| 8,0 | 103080080- | 30 / 45 / 55 | 8 | 8 | 20 | 63 | | |
| 10,0 | 103100100- | 30 / 45 / 55 | 10 | 10 | 25 | 72 | | |
| 12,0 | 103120120- | 30 / 45 / 55 | 12 | 12 | 30 | 83 | | |
| 16,0 | 103160160- | 30 / 45 / 55 | 16 | 16 | 35 | 92 | | |
| 20,0 | 103200200- | 30 / 45 / 55 | 20 | 20 | 45 | 104 | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Durchmesserbereich:
3,0 bis 20,0 mm
diameter range:
3,0 to 20,0 mm

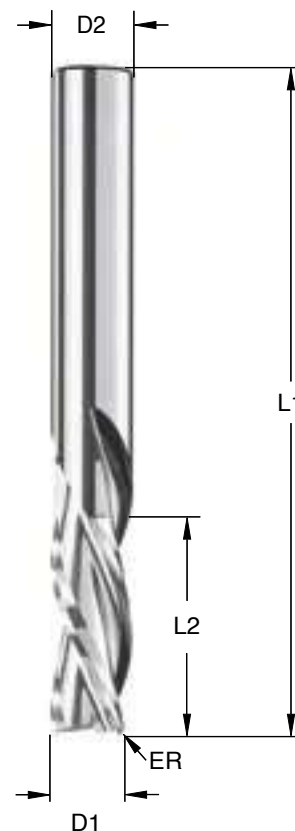
Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 103030030-30 und wenn gewünscht Beschichtung: z.B. TLX.
Please indicate order number: e.g. 103160160-45 and if wanted COATING: e.g. TLX.



| BESTELL-NUMMER ORDER NUMBER | | Spirale helix ° / λs | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | ER mm |
|--------------------------------|--------------|-------------------------|----------|----------------|----------|----------------|----------|
| 3,0 | 105030030 | 30 | 3 | 3 | 12 | 40 | |
| | 105DK030030- | 14 / 30 | 3 | 3 | 12 | 40 | 0,2 |
| 4,0 | 105040040 | 30 | 4 | 4 | 14 | 40 | |
| | 105DK040040- | 14 / 30 | 4 | 4 | 14 | 40 | 0,2 |
| 5,0 | 105050050 | 30 | 5 | 5 | 16 | 50 | |
| | 105DK050050- | 14 / 30 | 5 | 5 | 16 | 50 | 0,2 |
| 6,0 | 105060060 | 30 | 6 | 6 | 18 | 50 | |
| | 105DK060060- | 14 / 30 | 6 | 6 | 18 | 50 | 0,2 |
| 8,0 | 105080080 | 30 | 8 | 8 | 20 | 63 | |
| | 105DK080080- | 14 / 30 | 8 | 8 | 20 | 63 | 0,2 |
| 10,0 | 105100100 | 30 | 10 | 10 | 25 | 72 | |
| | 105DK100100- | 14 / 30 | 10 | 10 | 25 | 72 | 0,2 |
| 12,0 | 105120120 | 30 | 12 | 12 | 30 | 83 | |
| 16,0 | 105160160 | 30 | 16 | 16 | 35 | 92 | |
| 20,0 | 105200200 | 30 | 20 | 20 | 45 | 104 | |



Durchmesserbereich:
3,0 bis 20,0 mm
diameter range:
3,0 to 20,0 mm

Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 105DK040040-30 und wenn gewünscht Beschichtung: z.B. TLX.
Please indicate order number: e.g. 105100100-30 and if wanted COATING: e.g. TLX.

UNIVERSAL-LINE

FÜR DIE BEARBEITUNG
VON SCHAUM, PE UND PU

FOR THE MACHINING OF
FOAM, PE AND PU

UNIVERSAL-LINE



103DFO

Diese Werkzeuge sind mit speziellen Geometrien für die Bearbeitung von PE- und PU-Schäumen ausgestattet und auch in sehr langer Ausführung lieferbar. Sie erlauben die Bearbeitung senkrechter Kanten ohne Flusen und Fasern. Die Geometrie an der Kopfschneide vermeidet Eintauchabdrücke am Boden der Bauteiltasche.

DEKOFOAM-FRÄSER Z3 14°

- mit 14° Spirale
- mit definiertem Kantenradius
- mit sanfter Zuggeometrie
- mit Protect-Formel
- auch linksgedrallt lieferbar

Schäume aus vernetztem und unernetztem PE oder geschäumtem PU werden in der Verpackungsindustrie, der Orthopädietechnik und in der Automobilindustrie eingesetzt. Hier müssen auch spitze Ecken sauber mit abgetrennt werden.

Die dafür entwickelten Fräser werden in der Ausführung mit Spirale im Winkel von 14 Grad, definiertem Kantenradius, sanfter Zuggeometrie und mit Protect-Formel angeboten.

Auf Anfrage sind andere Werkzeuge auch linksgedrallt lieferbar.

103DFO

These tools are equipped with special geometries for processing PE and PU foams and are also available in very long version. These tools allow treatment of vertical borders without lint and fibers. The geometry at the head blade prevents sinking imprints at the bottom of the component sack.

DEKOFOAM-MILLING TOOL Z3 14°

- with 14° spiral
- with defined edge radius
- with soft pulling geometry
- with Protect-Formula
- also available with left-handed twist

Foams of cured and uncured PE or foamed PU find application in packing industry, orthopedic prosthetics and automotive industry. Here sharp edges must be cleanly cut.

The milling tools developed for this are available as models with spiral angle of 14°, defined edge radius, soft pulling and with Protect Formula.

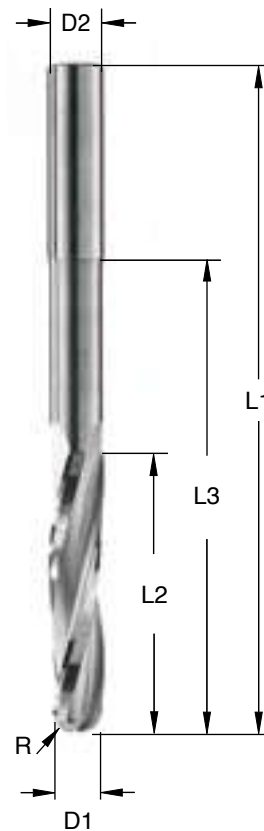
All our tools are also available with left-hand cutting on special demand.



$\lambda_s = 14^\circ$
 $\gamma_s = 18^\circ$

mit
polierter
Span-
nut

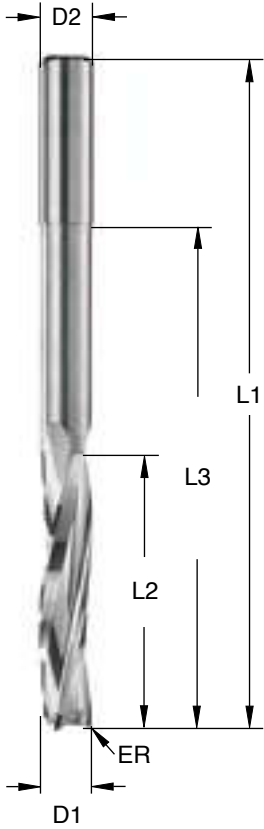
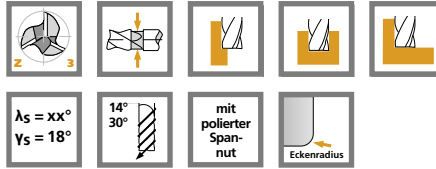
| BESTELL-NUMMER ORDER NUMBER | | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | R mm | | |
|--------------------------------|---------------|----------|----------------|----------|----------------|----------|---------|--|--|
| 3,0 | 103DFOR030 | 3 | 3 | 15 | 75 | 40 | 1,5 | | |
| 4,0 | 103DFOR040 | 4 | 4 | 15 | 75 | 40 | 2,0 | | |
| | 103DFORL040 | 4 | 4 | 20 | 75 | 40 | 2,0 | | |
| | 103DFORXL040 | 4 | 4 | 22 | 100 | | 2,0 | | |
| | 103DFORSXL040 | 4 | 4 | 20 | 125 | 100 | 2,0 | | |
| | 103DFORXXL040 | 4 | 4 | 15 | 150 | 100 | 2,0 | | |
| 5,0 | 103DFOR050 | 5 | 5 | 15 | 100 | 50 | 2,5 | | |
| | 103DFORL050 | 5 | 5 | 20 | 100 | 65 | 2,5 | | |
| 6,0 | 103DFORK060 | 6 | 6 | 25 | 100 | | 3,0 | | |
| | 103DFORKF060 | 6 | 6 | 25 | 100 | 75 | 3,0 | | |
| | 103DFORSL060 | 6 | 6 | 42 | 100 | 75 | 3,0 | | |
| | 103DFOR060 | 6 | 6 | 20 | 125 | 75 | 3,0 | | |
| | 103DFORXL060 | 6 | 6 | 42 | 150 | | 3,0 | | |
| | 103DFORL060 | 6 | 6 | 20 | 150 | 100 | 3,0 | | |
| 8,0 | 103DFOR080 | 8 | 8 | 42 | 100 | 75 | 4,0 | | |
| | 103DFORSL080 | 8 | 8 | 52 | 100 | 75 | 4,0 | | |
| | 103DFORL080 | 8 | 8 | 20 | 150 | 100 | 4,0 | | |
| | 103DFORXL080 | 8 | 8 | 52 | 150 | | 4,0 | | |
| | 103DFORSXL080 | 8 | 8 | 52 | 150 | 115 | 4,0 | | |
| 10,0 | 103DFOR100 | 10 | 10 | 50 | 120 | 85 | 5,0 | | |
| | 103DFORL100 | 10 | 10 | 25 | 150 | 115 | 5,0 | | |
| | 103DFORXL100 | 10 | 10 | 52 | 150 | | 5,0 | | |
| | 103DFORSXL100 | 10 | 10 | 52 | 150 | 115 | 5,0 | | |
| 12,0 | 103DFOR120 | 12 | 12 | 50 | 125 | 90 | 6,0 | | |
| | 103DFORL120 | 12 | 12 | 25 | 150 | 115 | 6,0 | | |
| | 103DFORXL120 | 12 | 12 | 50 | 170 | 135 | 6,0 | | |
| 16,0 | 103DFOR160 | 16 | 16 | 50 | 125 | 85 | 8,0 | | |
| | 103DFORL160 | 16 | 16 | 70 | 150 | 125 | 8,0 | | |
| | 103DFORXL160 | 16 | 16 | 80 | 200 | 170 | 8,0 | | |



Durchmesserbereich:
3,0 bis 16,0 mm
diameter range:
3,0 to 16,0 mm

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 103DFOR160.
Please indicate order number: e.g. 103DFORL120.



Durchmesserbereich:
3,0 bis 16,0 mm
diameter range:
3,0 to 16,0 mm

| | BESTELL-NUMMER ORDER NUMBER | Spirale helix ° / λs | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | ER mm |
|------|--------------------------------|-------------------------|----------|----------------|----------|----------------|----------|----------|
| 3,0 | 103DFO030 | 14 | 3 | 3 | 15 | 75 | 40 | |
| | 103DK030030- | 14 / 30 | 3 | 3 | 12 | 40 | | 0,2 |
| 4,0 | 103DFO040 | 14 | 4 | 4 | 15 | 75 | 40 | |
| | 103DFOL040 | 14 | 4 | 4 | 20 | 75 | 40 | |
| | 103DFOXL040 | 14 | 4 | 4 | 22 | 100 | | |
| | 103DFOSXL040 | 14 | 4 | 4 | 20 | 125 | 100 | |
| | 103DFOXXL040 | 14 | 4 | 4 | 15 | 150 | 100 | |
| | 103DK040040- | 14 / 30 | 4 | 4 | 14 | 40 | | 0,2 |
| 5,0 | 103DFO050 | 14 | 5 | 5 | 15 | 100 | 50 | |
| | 103DFOL050 | 14 | 5 | 5 | 20 | 100 | 65 | |
| | 103DK050050- | 14 / 30 | 5 | 5 | 16 | 50 | | 0,2 |
| 6,0 | 103DFOK060 | 14 | 6 | 6 | 25 | 100 | | |
| | 103DFOKF060 | 14 | 6 | 6 | 25 | 100 | 75 | |
| | 103DFO060 | 14 | 6 | 6 | 20 | 125 | 75 | |
| | 103DFOL060 | 14 | 6 | 6 | 20 | 150 | 100 | |
| | 103DFOSL060 | 14 | 6 | 6 | 42 | 100 | 75 | |
| | 103DFOXL060 | 14 | 6 | 6 | 42 | 150 | | |
| | 103DK060060- | 14 / 30 | 6 | 6 | 18 | 50 | | 0,2 |
| 8,0 | 103DFO080 | 14 | 8 | 8 | 42 | 100 | 75 | |
| | 103DFOL080 | 14 | 8 | 8 | 20 | 150 | 100 | |
| | 103DFOSL080 | 14 | 8 | 8 | 52 | 100 | 75 | |
| | 103DFOXL080 | 14 | 8 | 8 | 52 | 150 | | |
| | 103DFOSXL080 | 14 | 8 | 8 | 52 | 150 | 115 | |
| | 103DK080080- | 14 / 30 | 8 | 8 | 20 | 63 | | 0,2 |
| 10,0 | 103DFO100 | 14 | 10 | 10 | 50 | 120 | 85 | |
| | 103DFOL100 | 14 | 10 | 10 | 25 | 150 | 115 | |
| | 103DFOXL100 | 14 | 10 | 10 | 52 | 150 | | |
| | 103DFOSXL100 | 14 | 10 | 10 | 52 | 150 | 115 | |
| | 103DK100100- | 14 / 30 | 10 | 10 | 25 | 72 | | 0,2 |
| 12,0 | 103DFO120 | 14 | 12 | 12 | 50 | 125 | 90 | |
| | 103DFOL120 | 14 | 12 | 12 | 25 | 150 | 115 | |
| | 103DFOXL120 | 14 | 12 | 12 | 50 | 170 | 135 | |
| 16,0 | 103DFO160 | 14 | 16 | 16 | 50 | 125 | 85 | |
| | 103DFOL160 | 14 | 16 | 16 | 70 | 150 | 125 | |
| | 103DFOXL160 | 14 | 16 | 16 | 80 | 200 | 170 | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

UNIVERSAL-LINE

FÜR DIE
MEDIZINTECHNIK

FOR MEDICAL
TECHNOLOGY



PEEK
PEEK

UHM
UHM

PA
PA

PE
PE

PP
PP

PS
PS

PUR
PUR

Gummi
Rubber

Latex
Latex

HUFSCHMIED
ZERSpanungSSYSTEME



UNIVERSAL-LINE

ZUR BEARBEITUNG VON
PEEK, UHM, PE

FOR THE MACHINING OF
PEEK, UHM, PE



UHM / PE

Auch hier halten ständig neue Werkstoffe Einzug. PEEK oder PTFE zum Beispiel, eröffnen bei Implantaten oder medizinischen Bauteilen ganz neue Möglichkeiten.

Werkstoffoptimierte Werkzeuge von Hufschmied unterscheiden sich von bisher handelsüblichen Ausführungen durch hohe Oberflächengüten und die Gratfreiheit nach dem Bohren und Fräsen. Dadurch wird eine Nachbearbeitung oft überflüssig. Unsere prozessoptimierten Werkzeuge verkürzen die Bearbeitungszeiten ohne Qualitätseinbußen und werden zudem auch den Forderungen nach immer kleineren Werkzeugen gerecht.

UHM / PE

New materials also appear here permanently. PEEK or PTFE for example, establish very new options for implants or medical components.

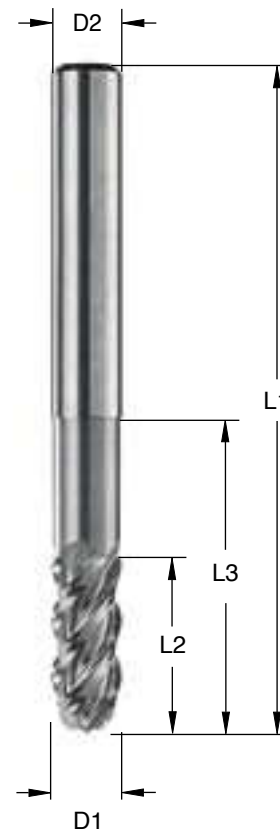
The material-optimized Hufschmied-tools differ from previous standard models in a high surface finish and the non-existence of burrs after drilling and milling. Therefore a post-processing is often unnecessary. Our process-optimized tools reduce the processing times without quality losses and come in addition up to the demand of more small tools.



$\lambda_s = 40^\circ$
 $\gamma_s = 22^\circ$

mit
polierter
Span-
nut

| BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | | | |
|--------------------------------|----------|----------------|----------|----------------|----------|--|--|--|
| 2,0 95PEL02 | 2 | 3 | 10 | 60 | | | | |
| 3,0 95PE03 95PEXL03 | 3 | 3 | 10 | 60 | | | | |
| | 3 | 3 | 10 | 75 | 25 | | | |
| 4,0 95PE04 95PEXL04 | 4 | 4 | 12 | 60 | | | | |
| | 4 | 4 | 12 | 75 | 25 | | | |
| 5,0 95PE05 95PEXL05 | 5 | 5 | 13 | 62 | | | | |
| | 5 | 5 | 13 | 75 | 30 | | | |
| 6,0 95PE06 95PEL06 | 6 | 6 | 16 | 60 | | | | |
| | 6 | 6 | 16 | 75 | 35 | | | |
| 8,0 95PE08 95PEXL08 | 8 | 8 | 19 | 63 | | | | |
| | 8 | 8 | 19 | 75 | 35 | | | |
| 10,0 95PE10 95PEL10 | 10 | 10 | 22 | 72 | | | | |
| | 10 | 10 | 22 | 89 | 35 | | | |
| 12,0 95PEL12 | 12 | 12 | 26 | 100 | 45 | | | |
| 16,0 95PEL16 | 16 | 16 | 19 | 100 | 45 | | | |

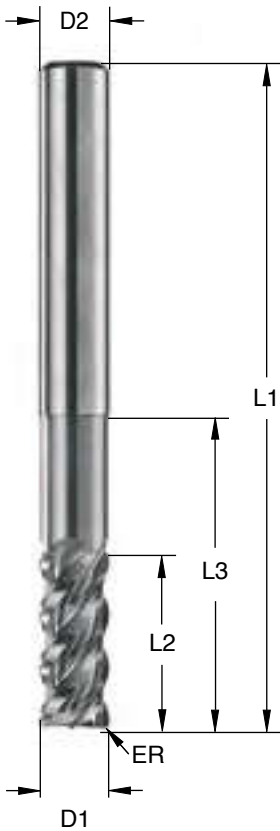
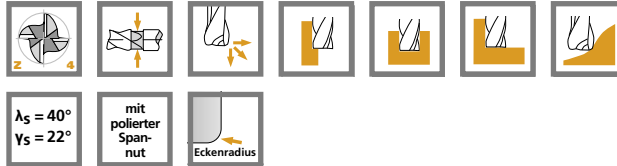


Durchmesserbereich:
2,0 bis 16,0 mm
diameter range:
2,0 to 16,0 mm

Mögliche Beschichtungen:
ALX - Standard
DIP - auf Anfrage
possible coatings:
ALX - Standard
DIP - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

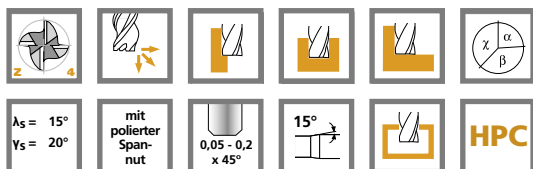
Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 95PE03 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. 95PEL12 and if wanted COATING: e.g. ALX.



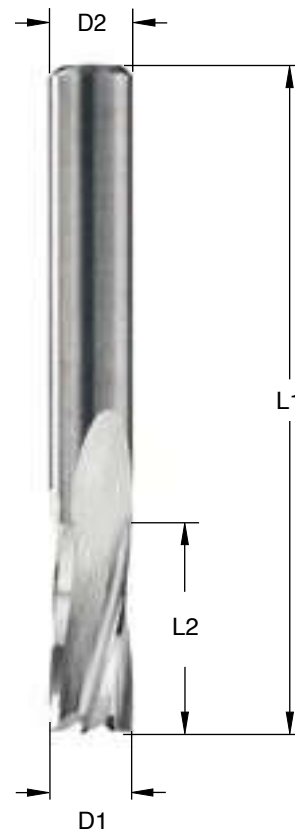
Durchmesserbereich:
 2,0 bis 16,0 mm
diameter range:
 2,0 to 16,0 mm

Mögliche Beschichtungen:
 ALX - Standard
 DIP - auf Anfrage
possible coatings:
 ALX - Standard
 DIP - on demand

| BESTELL-NUMMER ORDER NUMBER | | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | ER mm | | |
|--------------------------------|-----------|----------|----------------|----------|----------------|----------|----------|--|--|
| 2,0 | 91PEL02 | 2 | 3 | 10 | 60 | | 0,15 | | |
| 3,0 | 91PE03 | 3 | 3 | 10 | 60 | | 0,15 | | |
| | 91PEXL03 | 3 | 3 | 10 | 75 | 25 | 0,15 | | |
| 4,0 | 91PE04 | 4 | 4 | 12 | 60 | | 0,2 | | |
| | 91PEXL04 | 4 | 4 | 12 | 75 | 25 | 0,2 | | |
| 5,0 | 91PE05 | 5 | 5 | 13 | 62 | | 0,3 | | |
| | 91PEXL05 | 5 | 5 | 13 | 75 | 30 | 0,3 | | |
| 6,0 | 91PE06 | 6 | 6 | 16 | 60 | | 0,5 | | |
| | 91PEL06 | 6 | 6 | 16 | 75 | 35 | 0,5 | | |
| 8,0 | 91PE08 | 8 | 8 | 19 | 63 | | 0,5 | | |
| | 91PEXL08 | 8 | 8 | 19 | 75 | 35 | 0,5 | | |
| 10,0 | 91PE10 | 10 | 10 | 22 | 72 | | 0,5 | | |
| | 91PEL10 | 10 | 10 | 22 | 89 | 35 | 1,0 | | |
| 12,0 | 91PEL1205 | 12 | 12 | 26 | 100 | 45 | 0,5 | | |
| | 91PEL1210 | 12 | 12 | 26 | 100 | 45 | 1,0 | | |
| 16,0 | 91PEL1605 | 16 | 16 | 19 | 100 | 45 | 0,5 | | |
| | 91PEL1610 | 16 | 16 | 19 | 100 | 45 | 1,0 | | |



| BESTELL-NUMMER ORDER NUMBER | | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | | | | |
|--------------------------------|----------|----------|----------------|----------|----------------|--|--|--|--|
| 2,0 | 91BD02 | 2 | 3 | 6 | 40 | | | | |
| 3,0 | 91BD03 | 3 | 3 | 10 | 50 | | | | |
| | 91BDL03 | 3 | 3 | 18 | 60 | | | | |
| | 91BDXL03 | 3 | 3 | 25 | 75 | | | | |
| 4,0 | 91BD04 | 4 | 4 | 11 | 40 | | | | |
| | 91BDL04 | 4 | 4 | 20 | 60 | | | | |
| | 91BDXL04 | 4 | 4 | 32 | 75 | | | | |
| 5,0 | 91BD05 | 5 | 5 | 13 | 50 | | | | |
| | 91BDL05 | 5 | 5 | 25 | 62 | | | | |
| | 91BDXL05 | 5 | 5 | 38 | 100 | | | | |
| 6,0 | 91BD06 | 6 | 6 | 16 | 50 | | | | |
| | 91BDL06 | 6 | 6 | 30 | 75 | | | | |
| | 91BDXL06 | 6 | 6 | 40 | 100 | | | | |
| 8,0 | 91BD08 | 8 | 8 | 19 | 63 | | | | |
| | 91BDL08 | 8 | 8 | 35 | 79 | | | | |
| | 91BDXL08 | 8 | 8 | 45 | 100 | | | | |
| 10,0 | 91BD10 | 10 | 10 | 22 | 72 | | | | |
| | 91BDL10 | 10 | 10 | 40 | 89 | | | | |
| | 91BDXL10 | 10 | 10 | 50 | 120 | | | | |
| 12,0 | 91BD12 | 12 | 12 | 26 | 83 | | | | |
| | 91BDL12 | 12 | 12 | 50 | 100 | | | | |
| | 91BDXL12 | 12 | 12 | 60 | 150 | | | | |
| 16,0 | 91BD16 | 16 | 16 | 32 | 92 | | | | |
| | 91BDL16 | 16 | 16 | 58 | 125 | | | | |
| | 91BDXL16 | 16 | 16 | 75 | 150 | | | | |
| 20,0 | 91BD20 | 20 | 20 | 38 | 104 | | | | |
| | 91BDL20 | 20 | 20 | 60 | 125 | | | | |
| | 91BDXL20 | 20 | 20 | 75 | 150 | | | | |

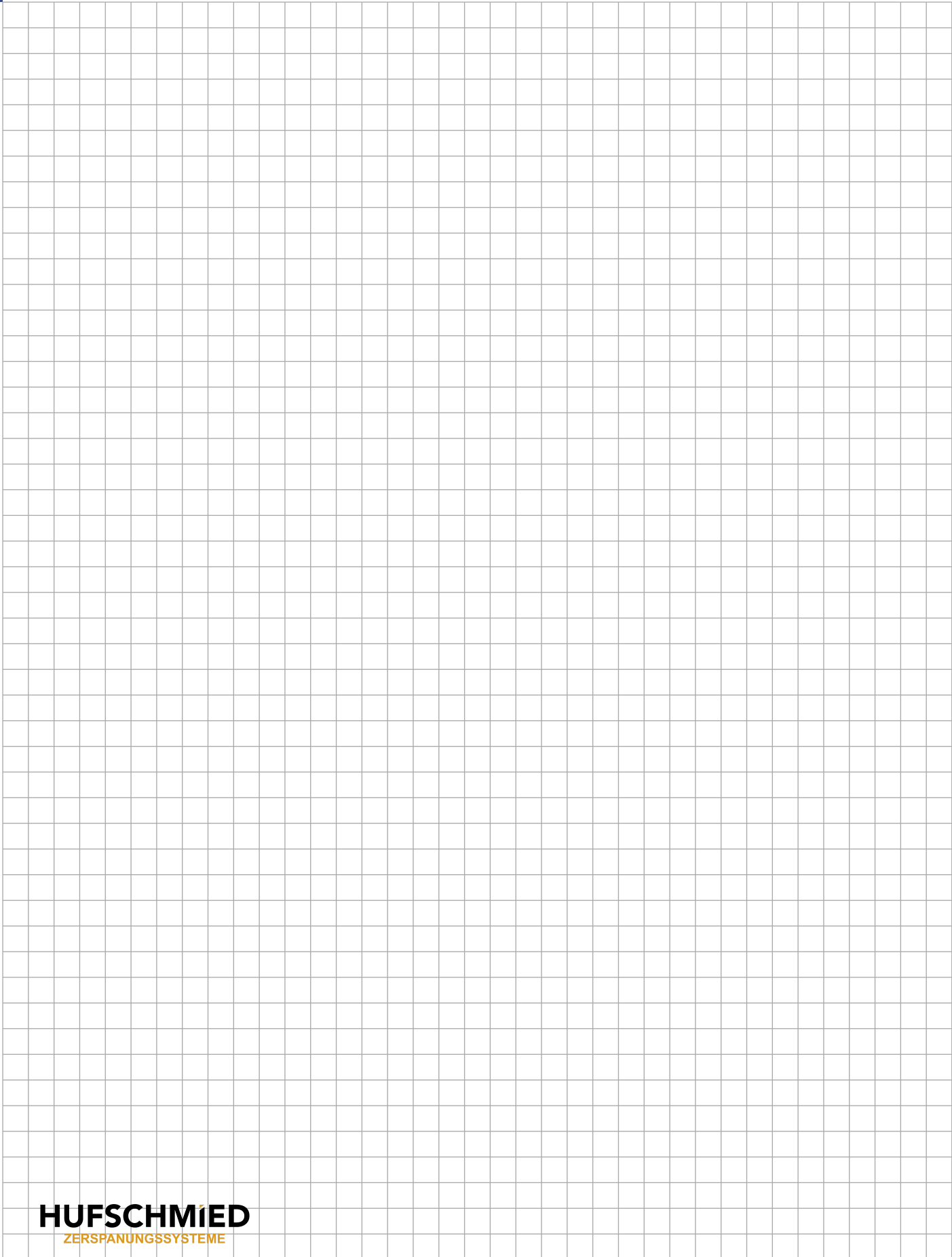


Durchmesserbereich:
2,0 bis 20,0 mm
diameter range:
2,0 to 20,0 mm

Mögliche Beschichtungen:
TLX - Standard
TL2 - auf Anfrage
DIP - auf Anfrage
possible coatings:
TLX - Standard
TL2 - on demand
DIP - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

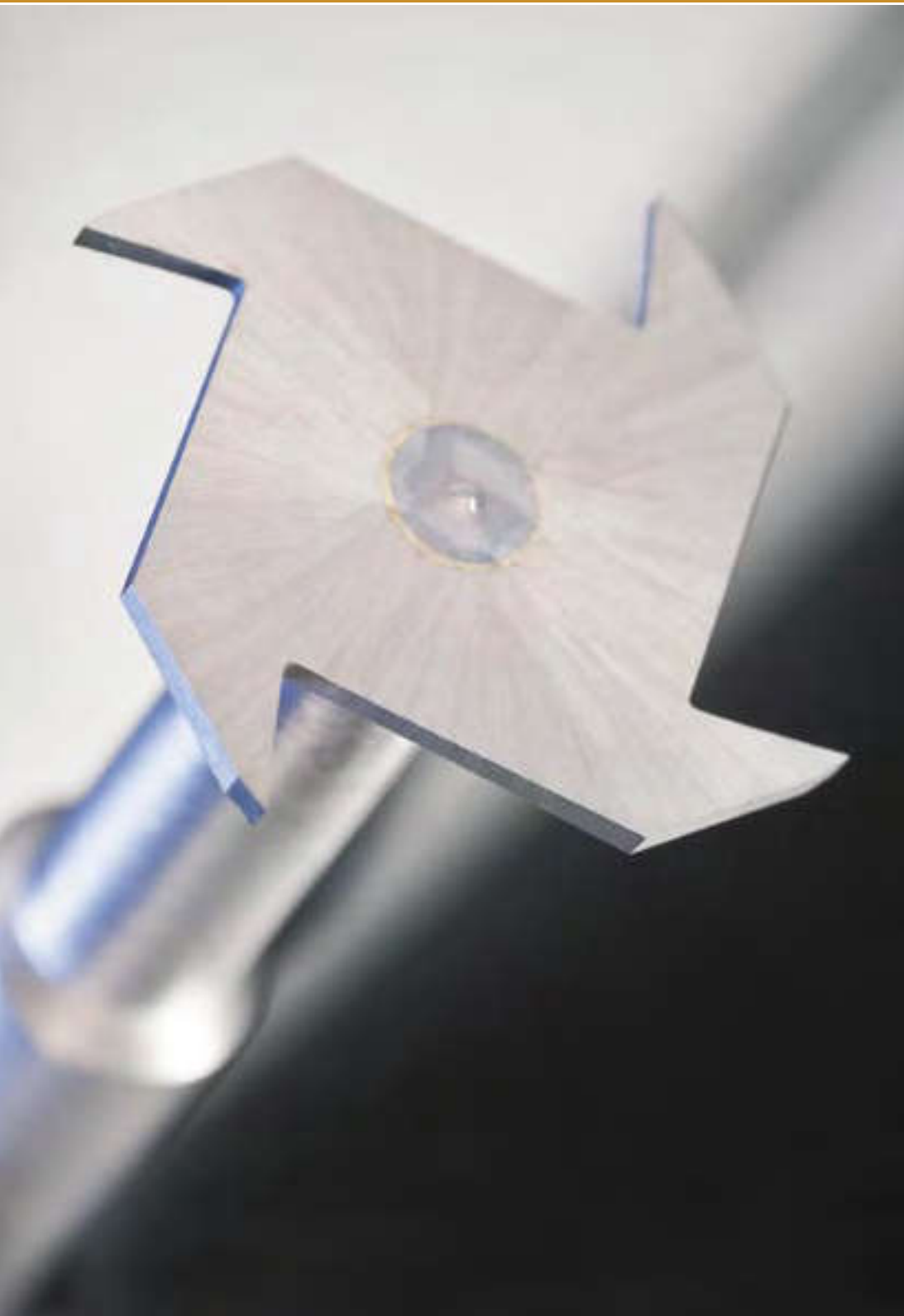
Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 91BD04 und wenn gewünscht Beschichtung: z.B. TLX.
Please indicate order number: e.g. 91BDL16 and if wanted COATING: e.g. TLX.



UNIVERSAL-LINE

SCHEIBENFRÄSER

DISC MILL



POM
POM

PA
PA

PE
PE

PP
PP

PVC
PVC

ABS
ABS

PS
PS

PUR
PUR

Gummi
Rubber

Latex
Latex

HUFSCHMIED
ZERSpanungSSYSTEME



$\lambda_s = 10^\circ$
 $\gamma_s = 16^\circ$

0,05 - 0,2
x 45°

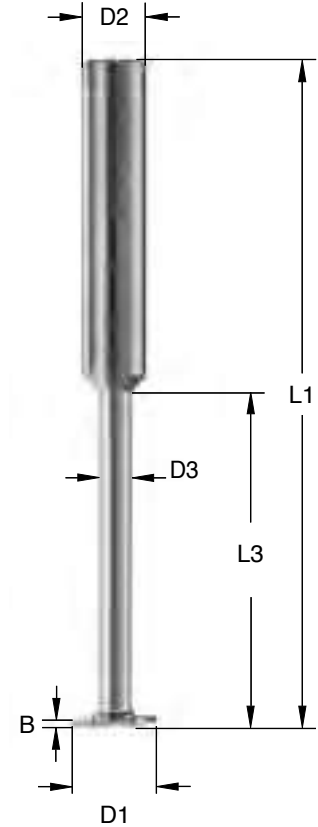


Durchmesserbereich:
20,0 bis 30,0 mm
diameter range:
20,0 to 30,0 mm

| BESTELL-NUMMER ORDER NUMBER | | D1 mm | D2 h6 mm | B mm | L1 +2 mm | | | | |
|--------------------------------|--------------|----------|----------------|---------|----------------|--|--|--|--|
| 20,0 | 120200060-2 | 20 | 6 | 2 | 50 | | | | |
| | 120200060-4 | 20 | 6 | 4 | 50 | | | | |
| | 120200060-6 | 20 | 6 | 6 | 50 | | | | |
| | 120200060-8 | 20 | 6 | 8 | 50 | | | | |
| | 120200060-10 | 20 | 6 | 10 | 50 | | | | |
| 30,0 | 120300060-2 | 30 | 6 | 2 | 50 | | | | |
| | 120300060-4 | 30 | 6 | 4 | 50 | | | | |
| | 120300060-6 | 30 | 6 | 6 | 50 | | | | |
| | 120300060-8 | 30 | 6 | 8 | 50 | | | | |
| | 120300060-10 | 30 | 6 | 10 | 50 | | | | |



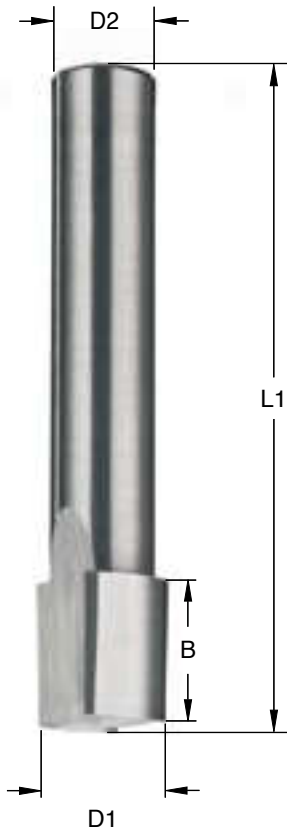
| BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | D3 mm | B mm | L1 +2 mm | L3 mm | | |
|--------------------------------|----------|----------------|----------|---------|----------------|----------|--|--|
| 12,0 120GM120 | 12 | 8 | 6 | 0,8 | 80 | 45 | | |
| 14,0 120GM140 | 14 | 8 | 6 | 0,8 | 80 | 45 | | |
| 16,0 120GM160 | 16 | 8 | 6 | 0,8 | 80 | 45 | | |
| 18,0 120GM180 | 18 | 8 | 6 | 0,8 | 80 | 45 | | |
| 20,0 120GM200 | 20 | 8 | 6 | 0,8 | 80 | 45 | | |
| 22,0 120GM220 | 22 | 8 | 6 | 0,8 | 80 | 45 | | |



Durchmesserbereich:
12,0 bis 22,0 mm
diameter range:
12,0 to 22,0 mm

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 1120GM140.
Please indicate order number: e.g. 120GM220.



Durchmesserbereich:
6,0 bis 20,0 mm
diameter range:
6,0 to 20,0 mm

| BESTELL-NUMMER ORDER NUMBER | | D1 mm | D2 h6 mm | L1 +2 mm | B mm | Z | | | |
|--------------------------------|------------|----------|----------------|----------------|---------|---|--|--|--|
| 6,0 | 120P060-5 | 6 | 10 | 75 | 5 | 2 | | | |
| | 120P060-10 | 6 | 10 | 75 | 10 | 2 | | | |
| | 120P060-15 | 6 | 10 | 75 | 15 | 2 | | | |
| 8,0 | 120P080-7 | 8 | 10 | 75 | 7 | 2 | | | |
| | 120P080-10 | 8 | 10 | 75 | 10 | 2 | | | |
| | 120P080-15 | 8 | 10 | 75 | 15 | 2 | | | |
| | 120P080-20 | 8 | 10 | 75 | 20 | 2 | | | |
| 12,0 | 120P120-7 | 12 | 10 | 75 | 7 | 2 | | | |
| | 120P120-10 | 12 | 10 | 75 | 10 | 2 | | | |
| | 120P120-15 | 12 | 10 | 75 | 15 | 2 | | | |
| | 120P120-20 | 12 | 10 | 75 | 20 | 2 | | | |
| 16,0 | 120P160-7 | 16 | 10 | 75 | 7 | 2 | | | |
| | 120P160-10 | 16 | 10 | 75 | 10 | 2 | | | |
| | 120P160-15 | 16 | 10 | 75 | 15 | 2 | | | |
| | 120P160-20 | 16 | 10 | 75 | 20 | 2 | | | |
| 20,0 | 120P200-7 | 20 | 10 | 75 | 7 | 2 | | | |
| | 120P200-10 | 20 | 10 | 75 | 10 | 2 | | | |
| | 120P200-15 | 20 | 10 | 75 | 15 | 2 | | | |
| | 120P200-20 | 20 | 10 | 75 | 20 | 2 | | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.



$\lambda_s = KV$
 $\gamma_s = 16^\circ$

| BESTELL-NUMMER ORDER NUMBER | B mm | Z | Drehrichtung Turning direction | D2 mm | | |
|--------------------------------|---------|----|-----------------------------------|----------|--|--|
| 30,0 1130-30002L | 2 | 6 | links | 16 | | |
| 1130-30002R | 2 | 6 | rechts | 16 | | |
| 40,0 1130-40002L | 2 | 8 | links | 16 | | |
| 1130-40002R | 2 | 8 | rechts | 16 | | |
| 50,0 1130-50002L | 2 | 10 | links | 24 | | |
| 1130-50002R | 2 | 10 | rechts | 24 | | |
| 60,0 1130-60002L | 2 | 12 | links | 24 | | |
| 1130-60002R | 2 | 12 | rechts | 24 | | |
| 80,0 1130-80003L | 3 | 14 | links | 24 | | |
| 1130-80003R | 3 | 14 | rechts | 24 | | |

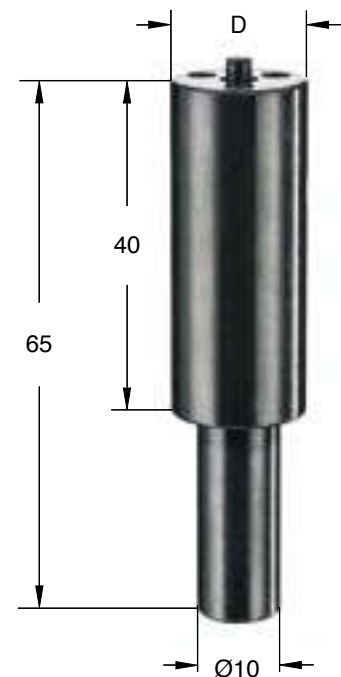


B=Schnittbreite
B=cutting width
D2=Schaftanlagefläche
D2=shank array

Durchmesserbereich:
30,0 bis 80,0 mm

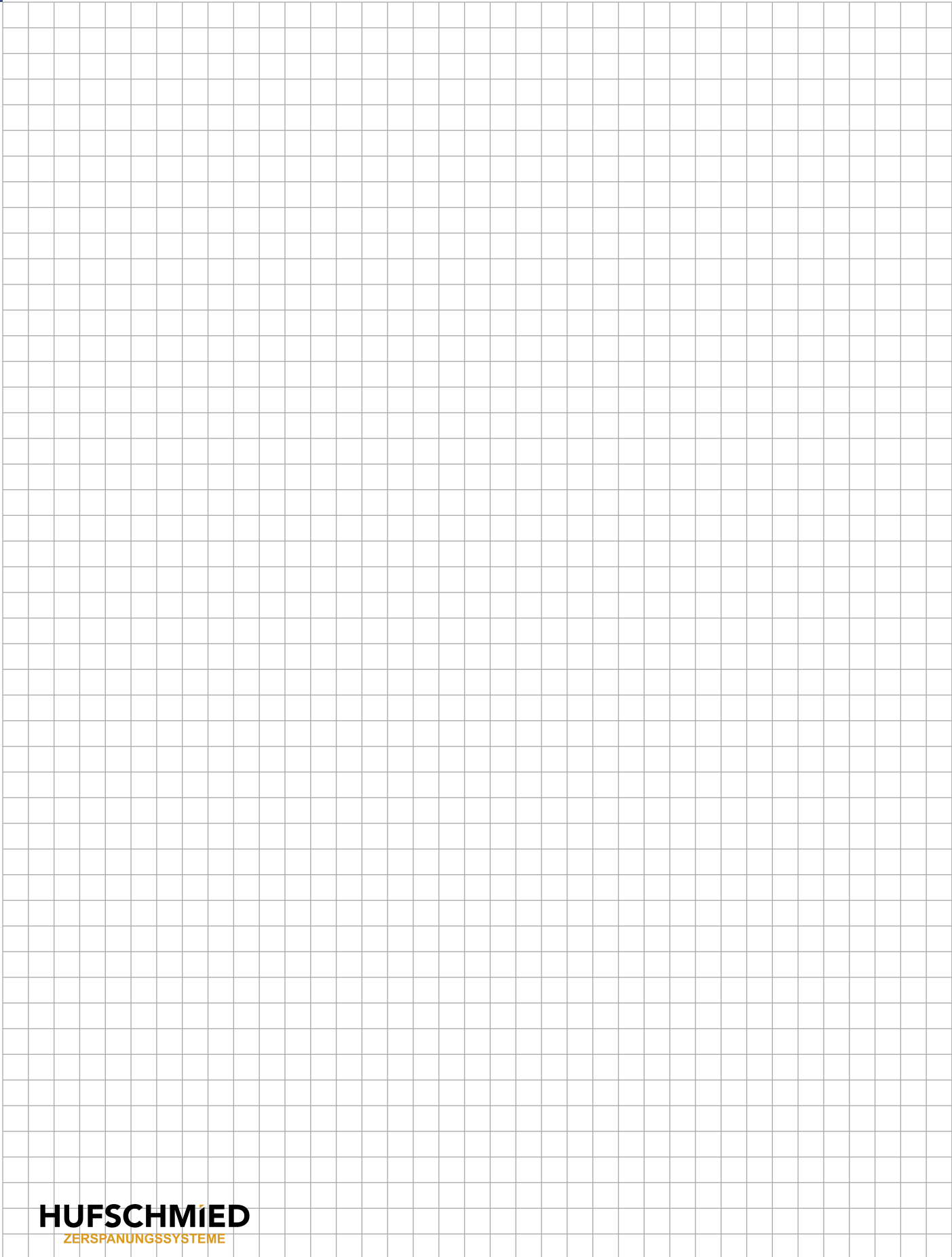
diameter range:
30,0 to 80,0 mm

| BESTELL-NUMMER ORDER NUMBER | Bezeichnung Description | D mm | |
|--------------------------------|--|---------|--|
| 1130A-30/40 | Aufnahme für Scheibenfräser D30 / D 40 Tool holder | 16 | |
| 1130A-50/60/80 | Aufnahme für Scheibenfräser D50 / D 60 / D 80 Tool holder | 24 | |



Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 1130-60002L.
Please indicate order number: e.g. 1130-80003R.



UNIVERSAL-LINE

BOHREN UND GEWINDEN
FÜR THERMO-, DURO-
PLASTE UND ELASTOMERE

*DRILLING AND THREADING
FOR THERMOPLASTICS,
CURABLE PLASTICS AND
ELASTOMERS*



POM
POM

PA
PA

PE
PE

PP
PP

PVC
PVC

ABS
ABS

PS
PS

PUR
PUR

Gummi
Rubber

Latex
Latex

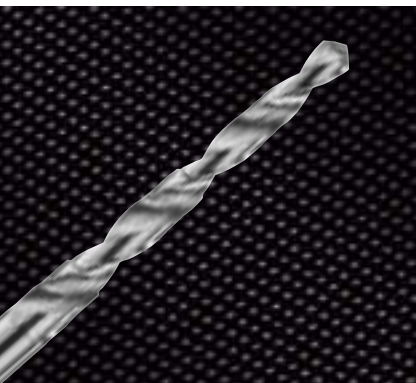
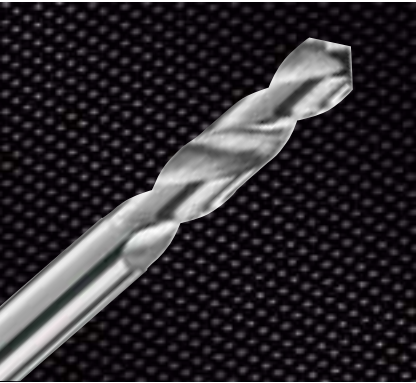
HUFSCHMIED
ZERSpanungSSYSTEME

UNIVERSAL-LINE

KUNSTSTOFFBOHRER
GEWINDEFÄSER

PLASTIC DRILLS
THREAD MILLS

UNIVERSAL-LINE



UNIVERSAL-BOHREN

Die Anforderungen an Bauteile aus Kunststoff steigen kontinuierlich. Dies gilt besonders für die Qualität von Bohrungen. Hier sind in der Serienfertigung hohe Passgenauigkeit, Konzentricität und Oberflächengüte gefragt.

Die neue Generation der KD-Kunststoffbohrer von Hufschmied erfüllt nicht nur diese Anforderungen, sondern setzt auch bei Gratfreiheit, Bearbeitungsgeschwindigkeit und Werkzeugstandzeiten neue Maßstäbe.

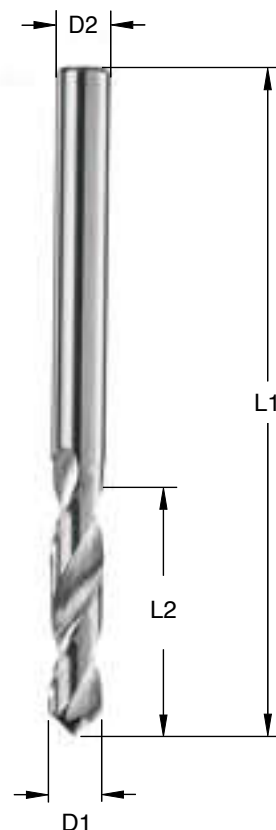
UNIVERSAL-DRILLING

The requirements for synthetic components rise continuously. The quality of drills is especially concerned. In the series manufacturing a high accuracy of fit, concentricity and surface quality is in demand.

The new generation of KD-synthetic drills of Hufschmied not only meets these requirements but also sets new standards in the non-existence of burrs, machining speed and tool durability.



| BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | | | | |
|--------------------------------|-----------|----------------|----------|----------------|-----|--|--|--|
| 0,5 | KD201005 | 0,5 | 3 | 2,5 | 50 | | | |
| 0,75 | KD2010075 | 0,75 | 3 | 4 | 50 | | | |
| 0,8 | KD201008 | 0,8 | 3 | 5 | 50 | | | |
| 1,0 | KD201010 | 1 | 3 | 7 | 50 | | | |
| 1,2 | KD201012 | 1,2 | 3 | 8 | 50 | | | |
| 1,5 | KD201015 | 1,5 | 3 | 10 | 50 | | | |
| 1,6 | KD201016 | 1,6 | 3 | 11 | 50 | | | |
| 1,8 | KD201018 | 1,8 | 3 | 12 | 50 | | | |
| 2,0 | KD201020 | 2 | 3 | 14 | 50 | | | |
| 2,05 | KD2010205 | 2,05 | 3 | 14 | 50 | | | |
| 2,5 | KD201025 | 2,5 | 3 | 16 | 50 | | | |
| 2,8 | KD201028 | 2,8 | 3 | 16 | 50 | | | |
| 3,0 | KD201030 | 3 | 3 | 18 | 50 | | | |
| 3,3 | KD201033 | 3,3 | 4 | 20 | 60 | | | |
| 3,5 | KD201035 | 3,5 | 4 | 20 | 60 | | | |
| 3,7 | KD201037 | 3,7 | 4 | 20 | 60 | | | |
| 4,0 | KD201040 | 4 | 4 | 24 | 60 | | | |
| 4,2 | KD201042 | 4,2 | 5 | 24 | 62 | | | |
| 4,5 | KD201045 | 4,5 | 5 | 24 | 62 | | | |
| 4,65 | KD2010465 | 4,65 | 5 | 25 | 62 | | | |
| 5,0 | KD201050 | 5 | 5 | 28 | 62 | | | |
| 5,5 | KD201055 | 5,5 | 6 | 28 | 75 | | | |
| 5,55 | KD2010555 | 5,55 | 6 | 28 | 75 | | | |
| 6,0 | KD201060 | 6 | 6 | 30 | 75 | | | |
| 6,8 | KD201068 | 6,8 | 8 | 32 | 75 | | | |
| 7,0 | KD201070 | 7 | 8 | 32 | 75 | | | |
| 7,45 | KD2010745 | 7,45 | 8 | 32 | 75 | | | |
| 7,5 | KD201075 | 7,5 | 8 | 35 | 100 | | | |
| 8,0 | KD201080 | 8 | 8 | 40 | 100 | | | |
| 8,5 | KD201085 | 8,5 | 10 | 45 | 100 | | | |
| 9,0 | KD201090 | 9 | 10 | 45 | 100 | | | |
| 9,35 | KD2010935 | 9,35 | 10 | 45 | 100 | | | |
| 9,5 | KD201095 | 9,5 | 10 | 45 | 100 | | | |
| 10,0 | KD201100 | 10 | 10 | 50 | 100 | | | |
| 10,2 | KD201102 | 10,2 | 12 | 60 | 125 | | | |
| 10,5 | KD201105 | 10,5 | 12 | 60 | 125 | | | |
| 11,0 | KD201110 | 11 | 12 | 60 | 125 | | | |
| 11,2 | KD201112 | 11,2 | 12 | 60 | 125 | | | |
| 11,5 | KD201115 | 11,5 | 12 | 60 | 125 | | | |
| 12,0 | KD201120 | 12 | 12 | 60 | 125 | | | |
| 14,0 | KD201140 | 14 | 16 | 70 | 125 | | | |
| 15,5 | KD201155 | 15,5 | 16 | 70 | 125 | | | |
| 16,0 | KD201160 | 16 | 16 | 70 | 125 | | | |
| 17,5 | KD201175 | 17,5 | 20 | 80 | 150 | | | |
| 20,0 | KD201200 | 20 | 20 | 80 | 150 | | | |



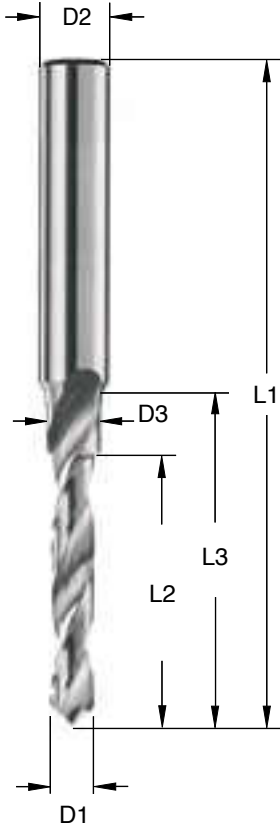
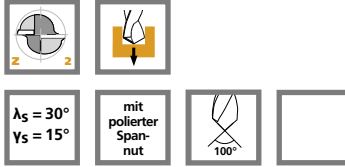
Durchmesserbereich:
0,5 bis 20,0 mm
diameter range:
0,5 to 20,0 mm

Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

linksdrall - linksschneidend
auf Anfrage
left helix - left cutting on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. KD201055 und wenn gewünscht Beschichtung: z.B. TLX.
Please indicate order number: e.g. KD201175 and if wanted COATING: e.g. TLX.



Durchmesserbereich:
0,5 bis 20,0 mm
diameter range:
0,5 to 20,0 mm

Mögliche Beschichtungen:
TLX - Standard
ALX - auf Anfrage
possible coatings:
TLX - Standard
ALX - on demand

linksdrall - linksschneidend
auf Anfrage
left helix - left cutting on demand

| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | D3 mm | L2 mm | L1 +2 mm | L3 mm | | |
|------|--------------------------------|----------|----------------|----------|----------|----------------|----------|--|--|
| 0,5 | KD202005 | 0,5 | 3 | 2,0 | 2,5 | 50 | 5 | | |
| 0,75 | KD2020075 | 0,75 | 3 | 2,0 | 4 | 50 | 8 | | |
| 0,8 | KD202008 | 0,8 | 3 | 2,0 | 5 | 50 | 10 | | |
| 1,0 | KD202010 | 1 | 3 | 2,5 | 7 | 50 | 15 | | |
| 1,2 | KD202012 | 1,2 | 3 | 2,5 | 8 | 50 | 16 | | |
| 1,5 | KD202015 | 1,5 | 3 | 2,5 | 10 | 50 | 20 | | |
| 1,6 | KD202016 | 1,6 | 3 | 2,5 | 11 | 50 | 20 | | |
| 1,8 | KD202018 | 1,8 | 3 | 2,5 | 12 | 50 | 20 | | |
| 2,0 | KD202020 | 2 | 6 | 4,5 | 14 | 60 | 25 | | |
| 2,05 | KD2020205 | 2,05 | 6 | 4,5 | 14 | 60 | 25 | | |
| 2,5 | KD202025 | 2,5 | 6 | 4,5 | 16 | 60 | 25 | | |
| 2,8 | KD202028 | 2,8 | 6 | 4,5 | 16 | 60 | 25 | | |
| 3,0 | KD202030 | 3 | 6 | 5,0 | 18 | 60 | 25 | | |
| 3,3 | KD202033 | 3,3 | 6 | 5,0 | 20 | 60 | 25 | | |
| 3,5 | KD202035 | 3,5 | 6 | 5,0 | 20 | 60 | 25 | | |
| 3,7 | KD202037 | 3,7 | 6 | 5,0 | 20 | 60 | 25 | | |
| 4,0 | KD202040 | 4 | 8 | 6,5 | 24 | 75 | 35 | | |
| 4,2 | KD202042 | 4,2 | 8 | 6,5 | 24 | 75 | 35 | | |
| 4,5 | KD202045 | 4,5 | 8 | 6,5 | 24 | 75 | 35 | | |
| 4,65 | KD2020465 | 4,65 | 8 | 6,5 | 25 | 75 | 35 | | |
| 5,0 | KD202050 | 5 | 8 | 6,5 | 28 | 75 | 35 | | |
| 5,5 | KD202055 | 5,5 | 10 | 8,0 | 28 | 100 | 40 | | |
| 5,55 | KD2020555 | 5,55 | 10 | 8,0 | 28 | 100 | 40 | | |
| 6,0 | KD202060 | 6 | 10 | 8,0 | 30 | 100 | 40 | | |
| 6,8 | KD202068 | 6,8 | 10 | 10,0 | 32 | 100 | 40 | | |
| 7,0 | KD202070 | 7 | 10 | 10,0 | 32 | 100 | 40 | | |
| 7,45 | KD2020745 | 7,45 | 10 | 10,0 | 32 | 100 | 40 | | |
| 7,5 | KD202075 | 7,5 | 10 | 10,0 | 35 | 100 | 40 | | |
| 8,0 | KD202080 | 8 | 12 | 12,0 | 40 | 125 | 55 | | |
| 8,5 | KD202085 | 8,5 | 12 | 12,0 | 45 | 125 | 55 | | |
| 9,0 | KD202090 | 9 | 12 | 12,0 | 45 | 125 | 55 | | |
| 9,35 | KD2020935 | 9,35 | 12 | 12,0 | 45 | 125 | 55 | | |
| 9,5 | KD202095 | 9,5 | 12 | 12,0 | 45 | 125 | 55 | | |
| 10,0 | KD202100 | 10 | 16 | 15,0 | 50 | 125 | 75 | | |
| 10,2 | KD202102 | 10,2 | 16 | 15,0 | 60 | 125 | 75 | | |
| 10,5 | KD202105 | 10,5 | 16 | 15,0 | 60 | 125 | 75 | | |
| 11,0 | KD202110 | 11 | 16 | 15,0 | 60 | 125 | 75 | | |
| 11,2 | KD202112 | 11,2 | 16 | 15,0 | 60 | 125 | 75 | | |
| 11,5 | KD202115 | 11,5 | 16 | 15,0 | 60 | 125 | 75 | | |
| 12,0 | KD202120 | 12 | 16 | 15,0 | 60 | 125 | 75 | | |
| 14,0 | KD202140 | 14 | 20 | 18,0 | 70 | 150 | 90 | | |
| 15,5 | KD202155 | 15,5 | 20 | 18,0 | 70 | 150 | 90 | | |
| 16,0 | KD202160 | 16 | 20 | 18,0 | 70 | 150 | 90 | | |
| 17,5 | KD202175 | 17,5 | 25 | 24,0 | 80 | 150 | 90 | | |
| 20,0 | KD202200 | 20 | 25 | 24,0 | 80 | 150 | 90 | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. KD202102 und wenn gewünscht Beschichtung: z.B. TLX.
Please indicate order number: e.g. KD202045 and if wanted COATING: e.g. TLX.



Wir individualisieren für Sie.
Ihr **Anfrageblatt**.

Dieses Werkzeug fertigen wir genau für
Ihre Anforderungen auf Anfrage!
Bitte füllen Sie das untere Blatt vollständig
aus und faxen es an die

+49/ (0) 8234-9664-99

oder per Mail an

info@hufschmied.net und wir
senden Ihnen gerne ein entsprechendes
Angebot zu.

Ihr Hufschmied-Team

*We customize for you.
Your **request sheet**.*

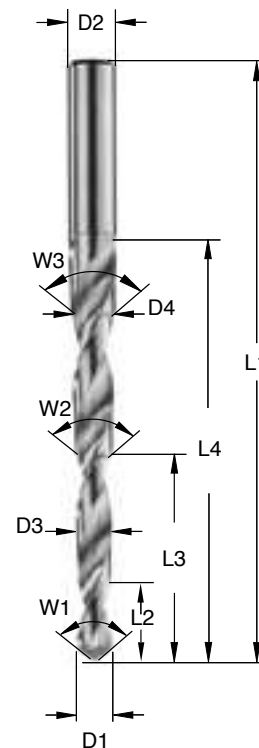
*We also manufacture tools for your
requirements on request.
Please fill in the correct parameters
and send it by fax to*

+49/ (0) 8234 9664-99 or by mail

info@hufschmied.net

and we will gladly send you a quote.

Sincerely yours Hufschmied-Team



INDIVIDUALANFERTIGUNG · INDIVIDUAL PRODUCTION

Meine individuellen Daten
My individual data

| | |
|---|---|
| zu bearbeitendes Material: Material to be processed: | <input type="text"/> |
| D1= <input type="text"/> mm ± | |
| D2= <input type="text"/> mm Tol. | |
| D3= <input type="text"/> mm ± | |
| D4= <input type="text"/> mm ± | |
| L1= <input type="text"/> mm ± | |
| L2= <input type="text"/> mm ± | |
| L3= <input type="text"/> mm ± | |
| L4= <input type="text"/> mm ± | |
| W1= <input type="text"/> °± (W1 = Spitzenwinkel) | |
| W2= <input type="text"/> °± (W2 + W3 = Senkerwinkel) | |
| W3= <input type="text"/> °± | |
| Schaftform / Shankform | HA <input type="radio"/> HB <input type="radio"/> HD <input type="radio"/> HE <input type="radio"/> Standard |
| Zähnezahl Z / Flutes F | <input type="text"/> 2 Standard |
| Ausspitzungsform / Headform | Form A <input type="radio"/> Form B <input type="radio"/> Form C <input type="radio"/> Form D <input type="radio"/> Form E <input type="radio"/> |
| Innenkühlung / Inner Coolant | ja <input type="radio"/> yes nein <input type="radio"/> no |
| Drallrichtung / Cutting Direction | rechtsdrall <input type="radio"/> gerade <input type="radio"/> linksdrall <input type="radio"/> right straight left |

MEINE KONTAKTDATEN:
MY CONTACT:

Firma / Company

Name / Surname

Vorname / Name

Funktion / Function

Straße/Hausnr. / Road/House number

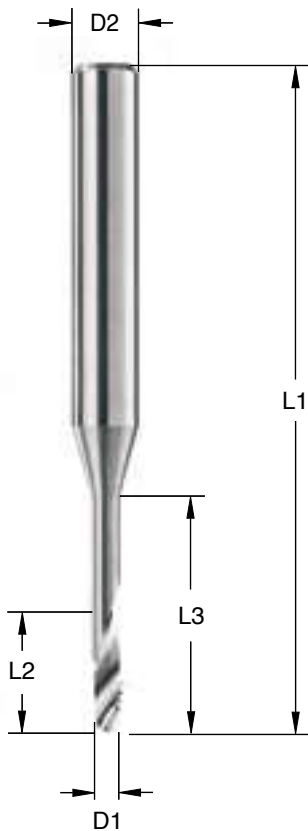
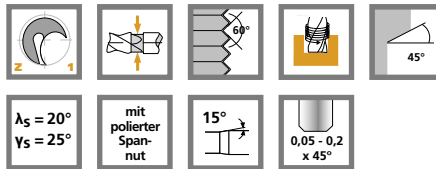
PLZ/Ort / Postcode/Location

Telefon / Phone

Telefax / Fax

E-Mail / E-mail

ANMERKUNGEN:
NOTES:



| BESTELL-NUMMER ORDER NUMBER | M | D1 mm | D2 h6 mm | L2 +2 mm | L1 mm | L3 mm | E-Maß | P |
|--------------------------------|-------|----------|----------------|----------------|----------|----------|-------|------|
| 110GF-M2 | M 2 | 0,82 | 3 | 4 | 50 | 8 | 0,29 | 0,4 |
| 110GF-M2,5 | M 2,5 | 1,1 | 3 | 6 | 50 | 10 | 0,32 | 0,45 |
| 110GF-M3 | M 3 | 1,42 | 6 | 10 | 60 | 15 | 0,37 | 0,5 |
| 110GF-M4 | M 4 | 1,74 | 6 | 15 | 75 | 20 | 0,52 | 0,7 |
| 110GF-M5 | M 5 | 2,5 | 6 | 18 | 75 | 25 | 0,57 | 0,8 |
| 110GF-M6 | M 6 | 3,0 | 8 | 20 | 75 | 30 | 0,75 | 1 |
| 110GF-M8 | M 8 | 4,2 | 10 | 25 | 100 | 35 | 0,9 | 1,25 |
| 110GF-M10 | M 10 | 5,39 | 12 | 30 | 100 | 40 | 1,1 | 1,5 |
| 110GF-M12 | M 12 | 6,67 | 12 | 30 | 100 | 40 | 1,25 | 1,75 |

Durchmesserbereich:
M2 - M12
diameter range:
M2 - M12

Mögliche Beschichtungen:
ALX - Standard
DIP - auf Anfrage
possible coatings:
ALX - Standard
DIP - on demand

Andere Abmessungen, sowie Fein-,
Rund- und Panzergewinde auf
Anfrage.
Other threadversions and
dimensions on demand.

SHARP-LINE

FÜR ANWENDUNGEN
IM HÖHEREN
DREHZAHLBEREICH

FOR USE ON
HIGHER REVOLUTIONS



PE
PE

PP
PP

SAN
SAN


PA
PA

Gummi
Rubber

Latex
Latex

Kautschuk
Rubber

SHARP-LINE



SHARP-LINE

Werkzeuge der neuen SHARP-LINE-Generation wurden für höchste Drehzahlen entwickelt. Durch die extrem scharfe Schneide und die vibrationsoptimierte Rückengeometrie erreichen diese Werkzeuge hervorragende Oberflächengüten und erhöhen die Lebensdauer der Hochfrequenzspindeln.

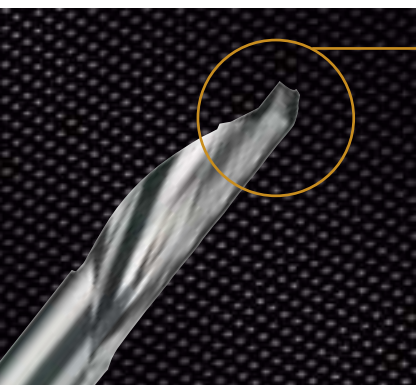
Tools of the new SHARP-LINE-generation were developed for the highest rotation speeds. These tools are able to reach the best surface qualities by the extremely sharp edge and the vibration-optimized back-geometry and increase the durability of the high-frequency spindles.

FRÄSER MIT EINER SCHNEIDE

MILLS WITH ONE EDGE

Für die grat- und faserfreie Bearbeitung weicher Werkstoffe mit höchsten Oberflächengüten.

Suited for the burr-free and fiber-free machining of weak materials with the highest surface qualities



FRÄSER MIT ZWEI SCHNEIDEN

MILLS WITH TWO EDGES

Diese Fräser verfügen über eine zusätzliche Schneide über Mitte und sind auch als Bohrnuten-Fräser einsetzbar.

These mills have an additional edge above the middle and can also be used as drilling-flutes mill.



Die Vorteile:

- optimierte Spannuten für hohes Spanvolumen
- extrem scharfe Schneiden
- Geometrie für erhöhte Vorrissbildung
- neuartiges, hoch verschleißfestes Feinstkornhartmetall

The advantages:

- *optimized milling flutes for a higher milling volume*
- *extremely sharp edges*
- *geometry for added cracking*
- *new, extremely wear resistant finest grain carbide*

SHARP-LINE



WIR FERTIGEN AUCH

linksschneidige Werkzeuge
auf Anfrage

WE ALSO MANUFACTURE

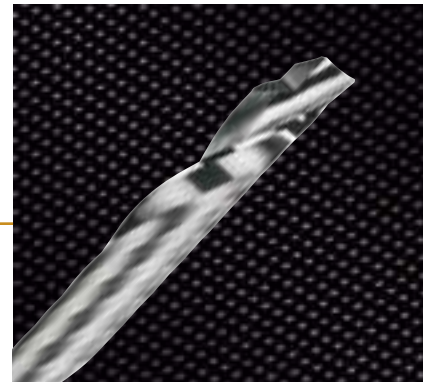
*left hand cutting tools
on demand*

140SH

SHARP-LINE-Fräser Z1 SL
rechtsdrall - linksschneidend

140SH

SHARP-LINE-end mill 1F SL
right helix - left cutting



141SH

SHARP-LINE-Fräser Z1 ZL
linksdrall - linksschneidend

141SH

SHARP-LINE-end mill 1F ZL
left helix - left cutting

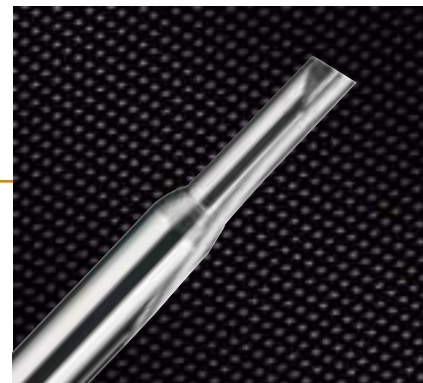


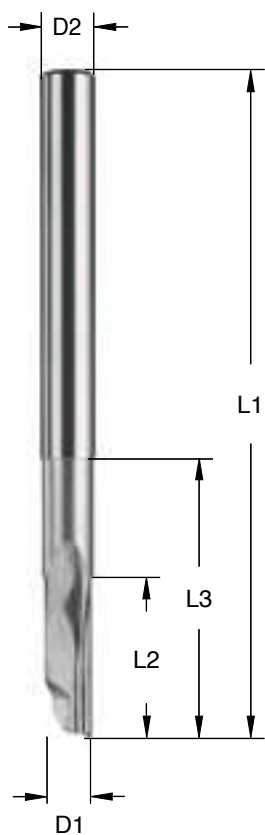
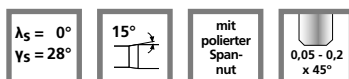
142SH

SHARP-LINE-Fräser Z1 GL
gerade - linksschneidend

142SH

SHARP-LINE-end mill 1F GL
straight - left cutting





Durchmesserbereich:
1,0 bis 10,0 mm
diameter range:
1,0 to 10,0 mm

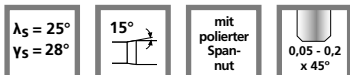
Mögliche Beschichtungen:
ALX - Standard
TL5 - auf Anfrage
possible coatings:
ALX - Standard
TL5 - on demand

| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | | | |
|------|--------------------------------|----------|----------------|----------|----------------|----------|--|--|--|
| 1,0 | 112SHA010030 | 1 | 3 | 4 | 40 | | | | |
| 1,5 | 112SHA015030 | 1,5 | 3 | 6 | 40 | | | | |
| 2,0 | 112SHA020030 | 2 | 3 | 8 | 40 | | | | |
| | 112SHKK020 | 2 | 3 | 3 | 50 | | | | |
| | 112SHA020 | 2 | 6 | 6 | 50 | | | | |
| 2,5 | 112SHA025030 | 2,5 | 3 | 9 | 40 | | | | |
| 3,0 | 112SHK03 | 3 | 3 | 10 | 30 | | | | |
| | 112SH03 | 3 | 3 | 6 | 40 | | | | |
| | 112SHKK030 | 3 | 3 | 4 | 50 | | | | |
| | 112SHL03 | 3 | 3 | 10 | 60 | | | | |
| | 112SHAG03 | 3 | 6 | 12 | 50 | | | | |
| | 112SHALG03 | 3 | 8 | 15 | 75 | | | | |
| | 112SHAXLG03 | 3 | 8 | 18 | 100 | | | | |
| 4,0 | 112SH04 | 4 | 4 | 8 | 40 | | | | |
| | 112SHKK040 | 4 | 4 | 5 | 50 | | | | |
| | 112SHL04 | 4 | 4 | 20 | 60 | | | | |
| | 112SHXL04 | 4 | 4 | 30 | 70 | | | | |
| | 112SHAG04 | 4 | 6 | 14 | 50 | | | | |
| | 112SHALG04 | 4 | 8 | 18 | 75 | | | | |
| | 112SHAXLG04 | 4 | 8 | 22 | 100 | | | | |
| 5,0 | 112SH05 | 5 | 5 | 10 | 40 | | | | |
| | 112SHKK050 | 5 | 5 | 6 | 50 | | | | |
| | 112SHK05 | 5 | 5 | 22 | 60 | | | | |
| | 112SHXL05 | 5 | 5 | 30 | 70 | | | | |
| | 112SHAG05 | 5 | 6 | 16 | 50 | | | | |
| | 112SHALG05 | 5 | 8 | 25 | 75 | | | | |
| | 112SHAXLG05 | 5 | 8 | 25 | 100 | | | | |
| 6,0 | 112SHKK060 | 6 | 6 | 7 | 50 | | | | |
| | 112SHG06 | 6 | 6 | 18 | 50 | | | | |
| | 112SHK06 | 6 | 6 | 20 | 60 | | | | |
| | 112SH06 | 6 | 6 | 25 | 65 | | | | |
| | 112SHXL06 | 6 | 6 | 40 | 80 | | | | |
| | 112SHF06 | 6 | 6 | 20 | 100 | 40 | | | |
| | 112SHALG06 | 6 | 8 | 25 | 75 | | | | |
| | 112SHAXLG06 | 6 | 8 | 30 | 100 | | | | |
| 7,0 | 112SHA07 | 7 | 8 | 25 | 75 | | | | |
| 8,0 | 112SHKK080 | 8 | 8 | 9 | 50 | | | | |
| | 112SHG08 | 8 | 8 | 20 | 50 | | | | |
| | 112SHK08 | 8 | 8 | 20 | 63 | | | | |
| | 112SHGL08 | 8 | 8 | 30 | 75 | | | | |
| | 112SHF08 | 8 | 8 | 20 | 100 | 40 | | | |
| | 112SHXLG08 | 8 | 8 | 35 | 100 | | | | |
| 10,0 | 112SHXK10 | 10 | 10 | 25 | 72 | | | | |
| | 112SH100 | 10 | 10 | 35 | 90 | | | | |
| | 112SHF100 | 10 | 10 | 25 | 120 | 50 | | | |

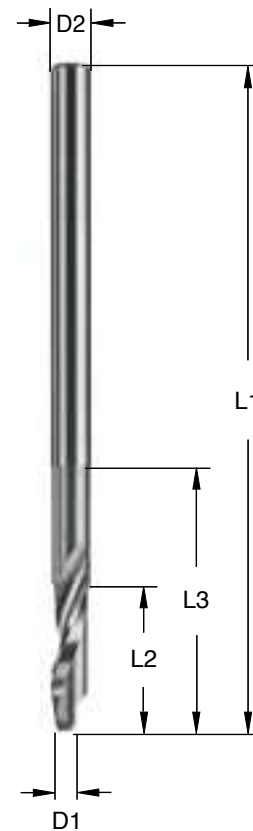
Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 112SH05 und wenn gewünscht Beschichtung: z.B. ALX.

Please indicate order number: e.g. 112SHF100 and if wanted COATING: e.g. ALX.



| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | | | |
|------|--------------------------------|----------|----------------|----------|----------------|----------|--|--|--|
| 1,0 | 110SHA010030 | 1 | 3 | 4 | 40 | | | | |
| 1,5 | 110SHA015030 | 1,5 | 3 | 6 | 40 | | | | |
| 2,0 | 110SHA020030 | 2 | 3 | 8 | 40 | | | | |
| | 110SHKK020 | 2 | 3 | 3 | 50 | | | | |
| | 110SHA020 | 2 | 6 | 6 | 50 | | | | |
| 2,5 | 110SHA025030 | 2,5 | 3 | 9 | 40 | | | | |
| 3,0 | 110SHK03 | 3 | 3 | 10 | 30 | | | | |
| | 110SH03 | 3 | 3 | 6 | 40 | | | | |
| | 110SHKK030 | 3 | 3 | 4 | 50 | | | | |
| | 110SHL03 | 3 | 3 | 10 | 60 | | | | |
| | 110SHAG03 | 3 | 6 | 12 | 50 | | | | |
| | 110SHALG03 | 3 | 8 | 15 | 75 | | | | |
| | 110SHAXLG03 | 3 | 8 | 18 | 100 | | | | |
| 4,0 | 110SH04 | 4 | 4 | 8 | 40 | | | | |
| | 110SHKK040 | 4 | 4 | 5 | 50 | | | | |
| | 110SHL04 | 4 | 4 | 20 | 60 | | | | |
| | 110SHXL04 | 4 | 4 | 30 | 70 | | | | |
| | 110SHAG04 | 4 | 6 | 14 | 50 | | | | |
| | 110SHALG04 | 4 | 8 | 18 | 75 | | | | |
| | 110SHAXLG04 | 4 | 8 | 22 | 100 | | | | |
| 5,0 | 110SH05 | 5 | 5 | 10 | 40 | | | | |
| | 110SHKK050 | 5 | 5 | 6 | 50 | | | | |
| | 110SHK05 | 5 | 5 | 16 | 60 | | | | |
| | 110SHXL05 | 5 | 5 | 30 | 70 | | | | |
| | 110SHAG05 | 5 | 6 | 16 | 50 | | | | |
| | 110SHALG05 | 5 | 8 | 25 | 75 | | | | |
| | 110SHAXLG05 | 5 | 8 | 25 | 100 | | | | |
| 6,0 | 110SHKK060 | 6 | 6 | 7 | 50 | | | | |
| | 110SHG06 | 6 | 6 | 18 | 50 | | | | |
| | 110SHK06 | 6 | 6 | 20 | 60 | | | | |
| | 110SH06 | 6 | 6 | 25 | 65 | | | | |
| | 110SHXL06 | 6 | 6 | 40 | 80 | | | | |
| | 110SHF06 | 6 | 6 | 20 | 100 | 40 | | | |
| | 110SHALG06 | 6 | 8 | 25 | 75 | | | | |
| | 110SHAXLG06 | 6 | 8 | 30 | 100 | | | | |
| 7,0 | 110SHA07 | 7 | 8 | 25 | 75 | | | | |
| 8,0 | 110SHKK080 | 8 | 8 | 9 | 50 | | | | |
| | 110SHG08 | 8 | 8 | 20 | 50 | | | | |
| | 110SHK08 | 8 | 8 | 20 | 63 | | | | |
| | 110SHGL08 | 8 | 8 | 30 | 75 | | | | |
| | 110SHF08 | 8 | 8 | 20 | 100 | 40 | | | |
| | 110SHXLG08 | 8 | 8 | 35 | 100 | | | | |
| 10,0 | 110SHXK10 | 10 | 10 | 25 | 72 | | | | |
| | 110SH100 | 10 | 10 | 35 | 90 | | | | |
| | 110SHF100 | 10 | 10 | 25 | 120 | 50 | | | |

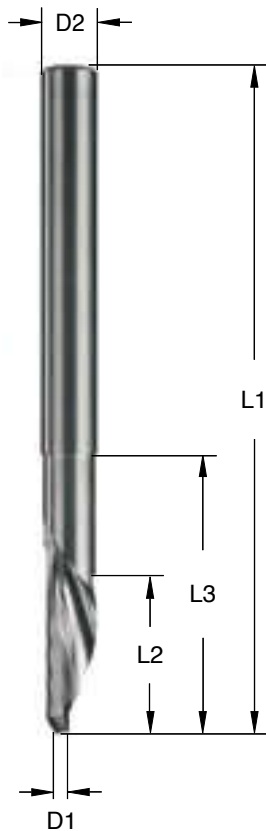
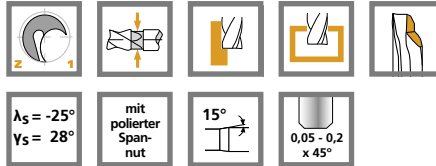


Durchmesserbereich:
1,0 bis 10,0 mm
diameter range:
1,0 to 10,0 mm

Mögliche Beschichtungen:
ALX - Standard
TL5 - auf Anfrage
possible coatings:
ALX - Standard
TL5 - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 110SH05 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. 110SHF100 and if wanted COATING: e.g. ALX.



Durchmesserbereich:
1,0 bis 10,0 mm
diameter range:
1,0 to 10,0 mm

Mögliche Beschichtungen:
ALX - Standard
TL5 - auf Anfrage
possible coatings:
ALX - Standard
TL5 - on demand

| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | | | |
|------|--------------------------------|----------|----------------|----------|----------------|----------|--|--|--|
| 1,0 | 111SHA010030 | 1 | 3 | 4 | 40 | | | | |
| 1,5 | 111SHA015030 | 1,5 | 3 | 6 | 40 | | | | |
| 2,0 | 111SHA020030 | 2 | 3 | 8 | 40 | | | | |
| | 111SHKK020 | 2 | 3 | 3 | 50 | | | | |
| | 111SHA020 | 2 | 6 | 6 | 50 | | | | |
| 2,5 | 111SHA025030 | 2,5 | 3 | 9 | 40 | | | | |
| 3,0 | 111SHK03 | 3 | 3 | 10 | 30 | | | | |
| | 111SH03 | 3 | 3 | 6 | 40 | | | | |
| | 111SHKK030 | 3 | 3 | 4 | 50 | | | | |
| | 111SHL03 | 3 | 3 | 10 | 60 | | | | |
| | 111SHAG03 | 3 | 6 | 12 | 50 | | | | |
| | 111SHALG03 | 3 | 8 | 15 | 75 | | | | |
| | 111SHAXLG03 | 3 | 8 | 18 | 100 | | | | |
| 4,0 | 111SH04 | 4 | 4 | 8 | 40 | | | | |
| | 111SHKK040 | 4 | 4 | 5 | 50 | | | | |
| | 111SHL04 | 4 | 4 | 20 | 60 | | | | |
| | 111SHXL04 | 4 | 4 | 30 | 70 | | | | |
| | 111SHAG04 | 4 | 6 | 14 | 50 | | | | |
| | 111SHALG04 | 4 | 8 | 18 | 75 | | | | |
| | 111SHAXLG04 | 4 | 8 | 22 | 100 | | | | |
| 5,0 | 111SH05 | 5 | 5 | 10 | 40 | | | | |
| | 111SHKK050 | 5 | 5 | 6 | 50 | | | | |
| | 111SHK05 | 5 | 5 | 22 | 60 | | | | |
| | 111SHXL05 | 5 | 5 | 30 | 70 | | | | |
| | 111SHAG05 | 5 | 6 | 16 | 50 | | | | |
| | 111SHALG05 | 5 | 8 | 25 | 75 | | | | |
| | 111SHAXLG05 | 5 | 8 | 25 | 100 | | | | |
| 6,0 | 111SHKK060 | 6 | 6 | 7 | 50 | | | | |
| | 111SHG06 | 6 | 6 | 18 | 50 | | | | |
| | 111SHK06 | 6 | 6 | 20 | 60 | | | | |
| | 111SH06 | 6 | 6 | 25 | 65 | | | | |
| | 111SHXL06 | 6 | 6 | 40 | 80 | | | | |
| | 111SHF06 | 6 | 6 | 20 | 100 | 40 | | | |
| | 111SHALG06 | 6 | 8 | 25 | 75 | | | | |
| | 111SHAXLG06 | 6 | 8 | 30 | 100 | | | | |
| 7,0 | 111SHA07 | 7 | 8 | 25 | 75 | | | | |
| 8,0 | 111SHKK080 | 8 | 8 | 9 | 50 | | | | |
| | 111SHG08 | 8 | 8 | 20 | 50 | | | | |
| | 111SHK08 | 8 | 8 | 20 | 63 | | | | |
| | 111SHGL08 | 8 | 8 | 30 | 75 | | | | |
| | 111SHF08 | 8 | 8 | 20 | 100 | 40 | | | |
| | 111SHXLG08 | 8 | 8 | 35 | 100 | | | | |
| 10,0 | 111SHXK10 | 10 | 10 | 25 | 72 | | | | |
| | 111SH100 | 10 | 10 | 35 | 90 | | | | |
| | 111SHF100 | 10 | 10 | 25 | 120 | 50 | | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 111SH05 und wenn gewünscht Beschichtung: z.B. ALX.

Please indicate order number: e.g. 111SHF100 and if wanted COATING: e.g. ALX.

SHARP-LINE Fräser Z2 ZR

1 Schneide über Mitte
rechtsdrall - rechtsschneidend

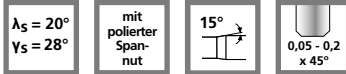
SHARP-LINE End mill 2F ZR

1 cutter over the center
right helix - right cutting

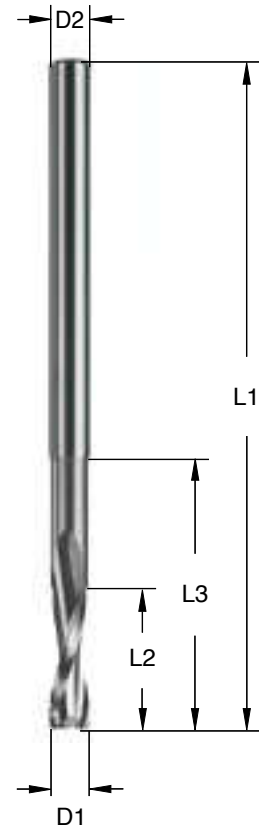
102SH

SHARP-LINE

SHARP-LINE



| BESTELL-NUMMER ORDER NUMBER | | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | | | |
|--------------------------------|--------------|----------|----------------|----------|----------------|----------|--|--|--|
| 1,0 | 102SHA010030 | 1 | 3 | 4 | 40 | | | | |
| 1,5 | 102SHA015030 | 1,5 | 3 | 6 | 40 | | | | |
| 2,0 | 102SHA020030 | 2 | 3 | 8 | 40 | | | | |
| | 102SHKK020 | 2 | 3 | 3 | 50 | | | | |
| | 102SHA020 | 2 | 6 | 6 | 50 | | | | |
| 2,5 | 102SHA025030 | 2,5 | 3 | 9 | 40 | | | | |
| 3,0 | 102SHK03 | 3 | 3 | 10 | 30 | | | | |
| | 102SH03 | 3 | 3 | 6 | 40 | | | | |
| | 102SHKK030 | 3 | 3 | 4 | 50 | | | | |
| | 102SHL03 | 3 | 3 | 10 | 60 | | | | |
| | 102SHAG03 | 3 | 6 | 12 | 50 | | | | |
| | 102SHALG03 | 3 | 8 | 15 | 75 | | | | |
| | 102SHAXLG03 | 3 | 8 | 18 | 100 | | | | |
| 4,0 | 102SH04 | 4 | 4 | 8 | 40 | | | | |
| | 102SHKK040 | 4 | 4 | 5 | 50 | | | | |
| | 102SHL04 | 4 | 4 | 20 | 60 | | | | |
| | 102SHXL04 | 4 | 4 | 30 | 70 | | | | |
| | 102SHAG04 | 4 | 6 | 14 | 50 | | | | |
| | 102SHALG04 | 4 | 8 | 18 | 75 | | | | |
| | 102SHAXLG04 | 4 | 8 | 22 | 100 | | | | |
| 5,0 | 102SH05 | 5 | 5 | 16 | 40 | | | | |
| | 102SHKK050 | 5 | 5 | 6 | 50 | | | | |
| | 102SHK05 | 5 | 5 | 22 | 60 | | | | |
| | 102SHXL05 | 5 | 5 | 30 | 70 | | | | |
| | 102SHAG05 | 5 | 6 | 16 | 50 | | | | |
| | 102SHALG05 | 5 | 8 | 25 | 75 | | | | |
| | 102SHAXLG05 | 5 | 8 | 25 | 100 | | | | |
| 6,0 | 102SHKK060 | 6 | 6 | 7 | 50 | | | | |
| | 102SHG06 | 6 | 6 | 18 | 50 | | | | |
| | 102SHK06 | 6 | 6 | 20 | 60 | | | | |
| | 102SH06 | 6 | 6 | 25 | 65 | | | | |
| | 102SHXL06 | 6 | 6 | 40 | 80 | | | | |
| | 102SHF06 | 6 | 6 | 20 | 100 | 40 | | | |
| | 102SHALG06 | 6 | 8 | 25 | 75 | | | | |
| | 102SHAXLG06 | 6 | 8 | 30 | 100 | | | | |
| 7,0 | 102SHA07 | 7 | 8 | 25 | 75 | | | | |
| 8,0 | 102SHKK080 | 8 | 8 | 9 | 50 | | | | |
| | 102SHG08 | 8 | 8 | 20 | 50 | | | | |
| | 102SHK08 | 8 | 8 | 20 | 63 | | | | |
| | 102SHGL08 | 8 | 8 | 30 | 75 | | | | |
| | 102SHF08 | 8 | 8 | 20 | 100 | 40 | | | |
| | 102SHXLG08 | 8 | 8 | 35 | 100 | | | | |
| 10,0 | 102SHKK10 | 10 | 10 | 25 | 72 | | | | |
| | 102SH100 | 10 | 10 | 35 | 90 | | | | |
| | 102SHF100 | 10 | 10 | 25 | 120 | 50 | | | |



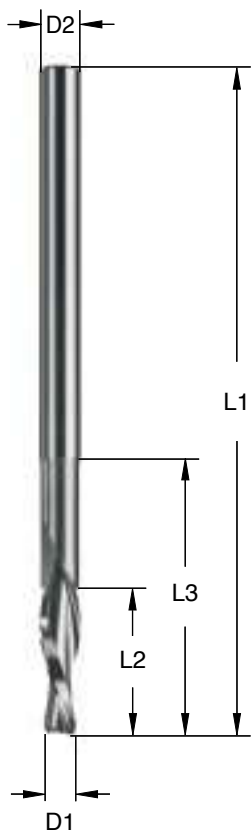
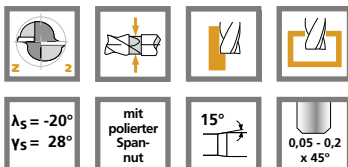
Durchmesserbereich:
1,0 bis 10,0 mm
diameter range:
1,0 to 10,0 mm

Mögliche Beschichtungen:
ALX - Standard
TL5 - auf Anfrage
possible coatings:
ALX - Standard
TL5 - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 102SH05 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. 102SHF100 and if wanted COATING: e.g. ALX.

HUFSCHMIED
ZERSpanungssysteme



Durchmesserbereich:
1,0 bis 10,0 mm
diameter range:
1,0 to 10,0 mm

Mögliche Beschichtungen:
ALX - Standard
TL5 - auf Anfrage
possible coatings:
ALX - Standard
TL5 - on demand

| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | | | |
|------|--------------------------------|----------|----------------|----------|----------------|----------|--|--|--|
| 1,0 | 104SHA010030 | 1 | 3 | 4 | 40 | | | | |
| 1,5 | 104SHA015030 | 1,5 | 3 | 6 | 40 | | | | |
| 2,0 | 104SHA020030 | 2 | 3 | 8 | 40 | | | | |
| | 104SHKK020 | 2 | 3 | 3 | 50 | | | | |
| | 104SHA020 | 2 | 6 | 6 | 50 | | | | |
| 2,5 | 104SHA025030 | 2,5 | 3 | 9 | 40 | | | | |
| 3,0 | 104SHK03 | 3 | 3 | 10 | 30 | | | | |
| | 104SH03 | 3 | 3 | 6 | 40 | | | | |
| | 104SHKK030 | 3 | 3 | 4 | 50 | | | | |
| | 104SHL03 | 3 | 3 | 10 | 60 | | | | |
| | 104SHAG03 | 3 | 6 | 12 | 50 | | | | |
| | 104SHALG03 | 3 | 8 | 15 | 75 | | | | |
| | 104SHAXLG03 | 3 | 8 | 18 | 100 | | | | |
| 4,0 | 104SH04 | 4 | 4 | 8 | 40 | | | | |
| | 104SHKK040 | 4 | 4 | 5 | 50 | | | | |
| | 104SHL04 | 4 | 4 | 20 | 60 | | | | |
| | 104SHXL04 | 4 | 4 | 30 | 70 | | | | |
| | 104SHAG04 | 4 | 6 | 14 | 50 | | | | |
| | 104SHALG04 | 4 | 8 | 18 | 75 | | | | |
| | 104SHAXLG04 | 4 | 8 | 22 | 100 | | | | |
| 5,0 | 104SH05 | 5 | 5 | 10 | 40 | | | | |
| | 104SHKK050 | 5 | 5 | 6 | 50 | | | | |
| | 104SHK05 | 5 | 5 | 22 | 60 | | | | |
| | 104SHXL05 | 5 | 5 | 30 | 70 | | | | |
| | 104SHAG05 | 5 | 6 | 16 | 50 | | | | |
| | 104SHALG05 | 5 | 8 | 25 | 75 | | | | |
| | 104SHAXLG05 | 5 | 8 | 25 | 100 | | | | |
| 6,0 | 104SHKK060 | 6 | 6 | 7 | 50 | | | | |
| | 104SHG06 | 6 | 6 | 18 | 50 | | | | |
| | 104SHK06 | 6 | 6 | 20 | 60 | | | | |
| | 104SH06 | 6 | 6 | 25 | 65 | | | | |
| | 104SHXL06 | 6 | 6 | 40 | 80 | | | | |
| | 104SHF06 | 6 | 6 | 20 | 100 | 40 | | | |
| | 104SHALG06 | 6 | 8 | 25 | 75 | | | | |
| | 104SHAXLG06 | 6 | 8 | 30 | 100 | | | | |
| 7,0 | 104SHA07 | 7 | 8 | 25 | 75 | | | | |
| 8,0 | 104SHKK080 | 8 | 8 | 9 | 50 | | | | |
| | 104SHG08 | 8 | 8 | 20 | 50 | | | | |
| | 104SHK08 | 8 | 8 | 20 | 63 | | | | |
| | 104SHGL08 | 8 | 8 | 30 | 75 | | | | |
| | 104SHF08 | 8 | 8 | 20 | 100 | 40 | | | |
| | 104SHXLG08 | 8 | 8 | 35 | 100 | | | | |
| 10,0 | 104SHXK10 | 10 | 10 | 25 | 72 | | | | |
| | 104SH100 | 10 | 10 | 35 | 90 | | | | |
| | 104SHF100 | 10 | 10 | 25 | 120 | 50 | | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 104SH05 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. 104SHF100 and if wanted COATING: e.g. ALX.

FRÄSEN PER PLEX®

KLARE KANTEN
BEIM FRÄSEN VON
ACRYL UND PMMA

*CLEAR EDGES AT MILLING
ACRYLICS AND PMMA*

Fräsen Per Plex®

FRÄSEN PER PLEX



PMMA
PMMA

ACRYL
ACRYLIC

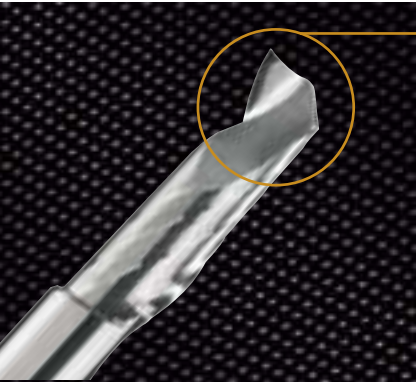
PET
PET

PC
PC

HUFSCHMIED
ZERSpanungSSYSTEME

FRÄSEN PER PLEX®

Fräsen Per Plex®

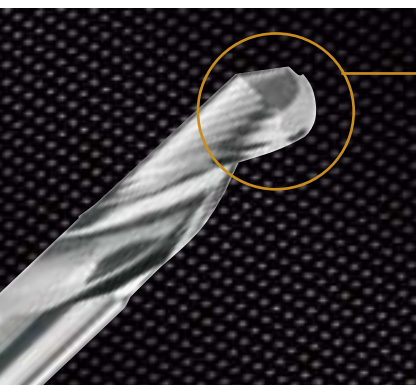


Der 110FPRV ist ein Schaftfräser zum Schruppen und Schlichten von PMMA und ähnlichen Materialien mit einem Werkzeug, mit dem Ziel möglichst klare Schnittkanten OHNE anschließendes Polieren zu erhalten, dh. auch OHNE Werkzeugwechsel.

The 110FPRV is an end milling cutter for scrubbing and smoothing of PMMA and similar materials with one tool and the aim to achieve as clear cut edges as possible WITHOUT polishing, and especially WITHOUT tool change.

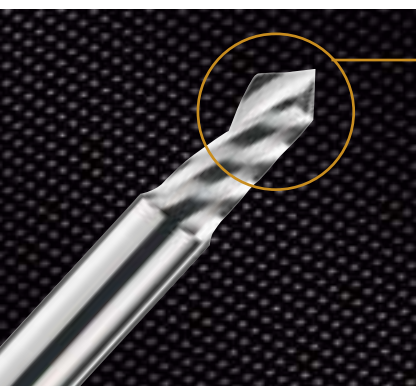
Der 110FPRV ist dabei so konstruiert, dass er ein sehr breites Prozessfenster hat, was bedeutet, dass er auf sehr vielen unterschiedlichen Maschinen einsetzbar ist.

The 110FPRV is designed for a wide process window and therefore can be used on a wide range of machines.



Für glasklare Oberflächen bei der 3D-Bearbeitung ist auch der Kopierfräser mit einer Schneide ausgelegt.

Also designed for crystal clear surfaces in 3D machines is the profile miller with one blade edge.

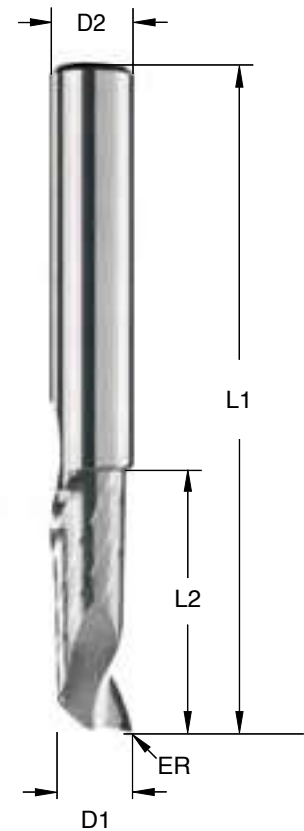


Der V-Nutenfräser ist vielseitig einsetzbar: Er eignet sich für Beschriftungen und Anfasungen oder Profilschnitte in verschiedenen Gradzahlen.

The V-slot miller is highly versatile: It is useful for inscriptions and beveling or sectioning at various angles.



| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | ER mm |
|---------------|--------------------------------|--------------|----------------|----------|----------------|----------|
| 1,0 | 110FPEA01-3 | 1 | 6 | 2,5 | 50 | 0,05 |
| | 110FPEA01-4 | 1 | 6 | 4 | 50 | 0,05 |
| | 110FPEA01-7 | 1 | 6 | 7 | 50 | 0,05 |
| 1,5 | 110FPEA015-3 | 1,5 | 6 | 3 | 50 | 0,05 |
| | 110FPEA015-5 | 1,5 | 6 | 5 | 50 | 0,05 |
| | 110FPEA015-7 | 1,5 | 6 | 7 | 50 | 0,05 |
| 2,0 | 110FPEA02-4 | 2 | 6 | 4 | 50 | 0,05 |
| | 110FPEA02-7 | 2 | 6 | 7 | 50 | 0,05 |
| | 110FPEA02-11 | 2 | 6 | 11 | 50 | 0,05 |
| 3,0 | 110FPEA03-5 | 3 | 6 | 5 | 50 | 0,05 |
| | 110FPEA03-11 | 3 | 6 | 11 | 50 | 0,05 |
| | 110FPEA03-17 | 3 | 6 | 17 | 60 | 0,05 |
| 3,17 / 1/8" | 110FPEA0317-5 | 3,17 / 1/8" | 6,35 / 1/4" | 5 | 50 | 0,05 |
| | 110FPEA0317-17 | 3,17 / 1/8" | 6,35 / 1/4" | 17 | 63 | 0,05 |
| 4,0 | 110FPEA04-6 | 4 | 6 | 6 | 50 | 0,1 |
| | 110FPEA04-13 | 4 | 6 | 13 | 50 | 0,1 |
| | 110FPEA04-17 | 4 | 6 | 17 | 60 | 0,1 |
| | 110FPEA04-905 | 4 | 6 | 9 | 50 | 0,5 |
| 5,0 | 110FPEA05-7 | 5 | 6 | 7 | 50 | 0,1 |
| | 110FPEA05-17 | 5 | 6 | 17 | 60 | 0,1 |
| 6,0 | 110FPE06-11 | 6 | 6 | 11 | 50 | 0,1 |
| | 110FPE06-22 | 6 | 6 | 22 | 60 | 0,1 |
| | 110FPE06-27 | 6 | 6 | 27 | 75 | 0,1 |
| | 110FPE06-42 | 6 | 6 | 42 | 100 | 0,1 |
| 110FPE06-1705 | 6 | 6 | 17 | 60 | 0,5 | |
| 6,35 / 1/4" | 110FPE0635-11 | 6,35 / 1/4" | 6,35 / 1/4" | 11 | 50 | 0,1 |
| | 110FPE0635-27 | 6,35 / 1/4" | 6,35 / 1/4" | 27 | 75 | 0,1 |
| 7,93 / 5/16" | 110FPE0793-13 | 7,93 / 5/16" | 7,93 / 5/16" | 11 | 63 | 0,1 |
| | 110FPE0793-27 | 7,93 / 5/16" | 7,93 / 5/16" | 27 | 75 | 0,1 |
| 8,0 | 110FPE08-13 | 8 | 8 | 13 | 63 | 0,1 |
| | 110FPE08-22 | 8 | 8 | 22 | 63 | 0,1 |
| | 110FPE08-27 | 8 | 8 | 27 | 75 | 0,1 |
| | 110FPE08-42 | 8 | 8 | 42 | 100 | 0,1 |
| | 110FPE08-2205 | 8 | 8 | 22 | 63 | 0,5 |
| 9,52 / 3/8" | 110FPE0952-17 | 9,52 / 3/8" | 9,52 / 3/8" | 17 | 75 | 0,1 |
| | 110FPE0952-42 | 9,52 / 3/8" | 9,52 / 3/8" | 42 | 100 | 0,1 |
| 10,0 | 110FPE10-17 | 10 | 10 | 17 | 72 | 0,1 |
| | 110FPE10-27 | 10 | 10 | 27 | 72 | 0,1 |
| | 110FPE10-42 | 10 | 10 | 42 | 100 | 0,1 |
| | 110FPE10-2705 | 10 | 10 | 27 | 72 | 0,5 |



Durchmesserbereich:
1,0 bis 10,0 mm
diameter range:
1,0 to 10,0 mm

Mögliche Beschichtungen:
ALX
possible coatings:
ALX

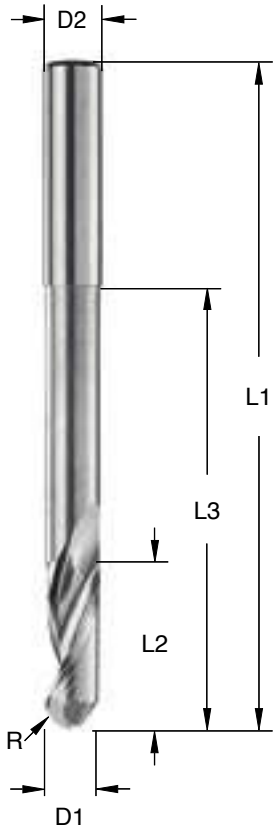
Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 110FPE06-11 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. 110FPE08-13 and if wanted COATING: e.g. ALX.



$\lambda_s = 30^\circ$
 $\gamma_s = 26^\circ$

mit polierter Spannut



Durchmesserbereich:
1,0 bis 20,0 mm
diamter range:
1,0 to 20,0 mm

Mögliche Beschichtungen:
ALX
possible coatings:
ALX

| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | R mm |
|--------------|--------------------------------|--------------|----------------|----------|----------------|----------|---------|
| 1,0 | 110FPERA01 | 1 | 6 | 4 | 50 | 10 | 0,5 |
| 1,5 | 110FPERAK015 | 1,5 | 6 | 5 | 50 | 10 | 0,75 |
| | 110FPERA015 | 1,5 | 6 | 7 | 60 | | 0,75 |
| 2,0 | 110FPERKK02 | 2 | 6 | 3 | 50 | | 1 |
| | 110FPERAK02 | 2 | 6 | 7 | 50 | 10 | 1 |
| | 110FPERA02 | 2 | 6 | 10 | 60 | | 1 |
| 3,0 | 110FPERKK03 | 3 | 6 | 4 | 50 | | 1,5 |
| | 110FPERA03 | 3 | 6 | 12 | 60 | | 1,5 |
| 3,17 / 1/8" | 110FPERKK0317 | 3,17 / 1/8" | 6,35 | 4 | 63 | | 1,585 |
| | 110FPER0317 | 3,17 / 1/8" | 6,35 | 12 | 63 | | 1,585 |
| 4,0 | 110FPERKK04 | 4 | 6 | 5 | 50 | | 2 |
| | 110FPERA04 | 4 | 6 | 15 | 60 | | 2 |
| 4,76 / 3/16" | 110FPERKK0476 | 4,76 / 3/16" | 6,35 | 6 | 63 | | 2,38 |
| | 110FPER0476 | 4,76 / 3/16" | 6,35 | 18 | 63 | | 2,38 |
| 5,0 | 110FPERKK05 | 5 | 5 | 6 | 50 | | 2,5 |
| | 110FPERA05 | 5 | 6 | 18 | 60 | | 2,5 |
| 6,0 | 110FPERKK06 | 6 | 6 | 7 | 50 | | 3 |
| | 110FPER06 | 6 | 6 | 20 | 60 | | 3 |
| | 110FPERF06 | 6 | 6 | 20 | 80 | 50 | 3 |
| 6,35 / 1/4" | 110FPERKK0635 | 6,35 / 1/4" | 6,35 / 1/4" | 7 | 50 | | 3,175 |
| | 110FPER0635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 63 | | 3,175 |
| 7,93 / 5/16" | 110FPERKK0793 | 7,93 / 5/16" | 7,93 / 5/16" | 9 | 63 | | 4,0 |
| | 110FPER0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 75 | | 4,0 |
| 8,0 | 110FPERKK08 | 8 | 8 | 9 | 50 | | 4 |
| | 110FPER08 | 8 | 8 | 22 | 63 | | 4 |
| | 110FPERF08 | 8 | 8 | 20 | 90 | 60 | 4 |
| 9,52 / 3/8" | 110FPERKK0952 | 9,52 / 3/8" | 9,52 / 3/8" | 10 | 63 | | 4,76 |
| | 110FPER0952 | 9,52 / 3/8" | 9,52 / 3/8" | 22 | 75 | | 4,76 |
| 10,0 | 110FPER10 | 10 | 10 | 30 | 83 | | 5 |
| | 110FPERF10 | 10 | 10 | 20 | 100 | 70 | 5 |
| 12,0 | 110FPER12 | 12 | 12 | 35 | 92 | | 6 |
| | 110FPERF12 | 12 | 12 | 20 | 120 | 80 | 6 |
| 12,7 / 1/2" | 110FPERKK127 | 12,7 / 1/2" | 12,7 / 1/2" | 35 | 100 | | 6,35 |
| | 110FPER127 | 12,7 / 1/2" | 12,7 / 1/2" | 20 | 125 | | 6,35 |
| 16,0 | 110FPER16 | 16 | 16 | 40 | 92 | | 8 |
| 20,0 | 110FPER20 | 20 | 20 | 45 | 102 | | 10 |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

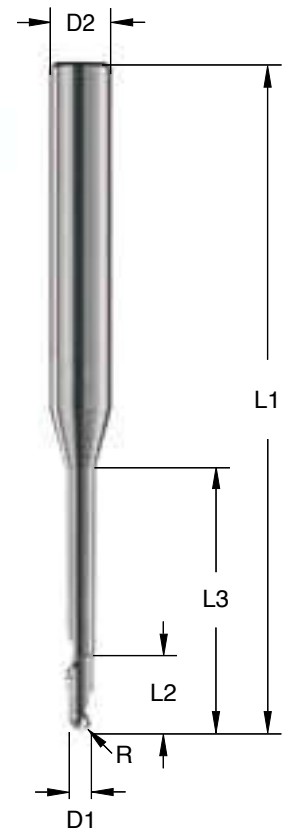
Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 110FPER08 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. 110FPERKK06 and if wanted COATING: e.g. ALX.



$\lambda_s = 30^\circ$
 $\gamma_s = 26^\circ$

mit
polierter
Span-
nut

| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | R mm | | |
|-----|--------------------------------|----------|----------------|----------|----------------|----------|---------|--|--|
| 0,2 | 110FPRM002030 | 0,2 | 3 | 0,2 | 40 | | 0,1 | | |
| | 110FPRM002030-2 | 0,2 | 3 | 0,2 | 40 | 2 | 0,1 | | |
| | 110FPRMK002030 | 0,2 | 3 | 0,6 | 40 | | 0,1 | | |
| 0,3 | 110FPRM003030 | 0,3 | 3 | 0,3 | 40 | | 0,15 | | |
| | 110FPRM003030-3 | 0,3 | 3 | 0,3 | 40 | 3 | 0,15 | | |
| | 110FPRMK003030 | 0,3 | 3 | 0,6 | 40 | | 0,15 | | |
| 0,4 | 110FPRM004030 | 0,4 | 3 | 0,6 | 40 | | 0,2 | | |
| | 110FPRM004030-4 | 0,4 | 3 | 0,6 | 40 | 4 | 0,2 | | |
| 0,5 | 110FPRM005030 | 0,5 | 3 | 0,8 | 40 | | 0,25 | | |
| | 110FPRMK005030 | 0,5 | 3 | 0,8 | 40 | 1,2 | 0,25 | | |
| | 110FPRM005030-5 | 0,5 | 3 | 0,8 | 40 | 5 | 0,25 | | |
| | 110FPRML005030 | 0,5 | 3 | 2 | 40 | | 0,25 | | |
| 0,6 | 110FPRM006030 | 0,6 | 3 | 1,2 | 40 | | 0,3 | | |
| | 110FPRM006030-6 | 0,6 | 3 | 1,2 | 40 | 6 | 0,3 | | |
| | 110FPRML006030 | 0,6 | 3 | 2,4 | 40 | | 0,3 | | |
| 0,8 | 110FPRM008030 | 0,8 | 3 | 1,5 | 40 | | 0,4 | | |
| | 110FPRM008030-8 | 0,8 | 3 | 1,5 | 40 | 8 | 0,4 | | |
| | 110FPRML008030 | 0,8 | 3 | 3 | 40 | | 0,4 | | |
| 1,0 | 110FPRM010030 | 1 | 3 | 2 | 40 | | 0,5 | | |
| | 110FPRM010030-10 | 1 | 3 | 2 | 40 | 10 | 0,5 | | |
| | 110FPRML010030 | 1 | 3 | 4 | 40 | | 0,5 | | |

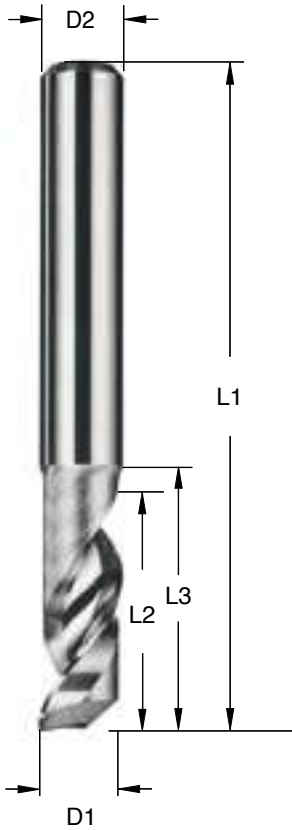
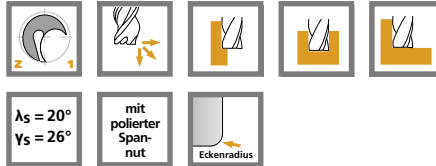


Durchmesserbereich:
0,2 bis 1,0 mm
diameter range:
0,2 to 1,0 mm

Mögliche Beschichtungen:
ALX
possible coatings:
ALX

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 110FPRM002030 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. 110FPRML008030 and if wanted COATING: e.g. ALX.



Durchmesserbereich:
1,0 bis 20,0 mm
diameter range:
1,0 to 20,0 mm

Mögliche Beschichtungen:
ALX
possible coatings:
ALX

| BESTELL-NUMMER ORDER NUMBER | | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | | |
|--------------------------------|-------------|----------|----------------|----------|----------------|----------|--|--|
| 1,0 | 110FPPA01 | 1 | 3 | 4 | 50 | 10 | | |
| 1,5 | 110FPPAK015 | 1,5 | 3 | 5 | 50 | 10 | | |
| | 110FPPA015 | 1,5 | 6 | 7 | 60 | | | |
| 2,0 | 110FPP02 | 2 | 2 | 10 | 50 | | | |
| | 110FPPKK020 | 2 | 3 | 3 | 50 | | | |
| | 110FPPAK02 | 2 | 3 | 7 | 50 | 10 | | |
| | 110FPPA02 | 2 | 6 | 10 | 60 | | | |
| 3,0 | 110FPPKK030 | 3 | 3 | 4 | 50 | | | |
| | 110FPP03 | 3 | 3 | 12 | 50 | | | |
| | 110FPPA03 | 3 | 6 | 12 | 60 | | | |
| 4,0 | 110FPPKK040 | 4 | 4 | 5 | 50 | | | |
| | 110FPP04 | 4 | 4 | 15 | 50 | | | |
| | 110FPPA04 | 4 | 6 | 15 | 60 | | | |
| 5,0 | 110FPPKK050 | 5 | 5 | 6 | 50 | | | |
| | 110FPP05 | 5 | 5 | 18 | 50 | | | |
| | 110FPPA05 | 5 | 6 | 18 | 60 | | | |
| 6,0 | 110FPPKK060 | 6 | 6 | 7 | 50 | | | |
| | 110FPP06 | 6 | 6 | 20 | 60 | | | |
| | 110FPPF06 | 6 | 6 | 20 | 80 | 50 | | |
| 8,0 | 110FPPKK080 | 8 | 8 | 9 | 50 | | | |
| | 110FPP08 | 8 | 8 | 22 | 63 | | | |
| | 110FPPF08 | 8 | 8 | 20 | 90 | 60 | | |
| 10,0 | 110FPP10 | 10 | 10 | 30 | 83 | | | |
| | 110FPPF10 | 10 | 10 | 20 | 100 | 70 | | |
| 12,0 | 110FPP12 | 12 | 12 | 35 | 92 | | | |
| | 110FPPF12 | 12 | 12 | 20 | 120 | 80 | | |
| 16,0 | 110FPP16 | 16 | 16 | 40 | 92 | | | |
| 20,0 | 110FPP20 | 20 | 20 | 45 | 102 | | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 110FPP04 und wenn gewünscht Beschichtung: z.B. TLX.
Please indicate order number: e.g. 110FPPF10 and if wanted COATING: e.g. TLX.

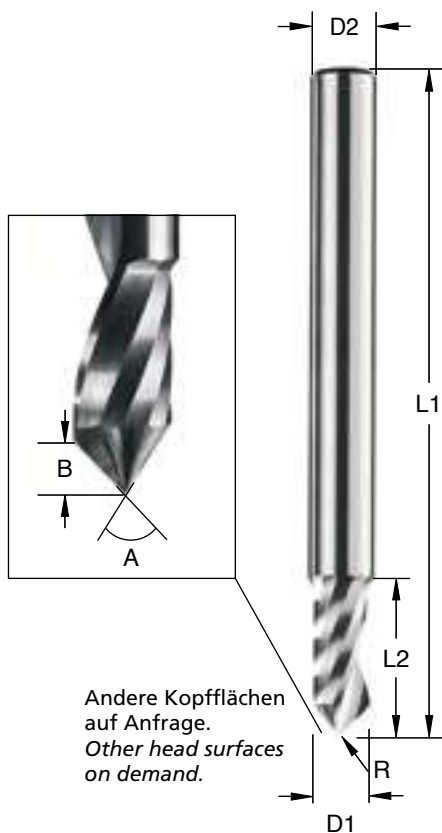
Fräsen Per Plex®

FRÄSEN PER PLEX



$\lambda_s = 25^\circ$
 $\gamma_s = 20^\circ$

mit polierter Spannut



Andere Kopfflächen auf Anfrage.
Other head surfaces on demand.

Durchmesserbereich:
3,0 bis 8,0 mm
diameter range:
3,0 to 8,0 mm

Mögliche Beschichtungen:
ALX - Standard
TL5 - auf Anfrage
DIP - auf Anfrage
possible coatings:
ALX - Standard
TL5 - on demand
DIP - on demand

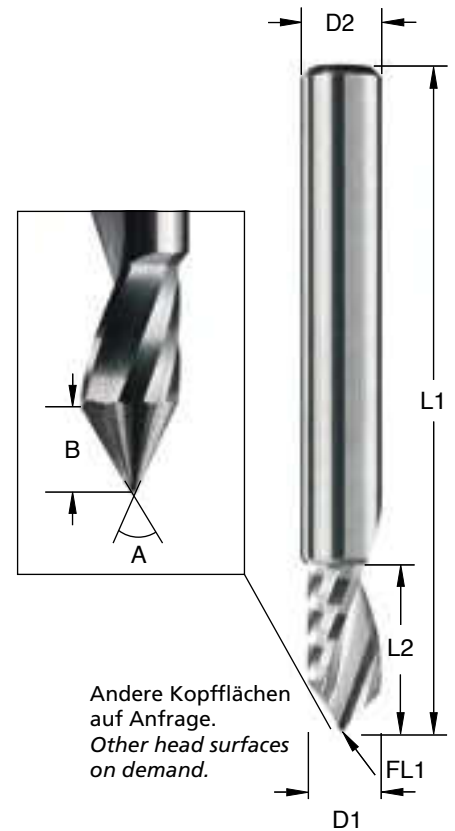
| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | R mm | A ° | B mm |
|-----|--------------------------------|----------|----------------|----------|----------------|---------|--------|---------|
| 3,0 | 110V030030-60 | 3 | 3 | 8 | 50 | 0,1 | 60 | 2,6 |
| | 110V030030-90 | 3 | 3 | 8 | 50 | 0,1 | 90 | 1,5 |
| | 110V030030-92 | 3 | 3 | 8 | 50 | 0,1 | 92 | 1,4 |
| 6,0 | 110V060060-60 | 6 | 6 | 12 | 60 | 0,1 | 60 | 5,2 |
| | 110V060060-90 | 6 | 6 | 12 | 60 | 0,1 | 90 | 3 |
| | 110V060060-92 | 6 | 6 | 12 | 60 | 0,1 | 92 | 2,9 |
| | 110V060060-94 | 6 | 6 | 12 | 60 | 0,1 | 94 | 2,8 |
| | 110V060060-96 | 6 | 6 | 12 | 60 | 0,1 | 96 | 2,7 |
| 8,0 | 110V080080-60 | 8 | 8 | 15 | 63 | 0,2 | 60 | 6,9 |
| | 110V080080-90 | 8 | 8 | 15 | 63 | 0,2 | 90 | 4 |
| | 110V080080-92 | 8 | 8 | 15 | 63 | 0,2 | 92 | 3,8 |
| | 110V080080-94 | 8 | 8 | 15 | 63 | 0,2 | 94 | 3,7 |
| | 110V080080-96 | 8 | 8 | 15 | 63 | 0,2 | 96 | 3,6 |



$\lambda_s = 25^\circ$
 $\gamma_s = 20^\circ$

mit
polierter
Span-
nut

| BESTELL-NUMMER ORDER NUMBER | | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | FL1 mm | A ° | B mm |
|--------------------------------|---------------|----------|----------------|----------|----------------|-----------|--------|---------|
| 3,0 | 110W030030-60 | 3 | 3 | 6 | 50 | 0,1 | 60 | 2,6 |
| | 110W030030-90 | 3 | 3 | 6 | 50 | 0,1 | 90 | 1,5 |
| | 110W030030-92 | 3 | 3 | 8 | 50 | 0,1 | 92 | 1,4 |
| | 110W030030-94 | 3 | 3 | 8 | 50 | 0,1 | 94 | 1,4 |
| 6,0 | 110W060060-60 | 6 | 6 | 12 | 60 | 0,1 | 60 | 5,2 |
| | 110W060060-90 | 6 | 6 | 12 | 60 | 0,1 | 90 | 3,0 |
| | 110W060060-92 | 6 | 6 | 12 | 60 | 0,1 | 92 | 2,9 |
| | 110W060060-94 | 6 | 6 | 12 | 60 | 0,1 | 94 | 2,8 |
| | 110W060060-96 | 6 | 6 | 12 | 60 | 0,1 | 96 | 2,7 |
| 8,0 | 110W080080-60 | 8 | 8 | 15 | 63 | 0,1 | 60 | 6,9 |
| | 110W080080-90 | 8 | 8 | 15 | 63 | 0,1 | 90 | 4,0 |
| | 110W080080-92 | 8 | 8 | 15 | 63 | 0,1 | 92 | 3,8 |
| | 110W080080-94 | 8 | 8 | 15 | 63 | 0,1 | 94 | 3,7 |
| | 110W080080-96 | 8 | 8 | 15 | 63 | 0,1 | 96 | 3,6 |



Durchmesserbereich:
3,0 bis 8,0 mm
diameter range:
3,0 bis 8,0 mm

Mögliche Beschichtungen:
ALX - Standard
TL5 - auf Anfrage
DIP - auf Anfrage
possible coatings:
ALX - Standard
TL5 - on demand
DIP - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 110W030030-92 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. 110W080080-94 and if wanted COATING: e.g. ALX.



Durchmesserbereich:
2,0 bis 12,0 mm
diamter range:
2,0 bis 12,0 mm

| | BESTELL-NUMMER ORDER NUMBER | D2 h6 mm | L2 mm | L1 +2 mm | B mm | | | | |
|------|--------------------------------|----------------|----------|----------------|---------|--|--|--|--|
| 2,0 | 946020030-40 | 2 | 3 | 40 | 1,7 | | | | |
| | 946020030-100 | 2 | 3 | 100 | 1,7 | | | | |
| 2,5 | 946025030-40 | 2,5 | 3 | 40 | 2,1 | | | | |
| | 946025030-100 | 2,5 | 3 | 100 | 2,1 | | | | |
| 3,0 | 946030040-55 | 3 | 4 | 50 | 2,6 | | | | |
| | 946030040-100 | 3 | 4 | 100 | 2,6 | | | | |
| 4,0 | 946040050-55 | 4 | 5 | 55 | 3,4 | | | | |
| | 946040050-100 | 4 | 5 | 100 | 3,4 | | | | |
| 5,0 | 946050060-62 | 5 | 6 | 62 | 4,3 | | | | |
| | 946050060-100 | 5 | 6 | 100 | 4,3 | | | | |
| 6,0 | 946060070-66 | 6 | 7 | 66 | 5,2 | | | | |
| | 946060070-100 | 6 | 7 | 100 | 5,2 | | | | |
| 8,0 | 946080090-79 | 8 | 9 | 79 | 6,9 | | | | |
| | 946080090-100 | 8 | 9 | 100 | 6,9 | | | | |
| 10,0 | 946100110-100 | 10 | 11 | 100 | 8,6 | | | | |
| 12,0 | 946120130-100 | 12 | 13 | 100 | 10,3 | | | | |



| | BESTELL-NUMMER ORDER NUMBER | D2 h6 mm | L2 mm | L1 +2 mm | B mm | | | | |
|------|--------------------------------|----------------|----------|----------------|---------|--|--|--|--|
| 2,0 | 949020030-40 | 2 | 3 | 40 | 1 | | | | |
| | 949020030-100 | 2 | 3 | 100 | 1 | | | | |
| 2,5 | 949025030-40 | 2,5 | 3 | 40 | 1,25 | | | | |
| | 949025030-100 | 2,5 | 3 | 100 | 1,25 | | | | |
| 3,0 | 949030040-50 | 3 | 4 | 50 | 1,5 | | | | |
| | 949030040-100 | 3 | 4 | 100 | 1,5 | | | | |
| 4,0 | 949040050-55 | 4 | 5 | 55 | 2 | | | | |
| | 949040050-100 | 4 | 5 | 100 | 2 | | | | |
| 5,0 | 949050060-62 | 5 | 6 | 62 | 2,5 | | | | |
| | 949050060-100 | 5 | 6 | 100 | 2,5 | | | | |
| 6,0 | 949060070-66 | 6 | 7 | 66 | 3 | | | | |
| | 949060070-100 | 6 | 7 | 100 | 3 | | | | |
| 8,0 | 949080090-79 | 8 | 9 | 79 | 4 | | | | |
| | 949080090-100 | 8 | 9 | 100 | 4 | | | | |
| 10,0 | 949100110-100 | 10 | 11 | 100 | 5 | | | | |
| 12,0 | 949120130-100 | 12 | 13 | 100 | 6 | | | | |



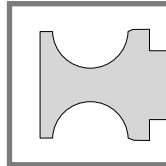
Durchmesserbereich:
2,0 bis 12,0 mm
diameter range:
2,0 to 12,0 mm

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 949030040-55.
Please indicate order number: e.g. 949060070-66.

Fräsen Per Plex®

FRÄSEN PER PLEX



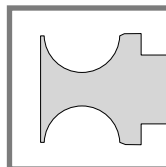
mit Stirnschneiden
with transverse section

$\lambda_s = 0^\circ$
 $\gamma_s = 15^\circ$

| BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L1 +2 mm | B mm | D3 mm | R mm | L2 mm | L7 mm | L5 mm |
|--------------------------------|----------|----------------|----------------|---------|----------|---------|----------|----------|----------|
| R1 126R01 | 10 | 10 | 72 | 2,2 | 7,8 | 1 | | 3,1 | 2 |
| R1,5 126R015 | 10 | 10 | 72 | 3,3 | 6,8 | 1,5 | | 3,65 | 2 |
| R2 126R02 | 10 | 10 | 72 | 4,4 | 5,8 | 2 | | 4,2 | 2 |
| R2,5 126R025 | 10 | 10 | 72 | 5,5 | 4,6 | 2,5 | | 4,75 | 2 |
| R3 126R03 | 12 | 10 | 72 | 6,6 | 5,4 | 3 | 12 | 5,3 | 2 |
| R4 126R04 | 16 | 10 | 75 | 8,8 | 7,7 | 4 | 16 | 6,4 | 2 |
| R5 126R05 | 16 | 10 | 75 | 11 | 5,2 | 5 | 16 | 7,5 | 2 |
| R6 126R06 | 20 | 10 | 75 | 13,2 | 6,5 | 6 | 21 | 8,6 | 2 |

Durchmesserbereich:
10,0 bis 20,0 mm
diameter range:
10,0 to 20,0 mm

Mögliche Beschichtungen:
ALX
possible coatings:
ALX



ohne Stirnschneiden
without transverse section

$\lambda_s = 0^\circ$
 $\gamma_s = 15^\circ$

| BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L1 +2 mm | B mm | D3 mm | R mm | L2 mm | L7 mm | L5 mm |
|--------------------------------|----------|----------------|----------------|---------|----------|---------|----------|----------|----------|
| R1 127R01 | 10 | 10 | 72 | 2,2 | 7,8 | 1 | | 1,6 | 0,5 |
| R1,5 127R015 | 10 | 10 | 72 | 3,3 | 6,8 | 1,5 | | 2,15 | 0,5 |
| R2 127R02 | 10 | 10 | 72 | 4,4 | 5,8 | 2 | | 2,7 | 0,5 |
| R2,5 127R025 | 10 | 10 | 72 | 5,5 | 4,6 | 2,5 | | 3,25 | 0,5 |
| R3 127R03 | 12 | 10 | 72 | 6,6 | 5,4 | 3 | 12 | 3,8 | 0,5 |
| R4 127R04 | 16 | 10 | 75 | 8,8 | 7,7 | 4 | 16 | 4,9 | 0,5 |
| R5 127R05 | 16 | 10 | 75 | 11 | 5,2 | 5 | 16 | 6 | 0,5 |
| R6 127R06 | 20 | 10 | 75 | 13,2 | 6,5 | 6 | 21 | 7,1 | 0,5 |

Durchmesserbereich:
10,0 bis 20,0 mm
diameter range:
10,0 to 20,0 mm

Mögliche Beschichtungen:
ALX
possible coatings:
ALX

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

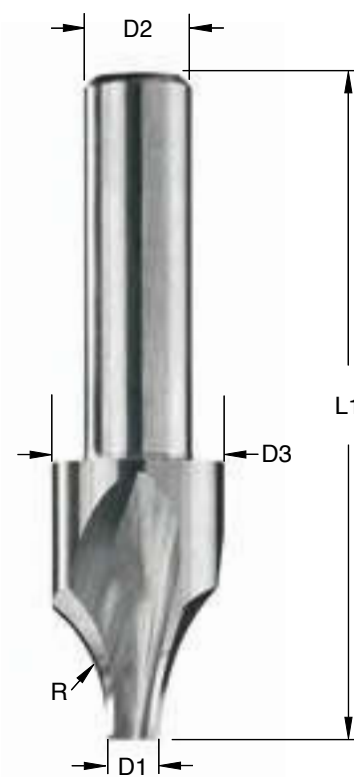
Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 126R6 und wenn gewünscht Beschichtung: z.B. ALX.

Please indicate order number: e.g. 126R13 and if wanted COATING: e.g. ALX.



$\lambda_s = 0^\circ$
 $\gamma_s = 15^\circ$

| BESTELL-NUMMER ORDER NUMBER | R mm | D1 mm | D2 h6 mm | L1 +2 mm | D3 mm | | | |
|--------------------------------|---------|----------|----------------|----------------|----------|--|--|--|
| HV31050 | 0,5 | 9 | 10 | 72 | 10 | | | |
| HV31100 | 1 | 8 | 10 | 72 | 10 | | | |
| HV31150 | 1,5 | 7 | 10 | 72 | 10 | | | |
| HV31200 | 2 | 6 | 10 | 72 | 10 | | | |
| HV31250 | 2,5 | 5 | 10 | 72 | 10 | | | |
| HV31300 | 3 | 4 | 10 | 72 | 10 | | | |
| HV31350 | 3,5 | 5 | 12 | 75 | 12 | | | |
| HV31400 | 4 | 4 | 12 | 75 | 12 | | | |
| HV31450 | 4,5 | 7 | 16 | 75 | 16 | | | |
| HV31500 | 5 | 6 | 16 | 75 | 16 | | | |
| HV31600 | 6 | 8 | 20 | 75 | 20 | | | |
| HV31700 | 7 | 8 | 20 | 75 | 22 | | | |
| HV31800 | 8 | 9 | 25 | 75 | 25 | | | |
| HV31000 | 10 | 8 | 25 | 80 | 28 | | | |



Durchmesserbereich:
0,5 bis 10,0 mm
diamter range:
0,5 tos 10,0 mm

Mögliche Beschichtungen:
ALX
possible coatings:
ALX

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. HV31450 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. HV31800 and if wanted COATING: e.g. ALX.

FRÄSEN PER PLEX®

EINSATZHINWEISE

USAGE FOR APPLICATION

Fräsen Per Plex®



KLARE KANTEN BEIM FRÄSEN VON ACRYL UND PMMA

Das Teil wird in zwei Umläufen gefertigt, dem Schrupp- und dem Schlichtgang.

1. Umlauf

Schruppen mit einer Restbodensärke von ca. 0,15 mm und einem seitlichen Aufmaß von 0,2 - 0,4 mm

110FPE080-16

z.B. FPE-Fräser Z1 D1 = 8

N = 24.000 U/min

F = 5.000 mm/min

aE = 8 mm

aP = 11,7 mm (bei Plattenstärke 12 mm)

2. Umlauf

Schlichten, dabei wird das Teil mit der fertigen Kontur ausgeschnitten.

110FPE080-16

z.B. FPE-Fräser Z1 D1 = 8

N = 24.000 U/min

F = 3.000 mm/min

aE = 0,25 mm

aP = 12,1 mm (bei Plattenstärke 12 mm)

Klare Schnittkanten direkt nach dem Fräsen des Teils, das bedeutet für Sie:

1. Kürzere Fertigungszeiten, da keine Nachbearbeitung mehr notwendig ist.
2. Keine weitere Maschinenbelegung auf Poliermaschinen.
3. Kein Einsatz von teuren Diamant-Polierwerkzeugen.

CRYSTAL CLEAR EDGES WHEN MILLING ACRYLIC AND PMMA

The part is manufactured in two passes, the scrubbing and the smoothing pass.

1. Pass

Scrubbing with remaining bottom thickness of approx. 0.15 mm and lateral allowance of 0.2 - 0.4 mm

110FPE080-16

e.g. FPE-Milling Tool Z1 D1 = 8

N = 24.000 U/min

F = 5.000 mm/min

aE = 8 mm

aP = 11,7 mm (at 12 mm board thickness)

2. Pass

Smoothing, where the part is cut out with the complete contour.

110FPE080-16

e.g. FPE milling tool Z1 D1 = 8

N = 24.000 U/min

F = 3.000 mm/min

aE = 0,25 mm

aP = 12,1 mm (at 12 mm board thickness)

Clearly cut edges immediately after milling. For you this means:

1. Less manufacturing time, because no post-processing is required.
2. No allocation of polishing machines.
3. No need for expensive diamond polishing tools.

PROTO-LINE

FÜR DEN MODELL- UND
PROTOTYPENBAU

FOR MODELBUILDING
AND PROTOTYPING

PROTO-LINE

PROTO-LINE



Ureol
Ureol

Aluminium
Aluminium

PEEK
PEEK

PE
PE

PA
PA

POM
POM

HUFSCHMIED
ZERSpanungSSYSTEME

PROTO-LINE

PROTO-LINE



Der Einsatz neuer Kunststoffe im Maschinen- und Anlagenbau und im Werkzeug- und Formenbau führen zu steigenden Anforderungen an die Bearbeitungswerkzeuge. Höhere Standzeiten und Oberflächengüten sind Pflicht. Diesem Anspruch werden die Werkzeuge der PROTO-LINE gerecht.

Spezielle Schneidengeometrien und Hartmetalle sorgen für kurze Bearbeitungszyklen bei hohen Standzeiten und erlauben die Serienproduktion von glatten und gratfreien Bauteilen.

Im Formenbau werden immer häufiger Ureol-Sorten eingesetzt, die durch verschiedene Additive an die jeweilige Aufgabe angepasst sind. Auch hier erzielen die werkstoffoptimierten Werkzeuge von Hufschmied beste Bearbeitungsergebnisse.

Aufgrund der fortschreitenden Miniaturisierung im Modell- und Prototypenbereich werden die neuen Hufschmied-Minifräser jetzt auch im Durchmesser von 0,2 - 3 mm angeboten.

The use of new synthetics in engineering and plant engineering and in tool and mold making lead to higher requirements in machining tools. Higher durabilities and surface qualities are an obligation. The tools of the PROTO-Line come up to this demand.

Special cutting geometries and carbides make short machining cycles at high durabilities and guarantee the series production of even and burr-free components.

In the mold making, kinds of ureol are used even more, which are adapted to the corresponding task by different additives. The material-optimized Hufschmied-tools also reach the best machining results in this field.

Because of the proceeding miniaturization in model and prototype area, the new Hufschmied-mini-mills are also now offered in the diameter from 0,2 to 3 mm.

PROTO-LINE

UREOL

TOOLS FOR UREOL

PROTO-LINE

Im Formen- und Vorrichtungsbau werden immer häufiger Ureol-Werkstoffe eingesetzt.

Die Vorteile dieser Werkstoffe sind:

- gute Zerspanbarkeit
- geringe Staubentwicklung
- gute Werkstückoberflächen
- Verzugsfreiheit

Außerdem können verschiedene Blöcke miteinander verklebt werden und Fehlstellen ausgebessert und nachbearbeitet werden. Durch die Zugabe verschiedener Additive kann auch die Werkstoffeigenschaft an die Aufgabe angepasst werden.

Ureol wird in 3 Dichteklassen eingeteilt:

- bis 0,7 g/cm³
- von 0,7 bis 1,2 g/cm³
- ab 1,2 g/cm³

Dementsprechend sind die passenden Werkzeuge der Typen HC 402 und HC 452 unbeschichtet, TLX- und DIP-beschichtet verfügbar.

Eine große Anzahl an überlangen Werkzeugen, auch mit Freilegung um große Bearbeitungstiefen zu erreichen, ermöglicht Bearbeitungsaufgaben schnell und unkompliziert zu erfüllen.

Bei Schruppbearbeitungen mit Ureol (höchste Dichte) empfehlen wir den Einsatz von WD-verzahnten Carbon-Fräsern aus unserer FIBER-LINE.

In the tool making and jigmaking, ureol materials are used more often.

The advantages:

- good machinability
- marginal formation of dust
- good component surfaces
- non-wrapping

Moreover, different blocks can be glued together, flaws can be mended and reworked. By adding different additives, the material feature is adaptive to the task.

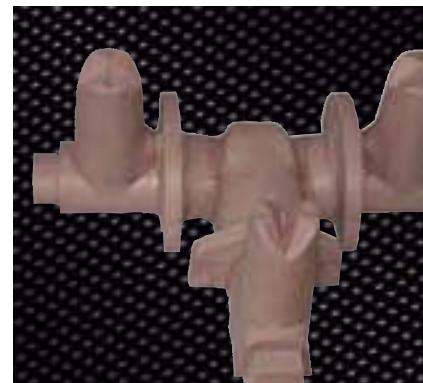
Ureol is categorized into 3 density classes:

- up to 0.7 g/cm³
- from 0.7 to 1.2 g/cm³
- 1.2 g/cm³ and more

The tools of the types HC 402 and HC 452 are determined uncoated either in TLX or DIP-coating deliverable.

A large amount of over-length tools – also with stripping for big machining downs – enables the fast and simple machining of ureol.

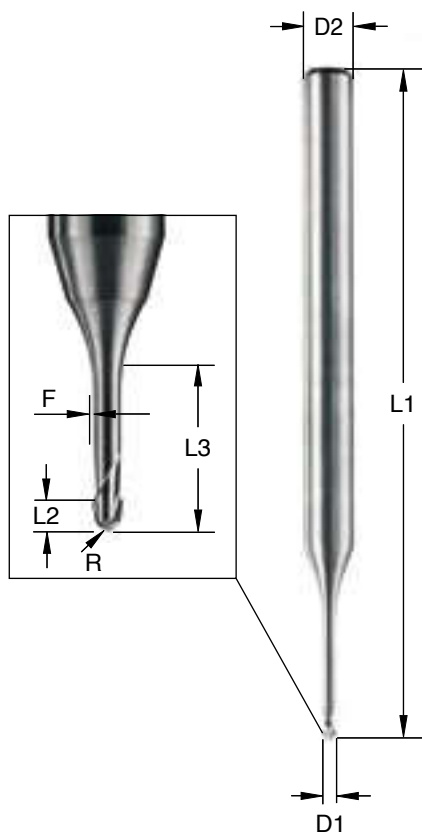
We recommend the use of WD-teethed carbon mills of our FIBER-LINE at the roughing of ureol of the highest density.





$\lambda_s = 30^\circ$
 $\gamma_s = 10^\circ$

HSC



Durchmesserbereich:
0,2 bis 2,0 mm
diameter range:
0,2 to 2,0 mm

Mögliche Beschichtungen:
DIP - Standard
ALX - auf Anfrage
TL5 - auf Anfrage
possible coatings:
DIP - Standard
ALX - on demand
TL5 - on demand

| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | F mm | R mm |
|-----|--------------------------------|----------|----------------|----------|----------------|----------|---------|---------|
| 0,2 | HM915MFE002 | 0,2 | 6 | 0,3 | 57 | | | 0,1 |
| 0,3 | HM915M0032 | 0,3 | 3 | 0,5 | 38 | | | 0,15 |
| | HM915MF003 | 0,3 | 4 | 0,3 | 50 | 3 | 0,01 | 0,15 |
| | HM915MFL003 | 0,3 | 4 | 0,3 | 50 | 6 | 0,01 | 0,15 |
| | HM915MFEL003 | 0,3 | 6 | 0,4 | 60 | 1 | 0,025 | 0,15 |
| 0,4 | HM915M0042 | 0,4 | 3 | 0,6 | 38 | | | 0,2 |
| | HM915MF004 | 0,4 | 4 | 0,4 | 50 | 3 | 0,01 | 0,2 |
| | HM915MFZ004 | 0,4 | 4 | 0,4 | 50 | 4 | 0,01 | 0,2 |
| | HM915MFL004 | 0,4 | 4 | 0,4 | 50 | 8 | 0,01 | 0,2 |
| | HM915MFEL004 | 0,4 | 6 | 0,5 | 60 | 1,2 | 0,025 | 0,2 |
| | HM915MFEXL004 | 0,4 | 6 | 0,5 | 60 | 4 | 0,01 | 0,2 |
| 0,5 | HM915M0052 | 0,5 | 3 | 0,8 | 38 | | | 0,25 |
| | HM915ML0052 | 0,5 | 4 | 1,5 | 50 | | | 0,25 |
| | HM915L005 | 0,5 | 3 | 0,5 | 40 | 2,5 | 0,025 | 0,25 |
| | HM915XL005 | 0,5 | 3 | 0,5 | 40 | 4 | 0,025 | 0,25 |
| | HM915MF005 | 0,5 | 4 | 0,5 | 50 | 5 | 0,01 | 0,25 |
| | HM915MFVL005 | 0,5 | 4 | 0,5 | 50 | 7,5 | 0,01 | 0,25 |
| | HM915MFL005 | 0,5 | 4 | 0,5 | 50 | 10 | 0,01 | 0,25 |
| | HM915MFEL005 | 0,5 | 6 | 0,5 | 60 | 3,3 | 0,025 | 0,25 |
| | HM915MFEXL005 | 0,5 | 6 | 0,5 | 60 | 5,1 | 0,025 | 0,25 |
| 0,6 | HM915M0062 | 0,6 | 3 | 0,9 | 38 | | | 0,3 |
| | HM915ML0062 | 0,6 | 4 | 1,8 | 50 | | | 0,3 |
| | HM915L006 | 0,6 | 3 | 0,6 | 40 | 3 | 0,025 | 0,3 |
| | HM915XL006 | 0,6 | 3 | 0,6 | 40 | 5 | 0,025 | 0,3 |
| | HM915MFZ006 | 0,6 | 4 | 0,6 | 50 | 7 | 0,01 | 0,3 |
| | HM915MFVL006 | 0,6 | 4 | 0,6 | 50 | 9 | 0,01 | 0,3 |
| | HM915MFL006 | 0,6 | 4 | 0,6 | 50 | 12 | 0,01 | 0,3 |
| | HM915MFEL006 | 0,6 | 6 | 0,6 | 60 | 4,5 | 0,01 | 0,3 |
| | HM915MFEXL006 | 0,6 | 6 | 0,6 | 60 | 6,2 | 0,01 | 0,3 |
| 0,8 | HM915M0082 | 0,8 | 3 | 1,2 | 38 | | | 0,4 |
| | HM915ML0082 | 0,8 | 4 | 2,4 | 50 | | | 0,4 |
| | HM915L008 | 0,8 | 3 | 0,8 | 40 | 4 | 0,025 | 0,4 |
| | HM915XL008 | 0,8 | 3 | 0,8 | 40 | 7 | 0,025 | 0,4 |
| | HM915MFZ008 | 0,8 | 4 | 0,8 | 50 | 8 | 0,01 | 0,4 |
| | HM915MFL008 | 0,8 | 4 | 0,8 | 50 | 10 | 0,01 | 0,4 |
| | HM915MFVL008 | 0,8 | 4 | 0,8 | 50 | 12 | 0,01 | 0,4 |
| | HM915MFXL008 | 0,8 | 4 | 0,8 | 50 | 16 | 0,01 | 0,4 |
| | HM915MFEL008 | 0,8 | 6 | 0,8 | 60 | 5,2 | 0,025 | 0,4 |
| | HM915MFEXL008 | 0,8 | 6 | 0,8 | 60 | 8 | 0,01 | 0,4 |
| 1,0 | HM915M0102 | 1 | 3 | 1,5 | 38 | | | 0,5 |
| | HM915ML0102 | 1 | 4 | 3 | 50 | | | 0,5 |
| | HM915L010 | 1 | 3 | 1 | 40 | 5 | 0,025 | 0,5 |
| | HM915XL010 | 1 | 3 | 1 | 40 | 8,5 | 0,025 | 0,5 |
| | HM915MFZ010 | 1 | 4 | 1 | 50 | 10 | 0,025 | 0,5 |
| | HM915MFVL010 | 1 | 4 | 1 | 50 | 15 | 0,025 | 0,5 |
| | HM915MFZL010 | 1 | 4 | 1 | 50 | 20 | 0,025 | 0,5 |
| | HM915MF010 | 1 | 6 | 1 | 60 | 6 | 0,01 | 0,5 |
| | HM915MFEL010 | 1 | 6 | 1 | 60 | 8 | 0,01 | 0,5 |
| | HM915MFL010 | 1 | 6 | 1 | 60 | 11 | 0,025 | 0,5 |
| | HM915MFEXL010 | 1 | 6 | 1 | 60 | 15 | 0,01 | 0,5 |
| | HM915MFXL010 | 1 | 4 | 1 | 50 | 20 | 0,01 | 0,5 |

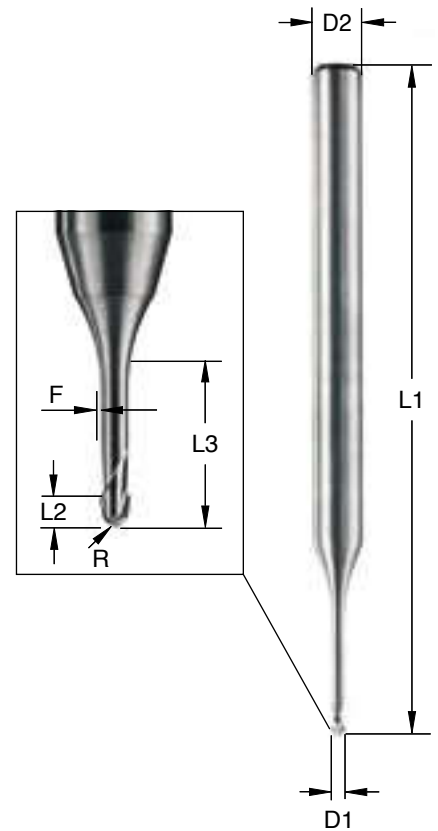
Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. HM915L015 und wenn gewünscht Beschichtung: z.B. DIP.

Please indicate order number: e.g. HM915M0082 and if wanted COATING: e.g. DIP.



| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | F mm | R mm |
|-----|--------------------------------|----------|----------------|----------|----------------|----------|---------|---------|
| 1,2 | HM915M0122 | 1,2 | 3 | 1,8 | 38 | | | 0,6 |
| | HM915ML0122 | 1,2 | 4 | 3,8 | 50 | | | 0,6 |
| | HM915L012 | 1,2 | 3 | 1,2 | 40 | 6 | 0,025 | 0,6 |
| | HM915XL012 | 1,2 | 3 | 1,2 | 40 | 10 | 0,025 | 0,6 |
| | HM915MFEL012 | 1,2 | 6 | 1,2 | 60 | 8 | 0,025 | 0,6 |
| 1,5 | HM915M0152 | 1,5 | 3 | 2,3 | 38 | | | 0,75 |
| | HM915ML0152 | 1,5 | 4 | 4,2 | 50 | | | 0,75 |
| | HM915L015 | 1,5 | 3 | 1,5 | 40 | 7,5 | 0,05 | 0,75 |
| | HM915XL015 | 1,5 | 3 | 1,5 | 40 | 12 | 0,05 | 0,75 |
| | HM915MFZ015 | 1,5 | 4 | 1,5 | 50 | 16 | 0,05 | 0,75 |
| | HM915MFVLO15 | 1,5 | 4 | 1,5 | 50 | 20 | 0,05 | 0,75 |
| | HM915MF015 | 1,5 | 6 | 1,5 | 60 | 7 | 0,01 | 0,75 |
| | HM915MFEL015 | 1,5 | 6 | 1,5 | 60 | 9,5 | 0,01 | 0,75 |
| | HM915MFL015 | 1,5 | 6 | 1,5 | 60 | 15 | 0,01 | 0,75 |
| | HM915MFXL015 | 1,5 | 6 | 1,5 | 60 | 20 | 0,01 | 0,75 |
| 2,0 | HM915M0202 | 2 | 3 | 3 | 38 | | | 1,0 |
| | HM915ML0202 | 2 | 4 | 6 | 50 | | | 1,0 |
| | HM915L020 | 2 | 3 | 2 | 50 | 12 | 0,05 | 1,0 |
| | HM915XL020 | 2 | 3 | 2 | 50 | 16 | 0,05 | 1,0 |
| | HM915SL020 | 2 | 3 | 2 | 50 | 20 | 0,05 | 1,0 |
| | HM915MFA020 | 2 | 4 | 2 | 60 | 15 | 0,025 | 1,0 |
| | HM915MFZ020 | 2 | 4 | 2 | 60 | 20 | 0,025 | 1,0 |
| | HM915MF020 | 2 | 6 | 2 | 60 | 7 | 0,01 | 1,0 |
| | HM915MFEL020 | 2 | 6 | 2,5 | 60 | 9,5 | 0,01 | 1,0 |
| | HM915MFL020 | 2 | 6 | 2 | 60 | 15 | 0,01 | 1,0 |
| | HM915MFXL020 | 2 | 6 | 2 | 60 | 20 | 0,01 | 1,0 |
| | HM915MFZL020 | 2 | 6 | 2 | 75 | 30 | 0,01 | 1,0 |

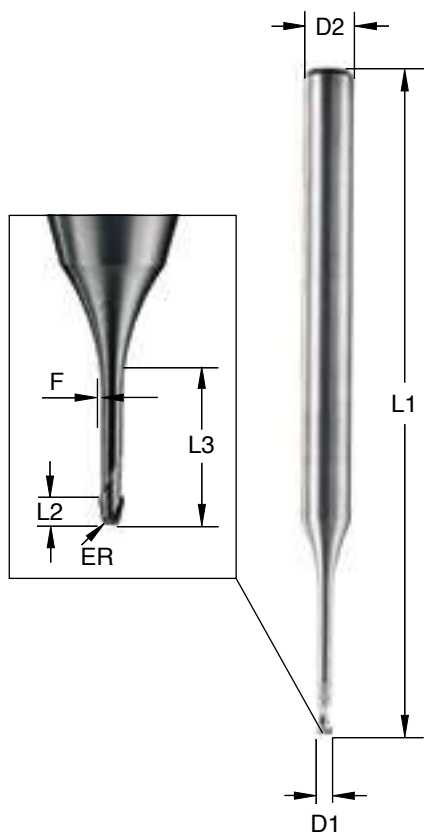


Durchmesserbereich:
0,2 bis 2,0 mm
diameter range:
0,2 to 2,0 mm

Mögliche Beschichtungen:
DIP - Standard
ALX - auf Anfrage
TL5 - auf Anfrage
possible coatings:
DIP - Standard
ALX - on demand
TL5 - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. HM915L015 und wenn gewünscht Beschichtung: z.B. DIP.
Please indicate order number: e.g. HM915M0082 and if wanted COATING: e.g. DIP.



| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | F mm | ER mm |
|--------------|--------------------------------|----------|----------------|----------|----------------|----------|---------|----------|
| 0,2 | HM905M0022 | 0,2 | 3 | 0,4 | 38 | | | |
| | HM905ML0022 | 0,2 | 4 | 0,4 | 50 | | | |
| | HM905MFE002 | 0,2 | 6 | 0,3 | 57 | | | |
| 0,3 | HM905M0032 | 0,3 | 3 | 0,9 | 38 | | | |
| | HM905ML0032 | 0,3 | 4 | 0,9 | 50 | | | |
| | HM905MFE003 | 0,3 | 6 | 0,4 | 57 | | | |
| | HM905MFEL003 | 0,3 | 6 | 0,4 | 57 | 1 | 0,025 | |
| 0,4 | HM905M0042 | 0,4 | 3 | 1,2 | 38 | | | |
| | HM905ML0042 | 0,4 | 4 | 1,2 | 50 | | | |
| | HM905MFL004 | 0,4 | 4 | 0,5 | 50 | 2 | 0,01 | 0,05 |
| | HM905MFZL004 | 0,4 | 4 | 0,5 | 50 | 4 | 0,01 | 0,05 |
| 0,5 | HM905M0052 | 0,5 | 3 | 1,5 | 38 | | | |
| | HM905ML0052 | 0,5 | 4 | 1,5 | 50 | | | |
| | HM905L005 | 0,5 | 3 | 0,7 | 40 | 2,5 | 0,025 | 0,05 |
| | HM905XL005 | 0,5 | 3 | 0,7 | 40 | 4 | 0,025 | 0,05 |
| | HM905MFO05 | 0,5 | 4 | 0,5 | 50 | 5 | 0,01 | 0,05 |
| | HM905MFZL005 | 0,5 | 4 | 0,5 | 50 | 7,5 | 0,01 | 0,05 |
| | HM905MFL005 | 0,5 | 4 | 0,5 | 50 | 10 | 0,01 | 0,05 |
| 0,6 | HM905M0062 | 0,6 | 3 | 1,8 | 38 | | | |
| | HM905ML0062 | 0,6 | 4 | 1,8 | 50 | | | |
| | HM905L006 | 0,6 | 3 | 0,9 | 40 | 3 | 0,025 | 0,05 |
| | HM905XL006 | 0,6 | 3 | 0,9 | 40 | 5 | 0,025 | 0,05 |
| | HM905MFZ006 | 0,6 | 4 | 0,6 | 50 | 7 | 0,01 | 0,05 |
| | HM905MFZL006 | 0,6 | 4 | 0,6 | 50 | 9 | 0,01 | 0,05 |
| | HM905MFL006 | 0,6 | 4 | 0,6 | 50 | 12 | 0,01 | 0,05 |
| 0,8 | HM905M0082 | 0,8 | 3 | 2,4 | 38 | | | |
| | HM905ML0082 | 0,8 | 4 | 2,4 | 50 | | | |
| | HM905L008 | 0,8 | 3 | 1,2 | 40 | 4 | 0,025 | 0,05 |
| | HM905XL008 | 0,8 | 3 | 1,2 | 40 | 7 | 0,025 | 0,05 |
| | HM905MFZ008 | 0,8 | 4 | 0,8 | 50 | 8 | 0,01 | 0,1 |
| | HM905MFL008 | 0,8 | 4 | 0,8 | 50 | 10 | 0,01 | 0,1 |
| | HM905MFZL008 | 0,8 | 4 | 0,8 | 50 | 12 | 0,01 | 0,1 |
| HM905MFXL008 | 0,8 | 4 | 0,8 | 50 | 16 | 0,01 | 0,1 | |
| 1,0 | HM905M0102 | 1 | 3 | 3 | 38 | | | |
| | HM905ML0102 | 1 | 4 | 3 | 50 | | | |
| | HM905L010 | 1 | 3 | 1,5 | 40 | 5 | 0,025 | 0,1 |
| | HM905XL010 | 1 | 3 | 1,5 | 40 | 8,5 | 0,025 | 0,1 |
| | HM905MFZL010 | 1 | 4 | 1,5 | 50 | 10 | 0,025 | 0,1 |
| | HM905MFSL010 | 1 | 4 | 1,5 | 50 | 15 | 0,025 | 0,1 |
| | HM905MFZXL010 | 1 | 4 | 1,5 | 50 | 20 | 0,025 | 0,1 |
| 1,2 | HM905M0122 | 1,2 | 3 | 3,8 | 38 | | | |
| | HM905ML0122 | 1,2 | 4 | 3,8 | 50 | | | |
| | HM905L012 | 1,2 | 3 | 1,8 | 40 | 6 | 0,025 | 0,1 |
| | HM905XL012 | 1,2 | 3 | 1,8 | 40 | 10 | 0,025 | 0,1 |

Durchmesserbereich:
1,2 bis 2,0 mm
diamter range:
1,2 to 2,0 mm

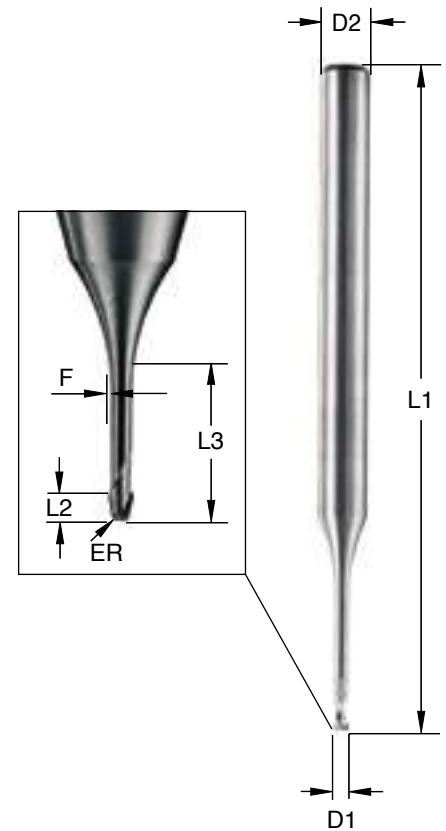
Mögliche Beschichtungen:
DIP - Standard
ALX - auf Anfrage
TL5 - auf Anfrage
possible coatings:
DIP - Standard
ALX - on demand
TL5 - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. HM905M0082 und wenn gewünscht Beschichtung: z.B. DIP.
Please indicate order number: e.g. HM905M0102 and if wanted COATING: e.g. DIP.



| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | F mm | ER mm | |
|-----|--------------------------------|----------|----------------|----------|----------------|----------|---------|----------|--|
| 1,5 | HM905M0152 | 1,5 | 3 | 4,2 | 38 | | | | |
| | HM905ML0152 | 1,5 | 4 | 4,2 | 50 | | | | |
| | HM905L015 | 1,5 | 3 | 2,2 | 40 | 7,5 | 0,05 | 0,15 | |
| | HM905XL015 | 1,5 | 3 | 2,2 | 40 | 12 | 0,05 | 0,15 | |
| | HM905MFZL015 | 1,5 | 4 | 2,2 | 50 | 15 | 0,05 | 0,15 | |
| | HM905MFSL015 | 1,5 | 4 | 2,2 | 50 | 20 | 0,05 | 0,15 | |
| | HM905MFZXL015 | 1,5 | 4 | 2,2 | 60 | 25 | 0,05 | 0,15 | |
| 2,0 | HM905M0202 | 2 | 3 | 6 | 38 | | | | |
| | HM905ML0202 | 2 | 4 | 6 | 50 | | | | |
| | HM905LE020 | 2 | 3 | 4 | 50 | 12 | 0,05 | 0,2 | |
| | HM905XL020 | 2 | 3 | 4 | 50 | 16 | 0,05 | 0,2 | |
| | HM905SL020 | 2 | 3 | 4 | 50 | 20 | 0,05 | 0,2 | |
| | HM905MFL020 | 2 | 6 | 2 | 60 | 15 | 0,05 | 0,2 | |
| | HM905MFZL020 | 2 | 4 | 2 | 60 | 20 | 0,05 | 0,2 | |
| | HM905MFXL020 | 2 | 6 | 2 | 75 | 30 | 0,05 | 0,2 | |

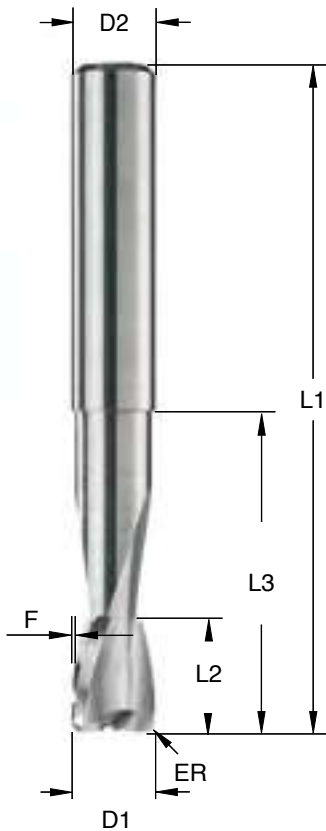
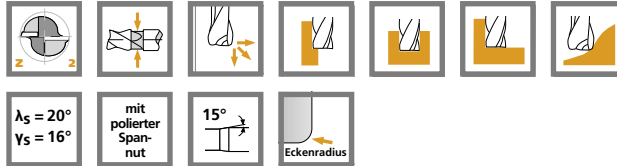


Durchmesserbereich:
0,1 bis 2,0 mm
diameter range:
0,1 to 2,0 mm

Mögliche Beschichtungen:
DIP - Standard
ALX - auf Anfrage
TL5 - auf Anfrage
possible coatings:
DIP - Standard
ALX - on demand
TL5 - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. HM905M0162 und wenn gewünscht Beschichtung: z.B. DIP.
Please indicate order number: e.g. HM905L020 and if wanted COATING: e.g. DIP.



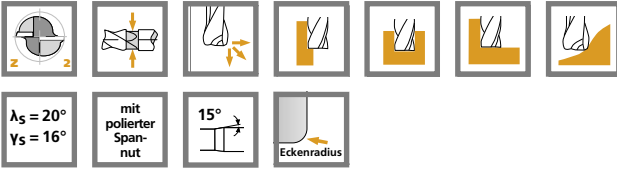
Durchmesserbereich:
1,0 bis 20,0 mm
diameter range:
1,0 to 20,0 mm

Mögliche Beschichtungen:
DIP - Standard
ALX - auf Anfrage
TL5 - auf Anfrage
possible coatings:
DIP - Standard
ALX - on demand
TL5 - on demand

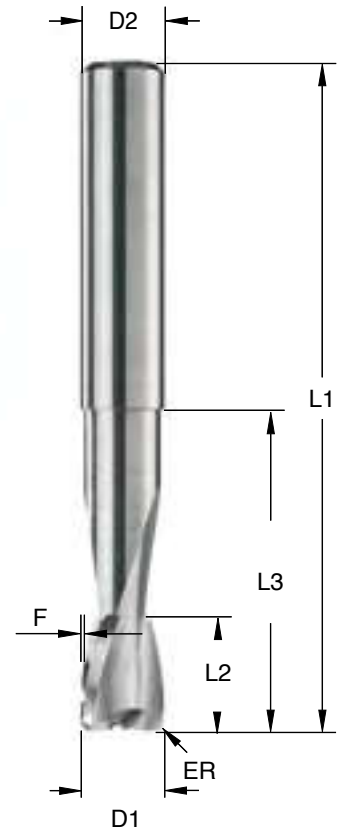
| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | F mm | ER mm |
|---------------|--------------------------------|------------|----------------|----------|----------------|----------|---------|----------|
| 1,0 | HC402AK010 | 1 | 3 | 2 | 40 | | | 0,2 |
| | HC402A010 | 1 | 3 | 5 | 40 | | | 0,1 |
| | HC402AX010 | 1 | 6 | 5 | 50 | | | 0,2 |
| 1,5 | HC402AK015 | 1,5 | 3 | 2,5 | 40 | | | 0,2 |
| | HC402A015 | 1,5 | 3 | 6 | 40 | | | 0,1 |
| | HC402AX015 | 1,5 | 6 | 7,5 | 50 | | | 0,2 |
| 2,0 | HC402AKF020 | 2 | 3 | 3 | 40 | 6 | 0,05 | 0,2 |
| | HC402AK020 | 2 | 3 | 6 | 40 | | | 0,1 |
| | HC402A02002 | 2 | 3 | 8 | 40 | | | 0,2 |
| | HC402L020015 | 2 | 3 | 6 | 60 | | | 0,15 |
| | HC402L020025 | 2 | 3 | 6 | 60 | | | 0,25 |
| | HC402L02005 | 2 | 3 | 6 | 60 | | | 0,5 |
| | HC402XL020 | 2 | 3 | 15 | 75 | | | 0,1 |
| | HC402XLF02002 | 2 | 3 | 10 | 100 | 20 | 0,05 | 0,2 |
| | HC402AXK02002 | 2 | 6 | 6 | 50 | | | 0,2 |
| | HC402AX02005 | 2 | 6 | 10 | 50 | | | 0,5 |
| | 2,5 | HC402AK025 | 2,5 | 3 | 8 | 40 | | |
| HC402AXK025 | | 2,5 | 6 | 6 | 50 | | | 0,2 |
| 3,0 | HC402KF03005 | 3 | 3 | 6 | 40 | 15 | 0,05 | 0,5 |
| | HC402K030 | 3 | 3 | 8 | 40 | | | 0,2 |
| | HC402K03003 | 3 | 3 | 8 | 40 | | | 0,3 |
| | HC402030 | 3 | 3 | 10 | 50 | | | 0,2 |
| | HC402KFL03005 | 3 | 3 | 6 | 60 | 30 | 0,05 | 0,5 |
| | HC402L030 | 3 | 3 | 18 | 60 | | | 0,1 |
| | HC402SL03003 | 3 | 3 | 30 | 60 | | | 0,3 |
| | HC402XL030 | 3 | 3 | 25 | 75 | | | 0,1 |
| | HC402KFXL03003 | 3 | 3 | 6 | 100 | 50 | 0,05 | 0,3 |
| | HC402KFXL03005 | 3 | 3 | 6 | 100 | 50 | 0,05 | 0,5 |
| | HC402A030 | 3 | 6 | 8 | 50 | | | 0,2 |
| | HC402AK030 | 3 | 6 | 4 | 60 | 15 | 0,05 | 0,25 |
| | HC402AV06005 | 3 | 6 | 8 | 60 | | | 0,5 |
| | HC402AVL030 | 3 | 6 | 10 | 75 | | | 0,1 |
| HC402AL03005 | 3 | 6 | 10 | 75 | | | 0,5 | |
| HC402AXL03002 | 3 | 8 | 10 | 100 | | | 0,2 | |
| 4,0 | HC402K040 | 4 | 4 | 8 | 40 | | | 0,2 |
| | HC402040 | 4 | 4 | 5 | 50 | 12 | 0,1 | 0,2 |
| | HC402VL04005 | 4 | 4 | 6 | 60 | 30 | 0,1 | 0,5 |
| | HC40204005 | 4 | 4 | 15 | 60 | | | 0,5 |
| | HC402L040 | 4 | 4 | 20 | 60 | | | 0,2 |
| | HC402L04005 | 4 | 4 | 30 | 60 | | | 0,5 |
| | HC402VL040 | 4 | 4 | 30 | 75 | | | 0,2 |
| | HC402VXL040 | 4 | 4 | 20 | 100 | 50 | 0,1 | 0,3 |
| | HC402AF040025 | 4 | 6 | 5 | 50 | 10 | 0,1 | 0,25 |
| | HC402A040 | 4 | 6 | 6 | 50 | | | 0,2 |
| | HC402AL040 | 4 | 6 | 14 | 50 | | | 0,2 |
| | HC402AV04005 | 4 | 6 | 8 | 60 | 15 | 0,1 | 0,5 |
| | HC402AL04005 | 4 | 6 | 10 | 75 | | | 0,5 |
| | HC402AVL040 | 4 | 8 | 18 | 75 | | | 0,2 |
| | HC402AVXL040 | 4 | 8 | 12 | 100 | | | 0,2 |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. HC402K080 und wenn gewünscht Beschichtung: z.B. DIP.
Please indicate order number: e.g. HC402F1605 and if wanted COATING: e.g. DIP.



| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | F mm | ER mm |
|-----|--------------------------------|----------|----------------|----------|----------------|----------|---------|----------|
| 5,0 | HC402K050 | 5 | 5 | 10 | 40 | | | 0,2 |
| | HC402050 | 5 | 5 | 8 | 50 | 14 | 0,1 | 0,2 |
| | HC402L05005 | 5 | 5 | 22 | 60 | | | 0,5 |
| | HC402L050 | 5 | 5 | 5 | 62 | 30 | 0,1 | 0,49 |
| | HC402VL050 | 5 | 5 | 6 | 75 | 40 | 0,1 | 0,49 |
| | HC402VL05005 | 5 | 5 | 30 | 75 | | | 0,5 |
| | HC402VXXL050 | 5 | 5 | 25 | 100 | 50 | 0,1 | 0,49 |
| | HC402VXL050 | 5 | 5 | 38 | 100 | | | |
| | HC402AF050 | 5 | 6 | 8 | 50 | 15 | 0,1 | 0,2 |
| | HC402A050 | 5 | 6 | 16 | 50 | | | 0,2 |
| | HC402AV05005 | 5 | 6 | 10 | 60 | 20 | 0,1 | 0,5 |
| | HC402AL05005 | 5 | 6 | 22 | 60 | | | 0,5 |
| | HC402AVL050 | 5 | 8 | 25 | 75 | | | 0,2 |
| | HC402AVXL050 | 5 | 8 | 15 | 100 | | | 0,2 |
| 6,0 | HC402K060 | 6 | 6 | 8 | 40 | | | 0,2 |
| | HC402KF060 | 6 | 6 | 10 | 50 | 18 | 0,15 | 0,2 |
| | HC402KL060 | 6 | 6 | 18 | 50 | | | 0,2 |
| | HC402F060025 | 6 | 6 | 8 | 60 | 20 | 0,15 | 0,25 |
| | HC402F06005 | 6 | 6 | 8 | 60 | 20 | 0,15 | 0,5 |
| | HC402F06010 | 6 | 6 | 8 | 60 | 30 | 0,15 | 1,0 |
| | HC402F06015 | 6 | 6 | 8 | 60 | 30 | 0,15 | 1,5 |
| | HC402060 | 6 | 6 | 20 | 60 | | | 0,2 |
| | HC40206005 | 6 | 6 | 20 | 60 | | | 0,5 |
| | HC402FL06005 | 6 | 6 | 10 | 75 | 35 | 0,15 | 0,5 |
| | HC402L06005 | 6 | 6 | 30 | 75 | | | 0,5 |
| | HC402VL06005 | 6 | 6 | 40 | 75 | | | 0,5 |
| | HC402F060 | 6 | 6 | 10 | 100 | 50 | 0,15 | 0,5 |
| | HC402FL060 | 6 | 6 | 10 | 100 | 50 | 0,15 | 1,0 |
| | HC402XFL06005 | 6 | 6 | 20 | 100 | 50 | 0,15 | 0,5 |
| | HC402FXL060 | 6 | 6 | 40 | 100 | | | 0,25 |
| | HC402FXXL060 | 6 | 6 | 40 | 100 | | | 0,5 |
| | HC402SL06010 | 6 | 6 | 50 | 150 | | | 1,0 |
| | HC402VXXL060 | 6 | 6 | 25 | 200 | | | 0,2 |
| | HC402AF06005 | 6 | 8 | 12 | 75 | 40 | 0,15 | 0,5 |
| | HC402A060 | 6 | 8 | 25 | 75 | | | 0,2 |
| | HC402AXL060 | 6 | 8 | 18 | 100 | | | 0,2 |
| 8,0 | HC402KF080 | 8 | 8 | 10 | 50 | 20 | 0,2 | 0,2 |
| | HC402K080 | 8 | 8 | 12 | 50 | | | 0,2 |
| | HC402KL08005 | 8 | 8 | 20 | 50 | | | 0,5 |
| | HC402F08005 | 8 | 8 | 10 | 63 | 30 | 0,2 | 0,5 |
| | HC402F08010 | 8 | 8 | 10 | 63 | 30 | 0,2 | 1,0 |
| | HC402F08020 | 8 | 8 | 10 | 63 | 30 | 0,2 | 2,0 |
| | HC402080 | 8 | 8 | 25 | 63 | | | 0,2 |
| | HC402LF080 | 8 | 8 | 10 | 75 | 30 | 0,2 | 0,2 |
| | HC402LF08005 | 8 | 8 | 10 | 75 | 30 | 0,2 | 0,5 |
| | HC402LF08010 | 8 | 8 | 10 | 75 | 30 | 0,2 | 1,0 |
| | HC402L08005 | 8 | 8 | 30 | 75 | | | 0,5 |
| | HC402XL08010 | 8 | 8 | 15 | 100 | 40 | 0,2 | 1,0 |
| | HC402XL08005 | 8 | 8 | 20 | 100 | | | 0,5 |
| | HC402XXL08010 | 8 | 8 | 40 | 100 | | | 1,0 |

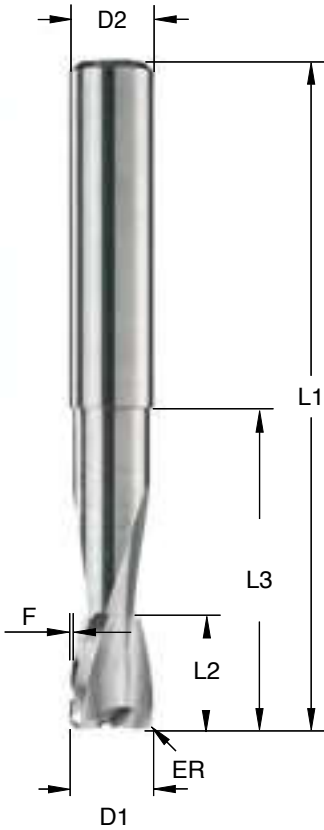
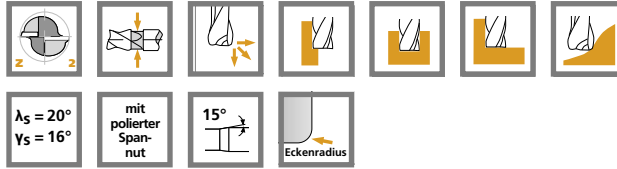


Durchmesserbereich:
1,0 bis 20,0 mm
diameter range:
1,0 to 20,0 mm

Mögliche Beschichtungen:
DIP - Standard
ALX - auf Anfrage
TL5 - auf Anfrage
possible coatings:
DIP - Standard
ALX - on demand
TL5 - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. HC402K080 und wenn gewünscht Beschichtung: z.B. DIP.
Please indicate order number: e.g. HC402F1605 and if wanted COATING: e.g. DIP.



Durchmesserbereich:
1,0 bis 20,0 mm
diameter range:
1,0 to 20,0 mm

Mögliche Beschichtungen:
DIP - Standard
ALX - auf Anfrage
TL5 - auf Anfrage
possible coatings:
DIP - Standard
ALX - on demand
TL5 - on demand

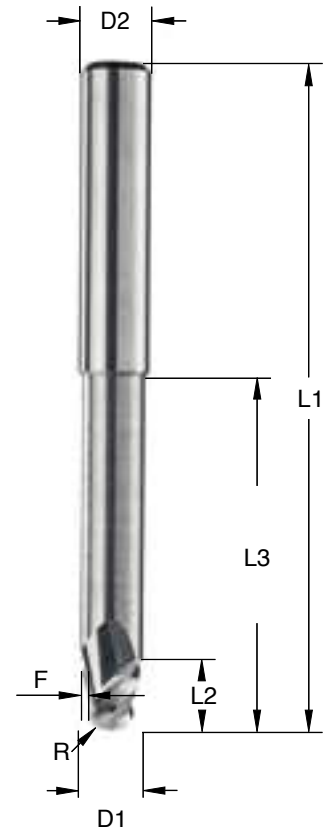
| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | F mm | ER mm |
|------|--------------------------------|----------|----------------|----------|----------------|----------|---------|----------|
| 10,0 | HC402K100 | 10 | 10 | 16 | 60 | | | 0,2 |
| | HC402F10005 | 10 | 10 | 12 | 72 | 35 | 0,25 | 0,5 |
| | HC402F10010 | 10 | 10 | 12 | 72 | 35 | 0,25 | 1,0 |
| | HC402F10025 | 10 | 10 | 12 | 72 | 35 | 0,25 | 2,5 |
| | HC40210010 | 10 | 10 | 25 | 72 | | | 1,0 |
| | HC402LF10005 | 10 | 10 | 12 | 90 | 36 | 0,25 | 0,5 |
| | HC402LF10010 | 10 | 10 | 12 | 90 | 36 | 0,25 | 1,0 |
| | HC402LF10025 | 10 | 10 | 12 | 90 | 36 | 0,25 | 2,5 |
| | HC402VL10005 | 10 | 10 | 35 | 100 | | | 0,5 |
| | HC402VKL10005 | 10 | 10 | 16 | 100 | | | 0,5 |
| | HC402FKL10010 | 10 | 10 | 16 | 100 | 50 | 0,25 | 1,0 |
| | HC402XLF10010 | 10 | 10 | 16 | 125 | 80 | 0,25 | 1,0 |
| | HC402SL10010 | 10 | 10 | 50 | 150 | | | 1,0 |
| 12,0 | HC402K120 | 12 | 12 | 16 | 65 | 35 | 0,3 | 0,2 |
| | HC402KF12030 | 12 | 12 | 16 | 83 | 40 | 0,3 | 3,0 |
| | HC402F12005 | 12 | 12 | 16 | 100 | 50 | 0,3 | 0,5 |
| | HC402F12010 | 12 | 12 | 16 | 100 | 50 | 0,3 | 1,0 |
| | HC402F12030 | 12 | 12 | 16 | 100 | 40 | 0,3 | 3,0 |
| | HC40212010 | 12 | 12 | 45 | 100 | | | 1,0 |
| | HC402LF12005 | 12 | 12 | 16 | 125 | 70 | 0,3 | 0,5 |
| | HC402XL12010 | 12 | 12 | 60 | 150 | | | 1,0 |
| 16,0 | HC402F16005 | 16 | 16 | 18 | 100 | 50 | 0,5 | 0,5 |
| | HC402F16015 | 16 | 16 | 18 | 100 | 50 | 0,5 | 1,5 |
| | HC402F16040 | 16 | 16 | 18 | 100 | 50 | 0,5 | 4,0 |
| | HC40216010 | 16 | 16 | 50 | 100 | | | 1,0 |
| | HC402XLF16005 | 16 | 16 | 18 | 150 | 90 | 0,5 | 0,5 |
| | HC402SL16010 | 16 | 16 | 80 | 200 | | | 1,0 |
| 20,0 | HC402F200 | 20 | 20 | 20 | 104 | 50 | 0,5 | 0,2 |
| | HC40220010 | 20 | 20 | 60 | 104 | | | 1,0 |
| | HC402F20015 | 20 | 20 | 20 | 104 | 50 | 0,5 | 1,5 |
| | HC402L20050 | 20 | 20 | 20 | 125 | 60 | 0,5 | 5,0 |
| | HC402XL20010 | 20 | 20 | 100 | 200 | | | 1,0 |



$\lambda_s = 35^\circ$
 $\gamma_s = 18^\circ$

mit
polierter
Span-
nut

| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | F mm | R mm |
|------|--------------------------------|----------|----------------|----------|----------------|----------|---------|---------|
| 2,0 | HC452020 | 2 | 6 | 3 | 60 | 6 | 0,1 | 1 |
| | HC452AL020 | 2 | 6 | 10 | 75 | 20 | 0,1 | 1 |
| 3,0 | HC452030 | 3 | 6 | 4 | 60 | 15 | 0,1 | 1,5 |
| | HC452AL030 | 3 | 6 | 12 | 75 | 25 | 0,1 | 1,5 |
| 4,0 | HC452040 | 4 | 6 | 5 | 60 | 15 | 0,1 | 2 |
| | HC452AL040 | 4 | 6 | 15 | 75 | 30 | 0,1 | 2 |
| 5,0 | HC452050 | 5 | 6 | 6 | 60 | 15 | 0,2 | 2,5 |
| | HC452AL050 | 5 | 6 | 20 | 75 | 30 | 0,2 | 2,5 |
| 6,0 | HC452060 | 6 | 6 | 10 | 60 | 30 | 0,3 | 3 |
| | HC452A060 | 6 | 6 | 10 | 75 | 35 | 0,3 | 3 |
| | HC452L060 | 6 | 6 | 10 | 100 | 50 | 0,3 | 3 |
| 8,0 | HC452080 | 8 | 8 | 7 | 63 | 30 | 0,4 | 4 |
| | HC452A080 | 8 | 8 | 7 | 75 | 40 | 0,4 | 4 |
| | HC452L080 | 8 | 8 | 7 | 100 | 50 | 0,4 | 4 |
| 10,0 | HC452100 | 10 | 10 | 8,5 | 72 | 35 | 0,5 | 5 |
| | HC452A100 | 10 | 10 | 8,5 | 100 | 45 | 0,5 | 5 |
| | HC452L100 | 10 | 10 | 10 | 125 | 85 | 0,5 | 5 |
| 12,0 | HC452120 | 12 | 12 | 10,5 | 83 | 40 | 0,5 | 6 |
| | HC452A120 | 12 | 12 | 10,5 | 125 | 60 | 0,5 | 6 |
| | HC452XL120 | 12 | 12 | 10,5 | 150 | 100 | 0,5 | 6 |
| 16,0 | HC452160 | 16 | 16 | 14 | 100 | 50 | 0,75 | 8 |
| | HC452A160 | 16 | 16 | 14 | 125 | 60 | 0,75 | 8 |
| | HC452XL160 | 16 | 16 | 24 | 150 | 100 | 0,75 | 8 |
| 20,0 | HC452200 | 20 | 20 | 17 | 104 | 50 | 1,0 | 10 |
| | HC452A200 | 20 | 20 | 17 | 125 | 60 | 1,0 | 10 |
| | HC452XL200 | 20 | 20 | 25 | 150 | 100 | 1,0 | 10 |



Durchmesserbereich:
2,0 bis 20,0 mm
diameter range:
2,0 to 20,0 mm

Mögliche Beschichtungen:
DIP - Standard
ALX - auf Anfrage
TL5 - auf Anfrage
possible coatings:
DIP - Standard
ALX - on demand
TL5 - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. HC452100 und wenn gewünscht Beschichtung: z.B. DIP.
Please indicate order number: e.g. HC452A160 and if wanted COATING: e.g. DIP.

A large grid of graph paper for taking notes, consisting of 20 columns and 30 rows of small squares.

FIBER-LINE

FÜR GFK-/CFK-MATERIALIEN,
VERSTÄRKTE WERK-
STOFFE UND
SCHAUMWERKSTOFFE

FOR GFK-/CFK- MATERIALS,
REINFORCED MATERIALS,
FOAM MATERIALS



Hartschäume
Hard foams

Weichschäume
Flexible foams

GFK
GFK

CFK
CFK

GMT
GMT

LFT
LFT

SMC
SMC

Kevlar
Kevlar

Honeycomb
Honeycomb

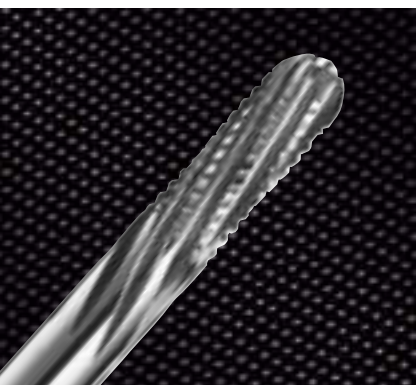
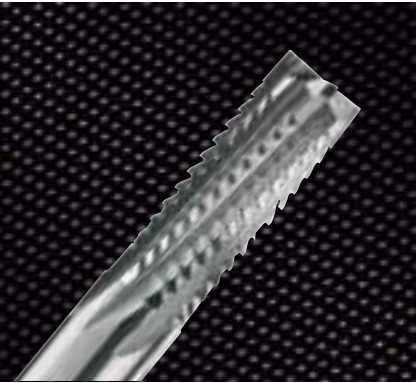
Organobleche
Organo sheet

HUFSCHMIED
ZERSpanungSSYSTEME

FIBER-LINE

FIBER-LINE

MATERIALBESCHREIBUNG UND BESCHICHTUNG



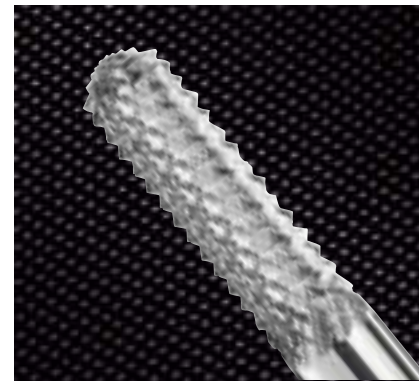
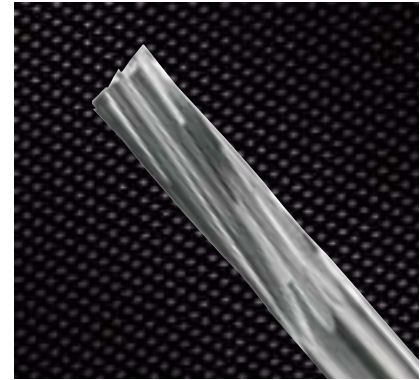
| WIR EMPFEHLEN: | | | BLANK | ALX/TL5 | DIP® |
|-----------------|----------------------------|-----------------------------|-------|---------|------|
| GFK | bis 30% Faseranteil | Carbon-Fräser GR-verzahnt | • | | |
| | | Carbon-Fräser WD-verzahnt | | • | |
| | | Universal-Fräser Z3 | | | • |
| | 30% bis 60% Faseranteil | HEXA CUT®-PC | | • | |
| | | Carbon-Fräser WD-verzahnt | | • | |
| | | Carbon-Fräser N-verzahnt | | • | |
| | | PKD | • | | |
| | über 60% Faseranteil | Carbon-Fräser N-verzahnt | | | • |
| Glasgewebe | | PKD HEXA CUT®-PC | | • | • |
| | | Carbon-Fräser WD-verzahnt | | • | • |
| GMT / LFT / LFI | | HEXA CUT® | • | • | |
| | | Carbon-Fräser GR-verzahnt | • | • | |
| SMC / BMC | | 066SMC | • | • | |
| | | Carbon-Fräser GR-verzahnt | | • | |
| CFK | bis 30% Faseranteil | HEXA CUT® | | • | • |
| | | Carbon-Fräser CARB STAR® | • | • | • |
| | 30% bis 60% Faseranteil | T-REX / CARB STAR® | • | • | • |
| | | HEXA CUT® | • | • | • |
| | | Carbon-Fräser | | • | • |
| | über 60% Faseranteil | T-REX / CARB STAR® | | | • |
| | | HEXA CUT®-PKD | | • | • |
| | | Carbon-Fräser N-verzahnt | | | • |
| Reincarbon | | HEXA CUT® | | | • |
| | | Carbon-Fräser WD-verzahnt | | • | • |
| Wabenstruktur | | HEXA CUT®-PW | • | • | |
| | | Carbon-Fräser WD-verzahnt | • | | |
| UD | | HC650 / HC670BD | | • | • |

FIBER-LINE

MATERIAL DESCRIPTION AND COATING



| WE RECOMMEND: | | | UNCOATED | ALXITL5 | DIP® |
|-----------------|----------------------------------|---|----------|---------|------|
| Glas fiber | up to 30% reinforcement | Carbon-end Mill GR-toothed Carbon-end Mill GR-toothed Universal-end Mill 3F | ● | ● | ● |
| | from 30% up to 60% reinforcement | HEXA CUT®-PC Carbon-end Mill WD-toothed Carbon-end Mill N-toothed | | ● | ● |
| | | PKD | ● | | |
| | over 60% reinforcement | Carbon-end Mill N-toothed | | | ● |
| Glas fabric | | PKD HEXA CUT®-PC Carbon-end Mill WD-toothed | | ● | ● |
| GMT / LFT / LFI | | HEXA CUT® Carbon-end Mill GR-toothed | ● | ● | |
| SMC / BMC | | 066SMC Carbon-Fräser GR-verzahnt | ● | ● | |
| Carbon fiber | up to 30% reinforcement | HEXA CUT® Carbon-end Mill CARB STAR® | ● | ● | ● |
| | from 30% up to 60% reinforcement | T-REX / CARB STAR® HEXA CUT® Carbon-end Mill | ● | ● | ● |
| | over 60% reinforcement | T-REX / CARB STAR® HEXA CUT® Carbon-end Mill N-toothed | | ● | ● |
| Pure Carbon | | HEXA CUT® Carbon-end Mill WD-toothed | | ● | ● |
| Honeycomb | | HEXA CUT®-PW Carbon-end Mill WD-toothed | ● | ● | |
| UD | | HC650 / HC670BD | | ● | ● |

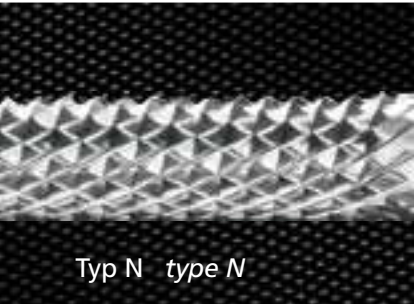


FIBER-LINE

CARBONFRÄSER

CARBON END MILL

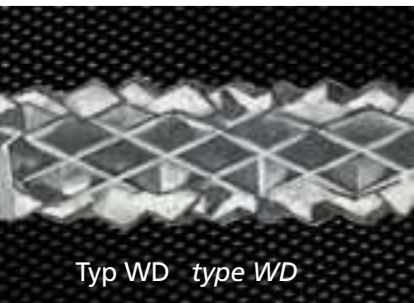
FIBER-LINE



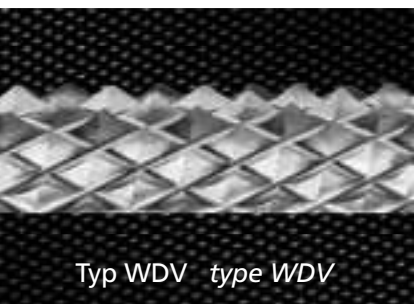
Typ N type N



Typ GR type GR



Typ WD type WD



Typ WDV type WDV

FIBER-LINE-Werkzeuge sind in Geometrie und Substrat speziell auf die Bearbeitung von Glas- und Kohlefaserwerkstoffen oder anderen faserverstärkten Werkstoffen zugeschnitten.

Die Carbonfräser sind in verschiedenen Verzahnungstypen erhältlich:

N engverzahnt
 WD mittelverzahnt
 GR grobverzahnt

Die Ausführung WDV ist für eine vibrationsreduzierte Bearbeitung optimiert. In Kombination mit extrem verschleißfesten Hartmetallen und Beschichtungen lassen sich damit auch bei sehr abrasiven Werkstoffen hohe Bearbeitungsgeschwindigkeiten mit optimalen Oberflächengüten erzielen.

FIBER-LINE-tools with specially designed geometry and substrate are specifically tailored for processing glass and carbon-fiber materials or other fiber reinforced materials

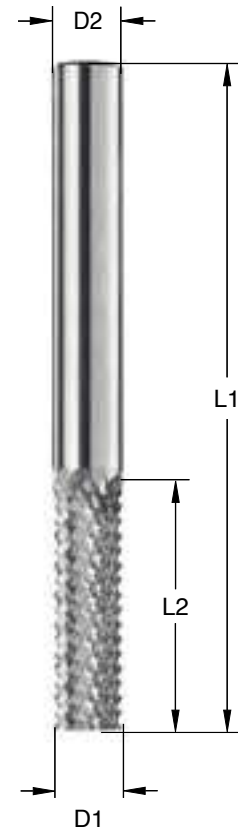
The carbon milling tools are available in different tooth types:

*N narrow-toothed
 WD medium-toothed
 GR coarse-toothed*

The WDV design is optimized for vibration-reduced processing. In combination with wear-resistant carbide metals and coatings even highly abrasive materials can be processed at high speed while achieving optimum surface quality.



| BESTELL-NUMMER ORDER NUMBER | | Verzahnung teeth | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm |
|--------------------------------|-------------|---------------------|-----------------|-----------------------|----------|----------------|
| 2,0 | 106020020 | N | 2 | 2 | 7 | 40 |
| 3,0 | 106030030 | N | 3 | 3 | 10 | 40 |
| | 106L030030 | N | 3 | 3 | 10 | 75 |
| 3,17 / 1/8" | 1060317317 | N | 3,17 / 1/8" | 3,17 / 1/8" | 10 | 38 |
| | 106L0317317 | N | 3,17 / 1/8" | 3,17 / 1/8" | 10 | 75 |
| 4,0 | 106040040 | N | 4 | 4 | 15 | 40 |
| | 106L040040 | N | 4 | 4 | 15 | 75 |
| 4,76 / 3/16" | 1060476476 | N | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 50 |
| | 106L0476476 | N | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 75 |
| 5,0 | 106050050 | N | 5 | 5 | 16 | 50 |
| | 106L050050 | N | 5 | 5 | 16 | 75 |
| 6,35 / 1/4" | 1060635635 | N | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 50 |
| | 106L0635635 | N | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 75 |
| 6,0 | 106060060 | N | 6 | 6 | 18 | 50 |
| | 106L060060 | N | 6 | 6 | 18 | 75 |
| 7,93 / 5/16" | 1060793793 | N | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 63 |
| | 106L0793793 | N | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 75 |
| 8,0 | 106080080 | N | 8 | 8 | 25 | 63 |
| | 106L080080 | N | 8 | 8 | 25 | 75 |
| 9,52 / 3/8" | 1060952952 | N | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 63 |
| | 106L0952952 | N | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 |
| 10,0 | 106100100 | N | 10 | 10 | 30 | 72 |
| 12,0 | 106120120 | N | 12 | 12 | 32 | 83 |
| 12,7 / 1/2" | 106127127 | N | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 |
| 16,0 | 106160160 | N | 16 | 16 | 36 | 92 |
| 20,0 | 106200200 | N | 20 | 20 | 45 | 104 |

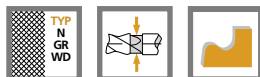
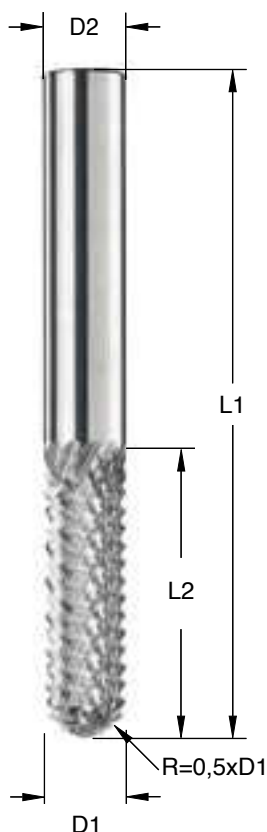


Durchmesserbereich:
2,0 bis 20,0 mm
diameter range:
2,0 to 20,0 mm

Mögliche Beschichtungen:
TL5 - Standard
ALX - auf Anfrage
DIP - auf Anfrage
possible coatings:
TL5 - Standard
ALX - on demand
DIP - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 106100100 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. 106L060060 and if wanted COATING: e.g. TL5.


 $\lambda_s = 0^\circ$
 $\gamma_s = 15^\circ$


Durchmesserbereich:
2,0 bis 20,0 mm
diameter range:
2,0 to 20,0 mm

Mögliche Beschichtungen:
TL5 - Standard
ALX - auf Anfrage
DIP - auf Anfrage
possible coatings:
TL5 - Standard
ALX - on demand
DIP - on demand

Bitte gewünschte Verzahnung angeben. Unsere WDV-Verzahnung erhalten Sie auf Anfrage.
Please indicate wanted teeth.
WDV-toothing on demand.

| | BESTELL-NUMMER ORDER NUMBER | Verzahnung teeth | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | |
|--------------|--------------------------------|---------------------|-----------------|-----------------------|----------|----------------|--|
| 2,0 | 107RKK020 | N | 2 | 3 | 3 | 40 | |
| | 107RA020020 | N | 2 | 3 | 7 | 40 | |
| 3,0 | 107RECO030 | N / WD | 3 | 3 | 12 | 40 | |
| | 107RKK030 | N / WD | 3 | 3 | 4 | 50 | |
| | 107RLO30030 | N / WD | 3 | 3 | 10 | 75 | |
| | 107RA030060 | N / WD | 3 | 6 | 15 | 60 | |
| 3,17 / 1/8" | 107R0317317 | N / WD | 3,17 / 1/8" | 3,17 / 1/8" | 10 | 38 | |
| | 107RL0317317 | N / WD | 3,17 / 1/8" | 3,17 / 1/8" | 10 | 75 | |
| 4,0 | 107R040040 | N / WD / GR | 4 | 4 | 15 | 40 | |
| | 107RKK040 | N / WD / GR | 4 | 4 | 5 | 50 | |
| | 107RECO040 | N / WD / GR | 4 | 4 | 16 | 50 | |
| | 107RLO40040 | N / WD / GR | 4 | 4 | 15 | 75 | |
| | 107RA040060 | N / WD / GR | 4 | 6 | 20 | 60 | |
| 4,76 / 3/16" | 107R0476476 | N / WD / GR | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 50 | |
| | 107RL0476476 | N / WD / GR | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 75 | |
| 5,0 | 107RKK050 | N / WD / GR | 5 | 5 | 6 | 50 | |
| | 107R050050 | N / WD / GR | 5 | 5 | 16 | 50 | |
| | 107RLO50050 | N / WD / GR | 5 | 5 | 16 | 75 | |
| | 107RA050060 | N / WD / GR | 5 | 6 | 20 | 60 | |
| 6,0 | 107RKK060 | N / WD / GR | 6 | 6 | 7 | 50 | |
| | 107R060060 | N / WD / GR | 6 | 6 | 18 | 50 | |
| | 107RECO060 | N / WD / GR | 6 | 6 | 19 | 60 | |
| | 107RH060060 | N / WD / GR | 6 | 6 | 25 | 65 | |
| | 107RLO60060 | N / WD / GR | 6 | 6 | 18 | 75 | |
| | 107RXL060060 | N / WD / GR | 6 | 6 | 30 | 75 | |
| 6,35 / 1/4" | 107R0635635 | N / WD / GR | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 50 | |
| | 107RL0635635 | N / WD / GR | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 75 | |
| 7,93 / 5/16" | 107R0793793 | N / WD / GR | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 63 | |
| | 107RL0793793 | N / WD / GR | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 75 | |
| 8,0 | 107RKK080 | N / WD / GR | 8 | 8 | 9 | 50 | |
| | 107RECO080 | N / WD / GR | 8 | 8 | 25 | 63 | |
| | 107RH080080 | N / WD / GR | 8 | 8 | 30 | 63 | |
| | 107RLO80080 | N / WD / GR | 8 | 8 | 25 | 75 | |
| | 107RXL080080 | N / WD / GR | 8 | 8 | 35 | 75 | |
| 9,52 / 3/8" | 107R0952952 | N / WD / GR | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 63 | |
| | 107RL0952952 | N / WD / GR | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 | |
| 10,0 | 107RECO100 | N / WD / GR | 10 | 10 | 25 | 72 | |
| | 107R100100 | N / WD / GR | 10 | 10 | 30 | 72 | |
| 12,0 | 107R120120 | N / WD / GR | 12 | 12 | 32 | 83 | |
| 12,7 / 1/2" | 107R127127 | N / WD / GR | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 | |
| 16,0 | 107R160160 | N / WD / GR | 16 | 16 | 36 | 92 | |
| 20,0 | 107R200200 | N / WD / GR | 20 | 20 | 45 | 104 | |

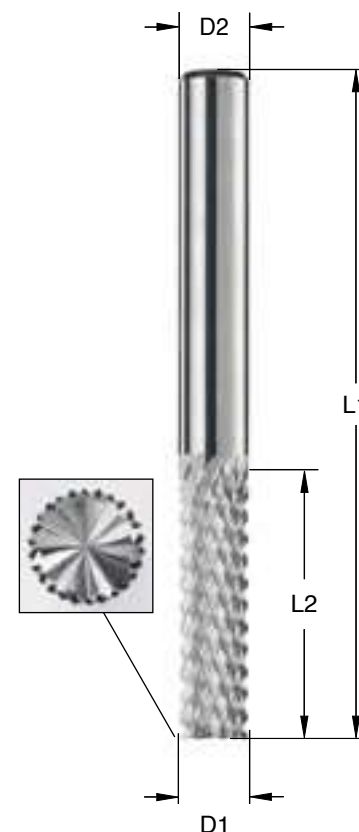
Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 107R030030-WD und wenn gewünscht Beschichtung: z.B. TL5.

Please indicate order number: e.g. 107RKK060-GR and if wanted COATING: e.g. TL5.



| | BESTELL-NUMMER ORDER NUMBER | Verzahnung teeth | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm |
|--------------|--------------------------------|---------------------|-----------------|-----------------------|----------|----------------|
| 2,0 | 107020020 | N | 2 | 2 | 7 | 40 |
| 3,0 | 107030030 | N | 3 | 3 | 10 | 40 |
| | 107L030030 | N | 3 | 3 | 10 | 75 |
| 3,17 / 1/8" | 1070317317 | N | 3,17 / 1/8" | 3,17 / 1/8" | 10 | 38 |
| | 107L0317317 | N | 3,17 / 1/8" | 3,17 / 1/8" | 10 | 75 |
| 4,0 | 107040040 | N | 4 | 4 | 15 | 40 |
| | 107L040040 | N | 4 | 4 | 15 | 75 |
| 4,76 / 3/16" | 1070476476 | N | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 38 |
| | 107L0476476 | N | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 75 |
| 5,0 | 107050050 | N | 5 | 5 | 16 | 50 |
| | 107L050050 | N | 5 | 5 | 16 | 75 |
| 6,0 | 107060060 | N | 6 | 6 | 18 | 50 |
| | 107L060060 | N | 6 | 6 | 18 | 75 |
| 6,35 / 1/4" | 1070635635 | N | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 50 |
| | 107L0635635 | N | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 75 |
| 7,93 / 5/16" | 1070793793 | N | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 63 |
| | 107L0793793 | N | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 75 |
| 8,0 | 107080080 | N | 8 | 8 | 25 | 63 |
| | 107L080080 | N | 8 | 8 | 25 | 75 |
| 9,52 / 3/8" | 1070952952 | N | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 63 |
| | 107L0952952 | N | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 |
| 10,0 | 107100100 | N | 10 | 10 | 30 | 72 |
| 12,0 | 107120120 | N | 12 | 12 | 32 | 83 |
| 12,7 / 1/2" | 107127127 | N | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 |
| 16,0 | 107160160 | N | 16 | 16 | 36 | 92 |
| 20,0 | 107200200 | N | 20 | 20 | 45 | 104 |



Durchmesserbereich:
2,0 bis 20,0 mm
diameter range:
2,0 to 20,0 mm

Mögliche Beschichtungen:
TL5 - Standard
ALX - auf Anfrage
DIP - auf Anfrage
possible coatings:
TL5 - Standard
ALX - on demand
DIP - on demand

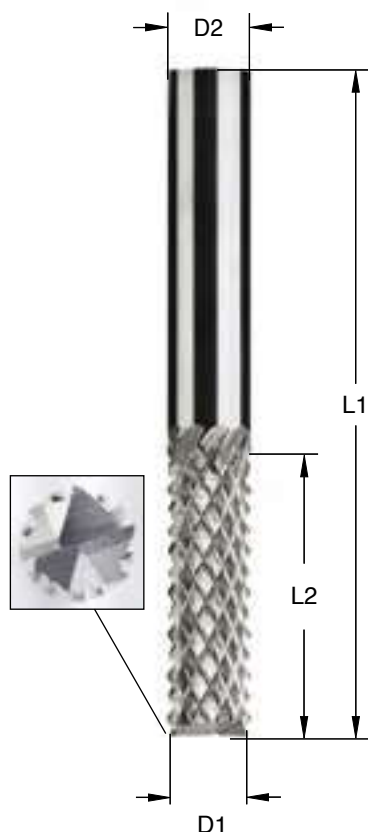
Bitte gewünschte Verzahnung angeben. Unsere WDV-Verzahnung erhalten Sie auf Anfrage
Please indicate wanted teeth.
WDV-toothing on demand.

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 107L060060 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. 107100100 and if wanted COATING: e.g. TL5.

FIBER-LINE

FIBER-LINE



Durchmesserbereich:
2,0 bis 20,0 mm
diamter range:
2,0 to 20,0 mm

Mögliche Beschichtungen:
TL5 - Standard
ALX - auf Anfrage
DIP - auf Anfrage
possible coatings:
TL5 - Standard
ALX - on demand
DIP - on demand

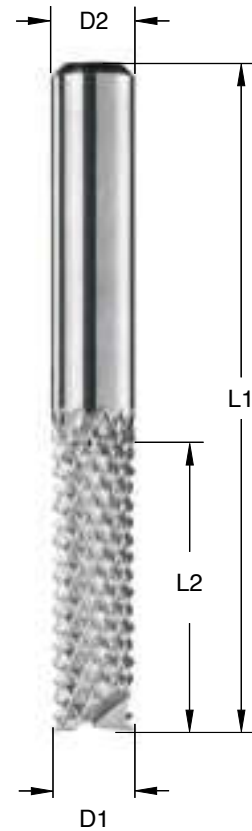
Bitte gewünschte Verzahnung an-
geben. Unsere WDV-Verzahnung
erhalten Sie auf Anfrage.
Please indicate wanted teeth.
WDV-toothing on demand.

Die Preise entnehmen Sie bitte
unsere aktuellen Preisliste.
Please take prices out of our
actual price list.

| | BESTELL-NUMMER ORDER NUMBER | Verzahnung teeth | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm |
|--------------|--------------------------------|---------------------|-----------------|-----------------------|----------|----------------|----------|
| 2,0 | 108020020 | N | 2 | 2 | 7 | 40 | |
| | 108ECO020030 | N | 2 | 3 | 6 | 40 | |
| | 108KK020030 | N | 2 | 3 | 3 | 50 | |
| 3,0 | 108ECO030 | N / WD | 3 | 3 | 12 | 40 | |
| | 108030030 | N / WD | 3 | 3 | 10 | 40 | |
| | 108KK030 | N / WD | 3 | 3 | 4 | 50 | |
| | 108L030030 | N / WD | 3 | 3 | 10 | 75 | |
| | 108A030060 | N / WD | 3 | 6 | 15 | 60 | |
| | | | | | | | |
| 3,17 / 1/8" | 1080317317 | N / WD | 3,17 / 1/8" | 3,17 / 1/8" | 10 | 38 | |
| | 108L0317317 | N / WD | 3,17 / 1/8" | 3,17 / 1/8" | 10 | 75 | |
| 4,0 | 108040040 | N / WD / GR | 4 | 4 | 15 | 40 | |
| | 108KK040 | N / WD / GR | 4 | 4 | 5 | 50 | |
| | 108ECO040 | N / WD / GR | 4 | 4 | 16 | 50 | |
| | 108L040040 | N / WD / GR | 4 | 4 | 15 | 75 | |
| | 108A040060 | N / WD / GR | 4 | 6 | 12 | 60 | |
| | | | | | | | |
| 4,76 / 3/16" | 1080476476 | N / WD / GR | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 50 | |
| | 108L0476476 | N / WD / GR | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 75 | |
| 5,0 | 108KK050 | N / WD / GR | 5 | 5 | 6 | 50 | |
| | 108ECO050 | N / WD / GR | 5 | 5 | 16 | 50 | |
| | 108L050050 | N / WD / GR | 5 | 5 | 16 | 75 | |
| | 108A050060 | N / WD / GR | 5 | 6 | 20 | 60 | |
| 6,0 | 108060060 | N / WD / GR | 6 | 6 | 18 | 50 | |
| | 108KK060 | N / WD / GR | 6 | 6 | 7 | 50 | |
| | 108ECO060 | N / WD / GR | 6 | 6 | 19 | 60 | |
| | 108H060060 | N / WD / GR | 6 | 6 | 25 | 65 | |
| | 108L060060 | N / WD / GR | 6 | 6 | 18 | 75 | |
| | 108XL060060 | N / WD / GR | 6 | 6 | 30 | 75 | |
| 6,35 / 1/4" | 1080635635 | N / WD / GR | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 50 | |
| | 108L0635635 | N / WD / GR | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 75 | |
| 7,93 / 5/16" | 1080793793 | N / WD / GR | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 63 | |
| | 108L0793793 | N / WD / GR | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 75 | |
| 8,0 | 108KK080 | N / WD / GR | 8 | 8 | 9 | 50 | |
| | 108ECO080 | N / WD / GR | 8 | 8 | 25 | 63 | |
| | 108H080080 | N / WD / GR | 8 | 8 | 30 | 63 | |
| | 108L080080 | N / WD / GR | 8 | 8 | 25 | 75 | |
| | 108XL080080 | N / WD / GR | 8 | 8 | 35 | 75 | |
| 9,0 | 108090090 | N / WD / GR | 9 | 9 | 25 | 63 | |
| | 108L090090 | N / WD / GR | 9 | 9 | 25 | 75 | |
| 9,52 / 3/8" | 1080952952 | N / WD / GR | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 63 | |
| | 108L0952952 | N / WD / GR | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 | |
| 10,0 | 108ECO100 | N / WD / GR | 10 | 10 | 25 | 72 | |
| | 108100100 | N / WD / GR | 10 | 10 | 30 | 72 | |
| 12,0 | 108120120 | N / WD / GR | 12 | 12 | 32 | 83 | |
| 12,7 / 1/2" | 108127127 | N / WD / GR | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 | |
| 16,0 | 108160160 | N / WD / GR | 16 | 16 | 36 | 92 | |
| 20,0 | 108200200 | N / WD / GR | 20 | 20 | 45 | 104 | |



| | BESTELL-NUMMER ORDER NUMBER | Verzahnung teeth | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm |
|--------------|--------------------------------|---------------------|-----------------|-----------------------|----------|----------------|
| 2,0 | 108SCKK020 | N | 2 | 3 | 3 | 50 |
| 3,0 | 108SCECO030 | N / WD | 3 | 3 | 12 | 40 |
| | 108SCKK030 | N / WD | 3 | 3 | 4 | 50 |
| 3,17 / 1/8" | 108SCECO0317 | N / WD | 3,17 / 1/8" | 3,17 / 1/8" | 10 | 38 |
| | 108SCECO0317 | N / WD | 3,17 / 1/8" | 3,17 / 1/8" | 10 | 75 |
| 4,0 | 108SCKK040 | N / WD / GR | 4 | 4 | 5 | 50 |
| | 108SCECO040 | N / WD / GR | 4 | 4 | 16 | 50 |
| 4,76 / 3/16" | 108SCECO0476 | N / WD / GR | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 38 |
| | 108SCECO0476 | N / WD / GR | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 75 |
| 5,0 | 108SCKK050 | N / WD / GR | 5 | 5 | 6 | 50 |
| | 108SCECO050 | N / WD / GR | 5 | 5 | 16 | 50 |
| 6,0 | 108SCKK060 | N / WD / GR | 6 | 6 | 7 | 50 |
| | 108SCECO060 | N / WD / GR | 6 | 6 | 19 | 60 |
| 6,35 / 1/4" | 108SCECO0635 | N / WD / GR | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 50 |
| | 108SCECO0635 | N / WD / GR | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 75 |
| 7,93 / 5/16" | 108SCECO0793 | N / WD / GR | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 63 |
| | 108SCECO0793 | N / WD / GR | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 75 |
| 8,0 | 108SCKK080 | N / WD / GR | 8 | 8 | 9 | 50 |
| | 108SCECO080 | N / WD / GR | 8 | 8 | 25 | 63 |
| 9,52 / 3/8" | 108SCECO0952 | N / WD / GR | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 63 |
| | 108SCECO0952 | N / WD / GR | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 |
| 10,0 | 108SCECO100 | N / WD / GR | 10 | 10 | 25 | 72 |
| 12,7 / 1/2" | 108SCECO127 | N / WD / GR | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 |



Durchmesserbereich:
2,0 bis 12,7 mm
diameter range:
2,0 to 12,7 mm

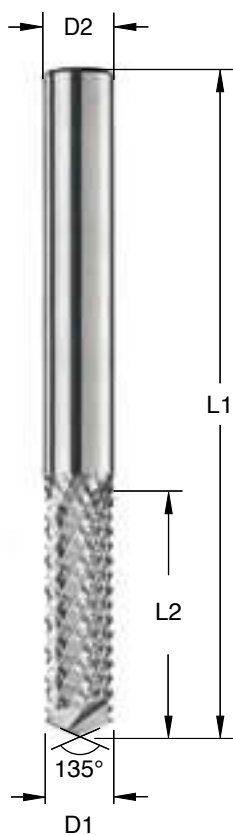
Mögliche Beschichtungen:
TL5 - Standard
ALX - auf Anfrage
DIP - auf Anfrage
possible coatings:
TL5 - Standard
ALX - on demand
DIP - on demand

Bitte gewünschte Verzahnung angeben. Unsere WDV-Verzahnung erhalten Sie auf Anfrage.
Please indicate wanted teeth. WDV-toothing on demand.

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 108SCKK040-GR und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. 108SCECO100-WD and if wanted COATING: e.g. TL5.

FIBER-LINE



Auch mit 90° Bohrspitze lieferbar.
Also deliverable with 90° drilling point.

Durchmesserbereich:
2,0 bis 20,0 mm
diameter range:
2,0 to 20,0 mm

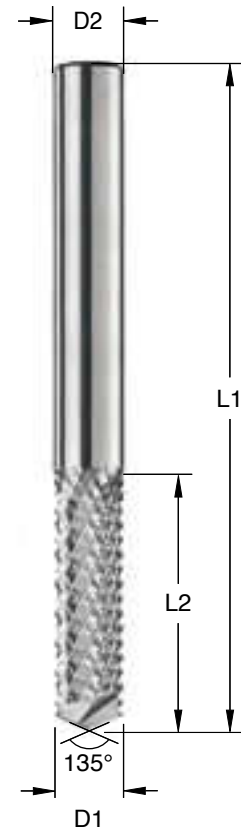
Mögliche Beschichtungen:
TL5 - Standard
ALX - auf Anfrage
DIP - auf Anfrage
possible coatings:
TL5 - Standard
ALX - on demand
DIP - on demand

Bitte gewünschte Verzahnung angeben. Unsere WDV-Verzahnung erhalten Sie auf Anfrage.
Please indicate wanted teeth.
WDV-toothing on demand.

| | BESTELL-NUMMER ORDER NUMBER | Verzahnung teeth | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm |
|--------------|--------------------------------|---------------------|-----------------|-----------------------|----------|----------------|
| 2,0 | 109020020 | N | 2 | 2 | 7 | 40 |
| | 109ECO020030 | N | 2 | 3 | 6 | 40 |
| 3,0 | 109ECO030 | N / WD | 3 | 3 | 12 | 40 |
| | 109030030 | N / WD | 3 | 3 | 10 | 40 |
| | 109KK030 | N / WD | 3 | 3 | 4 | 50 |
| | 109L030030 | N / WD | 3 | 3 | 10 | 75 |
| | 109A030060 | N / WD | 3 | 6 | 15 | 60 |
| 3,17 / 1/8" | 1090317317 | N / WD | 3,17 / 1/8" | 3,17 / 1/8" | 10 | 38 |
| | 109L0317317 | N / WD | 3,17 / 1/8" | 3,17 / 1/8" | 10 | 75 |
| 4,0 | 109040040 | N / WD / GR | 4 | 4 | 15 | 40 |
| | 109KK040 | N / WD / GR | 4 | 4 | 5 | 50 |
| | 109ECO040 | N / WD / GR | 4 | 4 | 16 | 50 |
| | 109L040040 | N / WD / GR | 4 | 4 | 15 | 75 |
| | 109A040060 | N / WD / GR | 4 | 6 | 12 | 60 |
| 4,76 / 3/16" | 1090476476 | N / WD / GR | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 38 |
| | 109L0476476 | N / WD / GR | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 75 |
| 5,0 | 109KK050 | N / WD / GR | 5 | 5 | 6 | 50 |
| | 109ECO050 | N / WD / GR | 5 | 5 | 16 | 50 |
| | 109L050050 | N / WD / GR | 5 | 5 | 16 | 75 |
| | 109A050060 | N / WD / GR | 5 | 6 | 20 | 60 |
| 6,0 | 109KK060 | N / WD / GR | 6 | 6 | 7 | 50 |
| | 109060060 | N / WD / GR | 6 | 6 | 18 | 50 |
| | 109ECO060 | N / WD / GR | 6 | 6 | 19 | 60 |
| | 109H060060 | N / WD / GR | 6 | 6 | 25 | 65 |
| | 109L060060 | N / WD / GR | 6 | 6 | 18 | 75 |
| | 109XL060060 | N / WD / GR | 6 | 6 | 30 | 75 |
| 6,35 / 1/4" | 1090635635 | N / WD / GR | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 50 |
| | 109L0635635 | N / WD / GR | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 75 |
| 7,93 / 5/16" | 1090793793 | N / WD / GR | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 63 |
| | 109L0793793 | N / WD / GR | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 75 |
| 8,0 | 109KK080 | N / WD / GR | 8 | 8 | 9 | 50 |
| | 109ECO080 | N / WD / GR | 8 | 8 | 25 | 60 |
| | 109H080080 | N / WD / GR | 8 | 8 | 30 | 63 |
| | 109L080080 | N / WD / GR | 8 | 8 | 25 | 75 |
| | 109XL080080 | N / WD / GR | 8 | 8 | 35 | 75 |
| 9,52 / 3/8" | 1090952952 | N / WD / GR | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 63 |
| | 109L0952952 | N / WD / GR | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 |
| 10,0 | 109ECO100 | N / WD / GR | 10 | 10 | 25 | 72 |
| | 109100100 | N / WD / GR | 10 | 10 | 30 | 72 |
| 12,0 | 109120120 | N / WD / GR | 12 | 12 | 32 | 83 |
| 12,7 / 1/2" | 109127127 | N / WD / GR | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 |
| 16,0 | 109160160 | N / WD / GR | 16 | 16 | 36 | 92 |
| 20,0 | 109200200 | N / WD / GR | 20 | 20 | 45 | 104 |



| | BESTELL-NUMMER ORDER NUMBER | Verzahnung teeth | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm |
|--------------|--------------------------------|---------------------|-----------------|-----------------------|----------|----------------|
| 2,0 | 109SCKK020 | N | 2 | 3 | 3 | 50 |
| 3,0 | 109SCECO030 | N / WD | 3 | 3 | 12 | 40 |
| | 109SCKK030 | N / WD | 3 | 3 | 4 | 50 |
| 3,17 / 1/8" | 109SCECO0317 | N / WD | 3,17 / 1/8" | 3,17 / 1/8" | 10 | 38 |
| | 109SCECO0317 | N / WD | 3,17 / 1/8" | 3,17 / 1/8" | 10 | 75 |
| 4,0 | 109SCKK040 | N / WD / GR | 4 | 4 | 5 | 50 |
| | 109SCECO040 | N / WD / GR | 4 | 4 | 16 | 50 |
| 4,76 / 3/16" | 109SCECO0476 | N / WD / GR | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 38 |
| | 109SCECO0476 | N / WD / GR | 4,76 / 3/16" | 4,76 / 3/16" | 15 | 75 |
| 5,0 | 109SCKK050 | N / WD / GR | 5 | 5 | 6 | 50 |
| | 109SCECO050 | N / WD / GR | 5 | 5 | 16 | 50 |
| 6,0 | 109SCKK060 | N / WD / GR | 6 | 6 | 7 | 50 |
| | 109SCECO060 | N / WD / GR | 6 | 6 | 19 | 60 |
| 6,35 / 1/4" | 109SCECO0635 | N / WD / GR | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 50 |
| | 109SCECO0635 | N / WD / GR | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 75 |
| 7,93 / 5/16" | 109SCECO0793 | N / WD / GR | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 63 |
| | 109SCECO0793 | N / WD / GR | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 75 |
| 8,0 | 109SCKK080 | N / WD / GR | 8 | 8 | 9 | 50 |
| | 109SCECO080 | N / WD / GR | 8 | 8 | 25 | 63 |
| 9,52 / 3/8" | 109SCECO0952 | N / WD / GR | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 63 |
| | 109SCECO0952 | N / WD / GR | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 |
| 10,0 | 109SCECO100 | N / WD / GR | 10 | 10 | 25 | 72 |
| 12,7 / 1/2" | 109SCECO127 | N / WD / GR | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 |



Auch mit 90° Bohrspitze lieferbar.
Also deliverable with 90° drilling point.

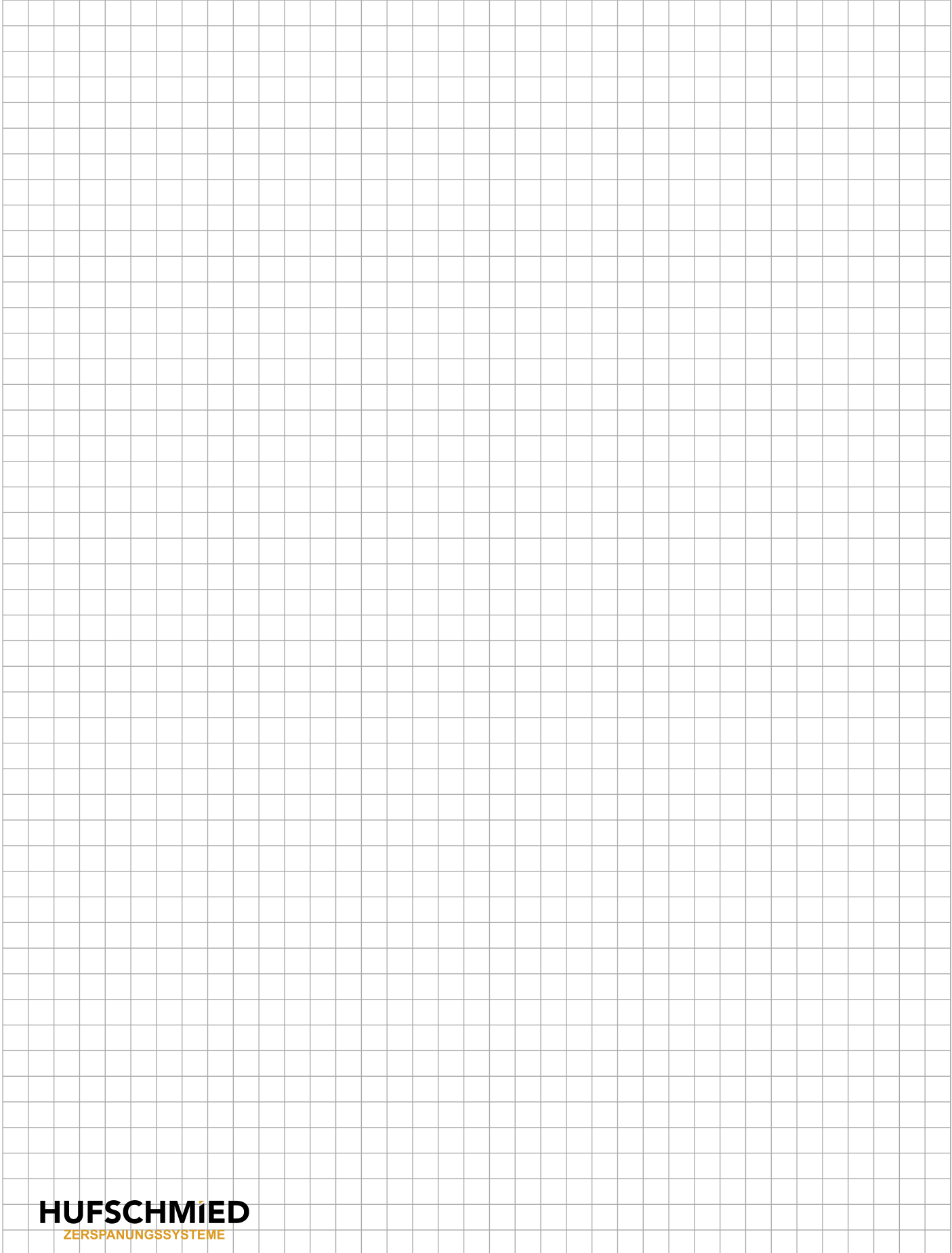
Durchmesserbereich:
2,0 bis 12,7 mm
diameter range:
2,0 to 12,7 mm

Mögliche Beschichtungen:
TL5 - Standard
ALX - auf Anfrage
DIP - auf Anfrage
possible coatings:
TL5 - Standard
ALX - on demand
DIP - on demand

Bitte gewünschte Verzahnung angeben. Unsere WDV-Verzahnung erhalten Sie auf Anfrage.
Please indicate wanted teeth.
WDV-toothing on demand.

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 109SCKK050-N und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. 109SCECO080-GR and if wanted COATING: e.g. TL5.



FIBER-LINE

SMC / BMC FRÄSER

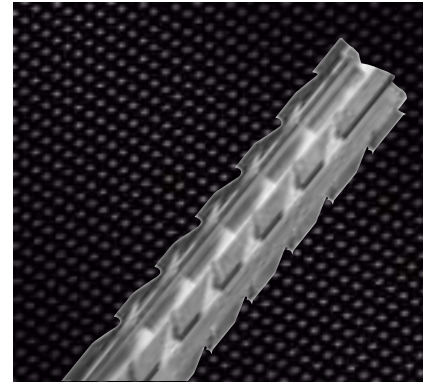
SMC / BMC MILLING CUTTERS

SMC wird im Leichtbau bei Karosserieteilen wie Kofferraumdeckeln oder Dachmodulen als Werkstoff eingesetzt. Diese Bauteile müssen in der Regel auch lackiert werden.

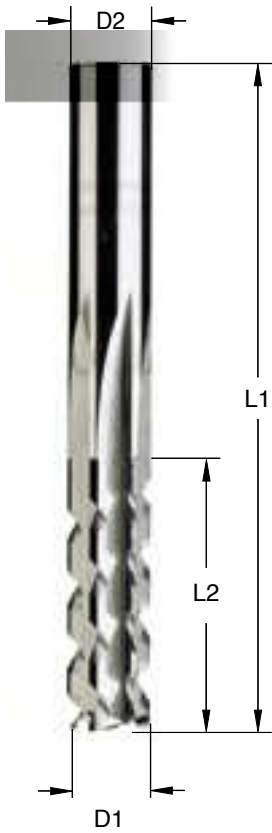
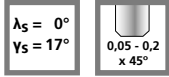
Die spezielle Geometrie des SMC-Fräasers erzeugt glatte Schnittflächen ohne Delaminationen. Sehr gute Werkzeugstandzeit senken die Bearbeitungskosten.

The sheet molding compounds are used as material in light weight construction with body components like deck lids or roof modules. These components have normally to be coated.

The special geometry of the SMC-mill produces smooth sections without delamination. A very good tool durability reduces the machining costs.



FIBER-LINE



Durchmesserbereich:
4,0 bis 20,0 mm
diameter range:
4,0 to 20,0 mm

Mögliche Beschichtungen:
TL5 - Standard
ALX - auf Anfrage
DIP - auf Anfrage
possible coatings:
TL5 - Standard
ALX - on demand
DIP - on demand

| | BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------------|--|--|
| 4,0 | 066SMCA040 | 4 | 6 | 16 | 60 | | |
| 4,76 / 3/16" | 066SMCA0476 | 4,76 / 3/16" | 6,35 / 1/4" | 18 | 50 | | |
| | 066SMCLA0476 | 4,76 / 3/16" | 6,35 / 1/4" | 18 | 75 | | |
| 5,0 | 066SMCA050 | 5 | 6 | 18 | 60 | | |
| 6,0 | 066SMC060 | 6 | 6 | 20 | 60 | | |
| | 066SMCL060 | 6 | 6 | 25 | 65 | | |
| | 066SMCX060 | 6 | 6 | 28 | 75 | | |
| 6,35 / 1/4" | 066SMC0635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 50 | | |
| | 066SMCL0635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 75 | | |
| 7,93 / 5/16" | 066SMC0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 63 | | |
| | 066SMCL0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 75 | | |
| 8,0 | 066SMC080 | 8 | 8 | 22 | 63 | | |
| | 066SMCX080 | 8 | 8 | 32 | 75 | | |
| 9,52 / 3/8" | 066SMC0952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 76 | | |
| 10,0 | 066SMC100 | 10 | 10 | 32 | 72 | | |
| 12,7 / 1/2" | 066SMC127 | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 | | |
| 16,0 | 066SMC160 | 16 | 16 | 36 | 92 | | |
| 20,0 | 066SMCO200 | 20 | 20 | 45 | 104 | | |

FIBER-LINE

HONEYCOMB

HONEYCOMB

FIBER-LINE



HONEYCOMB sind wabenartige Werkstoffplatten aus Papier, die mit einer Decklage aus GFK oder CFK versehen werden.

Bei der Bearbeitung gibt es immer wieder Probleme mit unsauberen Schnittkanten oder nicht abgetrennten Wabenteilen. Die abrasiven Decklagen erhöhen den Werkzeugverschleiß.

Um Inserts in die Bauteile einsetzen zu können, werden Taschen eingearbeitet, die durch einen speziellen Klebstoff und dem Insert gefüllt werden.

HONEYCOMB-Fräser Z8/Z10

- gerade-rechtsschneidend
- mit ausgesetzten Kopfschneiden
- mit gerader Schneide für geringen Zueffekt
- mit Protect-Formel

Hufschmied Werkzeuge für die Bearbeitung von HONEYCOMB

- verbessern die Schnittkantenqualität
- überzeugen mit hohen Standzeiten
- schneiden auch bereits verklebte Bereiche sauber aus ohne selbst zu verkleben

HONEYCOMB – these are comb-style panels of paper with GFK or CFK cover layer.

Processing suffers from the recurring problem of ragged or frayed edges or unseparated combs. The abrasive cover layers increase tool wear.

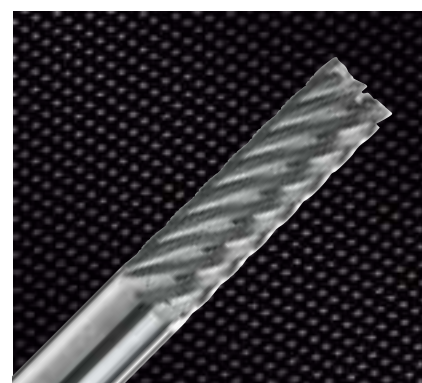
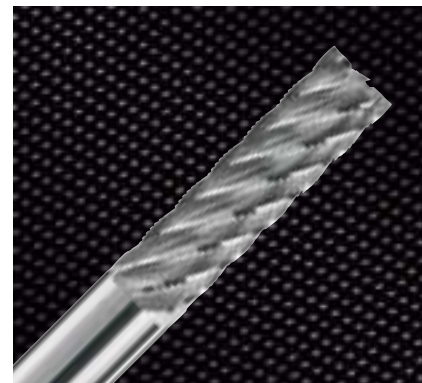
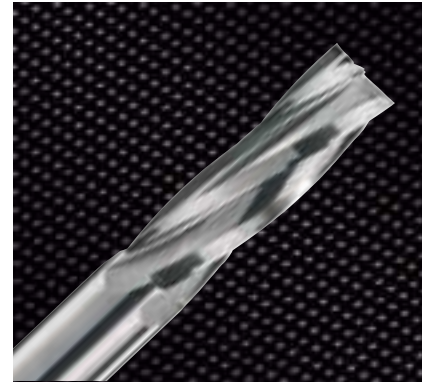
To place inserts into the components pockets are milled which are filled with special adhesives and the insert.

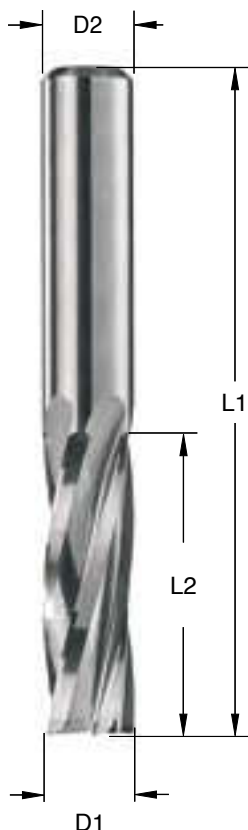
HONEYCOMB-milling tools Z8/Z10

- **straight right-cutting**
- **with staggered cutting head edges**
- **with straight cutting edge for low skew**
- **with Protect-Formula**

Hufschmied tools for machining HONEYCOMB

- *improve the quality of cut edges*
- *are convincing with high tool-life*
- *cut glued/filled regions cleanly without gumming up*





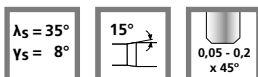
Durchmesserbereich:
4,0 bis 20,0 mm
diameter range:
4,0 to 20,0 mm

Mögliche Beschichtungen:
ALX - Standard
TL5 - auf Anfrage
DIP - auf Anfrage
possible coatings:
ALX - Standard
TL5 - on demand
DIP - on demand

| | BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------------|--|--|
| 4,0 | 065AHOA040 | 4 | 6 | 16 | 60 | | |
| 4,76 / 3/16" | 065AHO0476 | 4,76 / 3/16" | 6,35 / 1/4" | 11 | 63 | | |
| | 065AHO L0476 | 4,76 / 3/16" | 6,35 / 1/4" | 18 | 75 | | |
| 5,0 | 065AHOA050 | 5 | 6 | 18 | 60 | | |
| 6,0 | 065AHO060 | 6 | 6 | 20 | 60 | | |
| | 065AHO L060 | 6 | 6 | 25 | 65 | | |
| | 065AHOXL060 | 6 | 6 | 28 | 75 | | |
| 6,35 / 1/4" | 065AHO0635 | 6,35 / 1/4" | 6,35 / 1/4" | 16 | 63 | | |
| | 065AHO L0635 | 6,35 / 1/4" | 6,35 / 1/4" | 19 | 75 | | |
| 7,93 / 5/16" | 065AHO0793 | 7,93 / 5/16" | 7,93 / 5/16" | 19 | 63 | | |
| | 065AHO L0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 75 | | |
| 8,0 | 065AHO080 | 8 | 8 | 22 | 63 | | |
| | 065AHOXL080 | 8 | 8 | 32 | 75 | | |
| 9,52 / 3/8" | 065AHO0952 | 9,52 / 3/8" | 9,52 / 3/8" | 22 | 63 | | |
| | 065AHO L0952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 75 | | |
| 10,0 | 065AHO100 | 10 | 10 | 32 | 72 | | |
| 12,0 | 065AHO120 | 12 | 12 | 32 | 83 | | |
| 12,7 / 1/2" | 065AHO0127 | 12,7 / 1/2" | 12,7 / 1/2" | 26 | 88 | | |
| 16,0 | 065AHO160 | 16 | 16 | 36 | 92 | | |
| 20,0 | 065AHO200 | 20 | 20 | 45 | 104 | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 065AHO060 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. 065AHOXL080 and if wanted COATING: e.g. ALX.



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|------------|-----------------|-----------------------|----------|----------------|--|--|
| 4,0 | 068PWA040 | 4 | 6 | 16 | 60 | | |
| 4,76 / 3/16" | 068PWA0476 | 4,76 / 3/16" | 6,35 / 1/4" | 18 | 63 | | |
| | 068PWL0476 | 4,76 / 3/16" | 6,35 / 1/4" | 18 | 75 | | |
| 5,0 | 068PWA050 | 5 | 6 | 18 | 60 | | |
| 6,0 | 068PW060 | 6 | 6 | 20 | 60 | | |
| | 068PWL060 | 6 | 6 | 25 | 65 | | |
| | 068PWL060 | 6 | 6 | 28 | 75 | | |
| 6,35 / 1/4" | 068PW0635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 63 | | |
| | 068PWL0635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 75 | | |
| 7,93 / 5/16" | 068PW0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 63 | | |
| | 068PWL0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 75 | | |
| 8,0 | 068PW080 | 8 | 8 | 22 | 63 | | |
| | 068PWL080 | 8 | 8 | 32 | 75 | | |
| 9,52 / 3/8" | 068PW0952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 63 | | |
| | 068PWL0952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 75 | | |
| 10,0 | 068PW100 | 10 | 10 | 32 | 72 | | |
| 12,0 | 068PW120 | 12 | 12 | 32 | 83 | | |
| 12,7 / 1/2" | 068PW127 | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 | | |
| 16,0 | 068PW160 | 16 | 16 | 36 | 92 | | |
| 20,0 | 068PW200 | 20 | 20 | 45 | 104 | | |

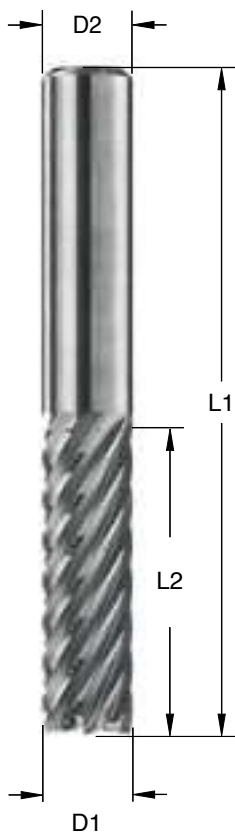
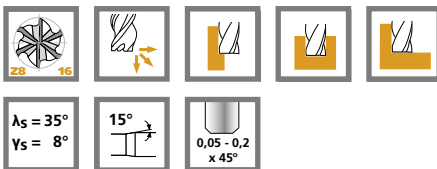


Durchmesserbereich:
4,0 bis 20,0 mm
diameter range:
4,0 to 20,0 mm

Mögliche Beschichtungen:
ALX - Standard
TL5 - auf Anfrage
DIP - auf Anfrage
possible coatings:
ALX - Standard
TL5 - on demand
DIP - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 068PWL060 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. 068PWL060 and if wanted COATING: e.g. ALX.



Durchmesserbereich:
6,0 bis 20,0 mm
diameter range:
6,0 to 20,0 mm

Mögliche Beschichtungen:
ALX - Standard
TL5 - auf Anfrage
DIP - auf Anfrage
possible coatings:
ALX - Standard
TL5 - on demand
DIP - on demand

| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|------------|-----------------|-----------------------|----------|----------------|--|--|
| 6,0 | 078PW060 | 6 | 6 | 20 | 60 | | |
| | 078PWL060 | 6 | 6 | 25 | 65 | | |
| | 078PWXL060 | 6 | 6 | 28 | 75 | | |
| 6,35 / 1/4" | 078PW0635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 63 | | |
| | 078PWL0635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 75 | | |
| 7,93 / 5/16" | 078PW0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 63 | | |
| | 078PWL0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 75 | | |
| 8,0 | 078PW080 | 8 | 8 | 22 | 63 | | |
| | 078PWXL080 | 8 | 8 | 32 | 75 | | |
| 9,52 / 3/8" | 078PW0952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 72 | | |
| | 078PWL0952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 72 | | |
| 10,0 | 078PW100 | 10 | 10 | 32 | 72 | | |
| 12,0 | 078PW120 | 12 | 12 | 32 | 83 | | |
| 12,7 / 1/2" | 078PW127 | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 | | |
| 16,0 | 078PW160 | 16 | 16 | 36 | 92 | | |
| 20,0 | 078PW200 | 20 | 20 | 45 | 104 | | |

FIBER-LINE

HEXA CUT®

HEXA CUT®

FIBER-LINE

FIBER-LINE



GFK
GFK

GMT
GMT

LFT
LFT

Organobleche
Organo-plates

CFK
CFK

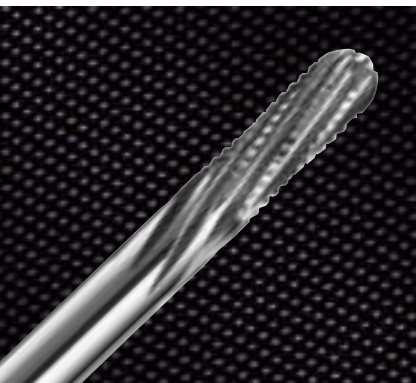
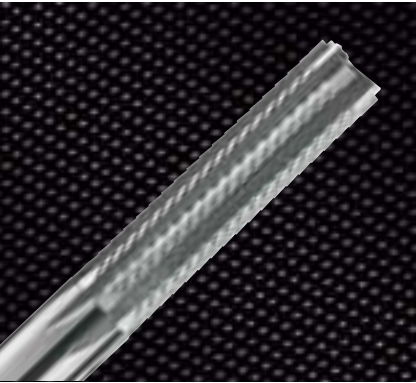
HUFSCHMIED
ZERSpanungSSYSTEME

FIBER-LINE

FIBER-LINE

HEXA CUT®

HEXA CUT®



Diese Werkzeuge wurden für die Bearbeitung von Glas- und Kohlefasern optimiert. Da die Automobilindustrie auch im Leichtbau und in der Bearbeitung neuer Werkstoffe verstärkt auf den Einsatz von Robotern setzt, sind sie selbstverständlich auch dafür geeignet. HEXA CUT®-Werkzeuge reduzieren durch ihre geringen Schnittkräfte die Beanspruchungen im Gesamtsystem.

These tools were optimized for machining glass and carbon fibers. Because automotive industry and light-weight construction increasingly employs robots for processing and machining new materials, they are naturally suitable for this, too. HEXA CUT®-tools reduce strain to the complete system with their low cutting forces.

Anwendungen:

- Fräsen von Kontur, Beschnitt und Taschen
- Schäften
- Freiformflächen
- 3D-Bearbeitung

Application:

- *Milling contours, trimming and pockets*
- *Scarf-jointing*
- *Free-formed surfaces*
- *3D machining*

Ausführungen:

- Mehrschneidig
- Stirnschneiden
- 8 Zähne, in den Varianten
gerade 066HO
ziehend 068HO
schiebend 067HO
- 10 Zähne, in den Varianten
gerade 076HO
ziehend 078HO
schiebend 077HO
- verschiedene Längen
- blank oder beschichtet

Designs:

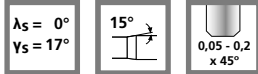
- *Multi blade*
- *End-teeth*
- *8 toothed, in variants
straight 066HO
pulling/up milling 068HO
pushing/down milling 067HO*
- *10 toothed, in variants
straight 076HO
pulling/up milling 078HO
pushing/down milling 077HO*
- *different lengths*
- *bare or coated*

Vorteile:

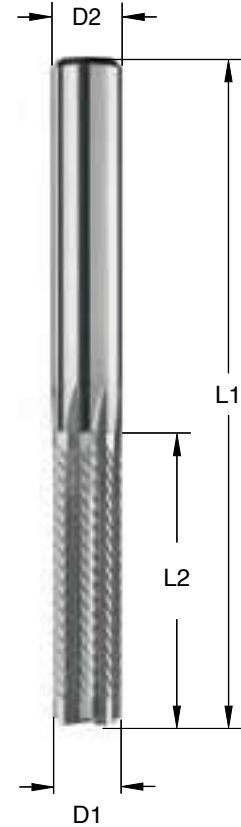
- hohe Standzeit
- große Spanräume für hohes Zerspanvolumen

Advantages:

- *high tool life*
- *large chip spaces for high material removal*



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|-------------|-----------------|-----------------------|----------|----------------|--|--|
| 3,0 | 066HOAKK030 | 3 | 6 | 4 | 50 | | |
| | 066HOA030 | 3 | 6 | 10 | 60 | | |
| 3,17 / 1/8" | 066HOA0317 | 3,17 / 1/8" | 6,35 / 1/4" | 4 | 50 | | |
| | 066HOLA0317 | 3,17 / 1/8" | 6,35 / 1/4" | 10 | 63 | | |
| 4,0 | 066HOAKK040 | 4 | 6 | 5 | 50 | | |
| | 066HOA040 | 4 | 6 | 16 | 60 | | |
| 4,76 / 3/16" | 066HOA0476 | 4,76 / 3/16" | 6,35 / 1/4" | 5 | 50 | | |
| | 066HOLA0476 | 4,76 / 3/16" | 6,35 / 1/4" | 16 | 63 | | |
| 5,0 | 066HOAKK050 | 5 | 6 | 6 | 50 | | |
| | 066HOA050 | 5 | 6 | 18 | 60 | | |
| 6,0 | 066HOKK060 | 6 | 6 | 7 | 50 | | |
| | 066HO060 | 6 | 6 | 20 | 60 | | |
| | 066HOL060 | 6 | 6 | 25 | 65 | | |
| | 066HOXL060 | 6 | 6 | 28 | 75 | | |
| 6,35 / 1/4" | 066HO0635 | 6,35 / 1/4" | 6,35 / 1/4" | 7 | 63 | | |
| | 066HOL0635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 75 | | |
| 7,93 / 5/16" | 066HO0793 | 7,93 / 5/16" | 7,93 / 5/16" | 9 | 63 | | |
| | 066HOL0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 75 | | |
| 8,0 | 066HOKK080 | 8 | 8 | 9 | 50 | | |
| | 066HO080 | 8 | 8 | 22 | 63 | | |
| | 066HOXL080 | 8 | 8 | 32 | 75 | | |
| 9,52 / 3/8" | 066HO0952 | 9,52 / 3/8" | 9,52 / 3/8" | 9 | 63 | | |
| | 066HOL0952 | 9,52 / 3/8" | 9,52 / 3/8" | 22 | 75 | | |
| 10,0 | 066HOK100 | 10 | 10 | 15 | 72 | | |
| | 066HO100 | 10 | 10 | 32 | 72 | | |
| 12,0 | 066HO120 | 12 | 12 | 32 | 83 | | |
| 12,7 / 1/2" | 066HO127 | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 | | |
| 16,0 | 066HO160 | 16 | 16 | 36 | 92 | | |
| 20,0 | 066HO200 | 20 | 20 | 45 | 104 | | |



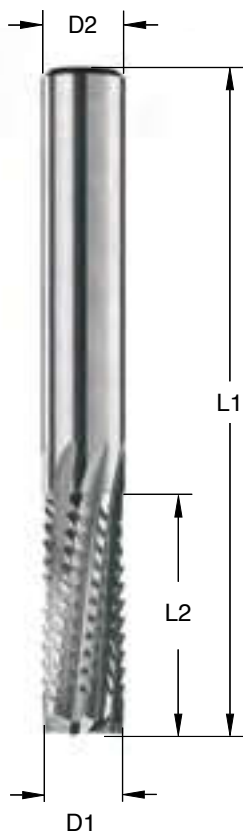
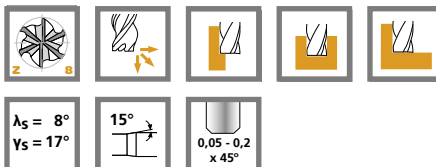
Durchmesserbereich:
3,0 bis 20,0 mm
diameter range:
3,0 to 20,0 mm

Mögliche Beschichtungen:
TL5 - Standard
ALX - auf Anfrage
DIP - auf Anfrage
possible coatings:
TL5 - Standard
ALX - on demand
DIP - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 066HO060 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. 066HOXL080 and if wanted COATING: e.g. TL5.

FIBER-LINE



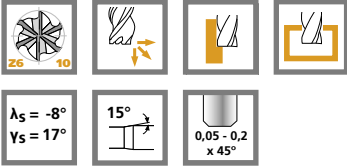
Durchmesserbereich:
3,0 bis 20,0 mm
diameter range:
3,0 to 20,0 mm

Mögliche Beschichtungen:
TL5 - Standard
ALX - auf Anfrage
DIP - auf Anfrage
possible coatings:
TL5 - Standard
ALX - on demand
DIP - on demand

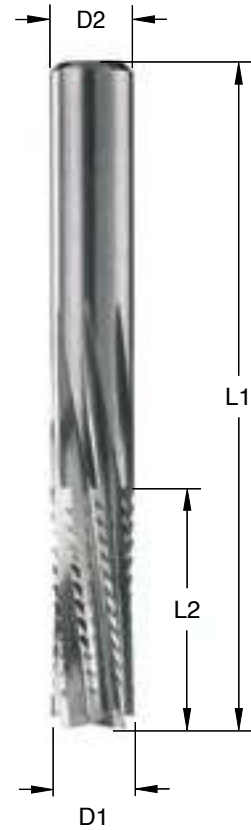
| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|-------------|-----------------|-----------------------|----------|----------------|--|--|
| 3,0 | 068HOAKK030 | 3 | 6 | 4 | 50 | | |
| | 068HOA030 | 3 | 6 | 10 | 60 | | |
| 3,17 / 1/8" | 068HOA0317 | 3,17 / 1/8" | 6,35 / 1/4" | 4 | 50 | | |
| | 068HOLA0317 | 3,17 / 1/8" | 6,35 / 1/4" | 10 | 63 | | |
| 4,0 | 068HOAKK040 | 4 | 6 | 5 | 50 | | |
| | 068HOA040 | 4 | 6 | 16 | 60 | | |
| 4,76 / 3/16" | 068HOA0476 | 4,76 / 3/16" | 6,35 / 1/4" | 5 | 50 | | |
| | 068HOLA0476 | 4,76 / 3/16" | 6,35 / 1/4" | 16 | 63 | | |
| 5,0 | 068HOAKK050 | 5 | 6 | 6 | 50 | | |
| | 068HOA050 | 5 | 6 | 18 | 60 | | |
| 6,0 | 068HOKK060 | 6 | 6 | 7 | 50 | | |
| | 068HO060 | 6 | 6 | 20 | 60 | | |
| | 068HOL060 | 6 | 6 | 25 | 65 | | |
| | 068HOXL060 | 6 | 6 | 28 | 75 | | |
| 6,35 / 1/4" | 068HO0635 | 6,35 / 1/4" | 6,35 / 1/4" | 7 | 63 | | |
| | 068HOL0635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 75 | | |
| 7,93 / 5/16" | 068HO0793 | 7,93 / 5/16" | 7,93 / 5/16" | 9 | 63 | | |
| | 068HOL0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 75 | | |
| 8,0 | 068HOKK080 | 8 | 8 | 9 | 50 | | |
| | 068HO080 | 8 | 8 | 22 | 63 | | |
| | 068HOXL080 | 8 | 8 | 32 | 75 | | |
| 9,52 / 3/8" | 068HO0952 | 9,52 / 3/8" | 9,52 / 3/8" | 9 | 63 | | |
| | 068HOL0952 | 9,52 / 3/8" | 9,52 / 3/8" | 22 | 75 | | |
| 10,0 | 068HOK100 | 10 | 10 | 15 | 72 | | |
| | 068HO100 | 10 | 10 | 32 | 72 | | |
| 12,0 | 068HO120 | 12 | 12 | 32 | 83 | | |
| 12,7 / 1/2" | 068HO127 | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 | | |
| 16,0 | 068HO160 | 16 | 16 | 36 | 92 | | |
| 20,0 | 068HO200 | 20 | 20 | 45 | 104 | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 068HOK100 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. 068HO120 and if wanted COATING: e.g. TL5.



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|-------------|-----------------|-----------------------|----------|----------------|--|--|
| 3,0 | 067HOAKK030 | 3 | 6 | 4 | 50 | | |
| | 067HOA030 | 3 | 6 | 10 | 60 | | |
| 3,17 / 1/8" | 067HOA0317 | 3,17 / 1/8" | 6,35 / 1/4" | 4 | 50 | | |
| | 067HOLA0317 | 3,17 / 1/8" | 6,35 / 1/4" | 10 | 63 | | |
| 4,0 | 067HOAKK040 | 4 | 6 | 5 | 50 | | |
| | 067HOA040 | 4 | 6 | 16 | 60 | | |
| 4,76 / 3/16" | 067HOA0476 | 4,76 / 3/16" | 6,35 / 1/4" | 5 | 50 | | |
| | 067HOLA0476 | 4,76 / 3/16" | 6,35 / 1/4" | 16 | 63 | | |
| 5,0 | 067HOAKK050 | 5 | 6 | 6 | 50 | | |
| | 067HOA050 | 5 | 6 | 18 | 60 | | |
| 6,0 | 067HOKK060 | 6 | 6 | 7 | 50 | | |
| | 067HO060 | 6 | 6 | 20 | 60 | | |
| | 067HOL060 | 6 | 6 | 25 | 65 | | |
| | 067HOXL060 | 6 | 6 | 28 | 75 | | |
| 6,35 / 1/4" | 067HO0635 | 6,35 / 1/4" | 6,35 / 1/4" | 7 | 63 | | |
| | 067HOL0635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 75 | | |
| 7,93 / 5/16" | 067HO0793 | 7,93 / 5/16" | 7,93 / 5/16" | 9 | 63 | | |
| | 067HOL0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 75 | | |
| 8,0 | 067HOKK080 | 8 | 8 | 9 | 50 | | |
| | 067HO080 | 8 | 8 | 22 | 63 | | |
| | 067HOXL080 | 8 | 8 | 32 | 75 | | |
| 9,52 / 3/8" | 067HO0952 | 9,52 / 3/8" | 9,52 / 3/8" | 9 | 63 | | |
| | 067HOL0952 | 9,52 / 3/8" | 9,52 / 3/8" | 22 | 75 | | |
| 10,0 | 067HOK100 | 10 | 10 | 15 | 72 | | |
| | 067HO100 | 10 | 10 | 32 | 72 | | |
| 12,0 | 067HO120 | 12 | 12 | 32 | 83 | | |
| 12,7 / 1/2" | 067HO127 | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 | | |
| 16,0 | 067HO160 | 16 | 16 | 36 | 92 | | |
| 20,0 | 067HO200 | 20 | 20 | 45 | 104 | | |



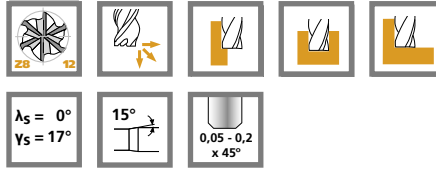
Durchmesserbereich:
3,0 bis 20,0 mm
diameter range:
3,0 to 20,0 mm

Mögliche Beschichtungen:
TL5 - Standard
ALX - auf Anfrage
DIP - auf Anfrage
possible coatings:
TL5 - Standard
ALX - on demand
DIP - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 067HOK100 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. 067HO120 and if wanted COATING: e.g. TL5.

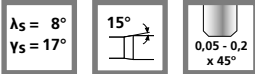
FIBER-LINE



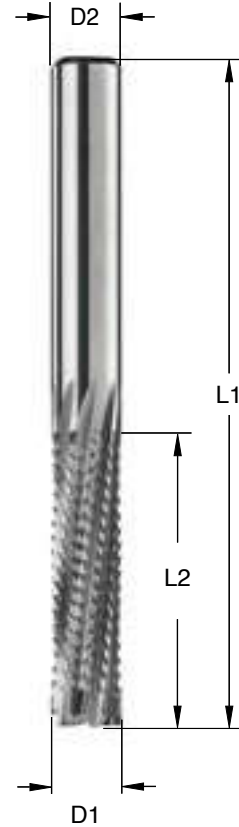
| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|------------|-----------------|-----------------------|----------|----------------|--|--|
| 6,0 | 076HOKK060 | 6 | 6 | 7 | 50 | | |
| | 076HO060 | 6 | 6 | 20 | 60 | | |
| | 076HOL060 | 6 | 6 | 25 | 65 | | |
| | 076HOXL060 | 6 | 6 | 28 | 75 | | |
| 6,35 / 1/4" | 076HO0635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 63 | | |
| | 076HOL0635 | 6,35 / 1/4" | 6,35 / 1/4" | 28 | 75 | | |
| 7,93 / 5/16" | 076HO0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 63 | | |
| | 076HOL0793 | 7,93 / 5/16" | 7,93 / 5/16" | 32 | 75 | | |
| 8,0 | 076HOKK080 | 8 | 8 | 9 | 50 | | |
| | 076HO080 | 8 | 8 | 22 | 63 | | |
| | 076HOXL080 | 8 | 8 | 32 | 75 | | |
| 9,52 / 3/8" | 076HO0952 | 9,52 / 3/8" | 9,52 / 3/8" | 22 | 63 | | |
| | 076HOL0952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 75 | | |
| 10,0 | 076HOK100 | 10 | 10 | 15 | 72 | | |
| | 076HO100 | 10 | 10 | 32 | 72 | | |
| 12,0 | 076HO120 | 12 | 12 | 32 | 83 | | |
| 12,7 / 1/2" | 076HO127 | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 | | |
| 16,0 | 076HO160 | 16 | 16 | 36 | 92 | | |
| 20,0 | 076HO200 | 20 | 20 | 45 | 104 | | |

Durchmesserbereich:
6,0 bis 20,0 mm
diamter range:
6,0 to 20,0 mm

Mögliche Beschichtungen:
TL5 - Standard
ALX - auf Anfrage
DIP - auf Anfrage
possible coatings:
TL5 - Standard
ALX - on demand
DIP - on demand



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|------------|-----------------|-----------------------|----------|----------------|--|--|
| 6,0 | 078HOKK060 | 6 | 6 | 7 | 50 | | |
| | 078HO060 | 6 | 6 | 20 | 60 | | |
| | 078HOL060 | 6 | 6 | 25 | 65 | | |
| | 078HOXL060 | 6 | 6 | 28 | 75 | | |
| 6,35 / 1/4" | 078HO0635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 63 | | |
| | 078HOL0635 | 6,35 / 1/4" | 6,35 / 1/4" | 28 | 75 | | |
| 7,93 / 5/16" | 078HO0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 63 | | |
| | 078HOL0793 | 7,93 / 5/16" | 7,93 / 5/16" | 32 | 75 | | |
| 8,0 | 078HOKK080 | 8 | 8 | 9 | 50 | | |
| | 078HO080 | 8 | 8 | 22 | 63 | | |
| | 078HOXL080 | 8 | 8 | 32 | 75 | | |
| 9,52 / 3/8" | 078HO0952 | 9,52 / 3/8" | 9,52 / 3/8" | 22 | 63 | | |
| | 078HOL0952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 75 | | |
| 10,0 | 078HOK100 | 10 | 10 | 15 | 72 | | |
| | 078HO100 | 10 | 10 | 32 | 72 | | |
| 12,0 | 078HO120 | 12 | 12 | 32 | 83 | | |
| 12,7 / 1/2" | 078HO127 | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 | | |
| 16,0 | 078HO160 | 16 | 16 | 36 | 92 | | |
| 20,0 | 078HO200 | 20 | 20 | 45 | 104 | | |



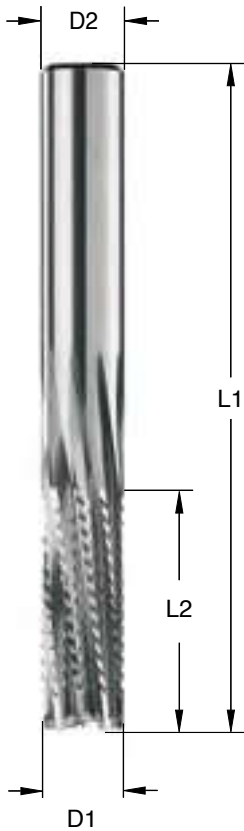
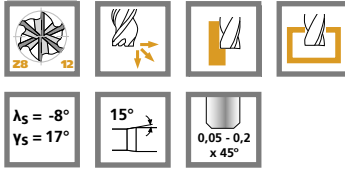
Durchmesserbereich:
6,0 bis 20,0 mm
diameter range:
6,0 to 20,0 mm

Mögliche Beschichtungen:
TL5 - Standard
ALX - auf Anfrage
DIP - auf Anfrage
possible coatings:
TL5 - Standard
ALX - on demand
DIP - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 078HOK100 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. 078HO120 and if wanted COATING: e.g. TL5.

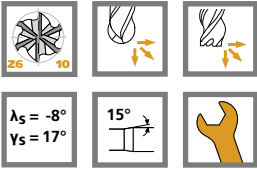
FIBER-LINE



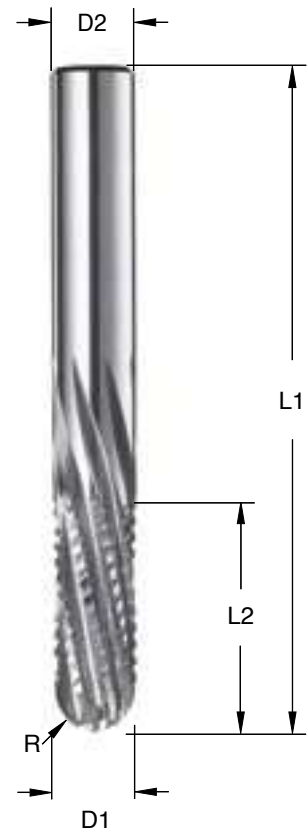
Durchmesserbereich:
6,0 bis 20,0 mm
diameter range:
6,0 to 20,0 mm

Mögliche Beschichtungen:
TL5 - Standard
ALX - auf Anfrage
DIP - auf Anfrage
possible coatings:
TL5 - Standard
ALX - on demand
DIP - on demand

| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|------------|-----------------|-----------------------|----------|----------------|--|--|
| 6,0 | 077HOKK060 | 6 | 6 | 7 | 50 | | |
| | 077HO060 | 6 | 6 | 20 | 60 | | |
| | 077HOL060 | 6 | 6 | 25 | 65 | | |
| | 077HOXL060 | 6 | 6 | 28 | 75 | | |
| 6,35 / 1/4" | 077HO0635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 63 | | |
| | 077HOL0635 | 6,35 / 1/4" | 6,35 / 1/4" | 28 | 75 | | |
| 7,93 / 5/16" | 077HO0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 63 | | |
| | 077HOL0793 | 7,93 / 5/16" | 7,93 / 5/16" | 32 | 75 | | |
| 8,0 | 077HOKK080 | 8 | 8 | 9 | 50 | | |
| | 077HO080 | 8 | 8 | 22 | 63 | | |
| | 077HOXL080 | 8 | 8 | 32 | 75 | | |
| 9,52 / 3/8" | 077HO0952 | 9,52 / 3/8" | 9,52 / 3/8" | 22 | 63 | | |
| | 077HOL0952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 75 | | |
| 10,0 | 077HOK100 | 10 | 10 | 15 | 72 | | |
| | 077HO100 | 10 | 10 | 32 | 72 | | |
| 12,0 | 077HO120 | 12 | 12 | 32 | 83 | | |
| 12,7 / 1/2" | 077HO127 | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 | | |
| 16,0 | 077HO160 | 16 | 16 | 36 | 92 | | |
| 20,0 | 077HO200 | 20 | 20 | 45 | 104 | | |



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | R mm |
|--------------------------------|--------------|-----------------|-----------------------|----------|----------------|---------|
| 3,0 | 067HORAKK030 | 3 | 6 | 4 | 50 | 1,5 |
| | 067HORA030 | 3 | 6 | 10 | 60 | 1,5 |
| 3,17 / 1/8" | 067HORA0317 | 3,17 / 1/8" | 6,35 / 1/4" | 4 | 50 | 1,585 |
| | 067HORLA0317 | 3,17 / 1/8" | 6,35 / 1/4" | 10 | 63 | 1,585 |
| 4,0 | 067HORAKK040 | 4 | 6 | 5 | 50 | 2,0 |
| | 067HORA040 | 4 | 6 | 16 | 60 | 2,0 |
| 4,76 / 3/16" | 067HORA0476 | 4,76 / 3/16" | 6,35 / 1/4" | 5 | 50 | 2,38 |
| | 067HORLA0476 | 4,76 / 3/16" | 6,35 / 1/4" | 16 | 63 | 2,38 |
| 5,0 | 067HORAKK050 | 5 | 6 | 6 | 50 | 2,5 |
| | 067HORA050 | 5 | 6 | 18 | 60 | 2,5 |
| 6,0 | 067HORKK060 | 6 | 6 | 7 | 50 | 3,0 |
| | 067HOR060 | 6 | 6 | 20 | 60 | 3,0 |
| | 067HORL060 | 6 | 6 | 25 | 65 | 3,0 |
| | 067HORXL060 | 6 | 6 | 28 | 75 | 3,0 |
| 6,35 / 1/4" | 067HOR0635 | 6,35 / 1/4" | 6,35 / 1/4" | 7 | 63 | 3,175 |
| | 067HORL0635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 75 | 3,175 |
| 7,93 / 5/16" | 067HOR0793 | 7,93 / 5/16" | 7,93 / 5/16" | 9 | 63 | 4,0 |
| | 067HORL0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 75 | 4,0 |
| 8,0 | 067HORKK080 | 8 | 8 | 9 | 50 | 4,0 |
| | 067HOR080 | 8 | 8 | 22 | 63 | 4,0 |
| | 067HORXL080 | 8 | 8 | 32 | 75 | 4,0 |
| 9,52 / 3/8" | 067HOR0952 | 9,52 / 3/8" | 9,52 / 3/8" | 9 | 63 | 4,76 |
| | 067HORL0952 | 9,52 / 3/8" | 9,52 / 3/8" | 22 | 75 | 4,76 |
| 10,0 | 067HORK100 | 10 | 10 | 15 | 72 | 5,0 |
| | 067HOR100 | 10 | 10 | 32 | 72 | 5,0 |
| 12,0 | 067HOR120 | 12 | 12 | 32 | 83 | 6,0 |
| 12,7 / 1/2" | 067HOR127 | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 | 6,35 |
| 16,0 | 067HOR160 | 16 | 16 | 36 | 92 | 8,0 |
| 20,0 | 067HOR200 | 20 | 20 | 45 | 104 | 10,0 |



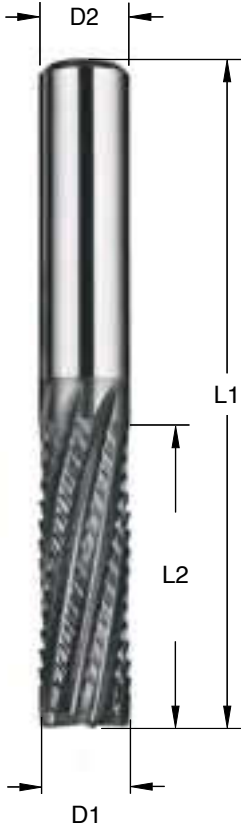
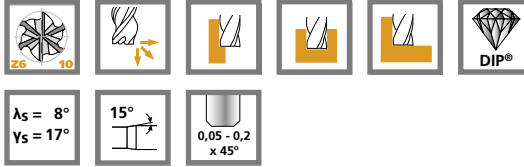
Durchmesserbereich:
3,0 bis 20,0 mm
diameter range:
3,0 bis 20,0 mm

Mögliche Beschichtungen:
TL5 - Standard
ALX - auf Anfrage
DIP - auf Anfrage
possible coatings:
TL5 - Standard
ALX - on demand
DIP - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

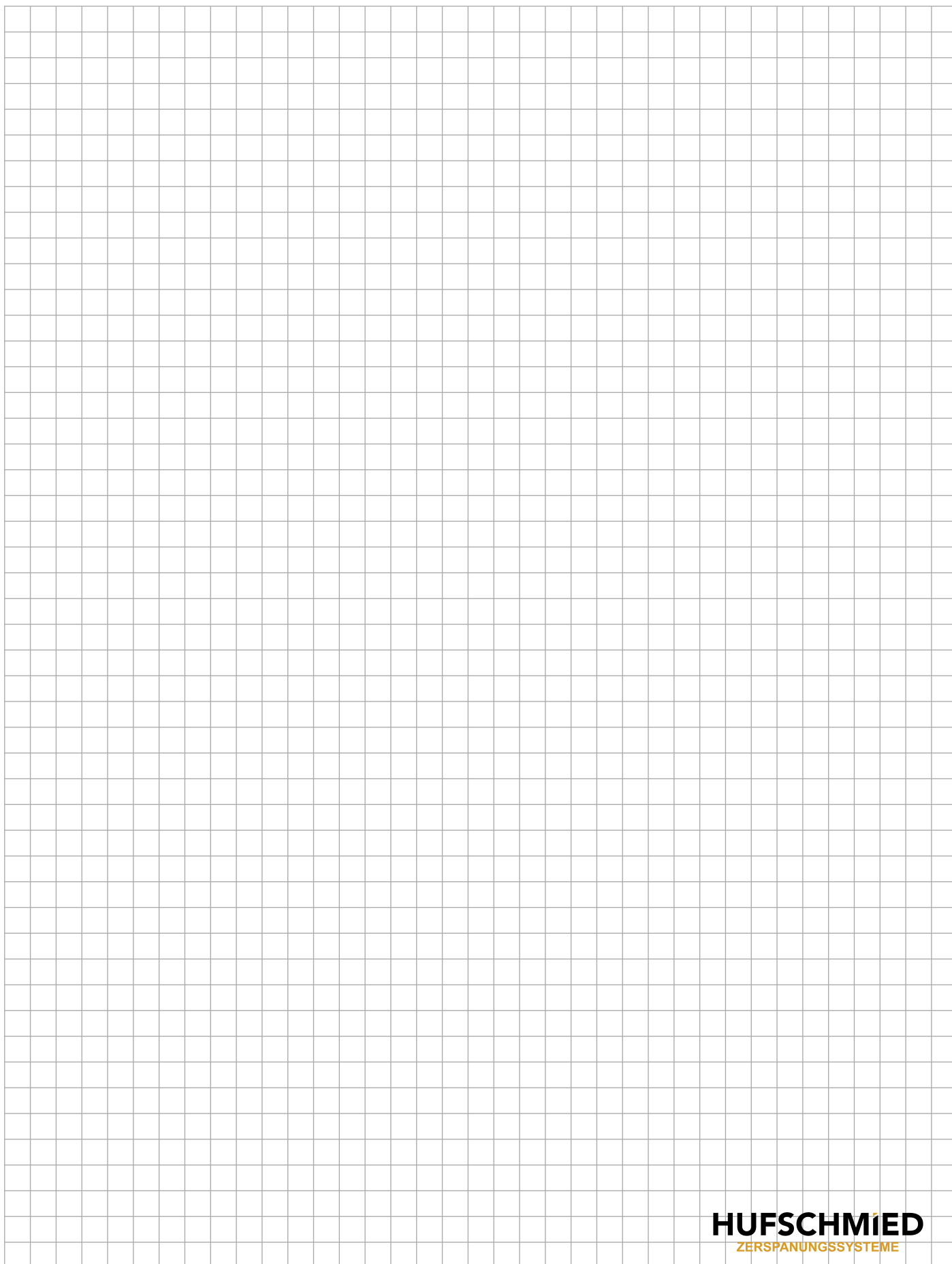
Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 067HORK100 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. 067HOR120 and if wanted COATING: e.g. TL5.

FIBER-LINE



Durchmesserbereich:
3,0 bis 20,0 mm
diameter range:
3,0 to 20,0 mm

| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|---------------|-----------------|-----------------------|----------|----------------|--|--|
| 3,0 | 068HOPCAKK030 | 3 | 6 | 4 | 50 | | |
| | 068HOPCA030 | 3 | 6 | 10 | 60 | | |
| 3,17 / 1/8" | 068HOPCA0317 | 3,17 / 1/8" | 6,35 / 1/4" | 4 | 50 | | |
| | 068HOPCLA0317 | 3,17 / 1/8" | 6,35 / 1/4" | 10 | 63 | | |
| 4,0 | 068HOPCAKK040 | 4 | 6 | 5 | 50 | | |
| | 068HOPCA040 | 4 | 6 | 16 | 60 | | |
| 4,76 / 3/16" | 068HOPCA0476 | 4,76 / 3/16" | 6,35 / 1/4" | 5 | 50 | | |
| | 068HOPCLA0476 | 4,76 / 3/16" | 6,35 / 1/4" | 16 | 63 | | |
| 5,0 | 068HOPCAKK050 | 5 | 6 | 6 | 50 | | |
| | 068HOPCA050 | 5 | 6 | 18 | 60 | | |
| 6,0 | 068HOPCKK060 | 6 | 6 | 7 | 50 | | |
| | 068HOPC060 | 6 | 6 | 20 | 60 | | |
| | 068HOPCL060 | 6 | 6 | 25 | 65 | | |
| | 068HOPCXL060 | 6 | 6 | 28 | 75 | | |
| 6,35 / 1/4" | 068HOPC0635 | 6,35 / 1/4" | 6,35 / 1/4" | 7 | 63 | | |
| | 068HOPCL0635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 75 | | |
| 7,93 / 5/16" | 068HOPC0793 | 7,93 / 5/16" | 7,93 / 5/16" | 9 | 63 | | |
| | 068HOPCL0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 75 | | |
| 8,0 | 068HOPCKK080 | 8 | 8 | 9 | 50 | | |
| | 068HOPC080 | 8 | 8 | 22 | 63 | | |
| | 068HOPCXL080 | 8 | 8 | 32 | 75 | | |
| 9,52 / 3/8" | 068HOPC0952 | 9,52 / 3/8" | 9,52 / 3/8" | 9 | 63 | | |
| | 068HOPCL0952 | 9,52 / 3/8" | 9,52 / 3/8" | 22 | 75 | | |
| 10,0 | 068HOPCK100 | 10 | 10 | 15 | 72 | | |
| | 068HOPC100 | 10 | 10 | 32 | 72 | | |
| 12,0 | 068HOPC120 | 12 | 12 | 32 | 83 | | |
| 12,7 / 1/2" | 068HOPC127 | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 88 | | |
| 16,0 | 068HOPC160 | 16 | 16 | 36 | 92 | | |
| 20,0 | 068HOPC200 | 20 | 20 | 45 | 104 | | |

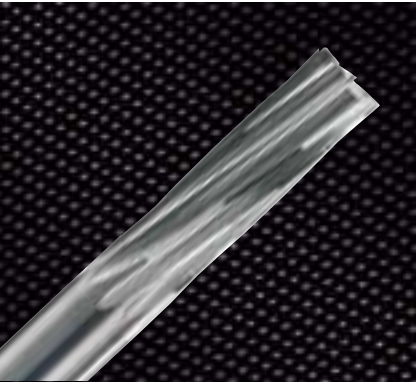


FIBER-LINE

CARB STAR®

CARB STAR®

FIBER-LINE

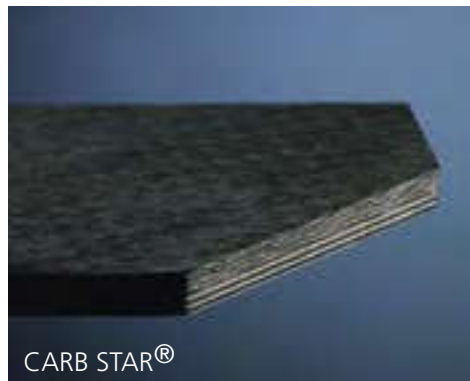


Die Schneidengeometrien der CARB STAR®-Werkzeuge erzielen beim Schlichten von Faserwerkstoffen an den Schnittkanten höchste Oberflächengüten.

The edge geometries of the CARB STAR®-tools achieve the highest surface qualities at finishing of fiber materials.

Die Templer-Schneidengeometrie schützt die Schlichtschneiden vor schlagender Beanspruchung durch die Glas- oder Kohlefasern und ebnet dadurch die Rauheit der Schnittkante ein.

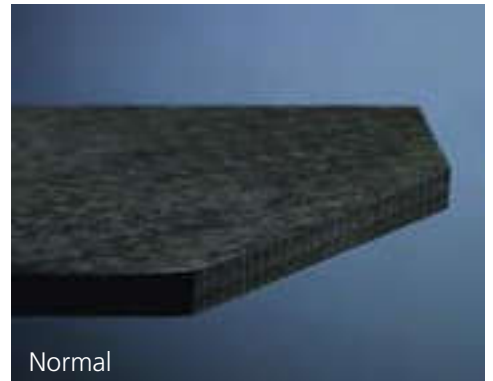
The Templer-edge-geometry protects the finishing edges from beating wear through the glass- or carbon fibers and so planes the abrasiveness of the cutting edge.



CARB STAR®

Im Vergleich sieht man deutlich die klar zu unterscheidenden Faserlagen der mit dem CARB STAR® Werkzeug erzeugten Schnittkante.

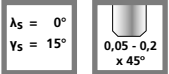
CARB STAR® machined cutting edge without any burrs and delaminations.



Normal

Normal gefräste Schnittkanten weisen immer Aufschmierungen durch den entstehenden Kohlefaserstaub auf. Diese Struktur ist NICHT direkt belastbar.

Normal machined cutting edge with burrs and delaminations.



Wir individualisieren für Sie.
Ihr **Anfrageblatt**.

Dieses Werkzeug fertigen wir genau für Ihre Anforderungen auf Anfrage!
Bitte füllen Sie das untere Blatt vollständig aus und faxen es an die

+49/ (0) 8234-9664-99

oder per Mail an

info@hufschmied.net und wir senden Ihnen gerne ein entsprechendes Angebot zu.

Ihr Hufschmied-Team

MEINE KONTAKTDATEN:
MY CONTACT:

Firma / Company

Name / Surname

Vorname / Name

Funktion / Function

Straße/Hausnr. / Road/House number

PLZ/Ort / Postcode/Location

Telefon / Phone

Telefax / Fax

E-Mail / E-mail

ANMERKUNGEN:
NOTES:

We customize for you.
*Your **request sheet**.*

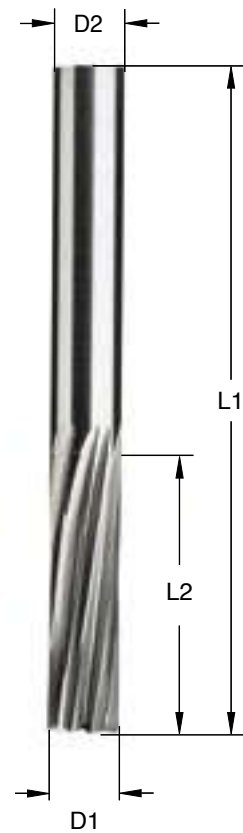
We also manufacture tools for your requirements on request.
Please fill in the correct parameters and send it by fax to

+49/ (0) 8234 9664-99 or by mail

info@hufschmied.net

and we will gladly send you a quote.

Sincerely yours Hufschmied-Team



INDIVIDUALANFERTIGUNG · INDIVIDUAL PRODUCTION

Meine individuellen Daten
My individual data

zu bearbeitendes Material:
Material to be processed:

D1= mm ±

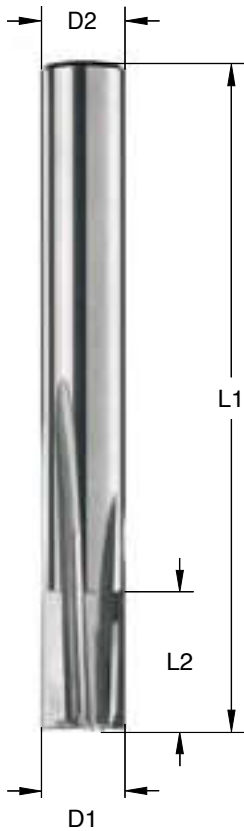
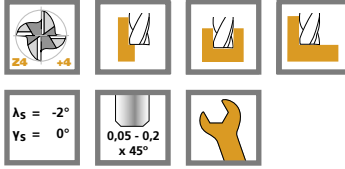
D2= mm Tol.

L2= mm ±

L1= mm ±

L3= mm ±

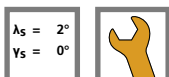
FIBER-LINE



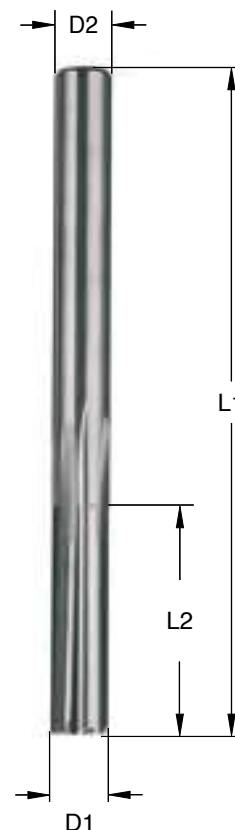
Durchmesserbereich:
6,0 bis 20,0 mm
diameter range:
6,0 to 20,0 mm

Mögliche Beschichtungen:
ALX
DIP
possible coatings:
ALX
DIP

| | BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------------|--|--|
| 6,0 | HC660BDK060 | 6 | 6 | 9 | 50 | | |
| | HC660BD060 | 6 | 6 | 20 | 60 | | |
| | HC660BDL060 | 6 | 6 | 25 | 65 | | |
| | HC660BDKXL060 | 6 | 6 | 9 | 75 | | |
| 6,35 / 1/4" | HC660BDK0635 | 6,35 / 1/4" | 6,35 / 1/4" | 12 | 63 | | |
| | HC660BD0635 | 6,35 / 1/4" | 6,35 / 1/4" | 22 | 75 | | |
| 7,93 / 5/16" | HC660BD0793 | 7,93 / 5/16" | 7,93 / 5/16" | 14 | 63 | | |
| | HC660BDL0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 75 | | |
| 8,0 | HC660BDK080 | 8 | 8 | 11 | 50 | | |
| | HC660BD080 | 8 | 8 | 25 | 63 | | |
| | HC660BDKXL080 | 8 | 8 | 11 | 75 | | |
| 9,52 / 3/8" | HC660BD0952 | 9,52 / 3/8" | 9,52 / 3/8" | 16 | 63 | | |
| | HC660BDL0952 | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 | | |
| 10,0 | HC660BDK100 | 10 | 10 | 14 | 72 | | |
| | HC660BDV100 | 10 | 10 | 25 | 72 | | |
| | HC660BDL100 | 10 | 10 | 25 | 100 | | |
| 12,0 | HC660BDK120 | 12 | 12 | 16 | 83 | | |
| | HC660BDL120 | 12 | 12 | 25 | 100 | | |
| 12,7 / 1/2" | HC660BD127 | 12,7 / 1/2" | 12,7 / 1/2" | 25 | 88 | | |
| 16,0 | HC660BD160 | 16 | 16 | 25 | 92 | | |
| 20,0 | HC660BD200 | 20 | 20 | 25 | 104 | | |



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|---------------|-----------------|-----------------------|----------|----------------|--|--|
| 6,0 | HC670BDK060 | 6 | 6 | 9 | 50 | | |
| | HC670BD060 | 6 | 6 | 20 | 60 | | |
| | HC670BDL060 | 6 | 6 | 25 | 65 | | |
| | HC670BDKXL060 | 6 | 6 | 9 | 75 | | |
| 6,35 / 1/4" | HC670BDK0635 | 6,35 / 1/4" | 6,35 / 1/4" | 12 | 63 | | |
| | HC670BD0635 | 6,35 / 1/4" | 6,35 / 1/4" | 22 | 75 | | |
| 7,93 / 5/16" | HC670BD0793 | 7,93 / 5/16" | 7,93 / 5/16" | 14 | 63 | | |
| | HC670BDL0793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 75 | | |
| 8,0 | HC670BDK080 | 8 | 8 | 11 | 50 | | |
| | HC670BD080 | 8 | 8 | 25 | 63 | | |
| | HC670BDKXL080 | 8 | 8 | 11 | 75 | | |
| 9,52 / 3/8" | HC670BD0952 | 9,52 / 3/8" | 9,52 / 3/8" | 16 | 63 | | |
| | HC670BDL0952 | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 | | |
| 10,0 | HC670BDK100 | 10 | 10 | 14 | 72 | | |
| | HC670BDV100 | 10 | 10 | 25 | 72 | | |
| | HC670BDL100 | 10 | 10 | 25 | 100 | | |
| 12,0 | HC670BDK120 | 12 | 12 | 16 | 83 | | |
| | HC670BDL120 | 12 | 12 | 25 | 100 | | |
| 12,7 / 1/2" | HC670BD127 | 12,7 / 1/2" | 12,7 / 1/2" | 25 | 88 | | |
| 16,0 | HC670BD160 | 16 | 16 | 25 | 92 | | |
| 20,0 | HC670BD200 | 20 | 20 | 25 | 104 | | |

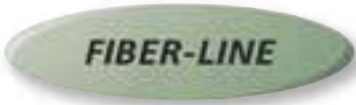


Durchmesserbereich:
6,0 bis 20,0 mm
diameter range:
6,0 to 20,0 mm

Mögliche Beschichtungen:
ALX
DIP
possible coatings:
ALX
DIP

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. HC670BD100 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. HC670BDK0635 and if wanted COATING: e.g. ALX.



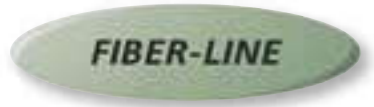
T-REX, DIE NEUE
WERKZEUGGENERATION
FÜR GLAS- UND KOHLE-
FASER

*T-REX, THE NEW
GENERATION OF TOOLS
FOR GLAS AND CARBON
FIBER*



NEU!
NEW!

FIBER-LINE



GFK
GFK

GMT
GMT

LFT
LFT

Organobleche
Organo sheets

CFK
CFK

FIBER-LINE

T-REX, DIE NEUE
WERKZEUGGENERATION

T-REX, THE NEW
GENERATION OF TOOLS

FIBER-LINE



Für die Zerspanung von CFK-Strukturbauteilen und die speziellen Anforderungen der Automobilindustrie wurden die T-REX-Werkzeuge entwickelt. T-REX vereint mit seiner variablen Schnittgeometrie die Vorteile einer Routergeometrie mit der delaminationsfreien Beschnittqualität eines Kompressionswerkzeugs. Daraus ergibt sich eine hohe Abrasionsbeständigkeit gepaart mit einer langen Standzeit. Diese Neuentwicklung ist von Hufschmied zum Patent angemeldet.

Anwendungen:

Befräsen von Randbeschnitt, Taschen, Aus- und Durchbrüchen

Vorteile:

- sehr hohe Standzeiten
- saubere Oberflächen
- keine Faserüberstände
- delaminationsfreie Bearbeitung
- große Abmessungsvielfalt

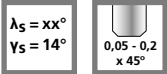
T-REX tools were developed for chipping CFK structure components and special requirements of the automotive industry. With its variable cutting geometry T-REX combines the advantages of router geometry with the delamination-free trimming quality of a compression tool. This results in high abrasion resistance for long tool life. This new development is filed for patent by Hufschmied.

Application:

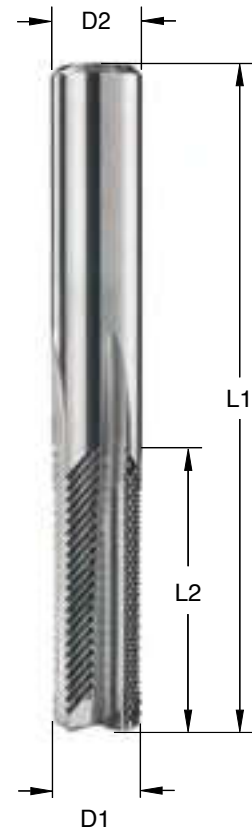
Milling of edge trimming, pockets and cut-outs

Advantages:

- *very high tool life*
- *clean surfaces*
- *no fiber over projections*
- *delamination-free machining*
- *high dimension variety*



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|-----------|-----------------|-----------------------|----------|----------------|--|--|
| 6,0 | 194K060 | 6 | 6 | 9 | 50 | | |
| | 194H060 | 6 | 6 | 15 | 60 | | |
| | 194060 | 6 | 6 | 20 | 60 | | |
| | 194L060 | 6 | 6 | 25 | 65 | | |
| | 194KXL060 | 6 | 6 | 9 | 75 | | |
| | 194XL060 | 6 | 6 | 30 | 75 | | |
| | 194A060 | 6 | 8 | 15 | 75 | | |
| 6,35 / 1/4" | 194K0635 | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 63 | | |
| | 1940635 | 6,35 / 1/4" | 6,35 / 1/4" | 27 | 75 | | |
| 7,93 / 5/16" | 1940793 | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 50 | | |
| | 194L0793 | 7,93 / 5/16" | 7,93 / 5/16" | 27 | 75 | | |
| 8,0 | 194K080 | 8 | 8 | 11 | 50 | | |
| | 194080 | 8 | 8 | 25 | 63 | | |
| | 194L080 | 8 | 8 | 30 | 63 | | |
| | 194KXL080 | 8 | 8 | 11 | 75 | | |
| | 194H080 | 8 | 8 | 18 | 75 | | |
| | 194XL080 | 8 | 8 | 35 | 75 | | |
| | | | | | | | |
| 9,52 / 3/8" | 1940952 | 9,52 / 3/8" | 9,52 / 3/8" | 22 | 63 | | |
| | 194L0952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 72 | | |
| 10,0 | 194K100 | 10 | 10 | 14 | 72 | | |
| | 194V100 | 10 | 10 | 25 | 72 | | |
| | 194H100 | 10 | 10 | 20 | 72 | | |
| | 194100 | 10 | 10 | 32 | 72 | | |
| | 194L100 | 10 | 10 | 26 | 100 | | |
| | | | | | | | |
| 12,0 | 194K120 | 12 | 12 | 16 | 83 | | |
| | 194120 | 12 | 12 | 32 | 83 | | |
| | 194L120 | 12 | 12 | 28 | 100 | | |
| 12,7 / 1/2" | 194127 | 12,7 / 1/2" | 12,7 / 1/2" | 25 | 88 | | |
| | 194L127 | 12,7 / 1/2" | 12,7 / 1/2" | 45 | 100 | | |
| 16,0 | 194160 | 16 | 16 | 36 | 92 | | |
| 20,0 | 194200 | 20 | 20 | 45 | 104 | | |

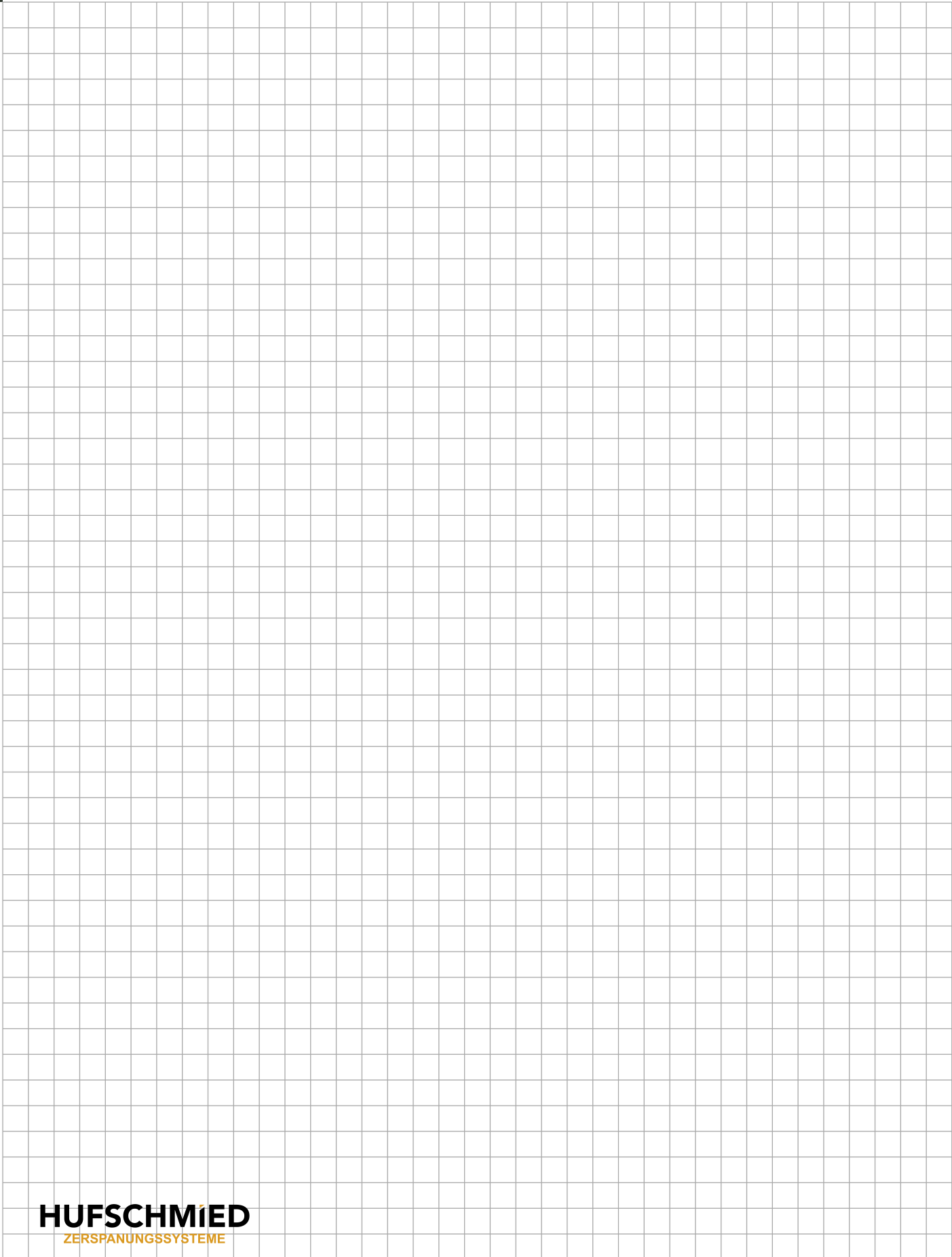


Durchmesserbereich:
6,0 bis 20,0 mm
diameter range:
6,0 to 20,0 mm

Mögliche Beschichtungen:
ALX - Standard
TL5 - auf Anfrage
DIP - auf Anfrage
possible coatings:
ALX - Standard
TL5 - on demand
DIP - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 194XL060 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. 194K120 and if wanted COATING: e.g. ALX.



FIBER-LINE

KOMPRESSIONS-
WERKZEUGE

COMPRESSION
TOOLS

FIBER-LINE

FIBER-LINE



GFK
GFK

GMT
GMT

LFT
LFT

CFK
CFK

Organobleche
Organo sheet

Kevlar
Kevlar

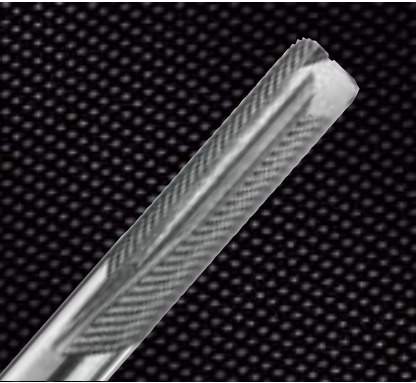
HUFSCHMIED
ZERSpanungSSYSTEME

FIBER-LINE

KOMPRESSIONS-
WERKZEUGE

COMPRESSION
TOOLS

FIBER-LINE



Sowohl in der Automobil- als auch in der Luftfahrtindustrie kommen immer mehr Werkstoffe zum Einsatz, die mit verwobenen oder sehr langen Fasern verstärkt sind. Beispiel dafür sind Organobleche oder Aramid-Bauteile (Kevlar). Aramid-Fasern zeichnen sich durch sehr hohe Festigkeit, hohe Schlagzähigkeit und Bruchdehnung aus.

Die Arbeitsweise unserer Kompressionswerkzeuge lässt sich am besten mit der Schnittwirkung einer Schere vergleichen.

Sie sind im hinteren Schneidenbereich so aufgebaut, dass das Werkzeug mit einem Linksdrall Druck auf die Oberkante des Werkstücks ausübt. Im vorderen Bereich erzeugt ein Rechtsdrall eine gegenläufige Kraft auf die Werkstückunterseite. Die langen Fasern werden dadurch ohne Aufsplissen, Delaminationen oder Aufschmelzungen sauber durchtrennt, die Kanten haben Finish-Qualität.

Anwendungen:

Bearbeitung von GFK, GMT, LFT, CFK, Organoblechen, Kevlar

Ausführungen:

- ALX als Standardbeschichtungen
- TL5 und Dip optional

Both for automotive as well as aviation technology more and more materials are employed which are reinforced with woven or very long fibers. Examples are organic sheet or aramid components (Kevlar). Aramid fibers distinguish themselves with high rigidity, high impact resistance and elongation at failure.

The method of operation of our compression tools can be best compared with the effect of cutting with scissors.

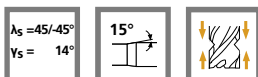
The blade-zone is mitered such that the tool exerts compressive energy to the material surface with a left-hand twist. This severs long fibers without splicing, fraying, delamination or melting resulting in edges with finish quality.

Application:

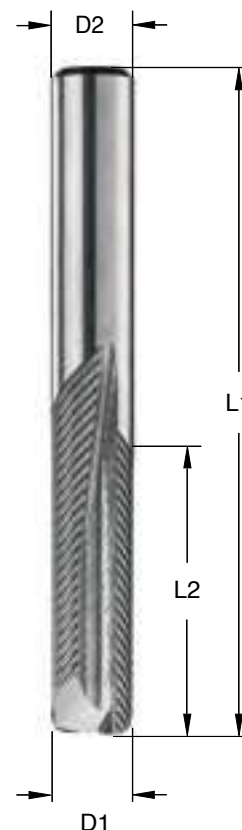
Machining GFK, GMT, LFT, CFK, organic sheets, Kevlar

Variants:

- ALX as standard coating
- TL5 and Dip optional



| | BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------------|--|--|
| 3,0 | 161030030 | 3 | 3 | 12 | 50 | | |
| | 161L030060 | 3 | 6 | 18 | 75 | | |
| 3,17 / 1/8" | 1610317635 | 3,17 / 1/8" | 6,35 / 1/4" | 12 | 50 | | |
| | 161L0317635 | 3,17 / 1/8" | 6,35 / 1/4" | 20 | 75 | | |
| 4,0 | 161040040 | 4 | 4 | 14 | 50 | | |
| | 161L040060 | 4 | 6 | 20 | 75 | | |
| 4,76 / 3/16" | 1610476635 | 4,76 / 3/16" | 6,35 / 1/4" | 16 | 50 | | |
| | 161L0476635 | 4,76 / 3/16" | 6,35 / 1/4" | 25 | 75 | | |
| 5,0 | 161050050 | 5 | 5 | 16 | 50 | | |
| | 161L050060 | 5 | 6 | 25 | 75 | | |
| 6,0 | 161060060 | 6 | 6 | 20 | 60 | | |
| | 161L060080 | 6 | 8 | 35 | 100 | | |
| 6,35 / 1/4" | 1610635635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 63 | | |
| | 161L0635635 | 6,35 / 1/4" | 6,35 / 1/4" | 27 | 75 | | |
| 7,93 / 5/16" | 1610793793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 63 | | |
| | 161L0793793 | 7,93 / 5/16" | 7,93 / 5/16" | 27 | 100 | | |
| 8,0 | 161080080 | 8 | 8 | 22 | 63 | | |
| | 161L080080 | 8 | 8 | 40 | 100 | | |
| 9,52 / 3/8" | 1610952952 | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 | | |
| | 161L0952952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 100 | | |
| 10,0 | 161100100 | 10 | 10 | 25 | 72 | | |
| | 161L100100 | 10 | 10 | 50 | 125 | | |
| 12,0 | 161120120 | 12 | 12 | 30 | 83 | | |
| | 161L120120 | 12 | 12 | 60 | 125 | | |
| 12,7 / 1/2" | 161127127 | 12,7 / 1/2" | 12,7 / 1/2" | 40 | 100 | | |
| 16,0 | 161160160 | 16 | 16 | 35 | 92 | | |
| | 161L160160 | 16 | 16 | 75 | 150 | | |
| 20,0 | 161200200 | 20 | 20 | 45 | 104 | | |

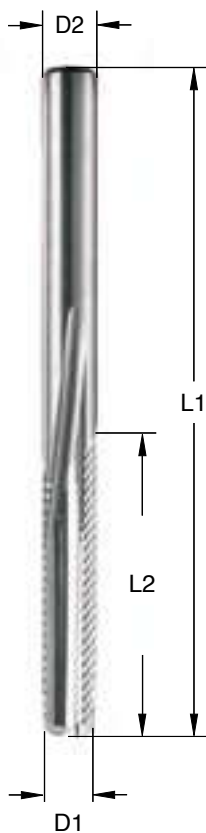
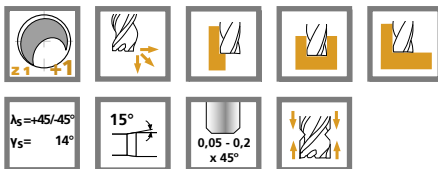


Durchmesserbereich:
3,0 bis 20,0 mm
diameter range:
3,0 to 20,0 mm

Mögliche Beschichtungen:
ALX - Standard
DIP - auf Anfrage
possible coatings:
ALX - Standard
DIP - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 161040040 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. 161L060080 and if wanted COATING: e.g. ALX.



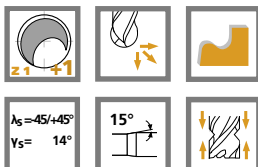
Durchmesserbereich:
 3,0 bis 20,0 mm
diameter range:
 3,0 to 20,0 mm

Mögliche Beschichtungen:
 ALX - Standard
 DIP - auf Anfrage
possible coatings:
 ALX - Standard
 DIP - on demand

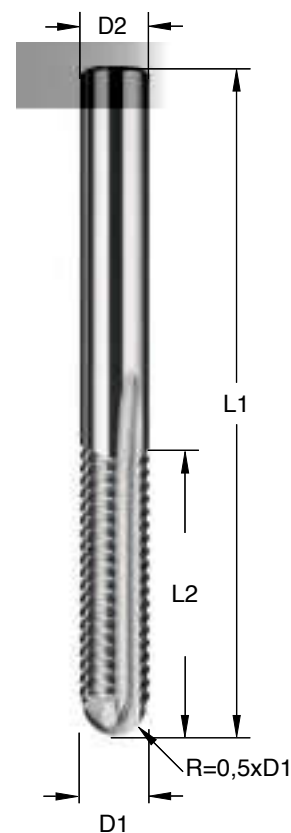
| | BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------------|--|--|
| 3,0 | 161F030030 | 3 | 3 | 12 | 50 | | |
| | 161FL030060 | 3 | 6 | 18 | 75 | | |
| 3,17 / 1/8" | 161F0317635 | 3,17 / 1/8" | 6,35 / 1/4" | 12 | 50 | | |
| | 161FL0317635 | 3,17 / 1/8" | 6,35 / 1/4" | 20 | 75 | | |
| 4,0 | 161F040040 | 4 | 4 | 14 | 50 | | |
| | 161FL040060 | 4 | 6 | 20 | 75 | | |
| 4,76 / 3/16" | 161F0476635 | 4,76 / 3/16" | 6,35 / 1/4" | 16 | 50 | | |
| | 161FL0476635 | 4,76 / 3/16" | 6,35 / 1/4" | 25 | 75 | | |
| 5,0 | 161F050050 | 5 | 5 | 16 | 50 | | |
| | 161FL050060 | 5 | 6 | 25 | 75 | | |
| 6,0 | 161F060060 | 6 | 6 | 20 | 60 | | |
| | 161FL060080 | 6 | 8 | 35 | 100 | | |
| 6,35 / 1/4" | 161F0635635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 63 | | |
| | 161FL0635635 | 6,35 / 1/4" | 6,35 / 1/4" | 27 | 75 | | |
| 7,93 / 5/16" | 161F0793793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 63 | | |
| | 161FL0793793 | 7,93 / 5/16" | 7,93 / 5/16" | 27 | 100 | | |
| 8,0 | 161F080080 | 8 | 8 | 22 | 63 | | |
| | 161FL080080 | 8 | 8 | 40 | 100 | | |
| 9,52 / 3/8" | 161F0952952 | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 | | |
| | 161FL0952952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 100 | | |
| 10,0 | 161F100100 | 10 | 10 | 25 | 72 | | |
| | 161FL100100 | 10 | 10 | 50 | 125 | | |
| 12,0 | 161F120120 | 12 | 12 | 30 | 83 | | |
| | 161FL120120 | 12 | 12 | 60 | 125 | | |
| 12,7 / 1/2" | 161F127127 | 12,7 / 1/2" | 12,7 / 1/2" | 40 | 100 | | |
| 16,0 | 161F160160 | 16 | 16 | 35 | 92 | | |
| | 161FL160160 | 16 | 16 | 75 | 150 | | |
| 20,0 | 161F200200 | 20 | 20 | 45 | 104 | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
 Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 161F040040 und wenn gewünscht Beschichtung: z.B. ALX.
 Please indicate order number: e.g. 161FL120120 and if wanted COATING: e.g. ALX.



| | BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------------|--|--|
| 3,0 | 161R030030 | 3 | 3 | 12 | 50 | | |
| | 161RL030060 | 3 | 6 | 18 | 75 | | |
| 3,17 / 1/8" | 161R0317635 | 3,17 / 1/8" | 6,35 / 1/4" | 12 | 50 | | |
| | 161RL0317635 | 3,17 / 1/8" | 6,35 / 1/4" | 20 | 75 | | |
| 4,0 | 161R040040 | 4 | 4 | 14 | 50 | | |
| | 161RL040060 | 4 | 6 | 20 | 75 | | |
| 4,76 / 3/16" | 161R0476635 | 4,76 / 3/16" | 6,35 / 1/4" | 16 | 50 | | |
| | 161RL0476635 | 4,76 / 3/16" | 6,35 / 1/4" | 25 | 75 | | |
| 5,0 | 161R050050 | 5 | 5 | 16 | 50 | | |
| | 161RL050060 | 5 | 6 | 25 | 75 | | |
| 6,0 | 161R060060 | 6 | 6 | 20 | 60 | | |
| | 161RL060080 | 6 | 8 | 35 | 100 | | |
| 6,35 / 1/4" | 161R0635635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 63 | | |
| | 161R0635635 | 6,35 / 1/4" | 6,35 / 1/4" | 27 | 75 | | |
| 7,93 / 5/16" | 161R0793793 | 7,93 / 5/16" | 7,93 / 5/16" | 22 | 63 | | |
| | 161RL0793793 | 7,93 / 5/16" | 7,93 / 5/16" | 27 | 100 | | |
| 8,0 | 161R080080 | 8 | 8 | 22 | 63 | | |
| | 161RL080080 | 8 | 8 | 40 | 100 | | |
| 9,52 / 3/8" | 161R0952952 | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 | | |
| | 161RL0952952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 100 | | |
| 10,0 | 161R100100 | 10 | 10 | 25 | 72 | | |
| | 161RL100100 | 10 | 10 | 50 | 125 | | |
| 12,0 | 161R120120 | 12 | 12 | 30 | 83 | | |
| | 161RL120120 | 12 | 12 | 60 | 125 | | |
| 12,7 / 1/2" | 161R127127 | 12,7 / 1/2" | 12,7 / 1/2" | 40 | 100 | | |
| 16,0 | 161R160160 | 16 | 16 | 35 | 92 | | |
| | 161RL160160 | 16 | 16 | 75 | 150 | | |
| 20,0 | 161R200200 | 20 | 20 | 45 | 104 | | |

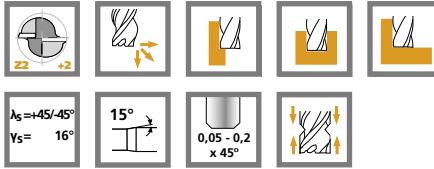


Durchmesserbereich:
3,0 bis 20,0 mm
diameter range:
3,0 to 20,0 mm

Mögliche Beschichtungen:
ALX - Standard
DIP - auf Anfrage
possible coatings:
ALX - Standard
DIP - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 161R040040 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. 161RL120120 and if wanted COATING: e.g. ALX.



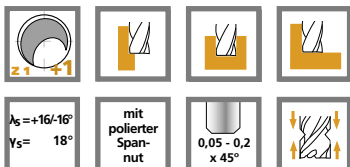
Durchmesserbereich:
 6,0 bis 20,0 mm
diameter range:
 6,0 to 20,0 mm

Mögliche Beschichtungen:
 ALX - Standard
 DIP - auf Anfrage
possible coatings:
 ALX - Standard
 DIP - on demand

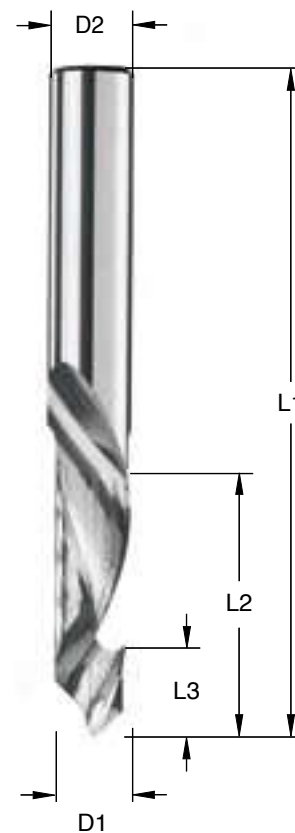
| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|-----------|-----------------|-----------------------|----------|----------------|--|--|
| 6,0 | 193K060 | 6 | 6 | 9 | 50 | | |
| | 193060 | 6 | 6 | 20 | 60 | | |
| | 193L060 | 6 | 6 | 25 | 65 | | |
| | 193KXL060 | 6 | 6 | 9 | 75 | | |
| | 193XL060 | 6 | 6 | 30 | 75 | | |
| 6,35 / 1/4" | 1930635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 63 | | |
| | 193L0635 | 6,35 / 1/4" | 6,35 / 1/4" | 27 | 75 | | |
| 7,93 / 5/16" | 1930793 | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 63 | | |
| | 193L0793 | 7,93 / 5/16" | 7,93 / 5/16" | 27 | 100 | | |
| 8,0 | 193K080 | 8 | 8 | 11 | 50 | | |
| | 193080 | 8 | 8 | 25 | 63 | | |
| | 193L080 | 8 | 8 | 30 | 63 | | |
| | 193KXL080 | 8 | 8 | 11 | 75 | | |
| | 193XL080 | 8 | 8 | 35 | 75 | | |
| 9,52 / 3/8" | 1930952 | 9,52 / 3/8" | 9,52 / 3/8" | 30 | 72 | | |
| | 193L0952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 100 | | |
| 10,0 | 193K100 | 10 | 10 | 14 | 72 | | |
| | 193V100 | 10 | 10 | 25 | 72 | | |
| | 193100 | 10 | 10 | 32 | 72 | | |
| | 193XL100 | 10 | 10 | 26 | 100 | | |
| 12,0 | 193K120 | 12 | 12 | 16 | 83 | | |
| | 193120 | 12 | 12 | 30 | 83 | | |
| | 193L120 | 12 | 12 | 28 | 100 | | |
| 12,7 / 1/2" | 193127 | 12,7 / 1/2" | 12,7 / 1/2" | 40 | 100 | | |
| 16,0 | 193160 | 16 | 16 | 36 | 92 | | |
| 20,0 | 193200 | 20 | 20 | 45 | 104 | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
 Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 193L040060 und wenn gewünscht Beschichtung: z.B. ALX.
 Please indicate order number: e.g. 193L160160 and if wanted COATING: e.g. ALX.



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm |
|--------------------------------|--------------|-----------------|-----------------------|----------|----------------|----------|
| 6,0 | 160DK060060 | 6 | 6 | 20 | 60 | 6 |
| 6,35 / 1/4" | 160DK0635635 | 6,35 / 1/4" | 6,35 / 1/4" | 20 | 65 | 8 |
| 7,93 / 5/16" | 160DK0793793 | 7,93 / 5/16" | 7,93 / 5/16" | 25 | 75 | 8 |
| 8,0 | 160DK080080 | 8 | 8 | 22 | 63 | 8 |
| 9,52 / 3/8" | 160DK0952952 | 9,52 / 3/8" | 9,52 / 3/8" | 25 | 75 | 10 |
| 10,0 | 160DK100100 | 10 | 10 | 25 | 72 | 10 |
| 12,0 | 160DK120120 | 12 | 12 | 30 | 83 | 12 |
| 12,7 / 1/2" | 160DK127127 | 12,7 / 1/2" | 12,7 / 1/2" | 30 | 88 | 12 |
| 16,0 | 160DK160160 | 16 | 16 | 32 | 104 | 16 |
| 20,0 | 160DK200200 | 20 | 20 | 36 | 104 | 20 |

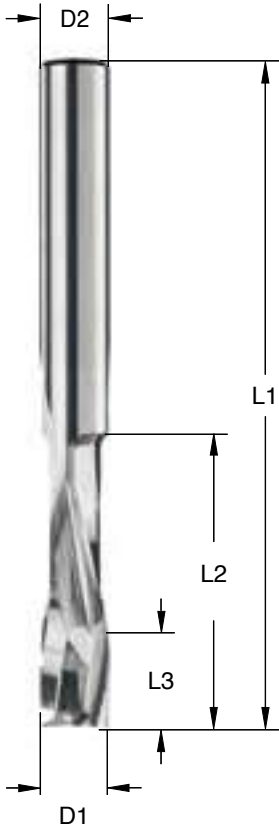
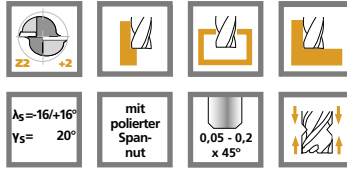


Durchmesserbereich:
6,0 bis 20,0 mm
diameter range:
6,0 to 20,0 mm

Mögliche Beschichtungen:
ALX
TL5
DIP
possible coatings:
ALX
TL5
DIP

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

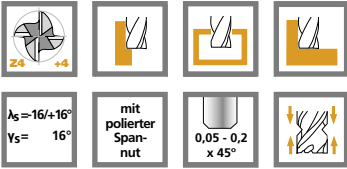
Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 160DK040040-14 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. 160DK100100-30 and if wanted COATING: e.g. TL5.



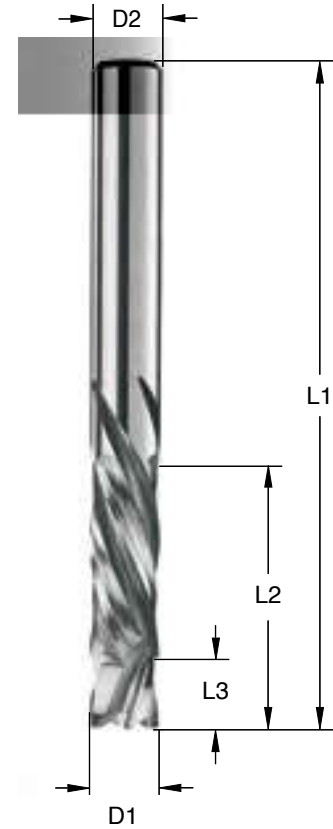
Durchmesserbereich:
3,0 bis 12,7 mm
diameter range:
3,0 to 12,7 mm

Mögliche Beschichtungen:
ALX
TL5
DIP
possible coatings:
ALX
TL5
DIP

| | BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------------|----------|
| 3,0 | 165DK030030 | 3 | 3 | 14 | 50 | 3 |
| 3,17 / 1/8" | 165DK0317635 | 3,17 / 1/8" | 6,35 / 1/4" | 14 | 50 | 3 |
| 4,0 | 165DK040040 | 4 | 4 | 16 | 50 | 5 |
| 4,76 / 3/16" | 165DK0476635 | 4,76 / 3/16" | 6,35 / 1/4" | 16 | 50 | 5 |
| 5,0 | 165DK050050 | 5 | 5 | 18 | 60 | 6 |
| 6,0 | 165DK060060 | 6 | 6 | 22 | 65 | 8 |
| 6,35 / 1/4" | 165DK0635635 | 6,35 / 1/4" | 6,35 / 1/4" | 22 | 63 | 8 |
| 7,93 / 5/16" | 165DK0793793 | 7,93 / 5/16" | 7,93 / 5/16" | 27 | 75 | 10 |
| 8,0 | 165DK080080 | 8 | 8 | 27 | 75 | 10 |
| 9,52 / 3/8" | 165DK0952952 | 9,52 / 3/8" | 9,52 / 3/8" | 27 | 75 | 12 |
| 10,0 | 165DK100100 | 10 | 10 | 30 | 83 | 15 |
| 12,7 / 1/2" | 165DK127127 | 12,7 / 1/2" | 12,7 / 1/2" | 30 | 100 | 15 |



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm |
|--------------------------------|-----------|-----------------|-----------------------|----------|----------------|----------|
| 6,0 | 191K060 | 6 | 6 | 15 | 50 | 8 |
| | 191060 | 6 | 6 | 20 | 60 | 8 |
| | 191L060 | 6 | 6 | 25 | 65 | 8 |
| | 191KXL060 | 6 | 6 | 15 | 75 | 8 |
| | 191XL060 | 6 | 6 | 30 | 75 | 8 |
| 6,35 / 1/4" | 191K0635 | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 50 | 8 |
| | 1910635 | 6,35 / 1/4" | 6,35 / 1/4" | 27 | 75 | 8 |
| 7,93 / 5/16" | 1910793 | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 63 | 10 |
| | 191L0793 | 7,93 / 5/16" | 7,93 / 5/16" | 27 | 75 | 10 |
| 8,0 | 191K080 | 8 | 8 | 18 | 50 | 10 |
| | 191080 | 8 | 8 | 25 | 63 | 10 |
| | 191L080 | 8 | 8 | 30 | 63 | 10 |
| | 191KXL080 | 8 | 8 | 18 | 75 | 10 |
| | 191XL080 | 8 | 8 | 35 | 75 | 10 |
| 9,52 / 3/8" | 1910952 | 9,52 / 3/8" | 9,52 / 3/8" | 30 | 63 | 12 |
| | 191L0952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 76 | 12 |
| 10,0 | 191K100 | 10 | 10 | 20 | 72 | 12 |
| | 191V100 | 10 | 10 | 25 | 72 | 12 |
| | 191100 | 10 | 10 | 32 | 72 | 12 |
| | 191L100 | 10 | 10 | 26 | 100 | 12 |
| 12,0 | 191K120 | 12 | 12 | 25 | 83 | 15 |
| | 191120 | 12 | 12 | 32 | 83 | 15 |
| | 191L120 | 12 | 12 | 28 | 100 | 15 |
| 12,7 / 1/2" | 191127 | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 83 | 15 |
| | 191L127 | 12,7 / 1/2" | 12,7 / 1/2" | 45 | 100 | 15 |
| 16,0 | 191160 | 16 | 16 | 36 | 92 | 15 |
| 20,0 | 191200 | 20 | 20 | 45 | 104 | 15 |

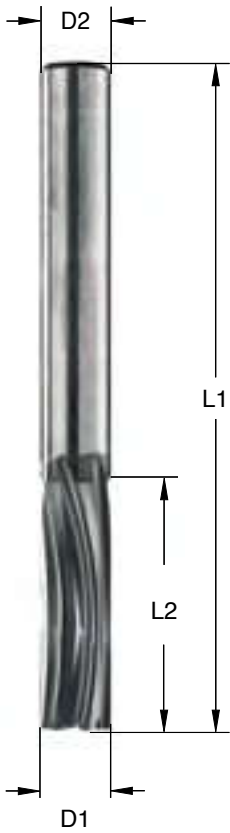
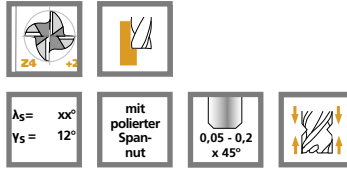


Durchmesserbereich:
6,0 bis 20,0 mm
diameter range:
6,0 to 20,0 mm

Mögliche Beschichtungen:
ALX
TL5
DIP
possible coatings:
ALX
TL5
DIP

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 191K100 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. 191KXL080 and if wanted COATING: e.g. TL5.



Durchmesserbereich:
6,0 bis 20,0 mm
diameter range:
6,0 to 20,0 mm

Mögliche Beschichtungen:
ALX - Standard
TL5 - auf Anfrage
DIP - auf Anfrage
possible coatings:
ALX - Standard
TL5 - on demand
DIP - on demand

| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|-------------|-----------------|-----------------------|----------|----------------|--|--|
| 6,0 | 191BAK060 | 6 | 6 | 9 | 50 | | |
| | 191BA060 | 6 | 6 | 20 | 60 | | |
| | 191BAL060 | 6 | 6 | 25 | 65 | | |
| | 191BAKXL060 | 6 | 6 | 9 | 75 | | |
| | 191BAXL060 | 6 | 6 | 30 | 75 | | |
| 6,35 / 1/4" | 191BAK0635 | 6,35 / 1/4" | 6,35 / 1/4" | 18 | 50 | | |
| | 191BA0635 | 6,35 / 1/4" | 6,35 / 1/4" | 27 | 75 | | |
| 7,93 / 5/16" | 191BA0793 | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 63 | | |
| | 191BAL0793 | 7,93 / 5/16" | 7,93 / 5/16" | 27 | 75 | | |
| 8,0 | 191BAK080 | 8 | 8 | 11 | 50 | | |
| | 191BA080 | 8 | 8 | 25 | 63 | | |
| | 191BAL080 | 8 | 8 | 30 | 63 | | |
| | 191BAKXL080 | 8 | 8 | 11 | 75 | | |
| | 191BAXL080 | 8 | 8 | 35 | 75 | | |
| 9,52 / 3/8" | 191BA0952 | 9,52 / 3/8" | 9,52 / 3/8" | 30 | 63 | | |
| | 191BAL0952 | 9,52 / 3/8" | 9,52 / 3/8" | 32 | 75 | | |
| 10,0 | 191BAK100 | 10 | 10 | 14 | 72 | | |
| | 191BAV100 | 10 | 10 | 25 | 72 | | |
| | 191BA100 | 10 | 10 | 32 | 72 | | |
| | 191BAL100 | 10 | 10 | 26 | 100 | | |
| 12,0 | 191BAK120 | 12 | 12 | 16 | 83 | | |
| | 191BA120 | 12 | 12 | 32 | 83 | | |
| | 191BAL120 | 12 | 12 | 28 | 100 | | |
| 12,7 / 1/2" | 191BA127 | 12,7 / 1/2" | 12,7 / 1/2" | 32 | 83 | | |
| | 191BAL127 | 12,7 / 1/2" | 12,7 / 1/2" | 45 | 100 | | |
| 16,0 | 191BA160 | 16 | 16 | 36 | 92 | | |
| 20,0 | 191BA200 | 20 | 20 | 45 | 104 | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

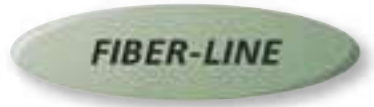
Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 191BAK100 und wenn gewünscht Beschichtung: z.B. ALX.
Please indicate order number: e.g. 191BAKXL080 and if wanted COATING: e.g. ALX.

FIBER-LINE

BOHRWERKZEUGE

TOOLS FOR DRILLING

FIBER-LINE



GFK
GFK

GMT
GMT

LFT
LFT

SMC
SMC

Organobleche
Organo sheet

CFK
CFK


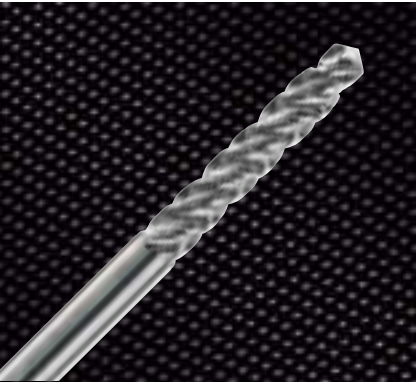
Kevlar
Kevlar

HUFSCHMIED
ZERSPANUNGSSYSTEME

FIBER-LINE

BOHRWERKZEUGE

TOOLS FOR DRILLING


 FIBER-LINE


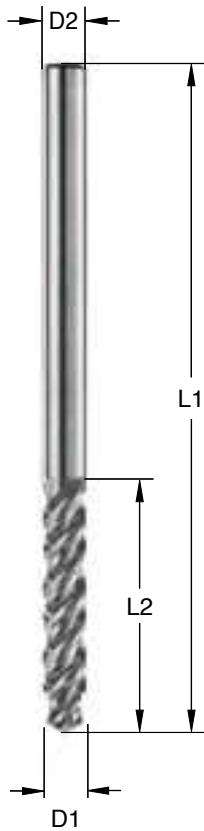
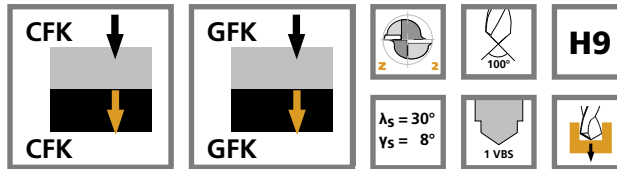
FIBER-LINE ermöglicht delaminationsfreies Bearbeiten bei gleichzeitig reduzierten Kosten pro Bohrung. Die materialspezifischen Eigenschaften an der SchneidAusführung führt zur optimalen Bohrungsqualität.

Verweis auf Varianten zum Bohren von Faserverbundwerkstoffen von CFK, GFK und Aramid-Werkstoffen ohne Delaminationen.

FIBER-LINE allows delamination-free machining at reduced cost-per-drilling. The material specific properties of the cutting edge results in optimum drilling quality.

Reference to variants for drilling fiber compound materials made of CFK, GFK and aramid without delaminations.

| | | | |
|-------|--------------------------------|-------|---|
| FB | Passbohrung ab H11 | FB | hole from H11 |
| FD | Passbohrung bis H9 | FD | hole up to H9 |
| 162 | Z2 - 1 Vorbohrstufe (VBS) 100° | 162 | 2F - 1 step head 100° |
| 164 | Z4 - 1 VBS 100° | 164 | 4F - 1 step head 100° |
| 264 | Z4 - 2 VBS 90° | 264 | 4F - 2 step heads 90° |
| 660BD | Z4+4 - 2 VBS 90° | 660BD | 4F+4 - 2 step heads 90° |
| 662 | Z2 - 2 VBS mit Senker 90° | 662 | 2F - 2 step heads with counter sink 90° |
| 664 | Z4 - 2 VBS mit Senker 90° | 664 | 4F - 2 step heads with counter sink 90° |
| 119 | Kevlarbohrer | 119 | Kevlar drill |
| 118 | Kalibrierbohrer ab H7 | 118 | calibration drill from H7 |



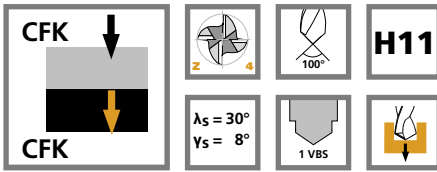
Durchmesserbereich:
2,48 bis 12,7 mm
diameter range:
2,48 to 12,7 mm

Mögliche Beschichtungen:
ALX
TL5
DIP
possible coatings:
ALX
TL5
DIP

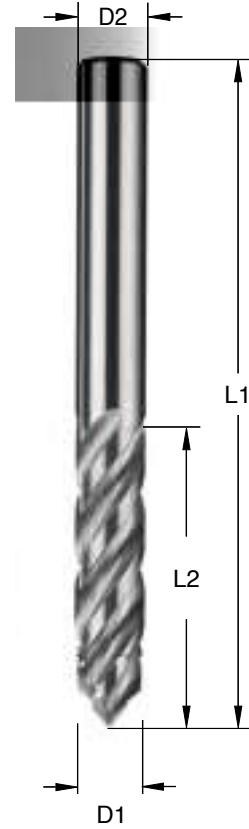
| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|------------|-----------------|-----------------------|----------|----------------|--|--|
| 2,48 | FD1620248 | 2,48 | 3 | 18 | 60 | | |
| 3,0 | FD162030 | 3 | 3 | 18 | 60 | | |
| 3,17 / 1/8" | FD1620317 | 3,17 / 1/8" | 3,17 / 1/8" | 18 | 60 | | |
| 4,0 | FD162040 | 4 | 4 | 22 | 60 | | |
| 4,21 | FD1620421 | 4,21 | 6 | 22 | 75 | | |
| 4,76 / 3/16" | FD1620476 | 4,76 / 3/16" | 4,76 / 3/16" | 22 | 75 | | |
| 4,82 | FD162K0482 | 4,82 | 6 | 25 | 75 | | |
| | FD1620482 | 4,82 | 8 | 30 | 100 | | |
| 5,05 | FD1620505 | 5,05 | 6 | 25 | 75 | | |
| 6,0 | FD162060 | 6 | 6 | 30 | 75 | | |
| 6,35 / 1/4" | FD162K0635 | 6,35 / 1/4" | 6,35 / 1/4" | 30 | 70 | | |
| 7,93 / 5/16" | FD162K0793 | 7,93 / 5/16" | 7,93 / 5/16" | 30 | 75 | | |
| 8,0 | FD162080 | 8 | 8 | 30 | 75 | | |
| 9,52 / 3/8" | FD1620952 | 9,52 / 3/8" | 9,52 / 3/8" | 30 | 90 | | |
| 10,0 | FD162100 | 10 | 10 | 40 | 100 | | |
| 12,0 | FD162120 | 12 | 12 | 50 | 100 | | |
| 12,7 / 1/2" | FD162127 | 12,7 / 1/2" | 12,7 / 1/2" | 50 | 102 | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. FD162060 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. FD162K0793 and if wanted COATING: e.g. TL5.



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm |
|--------------------------------|------------|-----------------|-----------------------|----------|----------------|
| 2,48 | FB1640248 | 2,48 | 3 | 18 | 60 |
| 3,0 | FB164030 | 3 | 3 | 18 | 60 |
| 3,17 / 1/8" | FB1640317 | 3,17 / 1/8" | 3,17 / 1/8" | 18 | 60 |
| 4,0 | FB164040 | 4 | 4 | 22 | 60 |
| 4,21 | FB1640421 | 4,21 | 6 | 22 | 75 |
| 4,76 / 3/16" | FB1640476 | 4,76 / 3/16" | 4,76 / 3/16" | 22 | 75 |
| 4,82 | FB164K0482 | 4,82 | 6 | 25 | 75 |
| 5,05 | FB1640505 | 5,05 | 6 | 25 | 75 |
| 6,0 | FB164060 | 6 | 6 | 30 | 75 |
| 6,35 / 1/4" | FB164K0635 | 6,35 / 1/4" | 6,35 / 1/4" | 30 | 70 |
| 7,93 / 5/16" | FB164K0793 | 7,93 / 5/16" | 7,93 / 5/16" | 30 | 75 |
| 8,0 | FB164080 | 8 | 8 | 30 | 75 |
| 9,52 / 3/8" | FB1640952 | 9,52 / 3/8" | 9,52 / 3/8" | 30 | 90 |
| 10,0 | FB164100 | 10 | 10 | 40 | 100 |
| 12,0 | FB164120 | 12 | 12 | 50 | 100 |
| 12,7 / 1/2" | FB164127 | 12,7 / 1/2" | 12,7 / 1/2" | 50 | 102 |

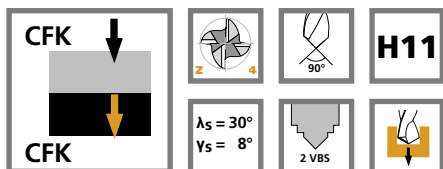


Durchmesserbereich:
2,48 bis 12,7 mm
diameter range:
2,48 to 12,7 mm

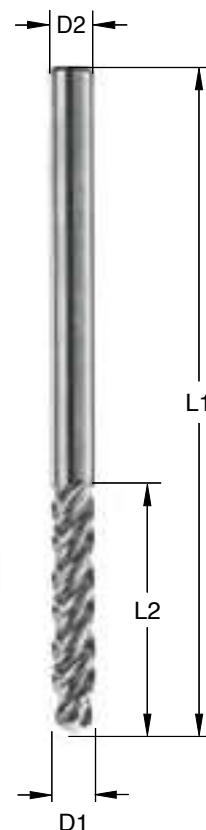
Mögliche Beschichtungen:
ALX
TL5
DIP
possible coatings:
ALX
TL5
DIP

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. FB164060 und wenn
gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. FB164K0793 and if wanted COATING: e.g. TL5.



| | BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------------|--|--|
| 2,48 | FB2640248 | 2,48 | 3 | 18 | 60 | | |
| 3,0 | FB264030 | 3 | 3 | 18 | 60 | | |
| 3,17 / 1/8" | FB2640317 | 3,17 / 1/8" | 3,17 / 1/8" | 18 | 60 | | |
| 4,0 | FB264040 | 4 | 4 | 22 | 60 | | |
| 4,21 | FB2640421 | 4,21 | 6 | 22 | 75 | | |
| 4,76 / 3/16" | FB2640476 | 4,76 / 3/16" | 4,76 / 3/16" | 22 | 75 | | |
| 4,82 | FB264K0482 | 4,82 | 6 | 25 | 75 | | |
| 5,05 | FB2640505 | 5,05 | 6 | 25 | 75 | | |
| 6,0 | FB264060 | 6 | 6 | 30 | 75 | | |
| 6,35 / 1/4" | FB264K0635 | 6,35 / 1/4" | 6,35 / 1/4" | 30 | 70 | | |
| 7,93 / 5/16" | FB264K0793 | 7,93 / 5/16" | 7,93 / 5/16" | 30 | 75 | | |
| 8,0 | FB264080 | 8 | 8 | 30 | 75 | | |
| 9,52 / 3/8" | FB2640952 | 9,52 / 3/8" | 9,52 / 3/8" | 30 | 90 | | |
| 10,0 | FB264100 | 10 | 10 | 40 | 100 | | |
| 12,0 | FB264120 | 12 | 12 | 50 | 100 | | |
| 12,7 / 1/2" | FB264127 | 12,7 / 1/2" | 12,7 / 1/2" | 50 | 102 | | |

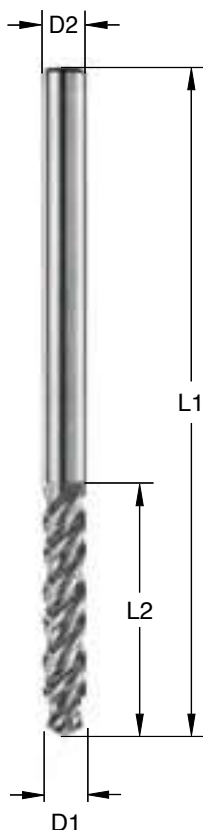
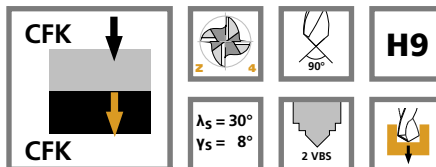


Durchmesserbereich:
2,48 bis 12,7 mm
diamter range:
2,48 to 12,7 mm

Mögliche Beschichtungen:
ALX
TL5
DIP
possible coatings:
ALX
TL5
DIP

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

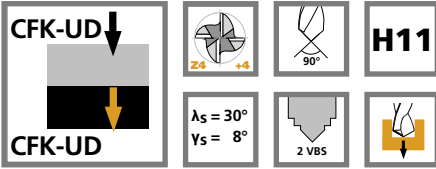
Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. FB264060 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. FB264K0793 and if wanted COATING: e.g. TL5.



Durchmesserbereich:
2,48 bis 12,7 mm
diameter range:
2,48 to 12,7 mm

Mögliche Beschichtungen:
ALX
TL5
DIP
possible coatings:
ALX
TL5
DIP

| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|------------|-----------------|-----------------------|----------|----------------|--|--|
| 2,48 | FD2640248 | 2,48 | 3 | 18 | 60 | | |
| 3,0 | FD264030 | 3 | 3 | 18 | 60 | | |
| 3,17 / 1/8" | FD2640317 | 3,17 / 1/8" | 3,17 / 1/8" | 18 | 60 | | |
| 4,0 | FD264040 | 4 | 4 | 22 | 60 | | |
| 4,21 | FD2640421 | 4,21 | 6 | 22 | 75 | | |
| 4,76 / 3/16" | FD2640476 | 4,76 / 3/16" | 4,76 / 3/16" | 22 | 75 | | |
| 4,82 | FD264K0482 | 4,82 | 6 | 25 | 75 | | |
| 5,05 | FD2640505 | 5,05 | 6 | 25 | 75 | | |
| 6,0 | FD264060 | 6 | 6 | 30 | 75 | | |
| 6,35 / 1/4" | FD264K0635 | 6,35 / 1/4" | 6,35 / 1/4" | 30 | 70 | | |
| 7,93 / 5/16" | FD264K0793 | 7,93 / 5/16" | 7,93 / 5/16" | 30 | 75 | | |
| 8,0 | FD264080 | 8 | 8 | 30 | 75 | | |
| 9,52 / 3/8" | FD2640952 | 9,52 / 3/8" | 9,52 / 3/8" | 30 | 90 | | |
| 10,0 | FD264100 | 10 | 10 | 40 | 100 | | |
| 12,0 | FD264120 | 12 | 12 | 50 | 100 | | |
| 12,7 / 1/2" | FD264127 | 12,7 / 1/2" | 12,7 / 1/2" | 50 | 102 | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm |
|--------------------------------|--------------|-----------------|-----------------------|----------|----------------|
| 2,48 | FB660BD0248 | 2,48 | 3 | 6 | 60 |
| 3,0 | FB660BD030 | 3 | 3 | 8 | 60 |
| 3,17 / 1/8" | FB660BD0317 | 3,17 / 1/8" | 3,17 / 1/8" | 8 | 60 |
| 4,0 | FB660BD040 | 4 | 4 | 10 | 60 |
| 4,21 | FB660BD0421 | 4,21 | 6 | 12 | 75 |
| 4,76 / 3/16" | FB660BD0476 | 4,76 / 3/16" | 4,76 / 3/16" | 12 | 75 |
| 4,82 | FB660BDK0482 | 4,82 | 6 | 12 | 75 |
| 5,05 | FB660BD0505 | 5,05 | 6 | 15 | 75 |
| 6,0 | FB660BD060 | 6 | 6 | 15 | 75 |
| 6,35 / 1/4" | FB660BDK0635 | 6,35 / 1/4" | 6,35 / 1/4" | 16 | 70 |
| 7,93 / 5/16" | FB660BDK0793 | 7,93 / 5/16" | 7,93 / 5/16" | 18 | 75 |
| 8,0 | FB660BD080 | 8 | 8 | 18 | 75 |
| 9,52 / 3/8" | FB660BD0952 | 9,52 / 3/8" | 9,52 / 3/8" | 20 | 90 |
| 10,0 | FB660BD100 | 10 | 10 | 20 | 100 |
| 12,0 | FB660BD120 | 12 | 12 | 22 | 100 |
| 12,7 / 1/2" | FB660BD127 | 12,7 / 1/2" | 12,7 / 1/2" | 24 | 102 |

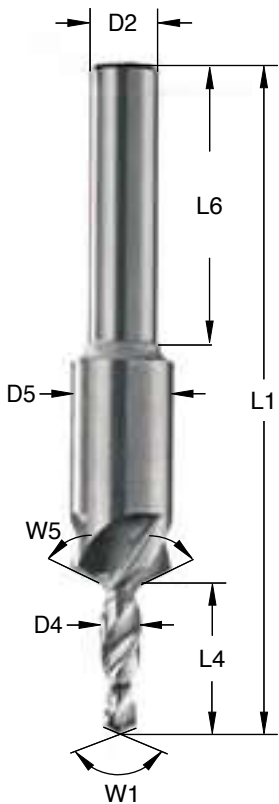
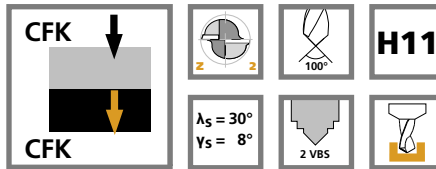


Durchmesserbereich:
2,48 bis 12,7 mm
diameter range:
2,48 to 12,7 mm

Mögliche Beschichtungen:
ALX
TL5
DIP
possible coatings:
ALX
TL5
DIP

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. FB464C060 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. FB464K0793 and if wanted COATING: e.g. TL5.



Mögliche Beschichtungen:

- ALX
- TL5
- DIP

possible coatings:

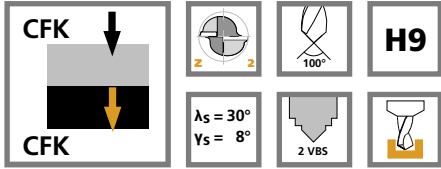
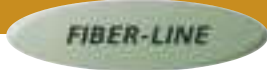
- ALX
- TL5
- DIP

Senkwinkel W5 130° - Standard
 Senkwinkel W5 100° - auf Anfrage
 Countersink angle W5
 130° - Standard
 Countersink angle W5
 100° - on demand

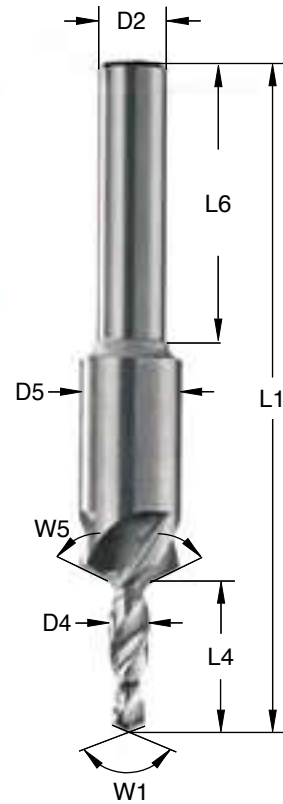
| | BESTELL-NUMMER ORDER NUMBER | D4 mm / inch | D2 h6 mm | D5 mm | L4 mm | L1 +2 mm | L6 mm | W5 |
|--------------|--------------------------------|-----------------|----------------|----------|----------|----------------|----------|-----|
| 4,0 | FB662040 | 4 | 6 | 10 | 22 | 60 | 35 | 130 |
| 4,21 | FB6620421 | 4,21 | 6 | 10 | 22 | 75 | 35 | 130 |
| 4,76 / 3/16" | FB6620476 | 4,76 / 3/16" | 6 | 12 | 22 | 75 | 35 | 130 |
| 4,82 | FB662K0482 | 4,82 | 6 | 12 | 25 | 75 | 35 | 130 |
| 5,05 | FB6620505 | 5,05 | 6 | 12 | 25 | 75 | 35 | 130 |
| 6,0 | FB662060 | 6 | 6 | 16 | 30 | 75 | 35 | 130 |
| 6,35 / 1/4" | FB662K0635 | 6,35 / 1/4" | 8 | 16 | 30 | 75 | 35 | 130 |
| 7,93 / 5/16" | FB662K0793 | 7,93 / 5/16" | 8 | 16 | 30 | 75 | 35 | 130 |
| 8,0 | FB662080 | 8 | 8 | 16 | 30 | 75 | 35 | 130 |
| 9,52 / 3/8" | FB6620952 | 9,52 / 3/8" | 8 | 20 | 30 | 75 | 35 | 130 |
| 10,0 | FB662100 | 10 | 10 | 20 | 40 | 100 | 35 | 130 |
| 12,0 | FB662120 | 12 | 10 | 20 | 50 | 100 | 35 | 130 |
| 12,7 / 1/2" | FB662127 | 12,7 / 1/2" | 10 | 20 | 50 | 100 | 35 | 130 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
 Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. FB662060 und wenn gewünscht Beschichtung: z.B. TL5.
 Please indicate order number: e.g. FB662K0793 and if wanted COATING: e.g. TL5.



| | BESTELL-NUMMER ORDER NUMBER | D4 mm / inch | D2 h6 mm | D5 mm | L4 mm | L1 +2 mm | L6 mm | W5 | |
|--|--------------------------------|-----------------|----------------|----------|----------|----------------|----------|----|-----|
| | 4,0 | FD662040 | 4 | 6 | 10 | 22 | 60 | 35 | 130 |
| | 4,21 | FD6620421 | 4,21 | 6 | 10 | 22 | 75 | 35 | 130 |
| | 4,76 / 3/16" | FD6620476 | 4,76 / 3/16" | 6 | 12 | 22 | 75 | 35 | 130 |
| | 4,82 | FD662K0482 | 4,82 | 6 | 12 | 25 | 75 | 35 | 130 |
| | 5,05 | FD6620505 | 5,05 | 6 | 12 | 25 | 75 | 35 | 130 |
| | 6,0 | FD662060 | 6 | 6 | 16 | 30 | 75 | 35 | 130 |
| | 6,35 / 1/4" | FD662K0635 | 6,35 / 1/4" | 8 | 16 | 30 | 75 | 35 | 130 |
| | 7,93 / 5/16" | FD662K0793 | 7,93 / 5/16" | 8 | 16 | 30 | 75 | 35 | 130 |
| | 8,0 | FD662080 | 8 | 8 | 16 | 30 | 75 | 35 | 130 |
| | 9,52 / 3/8" | FD6620952 | 9,52 / 3/8" | 8 | 20 | 30 | 75 | 35 | 130 |
| | 10,0 | FD662100 | 10 | 10 | 20 | 40 | 100 | 35 | 130 |
| | 12,0 | FD662120 | 12 | 10 | 20 | 50 | 100 | 35 | 130 |
| | 12,7 / 1/2" | FD662127 | 12,7 / 1/2" | 10 | 20 | 50 | 100 | 35 | 130 |



Mögliche Beschichtungen:

- ALX
- TL5
- DIP

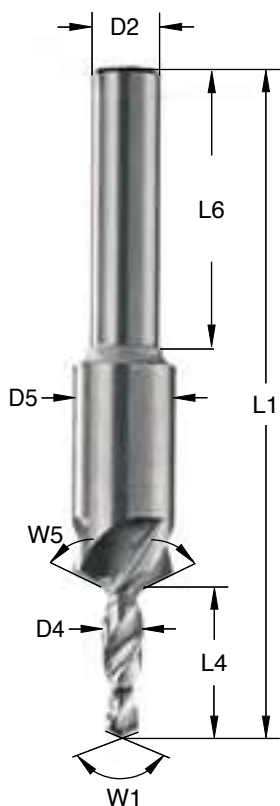
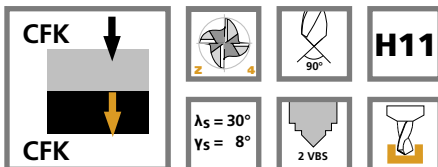
possible coatings:

- ALX
- TL5
- DIP

Senkwinkel W5 130° - Standard
Senkwinkel W5 100° - auf Anfrage
Countersink angle W5
130° - Standard
Countersink angle W5
100° - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. FB662060 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. FB662K0793 and if wanted COATING: e.g. TL5.



Mögliche Beschichtungen:

- ALX
- TL5
- DIP

possible coatings:

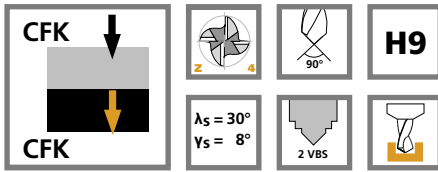
- ALX
- TL5
- DIP

Senkwinkel W5 130° - Standard
Senkwinkel W5 100° - auf Anfrage
Countersink angle W5
130° - Standard
Countersink angle W5
100° - on demand

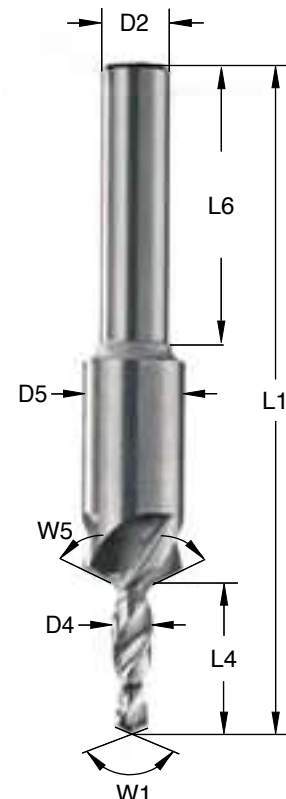
| BESTELL-NUMMER ORDER NUMBER | | D4 | D2 h6 | D5 | L4 +2 | L1 | L6 | W5 |
|--------------------------------|-----------|--------------|-----------|----|----------|------|----|-----|
| | | mm / inch | mm / inch | mm | mm | mm | mm | mm |
| 4,2 | FB664042 | 4,2 | 8 | 12 | 15 | 78,5 | 35 | 130 |
| 4,76 / 3/16" | FB6640476 | 4,76 / 3/16" | 8 | 12 | 16 | 78,5 | 35 | 130 |
| 4,8 | FB664049 | 4,9 | 8 | 12 | 16 | 78,5 | 35 | 130 |
| 4,8-1 | FBD664052 | 5,2 | 8 | 12 | 16 | 78,5 | 35 | 130 |
| 5,6 | FB664056 | 5,6 | 8 | 12 | 16 | 78,5 | 35 | 130 |
| 5,6-1 | FB664060 | 6,0 | 8 | 12 | 16 | 78,5 | 35 | 130 |
| 6,35 / 1/4" | FB660635 | 6,35 / 1/4" | 8 | 14 | 16 | 78,5 | 35 | 130 |
| 6,4 | FB664064 | 6,4 | 8 | 14 | 16 | 78,5 | 35 | 130 |
| 6,4-1 | FB664068 | 6,8 | 8 | 14 | 16 | 78,5 | 35 | 130 |
| 6,4-2 | FB664072 | 7,2 | 8 | 14 | 16 | 78,5 | 35 | 130 |
| 7,93 / 5/16" | FB6640793 | 7,93 / 5/16" | 8 | 16 | 28 | 78,5 | 35 | 130 |
| 7,9 | FB664080 | 8,0 | 8 | 16 | 28 | 78,5 | 35 | 130 |
| 7,9-1 | FB664084 | 8,4 | 8 | 16 | 28 | 78,5 | 35 | 130 |
| 7,9-2 | FB664088 | 8,8 | 8 | 16 | 28 | 78,5 | 35 | 130 |
| 9,5 | FB664096 | 9,6 | 8 | 20 | 28 | 78,5 | 35 | 130 |
| 9,5-1 | FB664100 | 10,0 | 8 | 20 | 28 | 78,5 | 35 | 130 |
| 9,5-2 | FB664104 | 10,4 | 8 | 24 | 28 | 78,5 | 35 | 130 |
| 11,1 | FB664112 | 11,2 | 8 | 24 | 46 | 78,5 | 35 | 130 |
| 11,1-1 | FB664116 | 11,6 | 8 | 24 | 46 | 78,5 | 35 | 130 |
| 11,1-2 | FB664120 | 12,0 | 8 | 24 | 46 | 78,5 | 35 | 130 |
| 12,7 / 1/2" | FB664127 | 12,7 / 1/2" | 8 | 24 | 46 | 78,5 | 35 | 130 |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. FB66411155 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. FB66404195 and if wanted COATING: e.g. TL5.



| | BESTELL-NUMMER ORDER NUMBER | D4 mm / inch | D2 h6 mm / inch | D5 mm | L4 +2 mm | L1 mm | L6 mm | W5 |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------------|----------|----------|-----|
| 4,2 | FD664042 | 4,2 | 8 | 12 | 15 | 78,5 | 35 | 130 |
| 4,76 / 3/16" | FD6640476 | 4,76 / 3/16" | 8 | 12 | 16 | 78,5 | 35 | 130 |
| 4,8 | FD664049 | 4,9 | 8 | 12 | 16 | 78,5 | 35 | 130 |
| 4,8-1 | FD664052 | 5,2 | 8 | 12 | 16 | 78,5 | 35 | 130 |
| 5,6 | FD664056 | 5,6 | 8 | 12 | 16 | 78,5 | 35 | 130 |
| 5,6-1 | FD664060 | 6,0 | 8 | 12 | 16 | 78,5 | 35 | 130 |
| 6,35 / 1/4" | FD660635 | 6,35 / 1/4" | 8 | 14 | 16 | 78,5 | 35 | 130 |
| 6,4 | FD664064 | 6,45 | 8 | 14 | 16 | 78,5 | 35 | 130 |
| 6,4-1 | FD664068 | 6,8 | 8 | 14 | 16 | 78,5 | 35 | 130 |
| 6,4-2 | FD664072 | 7,2 | 8 | 14 | 16 | 78,5 | 35 | 130 |
| 7,93 / 5/16" | FD6640793 | 7,93 / 5/16" | 8 | 16 | 28 | 78,5 | 35 | 130 |
| 7,9 | FD664080 | 8,0 | 8 | 16 | 28 | 78,5 | 35 | 130 |
| 7,9-1 | FD664084 | 8,4 | 8 | 16 | 28 | 78,5 | 35 | 130 |
| 7,9-2 | FD664088 | 8,8 | 8 | 16 | 28 | 78,5 | 35 | 130 |
| 9,5 | FD664096 | 9,6 | 8 | 20 | 28 | 78,5 | 35 | 130 |
| 9,5-1 | FD664100 | 10,0 | 8 | 20 | 28 | 78,5 | 35 | 130 |
| 9,5-2 | FD664104 | 10,4 | 8 | 20 | 28 | 78,5 | 35 | 130 |
| 11,1 | FD664112 | 11,2 | 8 | 24 | 46 | 78,5 | 35 | 130 |
| 11,1-1 | FD664116 | 11,6 | 8 | 24 | 46 | 78,5 | 35 | 130 |
| 11,1-2 | FD664120 | 12,0 | 8 | 24 | 46 | 78,5 | 35 | 130 |
| 12,7 / 1/2" | FD664127127 | 12,7 / 1/2" | 8 | 24 | 46 | 78,5 | 35 | 130 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |



Mögliche Beschichtungen:
ALX
TL5
DIP
possible coatings:
ALX
TL5
DIP

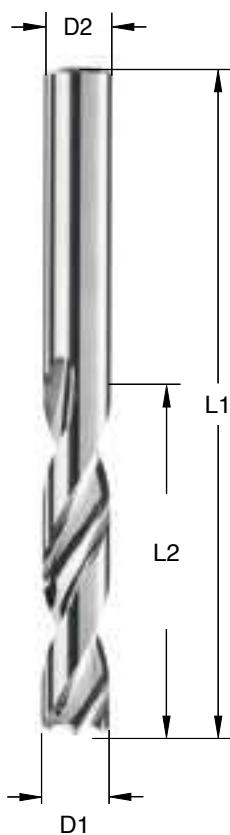
Senkwinkel W5 130° - Standard
Senkwinkel W5 100° - auf Anfrage
Countersink angle W5
130° - Standard
Countersink angle W5
100° - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. FD66404195 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. FD66411155 and if wanted COATING: e.g. TL5.



$\lambda_s = 20^\circ$
 $\gamma_s = 8^\circ$



Durchmesserbereich:
2,38 bis 12,7 mm
diameter range:
2, to bis 12,7 mm

Mögliche Beschichtungen:

TLX
TL5
DIP

possible coatings:

TLX
TL5
DIP

| BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | | |
|--------------------------------|-----------------|-----------------------|----------|----------------|--|--|--|
| 119024024 | 2,38 | 2,38 | 12 | 40 | | | |
| 119030030 | 3 | 3 | 12 | 40 | | | |
| 119031031 | 3,17 / 1/8" | 3,17 / 1/8" | 12 | 50 | | | |
| 119040040 | 4 | 4 | 18 | 55 | | | |
| 119047047 | 4,76 / 3/16" | 4,76 / 3/16" | 24 | 63 | | | |
| 119050050 | 5 | 5 | 26 | 62 | | | |
| 119055055 | 5,55 | 5,55 | 28 | 66 | | | |
| 119060060 | 6 | 6 | 28 | 66 | | | |
| 119064064 | 6,35 / 1/4" | 6,35 / 1/4" | 31 | 70 | | | |
| 119065065 | 6,5 | 6,5 | 31 | 70 | | | |
| 119070070 | 7 | 7 | 34 | 74 | | | |
| 119079079 | 7,93 / 5/16" | 7,93 / 5/16" | 37 | 76 | | | |
| 119080080 | 8 | 8 | 37 | 79 | | | |
| 119085085 | 8,5 | 8,5 | 37 | 79 | | | |
| 119090090 | 9 | 9 | 40 | 84 | | | |
| 119095095 | 9,52 / 3/8" | 9,52 / 3/8" | 40 | 88 | | | |
| 119100100 | 10 | 10 | 48 | 89 | | | |
| 119120120 | 12 | 12 | 50 | 102 | | | |
| 119127127 | 12,7 / 1/2" | 12,7 / 1/2" | 50 | 102 | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

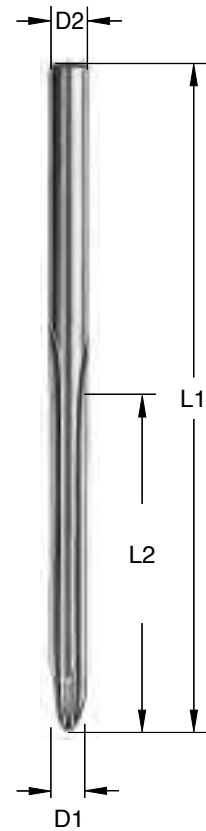
Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 119050050 und wenn gewünscht Beschichtung: z.B. TL5.

Please indicate order number: e.g. 119079079 and if wanted COATING: e.g. TL5.



$\lambda_s = 30^\circ$
 $\gamma_s = 8^\circ$

| BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | | |
|--------------------------------|-----------------|-----------------------|----------|----------------|--|--|--|
| 118020020 | 2 | 2 | 50 | 100 | | | |
| 118024024 | 2,48 | 2,48 | 50 | 100 | | | |
| 118030030 | 3 | 3 | 50 | 100 | | | |
| 118031031 | 3,17 / 1/8" | 3,17 / 1/8" | 50 | 100 | | | |
| 118040040 | 4 | 4 | 50 | 100 | | | |
| 118042042 | 4,21 | 4,21 | 50 | 100 | | | |
| 1180476476 | 4,76 / 3/16" | 4,76 / 3/16" | 50 | 100 | | | |
| 118048048 | 4,82 | 4,82 | 50 | 100 | | | |
| 118051051 | 5,05 | 5,05 | 50 | 100 | | | |
| 118055055 | 5,53 | 5,53 | 50 | 100 | | | |
| 118060060 | 6 | 6 | 50 | 100 | | | |
| 118063063 | 6,33 | 6,33 | 50 | 100 | | | |
| 1180635635 | 6,35 / 1/4" | 6,35 / 1/4" | 50 | 100 | | | |
| 118066066 | 6,6 | 6,6 | 50 | 100 | | | |
| 118070070 | 7 | 7 | 50 | 100 | | | |
| 118079079 | 7,92 | 7,92 | 50 | 100 | | | |
| 1180793793 | 7,93 / 5/16" | 7,93 / 5/16" | 50 | 100 | | | |
| 118080080 | 8 | 8 | 50 | 100 | | | |
| 118086086 | 8,63 | 8,63 | 50 | 100 | | | |
| 118090090 | 9 | 9 | 50 | 100 | | | |
| 1180952952 | 9,52 / 3/8" | 9,52 / 3/8" | 50 | 10 | | | |
| 118100100 | 10 | 10 | 50 | 100 | | | |
| 118120120 | 12 | 12 | 50 | 100 | | | |
| 118127127 | 12,7 / 1/2" | 12,7 / 1/2" | 50 | 100 | | | |



Mögliche Beschichtungen:

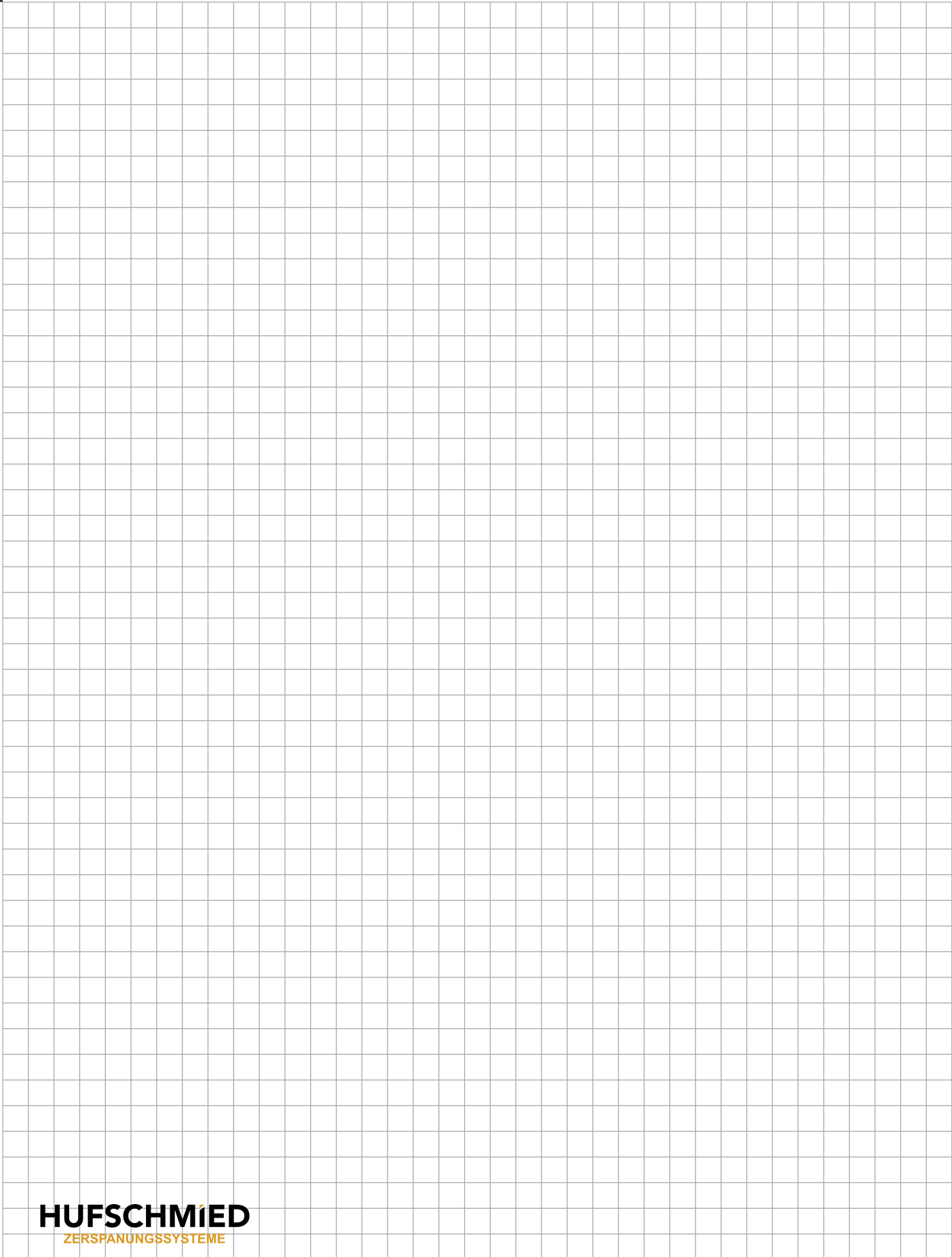
TLX
TL5
DIP

possible coatings:

TLX
TL5
DIP

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

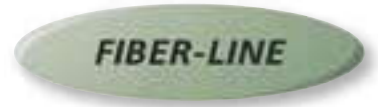
Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 118031031 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. 118086086 and if wanted COATING: e.g. TL5.



FIBER-LINE

FIBER-DRILL FÜR WERK-
STOFFKOMBINATIONEN

FIBER-DRILL FOR
MATERIAL COMBINATIONS



GFK
GFK

GMT
GMT

LFT
LFT

CFK
CFK

Organobleche
Organo sheet

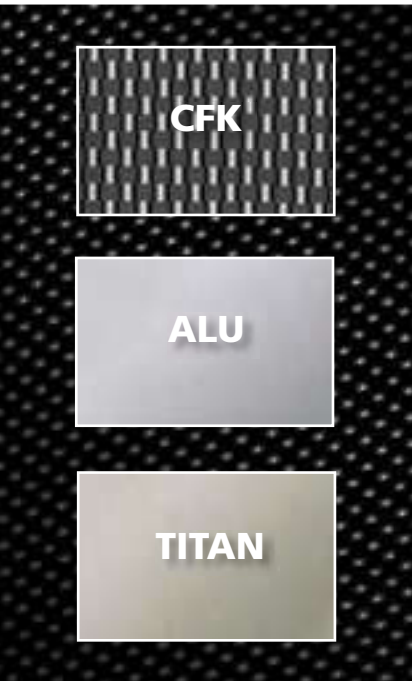
Kevlar
Kevlar

FIBER-LINE

WERKSTOFFKOMBINATION
CFK UND METALL

MATERIAL COMBINATION
CFK UND METAL

FIBER-LINE



Die kombinierte Bohrbearbeitung von FVK-Werkstoffen und Metallen stellt sehr hohe Anforderungen an die Werkzeug- und Schneidenkonstruktion und deren Herstellung.

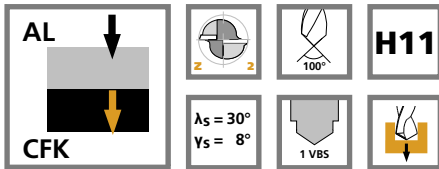
Je nachdem welches Material oben bzw. am Austritt der Bohrung liegt, werden unterschiedliche Bohrerspitzengeometrien eingesetzt, um Gratbildungen, Delamination bzw. Faserausrisse zu vermeiden.

Ein weiteres Unterscheidungskriterium ist das Metall selbst, denn jedes Metall mit seinen unterschiedlichen Eigenschaften hat auch seinen Einfluss auf die Bohrergeometrie.

Combined drill-machining of FRP materials and metal sets very high demands for the tools, cutting edge construction design and manufacture. Dependent upon which material is on top surface or respectively exit of drilling, different drill head geometries find application to avoid burr formation, delamination or fiber split.

Another criterion is the metal itself, as each metal with its different properties also influences the drill geometry.

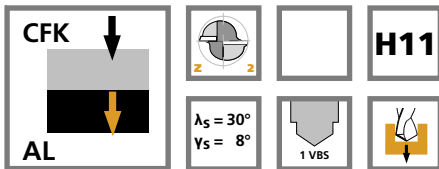
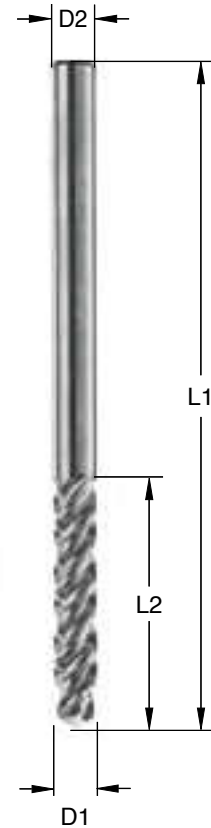
| | | | |
|-----|---------------------------------------|-----|-------------------------------------|
| FB | Passbohrung ab H11 | FB | hole from H11 |
| FD | Passbohrung bis H9 | FD | hole up to H9 |
| 162 | Z2 - 1 Vorbohrstufe (VBS) | 162 | 2F - 1 step head |
| 262 | Z2 - 2 VBS | 262 | 2F - 2 step heads |
| 662 | Z2 - 2 VBS mit Senker | 662 | 2F - 2 step heads with counter sink |
| AC | Aluminium - Eintritt / CFK - Austritt | AC | Aluminium - entry / CFK - exit |
| CA | CFK - Eintritt / Aluminium - Austritt | CA | CFK - entry / Aluminium - exit |
| TC | Titan - Eintritt / CFK - Austritt | TC | Titan - entry / CFK - exit |
| CT | CFK - Eintritt / Titan - Austritt | CT | CFK - entry / Titan - exit |



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|--------------|-----------------|-----------------------|----------|----------------|--|--|
| 2,48 | FB162AC0248 | 2,48 | 3 | 18 | 60 | | |
| 3,0 | FB162AC030 | 3 | 3 | 18 | 60 | | |
| 3,17 / 1/8" | FB162AC0317 | 3,17 / 1/8" | 3,17 / 1/8" | 18 | 63 | | |
| 4,0 | FB162AC040 | 4 | 4 | 22 | 60 | | |
| 4,21 | FB162AC0421 | 4,21 | 6 | 22 | 75 | | |
| 4,76 / 3/16" | FB162AC0476 | 4,76 / 3/16" | 4,76 / 3/16" | 22 | 75 | | |
| 4,82 | FB162ACK0482 | 4,82 | 6 | 25 | 75 | | |
| 5,05 | FB162AC0505 | 5,05 | 6 | 25 | 75 | | |
| 6,0 | FB162AC060 | 6 | 6 | 30 | 75 | | |
| 6,35 / 1/4" | FB162ACK0635 | 6,35 / 1/4" | 6,35 / 1/4" | 30 | 70 | | |
| 7,93 / 5/16" | FB162ACK0793 | 7,93 / 5/16" | 8 | 30 | 75 | | |
| 8,0 | FB162AC080 | 8 | 8 | 30 | 75 | | |
| 9,52 / 3/8" | FB162AC0952 | 9,52 / 3/8" | 9,52 / 3/8" | 30 | 75 | | |
| 10,0 | FB162AC100 | 10 | 10 | 40 | 100 | | |
| 12,0 | FB162AC120 | 12 | 12 | 50 | 100 | | |
| 12,7 / 1/2" | FB162AC127 | 12,7 / 1/2" | 12,7 / 1/2" | 50 | 100 | | |

Mögliche Beschichtungen:
ALX, TL5, DIP

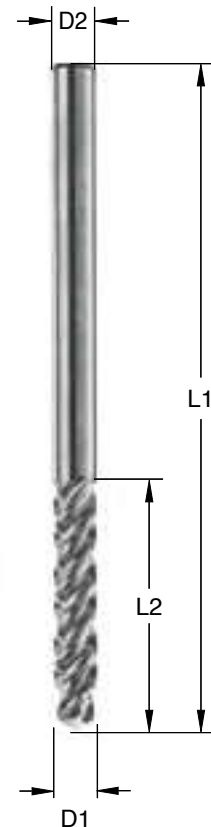
possible coatings:
ALX, TL5, DIP



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|--------------|-----------------|-----------------------|----------|----------------|--|--|
| 2,48 | FB162CA0248 | 2,48 | 3 | 18 | 60 | | |
| 3,0 | FB162CA030 | 3 | 3 | 18 | 60 | | |
| 3,17 / 1/8" | FB162CA0317 | 3,17 / 1/8" | 3,17 / 1/8" | 18 | 63 | | |
| 4,0 | FB162CA040 | 4 | 4 | 22 | 60 | | |
| 4,21 | FB162CA0421 | 4,21 | 6 | 22 | 75 | | |
| 4,76 / 3/16" | FB162CA0476 | 4,76 / 3/16" | 4,76 / 3/16" | 22 | 75 | | |
| 4,82 | FB162CAK0482 | 4,82 | 6 | 25 | 75 | | |
| 5,05 | FB162CA0505 | 5,05 | 6 | 25 | 75 | | |
| 6,0 | FB162CA060 | 6 | 6 | 30 | 75 | | |
| 6,35 / 1/4" | FB162CAK0635 | 6,35 / 1/4" | 6,35 / 1/4" | 30 | 70 | | |
| 7,93 / 5/16" | FB162CAK0793 | 7,93 / 5/16" | 8 | 30 | 75 | | |
| 8,0 | FB162CA080 | 8 | 8 | 30 | 75 | | |
| 9,52 / 3/8" | FB162CA0952 | 9,52 / 3/8" | 9,52 / 3/8" | 30 | 75 | | |
| 10,0 | FB162CA100 | 10 | 10 | 40 | 100 | | |
| 12,0 | FB162CA120 | 12 | 12 | 50 | 100 | | |
| 12,7 / 1/2" | FB162CA127 | 12,7 / 1/2" | 12,7 / 1/2" | 50 | 100 | | |

Mögliche Beschichtungen:
ALX, TL5, DIP

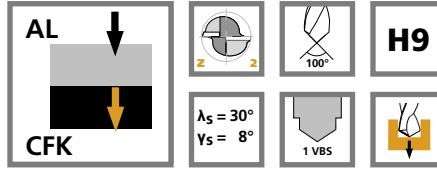
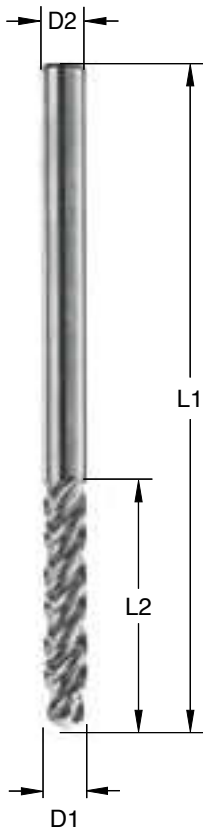
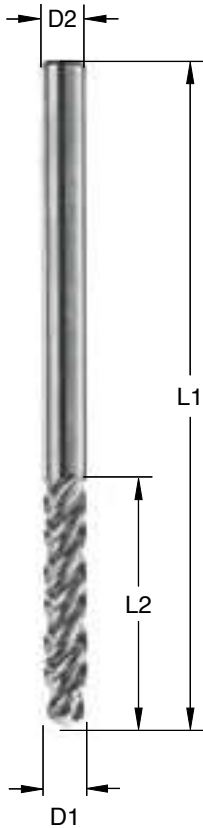
possible coatings:
ALX, TL5, DIP



Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. FB162AC060 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. FB162CAK0793 and if wanted COATING: e.g. TL5.

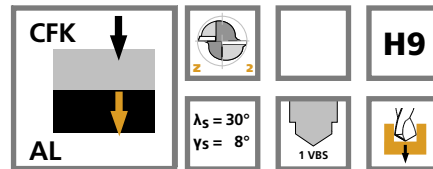
FIBER-LINE



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|--------------|-----------------|-----------------------|----------|----------------|--|--|
| 2,48 | FD162AC0248 | 2,48 | 3 | 18 | 60 | | |
| 3,0 | FD162AC030 | 3 | 3 | 18 | 60 | | |
| 3,17 / 1/8" | FD162AC0317 | 3,17 / 1/8" | 3,17 / 1/8" | 18 | 63 | | |
| 4,0 | FD162AC040 | 4 | 4 | 22 | 60 | | |
| 4,21 | FD162AC0421 | 4,21 | 6 | 22 | 75 | | |
| 4,76 / 3/16" | FD162AC0476 | 4,76 / 3/16" | 4,76 / 3/16" | 22 | 75 | | |
| 4,82 | FD162ACK0482 | 4,82 | 6 | 25 | 75 | | |
| 5,05 | FD162AC0505 | 5,05 | 6 | 25 | 75 | | |
| 6,0 | FD162AC060 | 6 | 6 | 30 | 75 | | |
| 6,35 / 1/4" | FD162ACK0635 | 6,35 / 1/4" | 6,35 / 1/4" | 30 | 70 | | |
| 7,93 / 5/16" | FD162ACK0793 | 7,93 / 5/16" | 8 | 30 | 75 | | |
| 8,0 | FD162AC080 | 8 | 8 | 30 | 75 | | |
| 9,52 / 3/8" | FD162AC0952 | 9,52 / 3/8" | 9,52 / 3/8" | 30 | 75 | | |
| 10,0 | FD162AC100 | 10 | 10 | 40 | 100 | | |
| 12,0 | FD162AC120 | 12 | 12 | 50 | 100 | | |
| 12,7 / 1/2" | FD162AC127 | 12,7 / 1/2" | 12,7 / 1/2" | 50 | 100 | | |

Mögliche Beschichtungen:
ALX, TL5, DIP

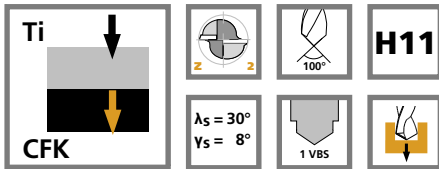
possible coatings:
ALX, TL5, DIP



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|--------------|-----------------|-----------------------|----------|----------------|--|--|
| 2,48 | FD162CA0248 | 2,48 | 3 | 18 | 60 | | |
| 3,0 | FD162CA030 | 3 | 3 | 18 | 60 | | |
| 3,17 / 1/8" | FD162CA0317 | 3,17 / 1/8" | 3,17 / 1/8" | 18 | 63 | | |
| 4,0 | FD162CA040 | 4 | 4 | 22 | 60 | | |
| 4,21 | FD162CA0421 | 4,21 | 6 | 22 | 75 | | |
| 4,76 / 3/16" | FD162CA0476 | 4,76 / 3/16" | 4,76 / 3/16" | 22 | 75 | | |
| 4,82 | FD162CAK0482 | 4,82 | 6 | 25 | 75 | | |
| 5,05 | FD162CA0505 | 5,05 | 6 | 25 | 75 | | |
| 6,0 | FD162CA060 | 6 | 6 | 30 | 75 | | |
| 6,35 / 1/4" | FD162CAK0635 | 6,35 / 1/4" | 6,35 / 1/4" | 30 | 70 | | |
| 7,93 / 5/16" | FD162CAK0793 | 7,93 / 5/16" | 8 | 30 | 75 | | |
| 8,0 | FD162CA080 | 8 | 8 | 30 | 75 | | |
| 9,52 / 3/8" | FD162CA0952 | 9,52 / 3/8" | 9,52 / 3/8" | 30 | 75 | | |
| 10,0 | FD162CA100 | 10 | 10 | 40 | 100 | | |
| 12,0 | FD162CA120 | 12 | 12 | 50 | 100 | | |
| 12,7 / 1/2" | FD162CA127 | 12,7 / 1/2" | 12,7 / 1/2" | 50 | 100 | | |

Mögliche Beschichtungen:
ALX, TL5, DIP

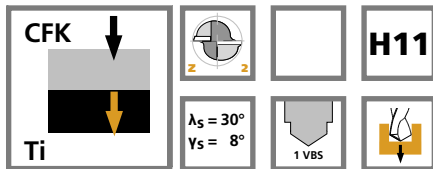
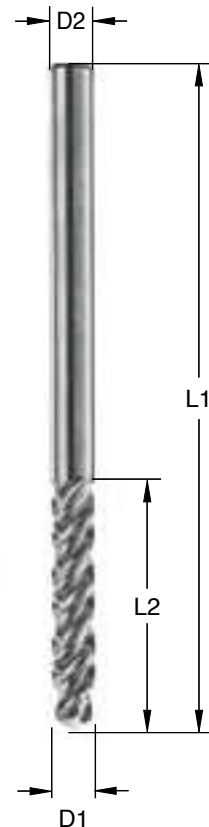
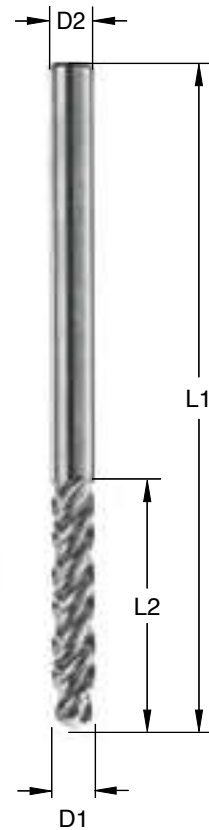
possible coatings:
ALX, TL5, DIP



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|--------------|-----------------|-----------------------|----------|----------------|--|--|
| 2,48 | FB162TC0248 | 2,48 | 3 | 18 | 60 | | |
| 3,0 | FB162TC030 | 3 | 3 | 18 | 60 | | |
| 3,17 / 1/8" | FB162TC0317 | 3,17 / 1/8" | 3,17 / 1/8" | 18 | 63 | | |
| 4,0 | FB162TC040 | 4 | 4 | 22 | 60 | | |
| 4,21 | FB162TC0421 | 4,21 | 6 | 22 | 75 | | |
| 4,76 / 3/16" | FB162TC0476 | 4,76 / 3/16" | 4,76 / 3/16" | 22 | 75 | | |
| 4,82 | FB162TCK0482 | 4,82 | 6 | 25 | 75 | | |
| 5,05 | FB162TC0505 | 5,05 | 6 | 25 | 75 | | |
| 6,0 | FB162TC060 | 6 | 6 | 30 | 75 | | |
| 6,35 / 1/4" | FB162TCK0635 | 6,35 / 1/4" | 6,35 / 1/4" | 30 | 70 | | |
| 7,93 / 5/16" | FB162TCK0793 | 7,93 / 5/16" | 8 | 30 | 75 | | |
| 8,0 | FB162TC080 | 8 | 8 | 30 | 75 | | |
| 9,52 / 3/8" | FB162TC0952 | 9,52 / 3/8" | 9,52 / 3/8" | 30 | 75 | | |
| 10,0 | FB162TC100 | 10 | 10 | 40 | 100 | | |
| 12,0 | FB162TC120 | 12 | 12 | 50 | 100 | | |
| 12,7 / 1/2" | FB162TC127 | 12,7 / 1/2" | 12,7 / 1/2" | 50 | 100 | | |

Mögliche Beschichtungen:
ALX, TL5, DIP

possible coatings:
ALX, TL5, DIP



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|--------------|-----------------|-----------------------|----------|----------------|--|--|
| 2,48 | FB162CT0248 | 2,48 | 3 | 18 | 60 | | |
| 3,0 | FB162CT030 | 3 | 3 | 18 | 60 | | |
| 3,17 / 1/8" | FB162CT0317 | 3,17 / 1/8" | 3,17 / 1/8" | 18 | 63 | | |
| 4,0 | FB162CT040 | 4 | 4 | 22 | 60 | | |
| 4,21 | FB162CT0421 | 4,21 | 6 | 22 | 75 | | |
| 4,76 / 3/16" | FB162CT0476 | 4,76 / 3/16" | 4,76 / 3/16" | 22 | 75 | | |
| 4,82 | FB162CTK0482 | 4,82 | 6 | 25 | 75 | | |
| 5,05 | FB162CT0505 | 5,05 | 6 | 25 | 75 | | |
| 6,0 | FB162CT060 | 6 | 6 | 30 | 75 | | |
| 6,35 / 1/4" | FB162CTK0635 | 6,35 / 1/4" | 6,35 / 1/4" | 30 | 70 | | |
| 7,93 / 5/16" | FB162CTK0793 | 7,93 / 5/16" | 8 | 30 | 75 | | |
| 8,0 | FB162CT080 | 8 | 8 | 30 | 75 | | |
| 9,52 / 3/8" | FB162CT0952 | 9,52 / 3/8" | 9,52 / 3/8" | 30 | 75 | | |
| 10,0 | FB162CT100 | 10 | 10 | 40 | 100 | | |
| 12,0 | FB162CT120 | 12 | 12 | 50 | 100 | | |
| 12,7 / 1/2" | FB162CT127 | 12,7 / 1/2" | 12,7 / 1/2" | 50 | 100 | | |

Mögliche Beschichtungen:
ALX, TL5, DIP

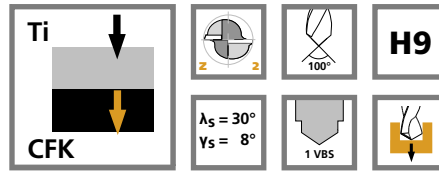
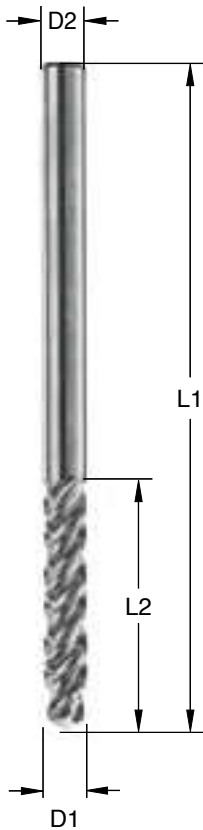
possible coatings:
ALX, TL5, DIP

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. FB162TC060 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. FB162CTK0793 and if wanted COATING: e.g. TL5.

FIBER-LINE

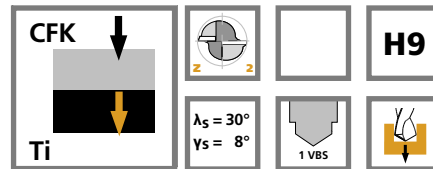
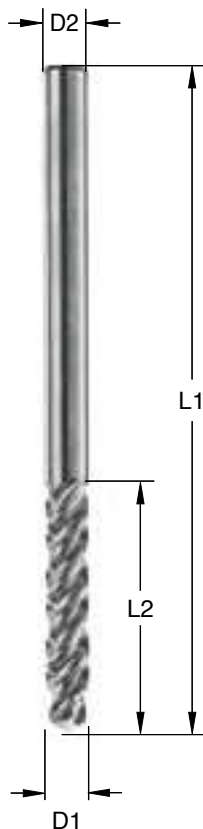
FIBER-LINE



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|--------------|-----------------|-----------------------|----------|----------------|--|--|
| 2,48 | FD162TC0248 | 2,48 | 3 | 18 | 60 | | |
| 3,0 | FD162TC030 | 3 | 3 | 18 | 60 | | |
| 3,17 / 1/8" | FD162TC0317 | 3,17 / 1/8" | 3,17 / 1/8" | 18 | 63 | | |
| 4,0 | FD162TC040 | 4 | 4 | 22 | 60 | | |
| 4,21 | FD162TC0421 | 4,21 | 6 | 22 | 75 | | |
| 4,76 / 3/16" | FD162TC0476 | 4,76 / 3/16" | 4,76 / 3/16" | 22 | 75 | | |
| 4,82 | FD162TCK0482 | 4,82 | 6 | 25 | 75 | | |
| 5,05 | FD162TC0505 | 5,05 | 6 | 25 | 75 | | |
| 6,0 | FD162TC060 | 6 | 6 | 30 | 75 | | |
| 6,35 / 1/4" | FD162TCK0635 | 6,35 / 1/4" | 6,35 / 1/4" | 30 | 70 | | |
| 7,93 / 5/16" | FD162TCK0793 | 7,93 / 5/16" | 8 | 30 | 75 | | |
| 8,0 | FD162TC080 | 8 | 8 | 30 | 75 | | |
| 9,52 / 3/8" | FD162TC0952 | 9,52 / 3/8" | 9,52 / 3/8" | 30 | 75 | | |
| 10,0 | FD162TC100 | 10 | 10 | 40 | 100 | | |
| 12,0 | FD162TC120 | 12 | 12 | 50 | 100 | | |
| 12,7 / 1/2" | FD162TC127 | 12,7 / 1/2" | 12,7 / 1/2" | 50 | 100 | | |

Mögliche Beschichtungen:
ALX, TL5, DIP

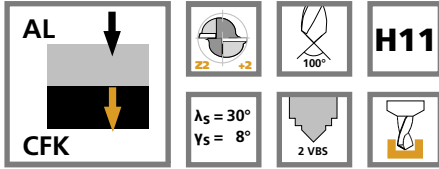
possible coatings:
ALX, TL5, DIP



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|--------------|-----------------|-----------------------|----------|----------------|--|--|
| 2,48 | FD162CT0248 | 2,48 | 3 | 18 | 60 | | |
| 3,0 | FD162CT030 | 3 | 3 | 18 | 60 | | |
| 3,17 / 1/8" | FD162CT0317 | 3,17 / 1/8" | 3,17 / 1/8" | 18 | 63 | | |
| 4,0 | FD162CT040 | 4 | 4 | 22 | 60 | | |
| 4,21 | FD162CT0421 | 4,21 | 6 | 22 | 75 | | |
| 4,76 / 3/16" | FD162CT0476 | 4,76 / 3/16" | 4,76 / 3/16" | 22 | 75 | | |
| 4,82 | FD162CTK0482 | 4,82 | 6 | 25 | 75 | | |
| 5,05 | FD162CT0505 | 5,05 | 6 | 25 | 75 | | |
| 6,0 | FD162CT060 | 6 | 6 | 30 | 75 | | |
| 6,35 / 1/4" | FD162CTK0635 | 6,35 / 1/4" | 6,35 / 1/4" | 30 | 70 | | |
| 7,93 / 5/16" | FD162CTK0793 | 7,93 / 5/16" | 8 | 30 | 75 | | |
| 8,0 | FD162CT080 | 8 | 8 | 30 | 75 | | |
| 9,52 / 3/8" | FD162CT0952 | 9,52 / 3/8" | 9,52 / 3/8" | 30 | 75 | | |
| 10,0 | FD162CT100 | 10 | 10 | 40 | 100 | | |
| 12,0 | FD162CT120 | 12 | 12 | 50 | 100 | | |
| 12,7 / 1/2" | FD162CT127 | 12,7 / 1/2" | 12,7 / 1/2" | 50 | 100 | | |

Mögliche Beschichtungen:
ALX, TL5, DIP

possible coatings:
ALX, TL5, DIP



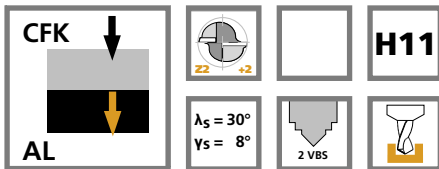
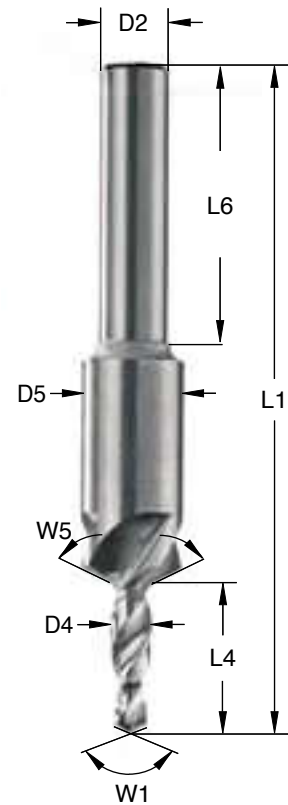
| BESTELL-NUMMER ORDER NUMBER | | D4 | D2 h6 | D5 | L4 | L1 +2 | L6 | W5 |
|--------------------------------|--------------|--------------|-------------|----|----|----------|----|-----|
| | | mm / inch | mm / inch | mm | mm | mm | mm | mm |
| 4,0 | FB662AC040 | 4 | 4 | 10 | 22 | 60 | 35 | 130 |
| 4,21 | FB662AC0421 | 4,21 | 6 | 10 | 22 | 75 | 35 | 130 |
| 4,76 / 3/16" | FB662AC0476 | 4,76 / 3/16" | 6 | 12 | 22 | 75 | 35 | 130 |
| 4,82 | FB662ACK0482 | 4,82 | 6 | 12 | 25 | 75 | 35 | 130 |
| 5,05 | FB662AC0505 | 5,05 | 6 | 12 | 25 | 75 | 35 | 130 |
| 6,0 | FB662AC060 | 6 | 6 | 16 | 30 | 75 | 35 | 130 |
| 6,35 / 1/4" | FB662ACK0635 | 6,35 / 1/4" | 8 | 16 | 30 | 75 | 35 | 130 |
| 7,93 / 5/16" | FB662ACK0793 | 7,93 / 5/16" | 8 | 16 | 30 | 75 | 35 | 130 |
| 8,0 | FB662AC080 | 8 | 8 | 16 | 30 | 75 | 35 | 130 |
| 9,52 / 3/8" | FB662AC0952 | 9,52 / 3/8" | 10 | 20 | 30 | 75 | 35 | 130 |
| 10,0 | FB662AC100 | 10 | 10 | 20 | 40 | 100 | 35 | 130 |
| 12,0 | FB662AC120 | 12 | 12 | 20 | 50 | 100 | 35 | 130 |
| 12,7 / 1/2" | FB662AC127 | 12,7 / 1/2" | 12,7 / 1/2" | 20 | 50 | 100 | 35 | 130 |

Mögliche Beschichtungen:
ALX, TL5, DIP

Senkwinkel W5 130° - Standard
Senkwinkel W5 100° - auf Anfrage

possible coatings:
ALX, TL5, DIP

Countersink angle W5 130° - Standard
Countersink angle W5 100° - on demand



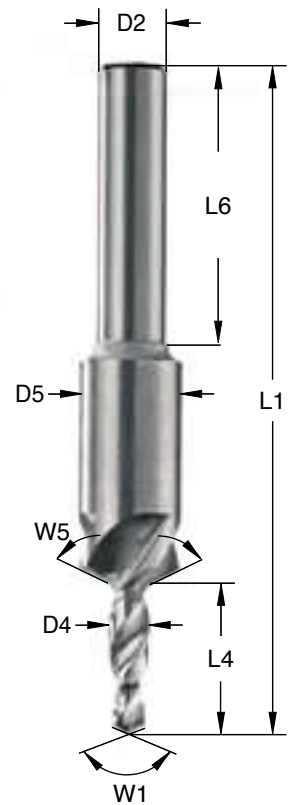
| BESTELL-NUMMER ORDER NUMBER | | D4 | D2 h6 | D5 | L4 | L1 +2 | L6 | W5 |
|--------------------------------|--------------|--------------|-------------|----|----|----------|----|-----|
| | | mm / inch | mm / inch | mm | mm | mm | mm | mm |
| 4,0 | FB662CA040 | 4 | 4 | 10 | 22 | 60 | 35 | 130 |
| 4,21 | FB662CA0421 | 4,21 | 6 | 10 | 22 | 75 | 35 | 130 |
| 4,76 / 3/16" | FB662CA0476 | 4,76 / 3/16" | 6 | 12 | 22 | 75 | 35 | 130 |
| 4,82 | FB662CAK0482 | 4,82 | 6 | 12 | 25 | 75 | 35 | 130 |
| 5,05 | FB662CA0505 | 5,05 | 6 | 12 | 25 | 75 | 35 | 130 |
| 6,0 | FB662CA060 | 6 | 6 | 16 | 30 | 75 | 35 | 130 |
| 6,35 / 1/4" | FB662CAK0635 | 6,35 / 1/4" | 8 | 16 | 30 | 75 | 35 | 130 |
| 7,93 / 5/16" | FB662CAK0793 | 7,93 / 5/16" | 8 | 16 | 30 | 75 | 35 | 130 |
| 8,0 | FB662CA080 | 8 | 8 | 16 | 30 | 75 | 35 | 130 |
| 9,52 / 3/8" | FB662CA0952 | 9,52 / 3/8" | 10 | 20 | 30 | 75 | 35 | 130 |
| 10,0 | FB662CA100 | 10 | 10 | 20 | 40 | 100 | 35 | 130 |
| 12,0 | FB662CA120 | 12 | 12 | 20 | 50 | 100 | 35 | 130 |
| 12,7 / 1/2" | FB662CA127 | 12,7 / 1/2" | 12,7 / 1/2" | 20 | 50 | 100 | 35 | 130 |

Mögliche Beschichtungen:
ALX, TL5, DIP

Senkwinkel W5 130° - Standard
Senkwinkel W5 100° - auf Anfrage

possible coatings:
ALX, TL5, DIP

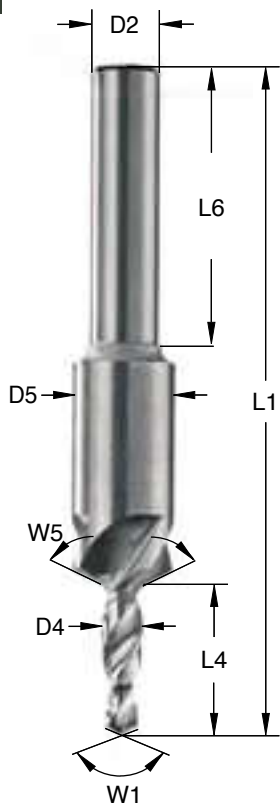
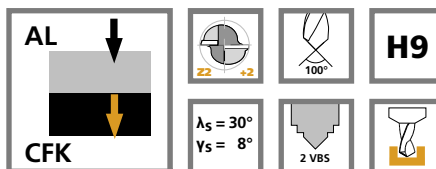
Countersink angle W5 130° - Standard
Countersink angle W5 100° - on demand



Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. FB662AC060 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. FB662ACK0793 and if wanted COATING: e.g. TL5.

FIBER-LINE

FIBER-LINE



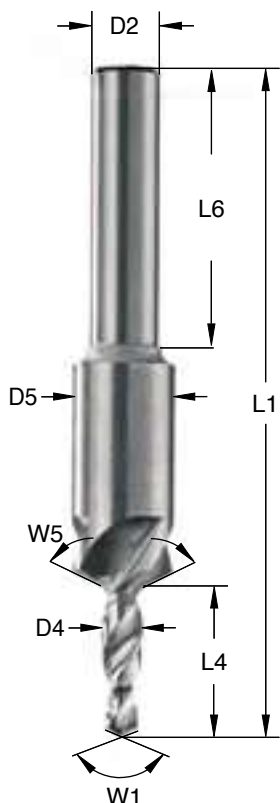
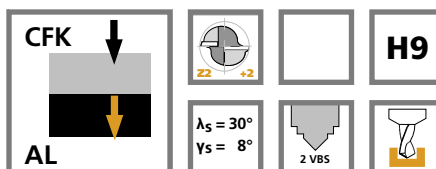
| BESTELL-NUMMER ORDER NUMBER | | D4 | D2 | D5 | L4 | L1 | L6 | W5 |
|--------------------------------|--------------|--------------|-----------------|----|----|----------|----|-----|
| | | mm / inch | h6 mm / inch | mm | mm | +2 mm | mm | mm |
| 4,0 | FD662AC040 | 4 | 4 | 10 | 22 | 60 | 35 | 130 |
| 4,21 | FD662AC0421 | 4,21 | 6 | 10 | 22 | 75 | 35 | 130 |
| 4,76 / 3/16" | FD662AC0476 | 4,76 / 3/16" | 6 | 12 | 22 | 75 | 35 | 130 |
| 4,82 | FD662ACK0482 | 4,82 | 6 | 12 | 25 | 75 | 35 | 130 |
| 5,05 | FD662AC0505 | 5,05 | 6 | 12 | 25 | 75 | 35 | 130 |
| 6,0 | FD662AC060 | 6 | 6 | 16 | 30 | 75 | 35 | 130 |
| 6,35 / 1/4" | FD662ACK0635 | 6,35 / 1/4" | 8 | 16 | 30 | 75 | 35 | 130 |
| 7,93 / 5/16" | FD662ACK0793 | 7,93 / 5/16" | 8 | 16 | 30 | 75 | 35 | 130 |
| 8,0 | FD662AC080 | 8 | 8 | 16 | 30 | 75 | 35 | 130 |
| 9,52 / 3/8" | FD662AC0952 | 9,52 / 3/8" | 10 | 20 | 30 | 75 | 35 | 130 |
| 10,0 | FD662AC100 | 10 | 10 | 20 | 40 | 100 | 35 | 130 |
| 12,0 | FD662AC120 | 12 | 12 | 20 | 50 | 100 | 35 | 130 |
| 12,7 / 1/2" | FD662AC127 | 12,7 / 1/2" | 12,7 / 1/2" | 20 | 50 | 100 | 35 | 130 |

Mögliche Beschichtungen:
ALX, TL5, DIP

possible coatings:
ALX, TL5, DIP

Senkwinkel W5 130° - Standard
Senkwinkel W5 100° - auf Anfrage

Countersink angle W5 130° - Standard
Countersink angle W5 100° - on demand



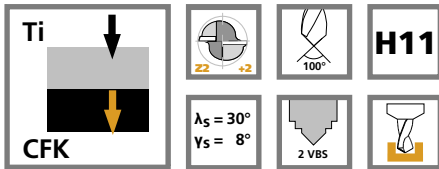
| BESTELL-NUMMER ORDER NUMBER | | D4 | D2 | D5 | L4 | L1 | L6 | W5 |
|--------------------------------|--------------|--------------|-----------------|----|----|----------|----|-----|
| | | mm / inch | h6 mm / inch | mm | mm | +2 mm | mm | mm |
| 4,0 | FD662CA040 | 4 | 4 | 10 | 22 | 60 | 35 | 130 |
| 4,21 | FD662CA0421 | 4,21 | 6 | 10 | 22 | 75 | 35 | 130 |
| 4,76 / 3/16" | FD662CA0476 | 4,76 / 3/16" | 6 | 12 | 22 | 75 | 35 | 130 |
| 4,82 | FD662CAK0482 | 4,82 | 6 | 12 | 25 | 75 | 35 | 130 |
| 5,05 | FD662CA0505 | 5,05 | 6 | 12 | 25 | 75 | 35 | 130 |
| 6,0 | FD662CA060 | 6 | 6 | 16 | 30 | 75 | 35 | 130 |
| 6,35 / 1/4" | FD662CAK0635 | 6,35 / 1/4" | 8 | 16 | 30 | 75 | 35 | 130 |
| 7,93 / 5/16" | FD662CAK0793 | 7,93 / 5/16" | 8 | 16 | 30 | 75 | 35 | 130 |
| 8,0 | FD662CA080 | 8 | 8 | 16 | 30 | 75 | 35 | 130 |
| 9,52 / 3/8" | FD662CA0952 | 9,52 / 3/8" | 10 | 20 | 30 | 75 | 35 | 130 |
| 10,0 | FD662CA100 | 10 | 10 | 20 | 40 | 100 | 35 | 130 |
| 12,0 | FD662CA120 | 12 | 12 | 20 | 50 | 100 | 35 | 130 |
| 12,7 / 1/2" | FD662CA127 | 12,7 / 1/2" | 12,7 / 1/2" | 20 | 50 | 100 | 35 | 130 |

Mögliche Beschichtungen:
ALX, TL5, DIP

possible coatings:
ALX, TL5, DIP

Senkwinkel W5 130° - Standard
Senkwinkel W5 100° - auf Anfrage

Countersink angle W5 130° - Standard
Countersink angle W5 100° - on demand



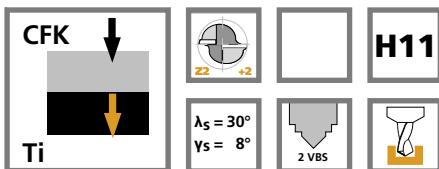
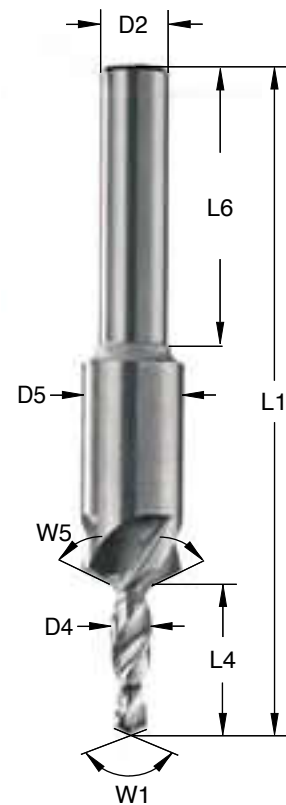
| | BESTELL-NUMMER ORDER NUMBER | D4 mm / inch | D2 h6 mm / inch | D5 mm | L4 mm | L1 +2 mm | L6 mm | W5 |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------|----------------|----------|-----|
| 4,0 | FB662TC040 | 4 | 4 | 10 | 22 | 60 | 35 | 130 |
| 4,21 | FB662TC0421 | 4,21 | 6 | 10 | 22 | 75 | 35 | 130 |
| 4,76 / 3/16" | FB662TC0476 | 4,76 / 3/16" | 6 | 12 | 22 | 75 | 35 | 130 |
| 4,82 | FB662TCK0482 | 4,82 | 6 | 12 | 25 | 75 | 35 | 130 |
| 5,05 | FB662TC0505 | 5,05 | 6 | 12 | 25 | 75 | 35 | 130 |
| 6,0 | FB662TC060 | 6 | 6 | 16 | 30 | 75 | 35 | 130 |
| 6,35 / 1/4" | FB662TCK0635 | 6,35 / 1/4" | 8 | 16 | 30 | 75 | 35 | 130 |
| 7,93 / 5/16" | FB662TCK0793 | 7,93 / 5/16" | 8 | 16 | 30 | 75 | 35 | 130 |
| 8,0 | FB662TC080 | 8 | 8 | 16 | 30 | 75 | 35 | 130 |
| 9,52 / 3/8" | FB662TC0952 | 9,52 / 3/8" | 10 | 20 | 30 | 75 | 35 | 130 |
| 10,0 | FB662TC100 | 10 | 10 | 20 | 40 | 100 | 35 | 130 |
| 12,0 | FB662TC120 | 12 | 12 | 20 | 50 | 100 | 35 | 130 |
| 12,7 / 1/2" | FB662TC127 | 12,7 / 1/2" | 12,7 / 1/2" | 20 | 50 | 100 | 35 | 130 |

Mögliche Beschichtungen:
ALX, TL5, DIP

Senkwinkel W5 130° - Standard
Senkwinkel W5 100° - auf Anfrage

possible coatings:
ALX, TL5, DIP

Countersink angle W5 130° - Standard
Countersink angle W5 100° - on demand



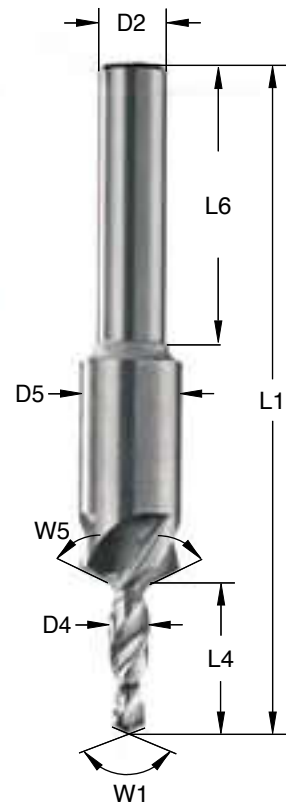
| | BESTELL-NUMMER ORDER NUMBER | D4 mm / inch | D2 h6 mm / inch | D5 mm | L4 mm | L1 +2 mm | L6 mm | W5 |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------|----------------|----------|-----|
| 4,0 | FB662CT040 | 4 | 4 | 10 | 22 | 60 | 35 | 130 |
| 4,21 | FB662CT0421 | 4,21 | 6 | 10 | 22 | 75 | 35 | 130 |
| 4,76 / 3/16" | FB662CT0476 | 4,76 / 3/16" | 6 | 12 | 22 | 75 | 35 | 130 |
| 4,82 | FB662CTK0482 | 4,82 | 6 | 12 | 25 | 75 | 35 | 130 |
| 5,05 | FB662CT0505 | 5,05 | 6 | 12 | 25 | 75 | 35 | 130 |
| 6,0 | FB662CT060 | 6 | 6 | 16 | 30 | 75 | 35 | 130 |
| 6,35 / 1/4" | FB662CTK0635 | 6,35 / 1/4" | 8 | 16 | 30 | 75 | 35 | 130 |
| 7,93 / 5/16" | FB662CTK0793 | 7,93 / 5/16" | 8 | 16 | 30 | 75 | 35 | 130 |
| 8,0 | FB662CT080 | 8 | 8 | 16 | 30 | 75 | 35 | 130 |
| 9,52 / 3/8" | FB662CT0952 | 9,52 / 3/8" | 10 | 20 | 30 | 75 | 35 | 130 |
| 10,0 | FB662CT100 | 10 | 10 | 20 | 40 | 100 | 35 | 130 |
| 12,0 | FB662CT120 | 12 | 12 | 20 | 50 | 100 | 35 | 130 |
| 12,7 / 1/2" | FB662CT127 | 12,7 / 1/2" | 12,7 / 1/2" | 20 | 50 | 100 | 35 | 130 |

Mögliche Beschichtungen:
ALX, TL5, DIP

Senkwinkel W5 130° - Standard
Senkwinkel W5 100° - auf Anfrage

possible coatings:
ALX, TL5, DIP

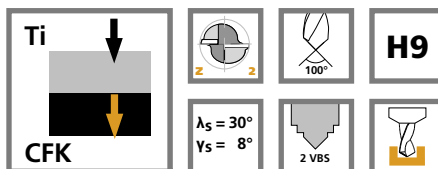
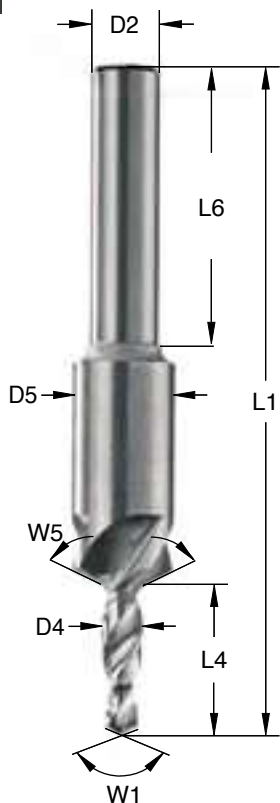
Countersink angle W5 130° - Standard
Countersink angle W5 100° - on demand



Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. FB662TC040 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. FB662CT127 and if wanted COATING: e.g. TL5.

FIBER-LINE



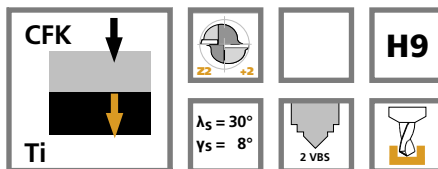
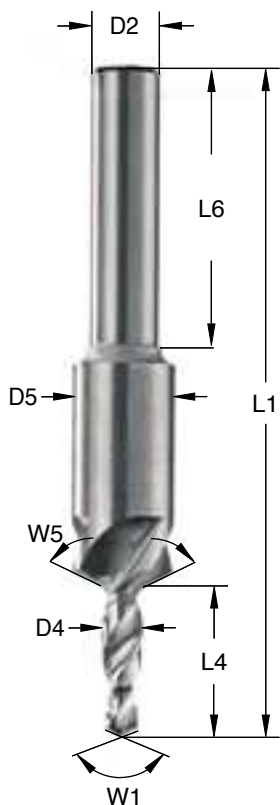
| BESTELL-NUMMER ORDER NUMBER | | D4 | D2 h6 | D5 | L4 | L1 +2 | L6 | W5 |
|--------------------------------|--------------|--------------|-------------|----|----|----------|----|-----|
| | | mm / inch | mm / inch | mm | mm | mm | mm | mm |
| 4,0 | FD662TC040 | 4 | 4 | 10 | 22 | 60 | 35 | 130 |
| 4,21 | FD662TC0421 | 4,21 | 6 | 10 | 22 | 75 | 35 | 130 |
| 4,76 / 3/16" | FD662TC0476 | 4,76 / 3/16" | 6 | 12 | 22 | 75 | 35 | 130 |
| 4,82 | FD662TCK0482 | 4,82 | 6 | 12 | 25 | 75 | 35 | 130 |
| 5,05 | FD662TC0505 | 5,05 | 6 | 12 | 25 | 75 | 35 | 130 |
| 6,0 | FD662TC060 | 6 | 6 | 16 | 30 | 75 | 35 | 130 |
| 6,35 / 1/4" | FD662TCK0635 | 6,35 / 1/4" | 8 | 16 | 30 | 75 | 35 | 130 |
| 7,93 / 5/16" | FD662TCK0793 | 7,93 / 5/16" | 8 | 16 | 30 | 75 | 35 | 130 |
| 8,0 | FD662TC080 | 8 | 8 | 16 | 30 | 75 | 35 | 130 |
| 9,52 / 3/8" | FD662TC0952 | 9,52 / 3/8" | 10 | 20 | 30 | 75 | 35 | 130 |
| 10,0 | FD662TC100 | 10 | 10 | 20 | 40 | 100 | 35 | 130 |
| 12,0 | FD662TC120 | 12 | 12 | 20 | 50 | 100 | 35 | 130 |
| 12,7 / 1/2" | FD662TC127 | 12,7 / 1/2" | 12,7 / 1/2" | 20 | 50 | 100 | 35 | 130 |

Mögliche Beschichtungen:
ALX, TL5, DIP

possible coatings:
ALX, TL5, DIP

Senkwinkel W5 130° - Standard
Senkwinkel W5 100° - auf Anfrage

Countersink angle W5 130° - Standard
Countersink angle W5 100° - on demand



| BESTELL-NUMMER ORDER NUMBER | | D4 | D2 h6 | D5 | L4 | L1 +2 | L6 | W5 |
|--------------------------------|--------------|--------------|-------------|----|----|----------|----|-----|
| | | mm / inch | mm / inch | mm | mm | mm | mm | mm |
| 4,0 | FD662CT040 | 4 | 4 | 10 | 22 | 60 | 35 | 130 |
| 4,21 | FD662CT0421 | 4,21 | 6 | 10 | 22 | 75 | 35 | 130 |
| 4,76 / 3/16" | FD662CT0476 | 4,76 / 3/16" | 6 | 12 | 22 | 75 | 35 | 130 |
| 4,82 | FD662CTK0482 | 4,82 | 6 | 12 | 25 | 75 | 35 | 130 |
| 5,05 | FD662CT0505 | 5,05 | 6 | 12 | 25 | 75 | 35 | 130 |
| 6,0 | FD662CT060 | 6 | 6 | 16 | 30 | 75 | 35 | 130 |
| 6,35 / 1/4" | FD662CTK0635 | 6,35 / 1/4" | 8 | 16 | 30 | 75 | 35 | 130 |
| 7,93 / 5/16" | FD662CTK0793 | 7,93 / 5/16" | 8 | 16 | 30 | 75 | 35 | 130 |
| 8,0 | FD662CT080 | 8 | 8 | 16 | 30 | 75 | 35 | 130 |
| 9,52 / 3/8" | FD662CT0952 | 9,52 / 3/8" | 10 | 20 | 30 | 75 | 35 | 130 |
| 10,0 | FD662CT100 | 10 | 10 | 20 | 40 | 100 | 35 | 130 |
| 12,0 | FD662CT120 | 12 | 12 | 20 | 50 | 100 | 35 | 130 |
| 12,7 / 1/2" | FD662CT127 | 12,7 / 1/2" | 12,7 / 1/2" | 20 | 50 | 100 | 35 | 130 |

Mögliche Beschichtungen:
ALX, TL5, DIP

possible coatings:
ALX, TL5, DIP

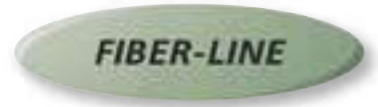
Senkwinkel W5 130° - Standard
Senkwinkel W5 100° - auf Anfrage

Countersink angle W5 130° - Standard
Countersink angle W5 100° - on demand

FIBER-LINE

FIBER-BOHRER FÜR
HANDMASCHINEN

FIBER-DRILLS FOR
MANUAL MACHINERY



GFK
GFK

GMT
GMT

LFT
LFT

CFK
CFK

Organobleche
Organo sheet

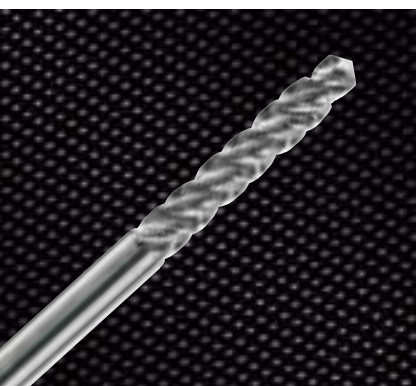
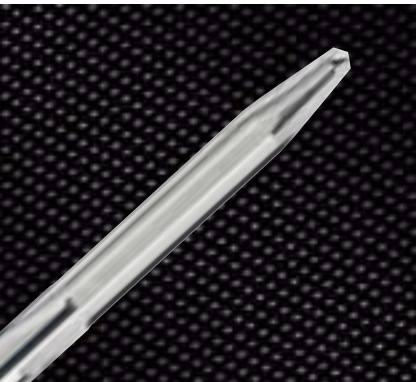
Kevlar
Kevlar

FIBER-LINE

FIBER-BOHRER FÜR
HANDMASCHINEN

FIBER-DRILLS FOR
MANUAL MACHINERY

FIBER-LINE



Beim Bohren mit Handmaschinen können die gleichen Grundgeometrien aus der FIBER-Drill-Reihe FB und FD eingesetzt werden, da diese sowieso auf eine möglichst geringe Zerspankraft hin ausgelegt sind.

Die Auslegung auf Handbetrieb erfordert eine konsequente Auslegung auf minimale Vorschubkräfte hin, um Ermüdungen der Bediener zu vermeiden. Alle Werkzeuge aus der FIBER-Drill-Reihe mit dem Kennzeichen HA wurden auf diese Anforderung hin angepasst.

Dies erspart speziell in der Luft- und Raumfahrt auf jeden Fall auch Qualifizierungsvorgänge und damit auch Kosten ein.

Bei den Schnittstellen sind alle gängigen Anschlussformate darstellbar, egal ob mit Gewinde, mit glattem Schaft oder anderen speziellen Aufnahmen.

When drilling with hand-held machines the same basic geometries of the FIBER-Drill Series FB and FD can be used, as these are designed for least-possible material cutting force.

The design for hand operation requires consistent pursuit of minimum longitudinal force exertion to avoid tiring out the operators. All tools of the FIBER-Drill series with marking HA were adopted for this requirement.

Especially for aerospace industry this certainly makes qualification procedures and involved expenses unnecessary.

All established tool holders are available as interface, regardless if threaded, smooth shaft or other special holders.

FB Passbohrung ab H11

FB hole from H11

FD Passbohrung bis H9

FD hole up to H9

162 Z2 - 1 Vorbohrstufe (VBS)

162 2F - 1 step head

262 Z2 - 2 VBS

262 2F - 2 step heads

662 Z2 - 2 VBS mit Senker

662 2F - 2 step heads with counter sink

664 Z4 - 2 VBS mit Senker

664 4F - 2 step heads with counter sink

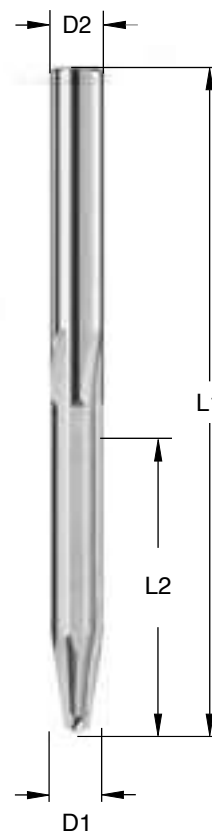
HA für Handmaschinen bzw.
Vorschubeinheiten

*HA for manual drilling machines
and pneumatic / hydraulic feeds*



$\lambda_s = 0^\circ$
 $\gamma_s = 8^\circ$

| BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | | |
|--------------------------------|-----------------|-----------------------|----------|----------------|--|--|--|
| 118HA020020 | 2 | 2 | 50 | 100 | | | |
| 118HA024024 | 2,48 | 2,48 | 50 | 100 | | | |
| 118HA030030 | 3 | 3 | 50 | 100 | | | |
| 118HA031031 | 3,17 | 3,17 | 50 | 100 | | | |
| 118HA040040 | 4 | 4 | 50 | 100 | | | |
| 118HA042042 | 4,21 | 4,21 | 50 | 100 | | | |
| 118HA048048 | 4,82 | 4,82 | 50 | 100 | | | |
| 118HA051051 | 5,05 | 5,05 | 50 | 100 | | | |
| 118HA055055 | 5,53 | 5,53 | 50 | 100 | | | |
| 118HA060060 | 6 | 6 | 50 | 100 | | | |
| 118HA0635635 | 6,35 | 6,35 | 50 | 100 | | | |
| 118HA066066 | 6,6 | 6,6 | 50 | 100 | | | |
| 118HA070070 | 7 | 7 | 50 | 100 | | | |
| 118HA079079 | 7,92 | 7,92 | 50 | 100 | | | |
| 118HA080080 | 8 | 8 | 50 | 100 | | | |
| 118HA086086 | 8,63 | 8,63 | 50 | 100 | | | |
| 118HA090090 | 9 | 9 | 50 | 100 | | | |
| 118HA100100 | 10 | 10 | 50 | 100 | | | |
| 118HA120120 | 12 | 12 | 50 | 100 | | | |



Mögliche Beschichtungen:

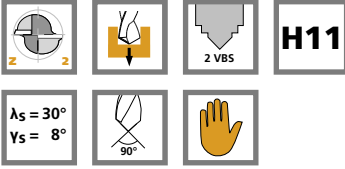
ALX
TL5
DIP

possible coatings:

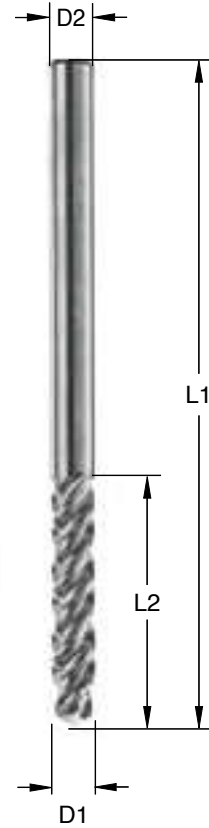
ALX
TL5
DIP

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 118HA031031 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. 118HA086086 and if wanted COATING: e.g. TL5.



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | | |
|--------------------------------|--------------|-----------------|-----------------------|----------|----------------|--|--|
| 4,0 | FB262HA040 | 4 | 4 | 50 | 100 | | |
| 4,21 | FB262HA0421 | 4,21 | 6 | 50 | 100 | | |
| 4,82 | FB262HAK0482 | 4,82 | 6 | 50 | 100 | | |
| | FB262HA0482 | 4,82 | 8 | 50 | 100 | | |
| 5,05 | FB262HA0505 | 5,05 | 6 | 50 | 100 | | |
| 6,0 | FB262HA060 | 6 | 6 | 50 | 100 | | |
| 6,35 / 1/4" | FB262HAK0635 | 6,35 / 1/4" | 6,35 / 1/4" | 50 | 100 | | |
| 7,93 / 5/16" | FB262HAK0793 | 7,93 / 5/16" | 7,93 / 5/16" | 50 | 100 | | |
| 8,0 | FB262HA080 | 8 | 8 | 50 | 100 | | |
| 9,52 / 3/8" | FB262HA0952 | 9,52 / 3/8" | 9,52 / 3/8" | 50 | 100 | | |
| 10,0 | FB262HA100 | 10 | 10 | 50 | 100 | | |
| 12,0 | FB262HA120 | 12 | 12 | 50 | 100 | | |
| 12,7 / 1/2" | FB262HA127 | 12,7 / 1/2" | 12,7 / 1/2" | 50 | 100 | | |



Mögliche Beschichtungen:

- ALX
- TL5
- DIP

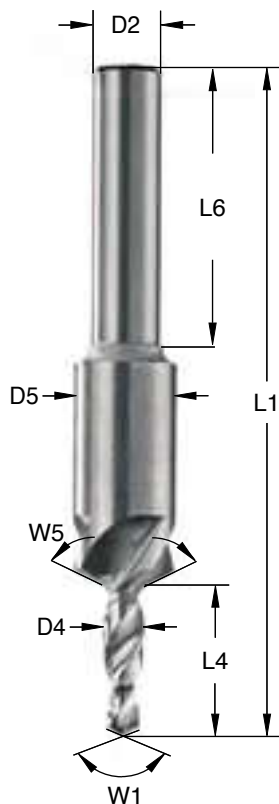
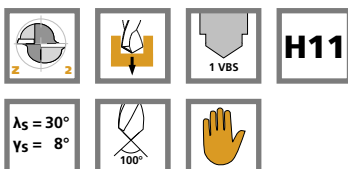
possible coatings:

- ALX
- TL5
- DIP

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. FB262HA060 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. FB262HA0952 and if wanted COATING: e.g. TL5.

FIBER-LINE



Mögliche Beschichtungen:

- ALX
- TL5
- DIP

possible coatings:

- ALX
- TL5
- DIP

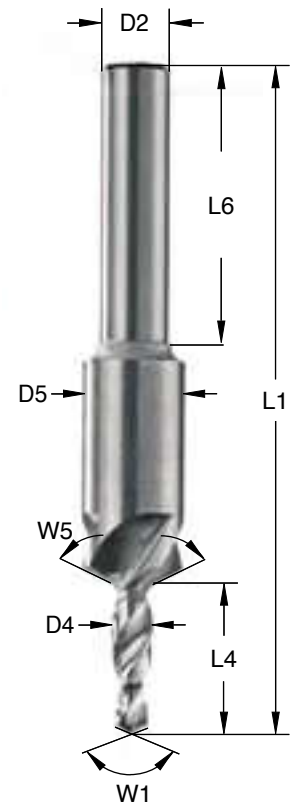
| | BESTELL-NUMMER ORDER NUMBER | D4 mm / inch | D2 h6 mm / inch | D5 mm | L4 mm | L1 +2 mm | L6 mm | W5 |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------|----------------|----------|-----|
| 4,0 | FB662HA040 | 4 | 4 | 10 | 22 | 100 | 35 | 130 |
| 4,21 | FB662HA0421 | 4,21 | 6 | 10 | 22 | 100 | 35 | 130 |
| 4,82 | FB662HAK0482 | 4,82 | 6 | 12 | 25 | 100 | 35 | 130 |
| 5,05 | FB662HA0505 | 5,05 | 6 | 12 | 25 | 100 | 35 | 130 |
| 6,0 | FB662HA060 | 6 | 6 | 16 | 30 | 100 | 35 | 130 |
| 6,35 / 1/4" | FB662HAK0635 | 6,35 / 1/4" | 8 | 16 | 30 | 100 | 35 | 130 |
| 7,93 / 5/16" | FB662HAK0793 | 7,93 / 5/16" | 8 | 16 | 30 | 100 | 35 | 130 |
| 8,0 | FB662HA080 | 8 | 8 | 16 | 30 | 100 | 35 | 130 |
| 9,52 / 3/8" | FB662HA0952 | 9,52 / 3/8" | 10 | 20 | 30 | 100 | 35 | 130 |
| 10,0 | FB662HA100 | 10 | 10 | 20 | 40 | 100 | 35 | 130 |
| 12,0 | FB662HA120 | 12 | 12 | 20 | 50 | 100 | 35 | 130 |
| 12,7 / 1/2" | FB662HA127 | 12,7 / 1/2" | 12,7 / 1/2" | 20 | 50 | 100 | 35 | 130 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. FB662HA060 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. FB662HA120 and if wanted COATING: e.g. TL5.



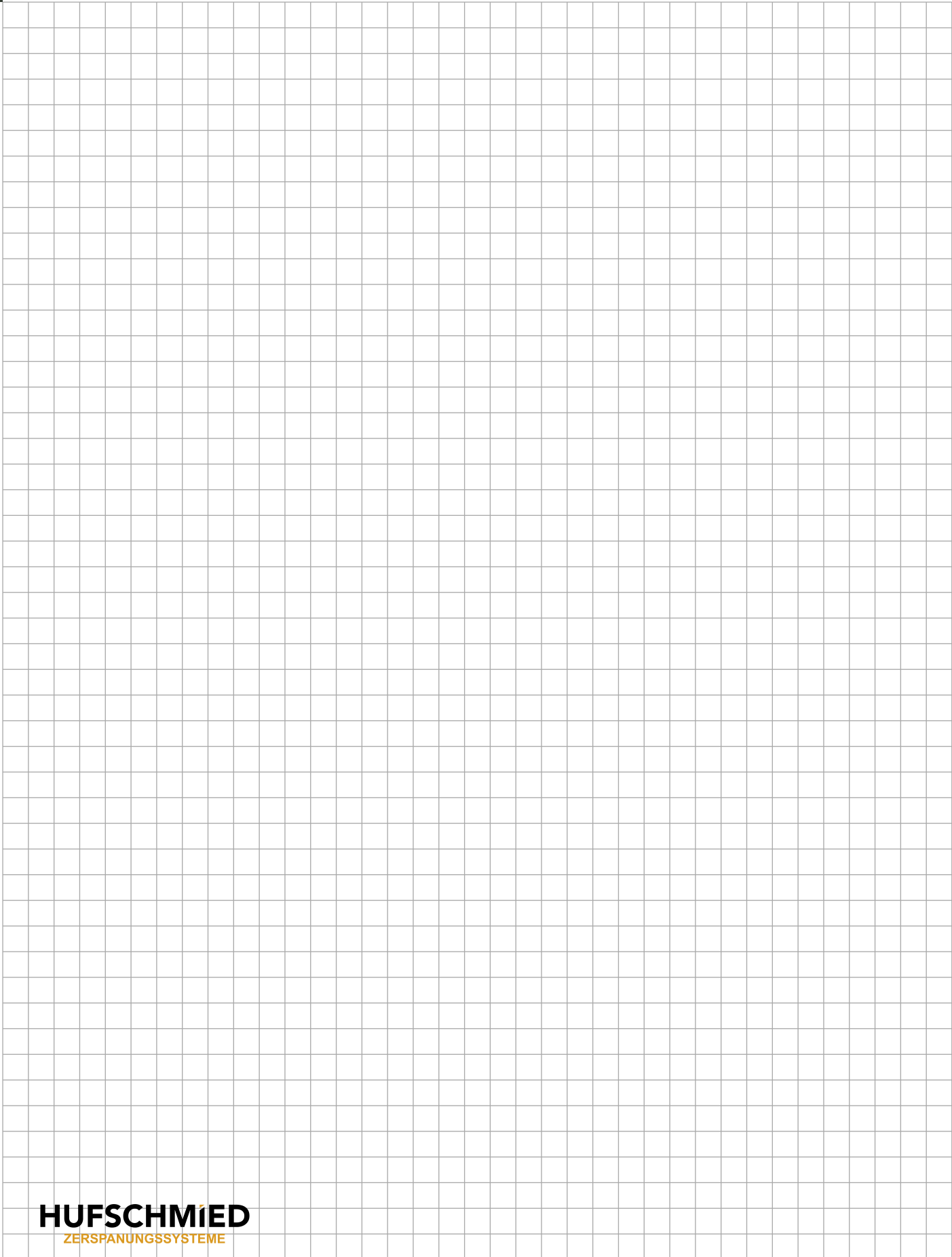
| | BESTELL-NUMMER ORDER NUMBER | D4 mm / inch | D2 h6 mm / inch | D5 mm | L4 mm | L1 +2 mm | L6 mm | W5 |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------|----------------|----------|-----|
| 4,0 | FB664HA040 | 4 | 4 | 10 | 22 | 100 | 35 | 130 |
| 4,21 | FB664HA0421 | 4,21 | 6 | 10 | 22 | 100 | 35 | 130 |
| 4,82 | FB664HAK0482 | 4,82 | 6 | 12 | 25 | 100 | 35 | 130 |
| 5,05 | FB664HA0505 | 5,05 | 6 | 12 | 25 | 100 | 35 | 130 |
| 6,0 | FB664HA060 | 6 | 6 | 16 | 30 | 100 | 35 | 130 |
| 6,35 / 1/4" | FB664HAK0635 | 6,35 / 1/4" | 8 | 16 | 30 | 100 | 35 | 130 |
| 7,93 / 5/16" | FB664HAK0793 | 7,93 / 5/16" | 8 | 16 | 30 | 100 | 35 | 130 |
| 8,0 | FB664HA080 | 8 | 8 | 16 | 30 | 100 | 35 | 130 |
| 9,52 / 3/8" | FB664HA0952 | 9,52 / 3/8" | 10 | 20 | 30 | 100 | 35 | 130 |
| 10,0 | FB664HA100 | 10 | 10 | 20 | 40 | 100 | 35 | 130 |
| 12,0 | FB664HA120 | 12 | 12 | 20 | 50 | 100 | 35 | 130 |
| 12,7 / 1/2" | FB664HA127 | 12,7 / 1/2" | 12,7 / 1/2" | 20 | 50 | 100 | 35 | 130 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |



Mögliche Beschichtungen:
ALX
TL5
DIP
possible coatings:
ALX
TL5
DIP

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. FB6642HA060 und wenn gewünscht Beschichtung: z.B. TL5.
Please indicate order number: e.g. FB664HA0952 and if wanted COATING: e.g. TL5.

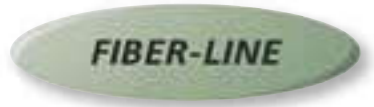


FIBER-LINE

PKD-WERKZEUGE

PCD TOOLS

FIBER-LINE



GFK
GFK

GMT
GMT

LFT
LFT

SMC
SMC

Organobleche
Organo sheet

CFK
CFK

Kevlar
Kevlar


Aramid
Aramid

HUFSCHMIED
ZERSpanungSSYSTEME

FIBER-LINE

PKD-WERKZEUGE

PCD TOOLS


 FIBER-LINE


TEC SHARK®-Werkzeuge sind eine Weiterentwicklung der PKD-Werkzeuge von Hufschmied. Mit ihnen sind höhere Oberflächengüten bei reduzierten Spindelbelastungen erreichbar.

Tests haben ergeben, dass durch die TEC SHARK®-Geometrien bis zu 20 Prozent weniger Wärme bei der Zerspanung von CFK auftritt. Dies verbessert die erzielbare Oberflächengüte und verlängert die Standzeit der Werkzeuge.

PKD-Fräser Z2 mit
TEC SHARK®-Geometrie

- mit gelasierter Spanleitstufe
- mit Protect-Formel

TEC SHARK®-Geometrien F und W
gibt es in den Ausführungen:

- Z - Ziehend 100Z
- S - Schiebend 100S
- G - Gerade 100G

TEC SHARK® Werkzeuge in den
Ausführungen:

- PTW für glatte Schnittkanten bei Holz und Dekor
- PTF für sehr abrasive Faserwerkstoffe

TEC SHARK®-tools are a further development of the PCD tools by Hufschmied. These allow higher surface quality at reduced spindle-loads.

Tests have shown that the TEC SHARK® geometries produce up to 20 percent less heat when chipping or cutting CFK. This improves the achievable surface quality and increases tool life.

*PCD milling tool Z2 with
TEC SHARK® geometry*

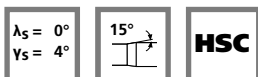
- with lasered chip groove*
- with Protect-Formula*

TEC SHARK® geometries F and W are available in different variants:

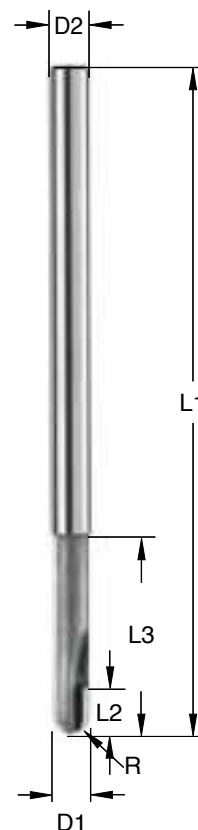
- Z - pulled 100Z*
- S - pushed 100S*
- G - straight 100G*

TEC SHARK®-tools in the variants:

- PTW for smooth cut edges for wood and decor*
- PTF for highly abrasive fiber materials*



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | R mm |
|--------------------------------|------------------|-----------------|-----------------------|----------|----------------|----------|---------|
| 3,0 | P100RG03-9-03 | 3 | 6 | 2,5 | 70 | 9 | 1,5 |
| 3,17 / 1/8" | P100RG0317-9 | 3,17 / 1/8" | 6,35 / 1/4" | 2,5 | 75 | 9 | 1,585 |
| 4,0 | P100RG04-12-03 | 4 | 6 | 2,5 | 70 | 12 | 2 |
| | P100RG04-20-03 | 4 | 6 | 2,5 | 70 | 20 | 2 |
| | P100RG04-28-03 | 4 | 6 | 2,5 | 70 | 28 | 2 |
| 4,76 / 3/16" | P100RG0476-12 | 4,76 / 3/16" | 6,35 / 1/4" | 3 | 75 | 12 | 2,38 |
| 6,0 | P100RG060-106 | 6 | 6 | 10 | 60 | | 3 |
| | P100RG060-156 | 6 | 6 | 15 | 60 | | 3 |
| | P100RG060800-106 | 6 | 8 | 10 | 65 | | 3 |
| | P100RG06-18-03 | 6 | 6 | 6 | 100 | 18 | 3 |
| | P100RG06-30-03 | 6 | 6 | 6 | 100 | 30 | 3 |
| | P100RG06-42-03 | 6 | 6 | 6 | 100 | 42 | 3 |
| 6,35 / 1/4" | P100RG0635-42 | 6,35 / 1/4" | 7,93 / 5/16" | 6 | 100 | 42 | 3,175 |
| 7,93 / 5/16" | P100RG0793-40 | 7,93 / 5/16" | 7,93 / 5/16" | 7 | 100 | 40 | 3,965 |
| 8,0 | P100RG080-157 | 8 | 8 | 15 | 70 | | 4 |
| | P100RG080-207 | 8 | 8 | 20 | 70 | | 4 |
| | P100RG080-208 | 8 | 8 | 20 | 80 | | 4 |
| | P100RG080100-157 | 8 | 10 | 15 | 70 | | 4 |
| | P100RG08-24-03 | 8 | 8 | 7 | 100 | 24 | 4 |
| | P100RG08-40-03 | 8 | 8 | 7 | 100 | 40 | 4 |
| 9,52 / 3/8" | P100RG0952-50 | 9,52 / 3/8" | 9,52 / 3/8" | 8 | 100 | 50 | 4,76 |
| 10,0 | P100RG100-157 | 10 | 10 | 15 | 70 | | 5 |
| | P100RG100-207 | 10 | 10 | 20 | 70 | | 5 |
| | P100RG100-209 | 10 | 10 | 20 | 90 | | 5 |
| | P100RG10-30-05 | 10 | 10 | 8 | 100 | 30 | 5 |
| | P100RG10-50-05 | 10 | 10 | 8 | 100 | 50 | 5 |
| 12,0 | P100RG12-36-05 | 12 | 12 | 9 | 100 | 36 | 6 |
| | P100RG12-60-05 | 12 | 12 | 9 | 100 | 60 | 6 |
| | P100RG12-36-10 | 12 | 12 | 9 | 100 | 36 | 6 |
| | P100RG120-210 | 12 | 12 | 20 | 100 | | 6 |
| 12,7 / 1/2" | P100RG127-60 | 12,7 / 1/2" | 12,7 / 1/2" | 9 | 102 | 60 | 6,35 |
| 16,0 | P100RG160-2010 | 16 | 16 | 20 | 125 | | 8 |



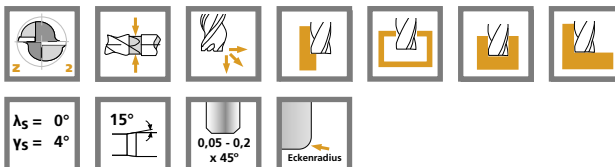
Durchmesserbereich:
3,0 bis 16,0 mm
diameter range:
3,0 to 16,0 mm

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.

Please take prices out of our actual price list.

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. P100RG060-106.
Please indicate order number: e.g. P100RG08-24-03.

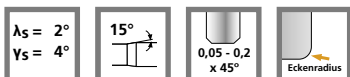


Durchmesserbereich:
3,0 bis 16,0 mm
diamter range:
3,0 to 16,0 mm

| | BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | ER mm |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------------|----------|----------|
| 3,0 | P100GECO03-9-03 | 3 | 6 | 2,5 | 70 | 9 | 0,3 |
| 3,17 / 1/8" | P100G0317-9 | 3,17 / 1/8" | 6,35 / 1/4" | 2,5 | 75 | 9 | |
| 4,0 | P100GECO04-12-03 | 4 | 6 | 2,5 | 70 | 12 | 0,3 |
| | P100GECO04-20-03 | 4 | 6 | 2,5 | 70 | 20 | 0,3 |
| | P100GECO04-28-03 | 4 | 6 | 2,5 | 70 | 28 | 0,3 |
| 4,76 / 3/16" | P100G0476-12 | 4,76 / 3/16" | 6,35 / 1/4" | 3 | 75 | 12 | |
| 6,0 | P100G060-106 | 6 | 6 | 10 | 60 | | |
| | P100G060-156 | 6 | 6 | 15 | 60 | | |
| | P100G060800-106 | 6 | 8 | 10 | 65 | | |
| | P100GECO06-18-03 | 6 | 6 | 6 | 100 | 18 | 0,3 |
| | P100GECO06-30-03 | 6 | 6 | 6 | 100 | 30 | 0,3 |
| | P100GECO06-42-03 | 6 | 6 | 6 | 100 | 42 | 0,3 |
| | P100GECO06-18-05 | 6 | 6 | 6 | 100 | 18 | 0,5 |
| | P100GECO06-30-05 | 6 | 6 | 6 | 100 | 30 | 0,5 |
| | P100GECO06-42-05 | 6 | 6 | 6 | 100 | 42 | 0,5 |
| | P100GECO06-18-10 | 6 | 6 | 6 | 100 | 18 | 1 |
| | P100GECO06-30-10 | 6 | 6 | 6 | 100 | 30 | 1 |
| | P100GECO06-42-10 | 6 | 6 | 6 | 100 | 42 | 1 |
| 6,35 / 1/4" | P100G0635-42 | 6,35 / 1/4" | 7,93 / 5/16" | 6 | 100 | 42 | |
| 7,93 / 5/16" | P100G0793-40 | 7,93 / 5/16" | 7,93 / 5/16" | 7 | 100 | 40 | |
| 8,0 | P100G080-157 | 8 | 8 | 15 | 70 | | |
| | P100G080-207 | 8 | 8 | 20 | 70 | | |
| | P100G080-208 | 8 | 8 | 20 | 80 | | |
| | P100G080100-157 | 8 | 10 | 15 | 70 | | |
| | P100GECO08-24-03 | 8 | 8 | 7 | 100 | 24 | 0,3 |
| | P100GECO08-40-03 | 8 | 8 | 7 | 100 | 40 | 0,3 |
| | P100GECO08-24-05 | 8 | 8 | 7 | 100 | 24 | 0,5 |
| | P100GECO08-40-05 | 8 | 8 | 7 | 100 | 40 | 0,5 |
| | P100GECO08-24-10 | 8 | 8 | 7 | 100 | 24 | 1 |
| | P100GECO08-40-10 | 8 | 8 | 7 | 100 | 40 | 1 |
| 9,52 / 3/8" | P100G0952-50 | 9,52 / 3/8" | 9,52 / 3/8" | 8 | 100 | 50 | |
| 10,0 | P100G100-157 | 10 | 10 | 15 | 70 | | |
| | P100G100-207 | 10 | 10 | 20 | 70 | | |
| | P100G100-209 | 10 | 10 | 20 | 90 | | |
| | P100G10-30-05 | 10 | 10 | 8 | 100 | 30 | 0,5 |
| | P100GECO10-50-05 | 10 | 10 | 8 | 100 | 50 | 0,5 |
| | P100GECO10-30-10 | 10 | 10 | 8 | 100 | 30 | 1 |
| | P100GECO10-50-10 | 10 | 10 | 8 | 100 | 50 | 1 |
| | P100GECO10-30-15 | 10 | 10 | 8 | 100 | 30 | 1,5 |
| | P100GECO10-50-15 | 10 | 10 | 8 | 100 | 50 | 1,5 |
| 12,0 | P100GECO12-36-05 | 12 | 12 | 9 | 100 | 36 | 0,5 |
| | P100GECO12-60-05 | 12 | 12 | 9 | 100 | 60 | 0,5 |
| | P100GECO12-36-10 | 12 | 12 | 9 | 100 | 36 | 1 |
| | P100GECO12-60-10 | 12 | 12 | 9 | 100 | 60 | 1 |
| | P100GECO12-36-15 | 12 | 12 | 9 | 100 | 36 | 1,5 |
| | P100GECO12-60-15 | 12 | 12 | 9 | 100 | 60 | 1,5 |
| | P100GECO120-2010 | 12 | 12 | 20 | 100 | | |
| 12,7 / 1/2" | P100GECO127-60 | 12,7 / 1/2" | 12,7 / 1/2" | 9 | 102 | 60 | |
| 16,0 | P100GECO160-2010 | 16 | 16 | 20 | 125 | | |

Die Preise entnehmen Sie bitte
unserer aktuellen Preisliste.

Please take prices out of our
actual price list.



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | ER mm |
|--------------------------------|-----------------|-----------------|-----------------------|----------|----------------|----------|----------|
| 3,0 | P100Z03-9-03 | 3 | 6 | 2,5 | 70 | 9 | 0,3 |
| 3,17 / 1/8" | P100Z0317-9 | 3,17 / 1/8" | 6,35 / 1/4" | 2,5 | 70 | 9 | |
| 4,0 | P100Z04-12-03 | 4 | 6 | 2,5 | 70 | 12 | 0,3 |
| | P100Z04-20-03 | 4 | 6 | 2,5 | 70 | 20 | 0,3 |
| | P100Z04-28-03 | 4 | 6 | 2,5 | 70 | 28 | 0,3 |
| 4,76 / 3/16" | P100Z0476-12 | 4,76 / 3/16" | 6,35 / 1/4" | 3 | 70 | 12 | |
| 6,0 | P100Z060-106 | 6 | 6 | 10 | 60 | | |
| | P100Z060-156 | 6 | 6 | 15 | 60 | | |
| | P100Z060800-106 | 6 | 8 | 10 | 65 | | |
| | P100Z06-18-03 | 6 | 6 | 6 | 100 | 18 | 0,3 |
| | P100Z06-30-03 | 6 | 6 | 6 | 100 | 30 | 0,3 |
| | P100Z06-42-03 | 6 | 6 | 6 | 100 | 42 | 0,3 |
| | P100Z06-18-05 | 6 | 6 | 6 | 100 | 18 | 0,5 |
| | P100Z06-30-05 | 6 | 6 | 6 | 100 | 30 | 0,5 |
| | P100Z06-42-05 | 6 | 6 | 6 | 100 | 42 | 0,5 |
| | P100Z06-18-10 | 6 | 6 | 6 | 100 | 18 | 1 |
| | P100Z06-30-10 | 6 | 6 | 6 | 100 | 30 | 1 |
| | P100Z06-42-10 | 6 | 6 | 6 | 100 | 42 | 1 |
| 6,35 / 1/4" | P100Z0635-42 | 6,35 / 1/4" | 7,93 / 5/16" | 6 | 100 | 42 | |
| 7,93 / 5/16" | P100Z0793-40 | 7,93 / 5/16" | 7,93 / 5/16" | 7 | 100 | 40 | |
| 8,0 | P100Z080-157 | 8 | 8 | 15 | 70 | | |
| | P100Z080-207 | 8 | 8 | 20 | 70 | | |
| | P100Z080-208 | 8 | 8 | 20 | 80 | | |
| | P100Z080100-157 | 8 | 10 | 15 | 70 | | |
| | P100Z08-24-03 | 8 | 8 | 7 | 100 | 24 | 0,3 |
| | P100Z08-40-03 | 8 | 8 | 7 | 100 | 40 | 0,3 |
| | P100Z08-24-05 | 8 | 8 | 7 | 100 | 24 | 0,5 |
| | P100Z08-40-05 | 8 | 8 | 7 | 100 | 40 | 0,5 |
| | P100Z08-24-10 | 8 | 8 | 7 | 100 | 24 | 1 |
| | P100Z08-40-10 | 8 | 8 | 7 | 100 | 40 | 1 |
| 9,52 / 3/8" | P100Z0952-50 | 9,52 / 3/8" | 9,52 / 3/8" | 8 | 100 | 50 | |
| 10,0 | P100Z100-157 | 10 | 10 | 15 | 70 | | |
| | P100Z100-207 | 10 | 10 | 20 | 70 | | |
| | P100Z100-209 | 10 | 10 | 20 | 90 | | |
| | P100Z10-30-05 | 10 | 10 | 8 | 100 | 30 | 0,5 |
| | P100Z10-50-05 | 10 | 10 | 8 | 100 | 50 | 0,5 |
| | P100Z10-30-10 | 10 | 10 | 8 | 100 | 30 | 1 |
| | P100Z10-50-10 | 10 | 10 | 8 | 100 | 50 | 1 |
| | P100Z10-30-15 | 10 | 10 | 8 | 100 | 30 | 1,5 |
| | P100Z10-50-15 | 10 | 10 | 8 | 100 | 50 | 1,5 |
| 12,0 | P100Z12-36-05 | 12 | 12 | 9 | 100 | 36 | 0,5 |
| | P100Z12-60-05 | 12 | 12 | 9 | 100 | 60 | 0,5 |
| | P100Z12-36-10 | 12 | 12 | 9 | 100 | 36 | 1 |
| | P100Z12-60-10 | 12 | 12 | 9 | 100 | 60 | 1 |
| | P100Z12-36-15 | 12 | 12 | 9 | 100 | 36 | 1,5 |
| | P100Z12-60-15 | 12 | 12 | 9 | 100 | 60 | 1,5 |
| | P100Z120-2010 | 12 | 12 | 20 | 100 | | |
| 12,7 / 1/2" | P100Z127-60 | 12,7 / 1/2" | 12,7 / 1/2" | 9 | 102 | 60 | |
| 16,0 | P100Z160-2010 | 16 | 16 | 20 | 125 | | |

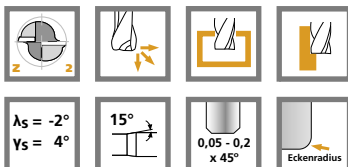


Durchmesserbereich:
3,0 bis 16,0 mm
diameter range:
3,0 to 16,0 mm

Die Preise entnehmen Sie bitte
unserer aktuellen Preisliste.

Please take prices out of our
actual price list.

FIBER-LINE



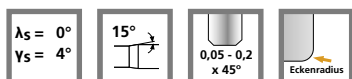
Durchmesserbereich:
3,0 bis 16,0 mm
diameter range:
3,0 to 16,0 mm

Die Preise entnehmen Sie bitte
unsere aktuellen Preisliste.

Please take prices out of our
actual price list.

| | BESTELL-NUMMER ORDER NUMBER | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | ER mm |
|--------------|--------------------------------|-----------------|-----------------------|----------|----------------|----------|----------|
| 3,0 | P100SC03-9-03 | 3 | 6 | 2,5 | 70 | 9 | 0,3 |
| 3,17 / 1/8" | P100SC0317-9 | 3,17 / 1/8" | 6,35 / 1/4" | 2,5 | 75 | 9 | |
| 4,0 | P100SC04-12-03 | 4 | 6 | 2,5 | 70 | 12 | 0,3 |
| | P100SC04-20-03 | 4 | 6 | 2,5 | 70 | 20 | 0,3 |
| | P100SC04-28-03 | 4 | 6 | 2,5 | 70 | 28 | 0,3 |
| 4,76 / 3/16" | P100SC0476-12 | 4,76 / 3/16" | 6,35 / 1/4" | 3 | 75 | 12 | |
| 6,0 | P100SC060-106 | 6 | 6 | 10 | 60 | | |
| | P100SC060-156 | 6 | 6 | 15 | 60 | | |
| | P100SC060800-106 | 6 | 8 | 10 | 65 | | |
| | P100SC06-18-03 | 6 | 6 | 6 | 100 | 18 | 0,3 |
| | P100SC06-30-03 | 6 | 6 | 6 | 100 | 30 | 0,3 |
| | P100SC06-42-03 | 6 | 6 | 6 | 100 | 42 | 0,3 |
| | P100SC06-18-05 | 6 | 6 | 6 | 100 | 18 | 0,5 |
| | P100SC06-30-05 | 6 | 6 | 6 | 100 | 30 | 0,5 |
| | P100SC06-42-05 | 6 | 6 | 6 | 100 | 42 | 0,5 |
| | P100SC06-18-10 | 6 | 6 | 6 | 100 | 18 | 1 |
| | P100SC06-30-10 | 6 | 6 | 6 | 100 | 30 | 1 |
| | P100SC06-42-10 | 6 | 6 | 6 | 100 | 42 | 1 |
| 6,35 / 1/4" | P100SC0635-42 | 6,35 / 1/4" | 7,93 / 5/16" | 6 | 100 | 42 | |
| 7,93 / 5/16" | P100SC0793-40 | 7,93 / 5/16" | 7,93 / 5/16" | 7 | 100 | 40 | |
| 8,0 | P100SC080-157 | 8 | 8 | 15 | 70 | | |
| | P100SC080-207 | 8 | 8 | 20 | 70 | | |
| | P100SC080-208 | 8 | 8 | 20 | 80 | | |
| | P100SC080100-157 | 8 | 10 | 15 | 70 | | |
| | P100SC08-24-03 | 8 | 8 | 7 | 100 | 24 | 0,3 |
| | P100SC08-40-03 | 8 | 8 | 7 | 100 | 40 | 0,3 |
| | P100SC08-24-05 | 8 | 8 | 7 | 100 | 24 | 0,5 |
| | P100SC08-40-05 | 8 | 8 | 7 | 100 | 40 | 0,5 |
| | P100SC08-24-10 | 8 | 8 | 7 | 100 | 24 | 1 |
| | P100SC08-40-10 | 8 | 8 | 7 | 100 | 40 | 1 |
| 9,52 / 3/8" | P100SC0952-50 | 9,52 / 3/8" | 9,52 / 3/8" | 8 | 100 | 50 | |
| 10,0 | P100SC100-157 | 10 | 10 | 15 | 70 | | |
| | P100SC100-207 | 10 | 10 | 20 | 70 | | |
| | P100SC100-209 | 10 | 10 | 20 | 90 | | |
| | P100SC10-30-05 | 10 | 10 | 8 | 100 | 30 | 0,5 |
| | P100SC10-50-05 | 10 | 10 | 8 | 100 | 50 | 0,5 |
| | P100SC10-30-10 | 10 | 10 | 8 | 100 | 30 | 1 |
| | P100SC10-50-10 | 10 | 10 | 8 | 100 | 50 | 1 |
| | P100SC10-30-15 | 10 | 10 | 8 | 100 | 30 | 1,5 |
| | P100SC10-50-15 | 10 | 10 | 8 | 100 | 50 | 1,5 |
| 12,0 | P100SC12-36-05 | 12 | 12 | 9 | 100 | 36 | 0,5 |
| | P100SC12-60-05 | 12 | 12 | 9 | 100 | 60 | 0,5 |
| | P100SC12-36-10 | 12 | 12 | 9 | 100 | 36 | 1 |
| | P100SC12-60-10 | 12 | 12 | 9 | 100 | 60 | 1 |
| | P100SC12-36-15 | 12 | 12 | 9 | 100 | 36 | 1,5 |
| | P100SC12-60-15 | 12 | 12 | 9 | 100 | 60 | 1,5 |
| | P100SC120-2010 | 12 | 12 | 20 | 100 | | |
| 12,7 / 1/2" | P100SC127-60 | 12,7 / 1/2" | 12,7 / 1/2" | 9 | 102 | 60 | |
| 16,0 | P100SC160-2010 | 16 | 16 | 20 | 125 | | |

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. P100SC060-106.
Please indicate order number: e.g. P100SC060-156.



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | ER mm |
|--------------------------------|-------------------|-----------------|-----------------------|----------|----------------|----------|----------|
| 3,0 | PTW100G03-9-03 | 3 | 6 | 2,5 | 70 | 9 | 0,3 |
| 3,17 / 1/8" | PTW100G0317-9 | 3,17 / 1/8" | 6,35 / 1/4" | 2,5 | 75 | 9 | |
| 4,0 | PTW100G04-12-03 | 4 | 6 | 2,5 | 70 | 12 | 0,3 |
| | PTW100G04-20-03 | 4 | 6 | 2,5 | 70 | 20 | 0,3 |
| | PTW100G04-28-03 | 4 | 6 | 2,5 | 70 | 28 | 0,3 |
| 4,76 / 3/16" | PTW100G0476-12 | 4,76 / 3/16" | 6,35 / 1/4" | 3 | 75 | 12 | |
| 6,0 | PTW100G060-106 | 6 | 6 | 10 | 60 | | |
| | PTW100G060-156 | 6 | 6 | 15 | 60 | | |
| | PTW100G060800-106 | 6 | 8 | 10 | 65 | | |
| | PTW100G06-18-03 | 6 | 6 | 6 | 100 | 18 | 0,3 |
| | PTW100G06-30-03 | 6 | 6 | 6 | 100 | 30 | 0,3 |
| | PTW100G06-42-03 | 6 | 6 | 6 | 100 | 42 | 0,3 |
| | PTW100G06-18-05 | 6 | 6 | 6 | 100 | 18 | 0,5 |
| | PTW100G06-30-05 | 6 | 6 | 6 | 100 | 30 | 0,5 |
| | PTW100G06-42-05 | 6 | 6 | 6 | 100 | 42 | 0,5 |
| | PTW100G06-18-10 | 6 | 6 | 6 | 100 | 18 | 1 |
| | PTW100G06-30-10 | 6 | 6 | 6 | 100 | 30 | 1 |
| | PTW100G06-42-10 | 6 | 6 | 6 | 100 | 42 | 1 |
| 6,35 / 1/4" | PTW100G0635-42 | 6,35 / 1/4" | 7,93 / 5/16" | 6 | 100 | 42 | |
| 7,93 / 5/16" | PTW100G0793-40 | 7,93 / 5/16" | 7,93 / 5/16" | 7 | 100 | 40 | |
| 8,0 | PTW100G080-157 | 8 | 8 | 15 | 70 | | |
| | PTW100G080-207 | 8 | 8 | 20 | 70 | | |
| | PTW100G080-208 | 8 | 8 | 20 | 80 | | |
| | PTW100G080100-157 | 8 | 10 | 15 | 70 | | |
| | PTW100G08-24-03 | 8 | 8 | 7 | 100 | 24 | 0,3 |
| | PTW100G08-40-03 | 8 | 8 | 7 | 100 | 40 | 0,3 |
| | PTW100G08-24-05 | 8 | 8 | 7 | 100 | 24 | 0,5 |
| | PTW100G08-40-05 | 8 | 8 | 7 | 100 | 40 | 0,5 |
| | PTW100G08-24-10 | 8 | 8 | 7 | 100 | 24 | 1 |
| | PTW100G08-40-10 | 8 | 8 | 7 | 100 | 40 | 1 |
| 9,52 / 3/8" | PTW100G0952-50 | 9,52 / 3/8" | 9,52 / 3/8" | 8 | 100 | 50 | |
| 10,0 | PTW100G100-157 | 10 | 10 | 15 | 70 | | |
| | PTW100G100-207 | 10 | 10 | 20 | 70 | | |
| | PTW100G100-209 | 10 | 10 | 20 | 90 | | |
| | PTW100G10-30-05 | 10 | 10 | 8 | 100 | 30 | 0,5 |
| | PTW100G10-50-05 | 10 | 10 | 8 | 100 | 50 | 0,5 |
| | PTW100G10-30-10 | 10 | 10 | 8 | 100 | 30 | 1 |
| | PTW100G10-50-10 | 10 | 10 | 8 | 100 | 50 | 1 |
| | PTW100G10-30-15 | 10 | 10 | 8 | 100 | 30 | 1,5 |
| | PTW100G10-50-15 | 10 | 10 | 8 | 100 | 50 | 1,5 |
| 12,0 | PTW100G12-36-05 | 12 | 12 | 9 | 100 | 36 | 0,5 |
| | PTW100G12-60-05 | 12 | 12 | 9 | 100 | 60 | 0,5 |
| | PTW100G12-36-10 | 12 | 12 | 9 | 100 | 36 | 1 |
| | PTW100G12-60-10 | 12 | 12 | 9 | 100 | 60 | 1 |
| | PTW100G12-36-15 | 12 | 12 | 9 | 100 | 36 | 1,5 |
| | PTW100G12-60-15 | 12 | 12 | 9 | 100 | 60 | 1,5 |
| | PTW100G120-2010 | 12 | 12 | 20 | 100 | | |
| 12,7 / 1/2" | PTW100G127-60 | 12,7 / 1/2" | 12,7 / 1/2" | 9 | 102 | 60 | |
| 16,0 | PTW100G160-2010 | 16 | 16 | 20 | 125 | | |

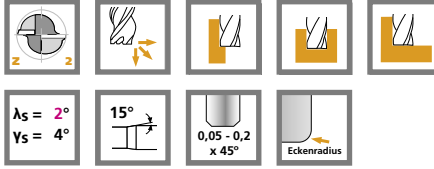


Laserweg W

Durchmesserbereich:
 3,0 bis 16,0 mm
 diameter range:
 3,0 to 16,0 mm

Die Preise entnehmen Sie bitte
 unserer aktuellen Preisliste.

Please take prices out of our
 actual price list.



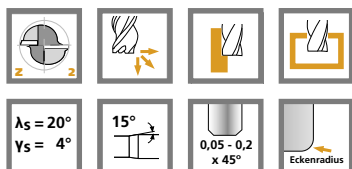
Laserweg W

| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | ER mm |
|--------------------------------|-------------------|-----------------|-----------------------|----------|----------------|----------|----------|
| 3,0 | PTW100Z03-9-03 | 3 | 6 | 2,5 | 70 | 9 | 0,3 |
| 3,17 / 1/8" | PTW100Z0317-9 | 3,17 / 1/8" | 6,35 / 1/4" | 2,5 | 75 | 9 | |
| 4,0 | PTW100Z04-12-03 | 4 | 6 | 2,5 | 70 | 12 | 0,3 |
| | PTW100Z04-20-03 | 4 | 6 | 2,5 | 70 | 20 | 0,3 |
| | PTW100Z04-28-03 | 4 | 6 | 2,5 | 70 | 28 | 0,3 |
| 4,76 / 3/16" | PTW100Z0476-12 | 4,76 / 3/16" | 6,35 / 1/4" | 3 | 75 | 12 | |
| 6,0 | PTW100Z060-106 | 6 | 6 | 10 | 60 | | |
| | PTW100Z060-156 | 6 | 6 | 15 | 60 | | |
| | PTW100Z060800-106 | 6 | 8 | 10 | 65 | | |
| | PTW100Z06-18-03 | 6 | 6 | 6 | 100 | 18 | 0,3 |
| | PTW100Z06-30-03 | 6 | 6 | 6 | 100 | 30 | 0,3 |
| | PTW100Z06-42-03 | 6 | 6 | 6 | 100 | 42 | 0,3 |
| | PTW100Z06-18-05 | 6 | 6 | 6 | 100 | 18 | 0,5 |
| | PTW100Z06-30-05 | 6 | 6 | 6 | 100 | 30 | 0,5 |
| | PTW100Z06-42-05 | 6 | 6 | 6 | 100 | 42 | 0,5 |
| | PTW100Z06-18-10 | 6 | 6 | 6 | 100 | 18 | 1 |
| | PTW100Z06-30-10 | 6 | 6 | 6 | 100 | 30 | 1 |
| | PTW100Z06-42-10 | 6 | 6 | 6 | 100 | 42 | 1 |
| 6,35 / 1/4" | PTW100Z0635-42 | 6,35 / 1/4" | 7,93 / 5/16" | 6 | 100 | 42 | |
| 7,93 / 5/16" | PTW100Z0793-40 | 7,93 / 5/16" | 7,93 / 5/16" | 7 | 100 | 40 | |
| 8,0 | PTW100Z080-157 | 8 | 8 | 15 | 70 | | |
| | PTW100Z080-207 | 8 | 8 | 20 | 70 | | |
| | PTW100Z080-208 | 8 | 8 | 20 | 80 | | |
| | PTW100Z080100-157 | 8 | 10 | 15 | 70 | | |
| | PTW100Z08-24-03 | 8 | 8 | 7 | 100 | 24 | 0,3 |
| | PTW100Z08-40-03 | 8 | 8 | 7 | 100 | 40 | 0,3 |
| | PTW100Z08-24-05 | 8 | 8 | 7 | 100 | 24 | 0,5 |
| | PTW100Z08-40-05 | 8 | 8 | 7 | 100 | 40 | 0,5 |
| | PTW100Z08-24-10 | 8 | 8 | 7 | 100 | 24 | 1 |
| | PTW100Z08-40-10 | 8 | 8 | 7 | 100 | 40 | 1 |
| 9,52 / 3/8" | PTW100Z0952-50 | 9,52 / 3/8" | 9,52 / 3/8" | 8 | 100 | 50 | |
| 10,0 | PTW100Z100-157 | 10 | 10 | 15 | 70 | | |
| | PTW100Z100-207 | 10 | 10 | 20 | 70 | | |
| | PTW100Z100-209 | 10 | 10 | 20 | 90 | | |
| | PTW100Z10-30-05 | 10 | 10 | 8 | 100 | 30 | 0,5 |
| | PTW100Z10-50-05 | 10 | 10 | 8 | 100 | 50 | 0,5 |
| | PTW100Z10-30-10 | 10 | 10 | 8 | 100 | 30 | 1 |
| | PTW100Z10-50-10 | 10 | 10 | 8 | 100 | 50 | 1 |
| | PTW100Z10-30-15 | 10 | 10 | 8 | 100 | 30 | 1,5 |
| | PTW100Z10-50-15 | 10 | 10 | 8 | 100 | 50 | 1,5 |
| 12,0 | PTW100Z12-36-05 | 12 | 12 | 9 | 100 | 36 | 0,5 |
| | PTW100Z12-60-05 | 12 | 12 | 9 | 100 | 60 | 0,5 |
| | PTW100Z12-36-10 | 12 | 12 | 9 | 100 | 36 | 1 |
| | PTW100Z12-60-10 | 12 | 12 | 9 | 100 | 60 | 1 |
| | PTW100Z12-36-15 | 12 | 12 | 9 | 100 | 36 | 1,5 |
| | PTW100Z12-60-15 | 12 | 12 | 9 | 100 | 60 | 1,5 |
| | PTW100Z120-2010 | 12 | 12 | 20 | 100 | | |
| 12,7 / 1/2" | PTW100Z127-60 | 12,7 / 1/2" | 12,7 / 1/2" | 9 | 102 | 60 | |
| 16,0 | PTW100Z160-2010 | 16 | 16 | 20 | 125 | | |

Durchmesserbereich:
3,0 bis 16,0 mm
diameter range:
3,0 to 16,0 mm

Die Preise entnehmen Sie bitte
unserer aktuellen Preisliste.

Please take prices out of our
actual price list.



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | ER mm |
|--------------------------------|--------------------|-----------------|-----------------------|----------|----------------|----------|----------|
| 3,0 | PTW100SC03-9-03 | 3 | 6 | 2,5 | 70 | 9 | 0,3 |
| 3,17 / 1/8" | PTW100SC0317-9 | 3,17 / 1/8" | 6,35 / 1/4" | 2,5 | 75 | 9 | |
| 4,0 | PTW100SC04-12-03 | 4 | 6 | 2,5 | 70 | 12 | 0,3 |
| | PTW100SC04-20-03 | 4 | 6 | 2,5 | 70 | 20 | 0,3 |
| | PTW100SC04-28-03 | 4 | 6 | 2,5 | 70 | 28 | 0,3 |
| 4,76 / 3/16" | PTW100SC0476-12 | 4,76 / 3/16" | 6,35 / 1/4" | 3 | 75 | 12 | |
| 6,0 | PTW100SC060-106 | 6 | 6 | 10 | 60 | | |
| | PTW100SC060-156 | 6 | 6 | 15 | 60 | | |
| | PTW100SC060800-106 | 6 | 8 | 10 | 65 | | |
| | PTW100SC06-18-03 | 6 | 6 | 6 | 100 | 18 | 0,3 |
| | PTW100SC06-30-03 | 6 | 6 | 6 | 100 | 30 | 0,3 |
| | PTW100SC06-42-03 | 6 | 6 | 6 | 100 | 42 | 0,3 |
| | PTW100SC06-18-05 | 6 | 6 | 6 | 100 | 18 | 0,5 |
| | PTW100SC06-30-05 | 6 | 6 | 6 | 100 | 30 | 0,5 |
| | PTW100SC06-42-05 | 6 | 6 | 6 | 100 | 42 | 0,5 |
| | PTW100SC06-18-10 | 6 | 6 | 6 | 100 | 18 | 1 |
| | PTW100SC06-30-10 | 6 | 6 | 6 | 100 | 30 | 1 |
| | PTW100SC06-42-10 | 6 | 6 | 6 | 100 | 42 | 1 |
| 6,35 / 1/4" | PTW100SC0635-42 | 6,35 / 1/4" | 7,93 / 5/16" | 6 | 100 | 42 | |
| 7,93 / 5/16" | PTW100SC0793-40 | 7,93 / 5/16" | 7,93 / 5/16" | 7 | 100 | 40 | |
| 8,0 | PTW100SC080-157 | 8 | 8 | 15 | 70 | | |
| | PTW100SC080-207 | 8 | 8 | 20 | 70 | | |
| | PTW100SC080-208 | 8 | 8 | 20 | 80 | | |
| | PTW100SC080100-157 | 8 | 10 | 15 | 70 | | |
| | PTW100SC08-24-03 | 8 | 8 | 7 | 100 | 24 | 0,3 |
| | PTW100SC08-40-03 | 8 | 8 | 7 | 100 | 40 | 0,3 |
| | PTW100SC08-24-05 | 8 | 8 | 7 | 100 | 24 | 0,5 |
| | PTW100SC08-40-05 | 8 | 8 | 7 | 100 | 40 | 0,5 |
| | PTW100SC08-24-10 | 8 | 8 | 7 | 100 | 24 | 1 |
| | PTW100SC08-40-10 | 8 | 8 | 7 | 100 | 40 | 1 |
| 9,52 / 3/8" | PTW100SC0952-50 | 9,52 / 3/8" | 9,52 / 3/8" | 8 | 100 | 50 | |
| 10,0 | PTW100SC100-157 | 10 | 10 | 15 | 70 | | |
| | PTW100SC100-207 | 10 | 10 | 20 | 70 | | |
| | PTW100SC100-209 | 10 | 10 | 20 | 90 | | |
| | PTW100SC10-30-05 | 10 | 10 | 8 | 100 | 30 | 0,5 |
| | PTW100SC10-50-05 | 10 | 10 | 8 | 100 | 50 | 0,5 |
| | PTW100SC10-30-10 | 10 | 10 | 8 | 100 | 30 | 1 |
| | PTW100SC10-50-10 | 10 | 10 | 8 | 100 | 50 | 1 |
| | PTW100SC10-30-15 | 10 | 10 | 8 | 100 | 30 | 1,5 |
| | PTW100SC10-50-15 | 10 | 10 | 8 | 100 | 50 | 1,5 |
| 12,0 | PTW100SC12-36-05 | 12 | 12 | 9 | 100 | 36 | 0,5 |
| | PTW100SC12-60-05 | 12 | 12 | 9 | 100 | 60 | 0,5 |
| | PTW100SC12-36-10 | 12 | 12 | 9 | 100 | 36 | 1 |
| | PTW100SC12-60-10 | 12 | 12 | 9 | 100 | 60 | 1 |
| | PTW100SC12-36-15 | 12 | 12 | 9 | 100 | 36 | 1,5 |
| | PTW100SC12-60-15 | 12 | 12 | 9 | 100 | 60 | 1,5 |
| | PTW100SC120-2010 | 12 | 12 | 20 | 100 | | |
| 12,7 / 1/2" | PTW100SC127-60 | 12,7 / 1/2" | 12,7 / 1/2" | 9 | 102 | 60 | |
| 16,0 | PTW100SC160-2010 | 16 | 16 | 20 | 125 | | |



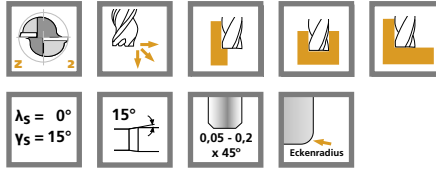
Laserweg W

Durchmesserbereich:
 3,0 bis 16,0 mm
 diameter range:
 3,0 to 16,0 mm

Die Preise entnehmen Sie bitte
 unserer aktuellen Preisliste.

Please take prices out of our
 actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. PTW100SC060-106.
 Please indicate order number: e.g. PTW100SC060-156.



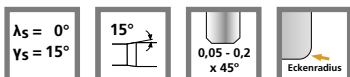
Laserweg F

| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | ER mm |
|--------------------------------|-------------------|-----------------|-----------------------|----------|----------------|----------|----------|
| 3,0 | PTF100G03-9-03 | 3 | 6 | 2,5 | 70 | 9 | 0,3 |
| 3,17 / 1/8" | PTF100G0317-9 | 3,17 / 1/8" | 6,35 / 1/4" | 2,5 | 75 | 9 | |
| 4,0 | PTF100G04-12-03 | 4 | 6 | 2,5 | 70 | 12 | 0,3 |
| | PTF100G04-20-03 | 4 | 6 | 2,5 | 70 | 20 | 0,3 |
| | PTF100G04-28-03 | 4 | 6 | 2,5 | 70 | 28 | 0,3 |
| 4,76 / 3/16" | PTF100G0476-12 | 4,76 / 3/16" | 6,35 / 1/4" | 3 | 75 | 12 | |
| 6,0 | PTF100G060-106 | 6 | 6 | 10 | 60 | | |
| | PTF100G060-156 | 6 | 6 | 15 | 60 | | |
| | PTF100G060800-106 | 6 | 8 | 10 | 65 | | |
| | PTF100G06-18-03 | 6 | 6 | 6 | 100 | 18 | 0,3 |
| | PTF100G06-30-03 | 6 | 6 | 6 | 100 | 30 | 0,3 |
| | PTF100G06-42-03 | 6 | 6 | 6 | 100 | 42 | 0,3 |
| | PTF100G06-18-05 | 6 | 6 | 6 | 100 | 18 | 0,5 |
| | PTF100G06-30-05 | 6 | 6 | 6 | 100 | 30 | 0,5 |
| | PTF100G06-42-05 | 6 | 6 | 6 | 100 | 42 | 0,5 |
| | PTF100G06-18-10 | 6 | 6 | 6 | 100 | 18 | 1 |
| | PTF100G06-30-10 | 6 | 6 | 6 | 100 | 30 | 1 |
| | PTF100G06-42-10 | 6 | 6 | 6 | 100 | 42 | 1 |
| 6,35 / 1/4" | PTF100G0635-42 | 6,35 / 1/4" | 7,93 / 5/16" | 6 | 100 | 42 | |
| 7,93 / 5/16" | PTF100G0793-40 | 7,93 / 5/16" | 7,93 / 5/16" | 7 | 100 | 40 | |
| 8,0 | PTF100G080-157 | 8 | 8 | 15 | 70 | | |
| | PTF100G080-207 | 8 | 8 | 20 | 70 | | |
| | PTF100G080-208 | 8 | 8 | 20 | 80 | | |
| | PTF100G080100-157 | 8 | 10 | 15 | 70 | | |
| | PTF100G08-24-03 | 8 | 8 | 7 | 100 | 24 | 0,3 |
| | PTF100G08-40-03 | 8 | 8 | 7 | 100 | 40 | 0,3 |
| | PTF100G08-24-05 | 8 | 8 | 7 | 100 | 24 | 0,5 |
| | PTF100G08-40-05 | 8 | 8 | 7 | 100 | 40 | 0,5 |
| | PTF100G08-24-10 | 8 | 8 | 7 | 100 | 24 | 1 |
| | PTF100G08-40-10 | 8 | 8 | 7 | 100 | 40 | 1 |
| 9,52 / 3/8" | PTF100G0952-50 | 9,52 / 3/8" | 9,52 / 3/8" | 8 | 100 | 50 | |
| 10,0 | PTF100G100-157 | 10 | 10 | 15 | 70 | | |
| | PTF100G100-207 | 10 | 10 | 20 | 70 | | |
| | PTF100G100-209 | 10 | 10 | 20 | 90 | | |
| | PTF100G10-30-05 | 10 | 10 | 8 | 100 | 30 | 0,5 |
| | PTF100G10-50-05 | 10 | 10 | 8 | 100 | 50 | 0,5 |
| | PTF100G10-30-10 | 10 | 10 | 8 | 100 | 30 | 1 |
| | PTF100G10-50-10 | 10 | 10 | 8 | 100 | 50 | 1 |
| | PTF100G10-30-15 | 10 | 10 | 8 | 100 | 30 | 1,5 |
| | PTF100G10-50-15 | 10 | 10 | 8 | 100 | 50 | 1,5 |
| 12,0 | PTF100G12-36-05 | 12 | 12 | 9 | 100 | 36 | 0,5 |
| | PTF100G12-60-05 | 12 | 12 | 9 | 100 | 60 | 0,5 |
| | PTF100G12-36-10 | 12 | 12 | 9 | 100 | 36 | 1 |
| | PTF100G12-60-10 | 12 | 12 | 9 | 100 | 60 | 1 |
| | PTF100G12-36-15 | 12 | 12 | 9 | 100 | 36 | 1,5 |
| | PTF100G12-60-15 | 12 | 12 | 9 | 100 | 60 | 1,5 |
| | PTF100G120-2010 | 12 | 12 | 20 | 100 | | |
| 12,7 / 1/2" | PTF100G127-60 | 12,7 / 1/2" | 12,7 / 1/2" | 9 | 102 | 60 | |
| 16,0 | PTF100G160-2010 | 16 | 16 | 20 | 125 | | |

Durchmesserbereich:
3,0 bis 16,0 mm
diameter range:
3,0 to 16,0 mm

Die Preise entnehmen Sie bitte
unserer aktuellen Preisliste.

Please take prices out of our
actual price list.



| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | ER mm |
|--------------------------------|-------------------|-----------------|-----------------------|----------|----------------|----------|----------|
| 3,0 | PTF100Z03-9-03 | 3 | 6 | 2,5 | 70 | 9 | 0,3 |
| 3,17 / 1/8" | PTF100Z0317-9 | 3,17 / 1/8" | 6,35 / 1/4" | 2,5 | 75 | 9 | |
| 4,0 | PTF100Z04-12-03 | 4 | 6 | 2,5 | 70 | 12 | 0,3 |
| | PTF100Z04-20-03 | 4 | 6 | 2,5 | 70 | 20 | 0,3 |
| | PTF100Z04-28-03 | 4 | 6 | 2,5 | 70 | 28 | 0,3 |
| 4,76 / 3/16" | PTF100Z0476-12 | 4,76 / 3/16" | 6,35 / 1/4" | 3 | 75 | 12 | |
| 6,0 | PTF100Z060-106 | 6 | 6 | 10 | 60 | | |
| | PTF100Z060-156 | 6 | 6 | 15 | 60 | | |
| | PTF100Z060800-106 | 6 | 8 | 10 | 65 | | |
| | PTF100Z06-18-03 | 6 | 6 | 6 | 100 | 18 | 0,3 |
| | PTF100Z06-30-03 | 6 | 6 | 6 | 100 | 30 | 0,3 |
| | PTF100Z06-42-03 | 6 | 6 | 6 | 100 | 42 | 0,3 |
| | PTF100Z06-18-05 | 6 | 6 | 6 | 100 | 18 | 0,5 |
| | PTF100Z06-30-05 | 6 | 6 | 6 | 100 | 30 | 0,5 |
| | PTF100Z06-42-05 | 6 | 6 | 6 | 100 | 42 | 0,5 |
| | PTF100Z06-18-10 | 6 | 6 | 6 | 100 | 18 | 1 |
| | PTF100Z06-30-10 | 6 | 6 | 6 | 100 | 30 | 1 |
| | PTF100Z06-42-10 | 6 | 6 | 6 | 100 | 42 | 1 |
| 6,35 / 1/4" | PTF100Z0635-42 | 6,35 / 1/4" | 7,93 / 5/16" | 6 | 100 | 42 | |
| 7,93 / 5/16" | PTF100Z0793-40 | 7,93 / 5/16" | 7,93 / 5/16" | 7 | 100 | 40 | |
| 8,0 | PTF100Z080-157 | 8 | 8 | 15 | 70 | | |
| | PTF100Z080-207 | 8 | 8 | 20 | 70 | | |
| | PTF100Z080-208 | 8 | 8 | 20 | 80 | | |
| | PTF100Z080100-157 | 8 | 10 | 15 | 70 | | |
| | PTF100Z08-24-03 | 8 | 8 | 7 | 100 | 24 | 0,3 |
| | PTF100Z08-40-03 | 8 | 8 | 7 | 100 | 40 | 0,3 |
| | PTF100Z08-24-05 | 8 | 8 | 7 | 100 | 24 | 0,5 |
| | PTF100Z08-40-05 | 8 | 8 | 7 | 100 | 40 | 0,5 |
| | PTF100Z08-24-10 | 8 | 8 | 7 | 100 | 24 | 1 |
| | PTF100Z08-40-10 | 8 | 8 | 7 | 100 | 40 | 1 |
| 9,52 / 3/8" | PTF100Z0952-50 | 9,52 / 3/8" | 9,52 / 3/8" | 8 | 100 | 50 | |
| 10,0 | PTF100Z100-157 | 10 | 10 | 15 | 70 | | |
| | PTF100Z100-207 | 10 | 10 | 20 | 70 | | |
| | PTF100Z100-209 | 10 | 10 | 20 | 90 | | |
| | PTF100Z10-30-05 | 10 | 10 | 8 | 100 | 30 | 0,5 |
| | PTF100Z10-50-05 | 10 | 10 | 8 | 100 | 50 | 0,5 |
| | PTF100Z10-30-10 | 10 | 10 | 8 | 100 | 30 | 1 |
| | PTF100Z10-50-10 | 10 | 10 | 8 | 100 | 50 | 1 |
| | PTF100Z10-30-15 | 10 | 10 | 8 | 100 | 30 | 1,5 |
| | PTF100Z10-50-15 | 10 | 10 | 8 | 100 | 50 | 1,5 |
| 12,0 | PTF100Z12-36-05 | 12 | 12 | 9 | 100 | 36 | 0,5 |
| | PTF100Z12-60-05 | 12 | 12 | 9 | 100 | 60 | 0,5 |
| | PTF100Z12-36-10 | 12 | 12 | 9 | 100 | 36 | 1 |
| | PTF100Z12-60-10 | 12 | 12 | 9 | 100 | 60 | 1 |
| | PTF100Z12-36-15 | 12 | 12 | 9 | 100 | 36 | 1,5 |
| | PTF100Z12-60-15 | 12 | 12 | 9 | 100 | 60 | 1,5 |
| | PTF100Z120-2010 | 12 | 12 | 20 | 100 | | |
| 12,7 / 1/2" | PTF100Z127-60 | 12,7 / 1/2" | 12,7 / 1/2" | 9 | 102 | 60 | |
| 16,0 | PTF100Z160-2010 | 16 | 16 | 20 | 125 | | |

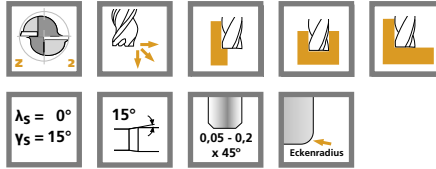


Laserweg F

Durchmesserbereich:
 3,0 bis 16,0 mm
 diameter range:
 3,0 to 16,0 mm

Die Preise entnehmen Sie bitte
 unserer aktuellen Preisliste.

Please take prices out of our
 actual price list.



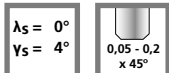
Laserweg F

| BESTELL-NUMMER ORDER NUMBER | | D1 mm / inch | D2 h6 mm / inch | L2 mm | L1 +2 mm | L3 mm | ER mm |
|--------------------------------|--------------------|-----------------|-----------------------|----------|----------------|----------|----------|
| 3,0 | PTF100SC03-9-03 | 3 | 6 | 2,5 | 70 | 9 | 0,3 |
| 3,17 / 1/8" | PTF100SC0317-9 | 3,17 / 1/8" | 6,35 / 1/4" | 2,5 | 75 | 9 | |
| 4,0 | PTF100SC04-12-03 | 4 | 6 | 2,5 | 70 | 12 | 0,3 |
| | PTF100SC04-20-03 | 4 | 6 | 2,5 | 70 | 20 | 0,3 |
| | PTF100SC04-28-03 | 4 | 6 | 2,5 | 70 | 28 | 0,3 |
| 4,76 / 3/16" | PTF100SC0476-12 | 4,76 / 3/16" | 6,35 / 1/4" | 3 | 75 | 12 | |
| 6,0 | PTF100SC060-106 | 6 | 6 | 10 | 60 | | |
| | PTF100SC060-156 | 6 | 6 | 15 | 60 | | |
| | PTF100SC060800-106 | 6 | 8 | 10 | 65 | | |
| | PTF100SC06-18-03 | 6 | 6 | 6 | 100 | 18 | 0,3 |
| | PTF100SC06-30-03 | 6 | 6 | 6 | 100 | 30 | 0,3 |
| | PTF100SC06-42-03 | 6 | 6 | 6 | 100 | 42 | 0,3 |
| | PTF100SC06-18-05 | 6 | 6 | 6 | 100 | 18 | 0,5 |
| | PTF100SC06-30-05 | 6 | 6 | 6 | 100 | 30 | 0,5 |
| | PTF100SC06-42-05 | 6 | 6 | 6 | 100 | 42 | 0,5 |
| | PTF100SC06-18-10 | 6 | 6 | 6 | 100 | 18 | 1 |
| | PTF100SC06-30-10 | 6 | 6 | 6 | 100 | 30 | 1 |
| | PTF100SC06-42-10 | 6 | 6 | 6 | 100 | 42 | 1 |
| 6,35 / 1/4" | PTF100SC0635-42 | 6,35 / 1/4" | 7,93 / 5/16" | 6 | 100 | 42 | |
| 7,93 / 5/16" | PTF100SC0793-40 | 7,93 / 5/16" | 7,93 / 5/16" | 7 | 100 | 40 | |
| 8,0 | PTF100SC080-157 | 8 | 8 | 15 | 70 | | |
| | PTF100SC080-207 | 8 | 8 | 20 | 70 | | |
| | PTF100SC080-208 | 8 | 8 | 20 | 80 | | |
| | PTF100SC080100-157 | 8 | 10 | 15 | 70 | | |
| | PTF100SC08-24-03 | 8 | 8 | 7 | 100 | 24 | 0,3 |
| | PTF100SC08-40-03 | 8 | 8 | 7 | 100 | 40 | 0,3 |
| | PTF100SC08-24-05 | 8 | 8 | 7 | 100 | 24 | 0,5 |
| | PTF100SC08-40-05 | 8 | 8 | 7 | 100 | 40 | 0,5 |
| | PTF100SC08-24-10 | 8 | 8 | 7 | 100 | 24 | 1 |
| | PTF100SC08-40-10 | 8 | 8 | 7 | 100 | 40 | 1 |
| 9,52 / 3/8" | PTF100SC0952-50 | 9,52 / 3/8" | 9,52 / 3/8" | 8 | 100 | 50 | |
| 10,0 | PTF100SC100-157 | 10 | 10 | 15 | 70 | | |
| | PTF100SC100-207 | 10 | 10 | 20 | 70 | | |
| | PTF100SC100-209 | 10 | 10 | 20 | 90 | | |
| | PTF100SC10-30-05 | 10 | 10 | 8 | 100 | 30 | 0,5 |
| | PTF100SC10-50-05 | 10 | 10 | 8 | 100 | 50 | 0,5 |
| | PTF100SC10-30-10 | 10 | 10 | 8 | 100 | 30 | 1 |
| | PTF100SC10-50-10 | 10 | 10 | 8 | 100 | 50 | 1 |
| | PTF100SC10-30-15 | 10 | 10 | 8 | 100 | 30 | 1,5 |
| | PTF100SC10-50-15 | 10 | 10 | 8 | 100 | 50 | 1,5 |
| 12,0 | PTF100SC12-36-05 | 12 | 12 | 9 | 100 | 36 | 0,5 |
| | PTF100SC12-60-05 | 12 | 12 | 9 | 100 | 60 | 0,5 |
| | PTF100SC12-36-10 | 12 | 12 | 9 | 100 | 36 | 1 |
| | PTF100SC12-60-10 | 12 | 12 | 9 | 100 | 60 | 1 |
| | PTF100SC12-36-15 | 12 | 12 | 9 | 100 | 36 | 1,5 |
| | PTF100SC12-60-15 | 12 | 12 | 9 | 100 | 60 | 1,5 |
| | PTF100SC120-2010 | 12 | 12 | 20 | 100 | | |
| 12,7 / 1/2" | PTF100SC127-60 | 12,7 / 1/2" | 12,7 / 1/2" | 9 | 102 | 60 | |
| 16,0 | PTF100SC160-2010 | 16 | 16 | 20 | 125 | | |

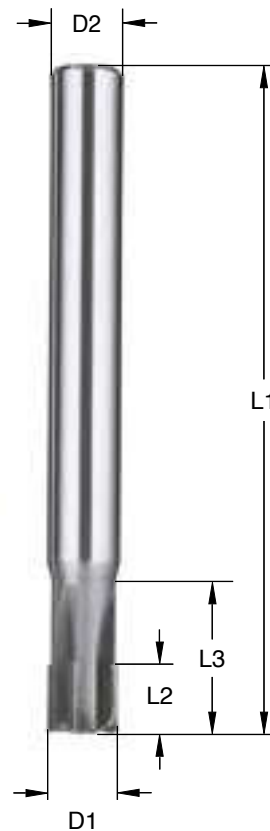
Durchmesserbereich:
3,0 bis 16,0 mm
diameter range:
3,0 to 16,0 mm

Die Preise entnehmen Sie bitte
unserer aktuellen Preisliste.

Please take prices out of our
actual price list.



| BESTELL-NUMMER ORDER NUMBER | | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | L3 mm | Z |
|--------------------------------|--------------|-------------|----------------|----------|----------------|----------|---|
| 8,0 | PKD150080-3 | 8 | 8 | 11 | 63 | 16 | 3 |
| 9,52 / 3/8" | PKD1500952-5 | 9,52 / 3/8" | 9,52 / 3/8" | 13 | 63 | 18 | 5 |
| 10,0 | PKD150100-3 | 10 | 10 | 13 | 63 | 18 | 3 |
| | PKD150100-5 | 10 | 10 | 13 | 63 | 18 | 5 |
| 12,0 | PKD150120-3 | 12 | 12 | 13 | 75 | 18 | 3 |
| | PKD150120-5 | 12 | 12 | 13 | 75 | 18 | 5 |
| | PKD150120-7 | 12 | 12 | 13 | 75 | 18 | 7 |
| | PKD150120-9 | 12 | 12 | 13 | 75 | 18 | 9 |
| 12,7 / 1/2" | PKD150127-7 | 12,7 / 1/2" | 12,7 / 1/2" | 13 | 75 | 18 | 7 |
| 16,0 | PKD150160-3 | 16 | 16 | 16 | 79 | 20 | 3 |
| | PKD150160-5 | 16 | 16 | 16 | 79 | 20 | 5 |
| | PKD150160-7 | 16 | 16 | 16 | 79 | 20 | 7 |
| | PKD150160-9 | 16 | 16 | 16 | 79 | 20 | 9 |



Durchmesserbereich:
8,0 bis 16,0 mm
diameter range:
8,0 to 16,0 mm

Die Preise entnehmen Sie bitte unserer aktuellen Preislise.
Please take prices out of our actual price list.

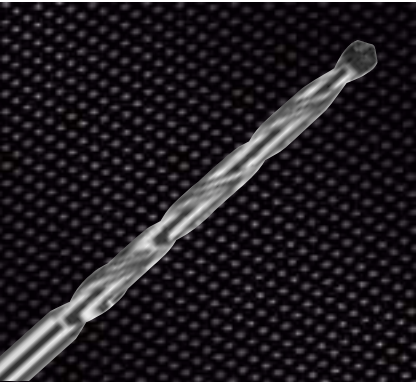
Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. PKD150080_3.
Please indicate order number: e.g. PKD150100_3.

FIBER-LINE

PKD-BOHRER

PCD-DRILLING

FIBER-LINE



PKD-Spiralbohrer sind für den Einsatz in Faserverbundwerkstoffen ausgelegt.

Die spezielle Spitzengeometrie bewirkt einen delaminationsfreien und faserfreien Bohrungsein- bzw. -austritt.

Durch die sehr scharfe Schneidkante wird die Krafteinwirkung auf das Fasermatrixsystem minimiert und damit die Ablösung der Fasern aus der Matrix vermieden.

Bei hochgefüllten Werkstoffen stellen sie nicht zuletzt durch die Nachschleifbarkeit die wirtschaftliche Lösung zur Bohrungsherstellung in sprödharten Werkstoffen dar.

Die Werkzeuge werden in zwei Spitzenwinkeln gefertigt, 120° (standard) und 90° (auf Anfrage).

PKD spiral drills are designed for application in fiber-reinforced composites.

The special head-geometry results in drill entry and exit free of delamination and fiber.

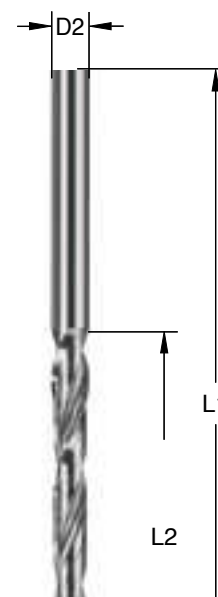
The extremely sharp cutting edge minimizes the forces exerted upon the fiber-matrix and by this avoids stripping fibers from the matrix.

For highly filled materials they represent – not least by leaving the option to finish-grind – the most economical solution for creating drillings in brittle/hard materials.

The tools are manufactured in two tip angles 120° (standard) and 90° (upon request).



| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | W1° |
|--------------|--------------------------------|--------------|----------------|----------|----------------|--------|
| 2,7 | P201027 | 2,7 | 4 | 18 | 60 | 90/120 |
| 2,8 | P201028 | 2,8 | 4 | 18 | 60 | 90/120 |
| 3,0 | P201030 | 3 | 4 | 18 | 60 | 90/120 |
| 3,17 / 3/8" | P2010317 | 3,17 / 3/8" | 3,17 / 3/8" | 18 | 60 | 90/120 |
| | P201L0317 | 3,17 / 3/8" | 3,17 / 3/8" | 25 | 62 | 90/120 |
| 3,3 | P201033 | 3,3 | 4 | 18 | 60 | 90/120 |
| 4,0 | P201040 | 4 | 4 | 18 | 60 | 90/120 |
| 4,16 | P2010416 | 4,16 | 4,16 | 30 | 75 | 90/120 |
| | P201L0416 | 4,16 | 4,16 | 25 | 62 | 90/120 |
| 4,21 | P2010421 | 4,21 | 6 | 30 | 75 | 90/120 |
| 4,76 / 3/16" | P2010476 | 4,76 / 3/16" | 4,76 / 3/16" | 30 | 75 | 90/120 |
| 4,81 | P201K0481 | 4,82 | 6,35 | 30 | 75 | 90/120 |
| | P2010481 | 4,82 | 6,35 | 31 | 75 | 90/120 |
| | P201L0481 | 4,82 | 6,35 | 30 | 100 | 90/120 |
| 5,05 | P2010505 | 5,05 | 6,35 | 30 | 75 | 90/120 |
| 5,56 | P2010556 | 5,56 | 6,35 | 30 | 75 | 90/120 |
| | P201L0556 | 5,56 | 6,35 | 31 | 75 | 90/120 |
| 6,0 | P201060 | 6 | 6 | 30 | 75 | 90/120 |
| 6,35 / 1/4" | P201K0635 | 6,35 / 1/4" | 8 | 35 | 75 | 90/120 |
| | P2010635 | 6,35 / 1/4" | 6,35 / 1/4" | 31 | 75 | 90/120 |
| | P201L0635 | 6,35 / 1/4" | 8 | 35 | 100 | 90/120 |
| 7,93 / 5/16" | P201K0793 | 7,93 / 5/16" | 8 | 35 | 75 | 90/120 |
| | P2010793 | 7,93 / 5/16" | 7,93 / 5/16" | 37 | 79 | 90/120 |
| | P201L0793 | 7,93 / 5/16" | 8 | 35 | 100 | 90/120 |
| 8,0 | P201080 | 8 | 8 | 35 | 75 | 90/120 |
| 9,52 / 3/8" | P201K0952 | 9,52 / 3/8" | 10 | 43 | 89 | 90/120 |
| | P2010952 | 9,52 / 3/8" | 9,52 / 3/8" | 40 | 125 | 90/120 |
| 10,0 | P201100 | 10 | 10 | 40 | 125 | 90/120 |
| 12,0 | P201120 | 12 | 12 | 50 | 125 | 90/120 |



Durchmesserbereich:
2,7 bis 12,0 mm
diamter range:
2,7 to 12,0 mm

90° - Standard
120° - auf Anfrage
90° - Standard
120° - on demand

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. P201060.
Please indicate order number: e.g. P201K0635.



$\lambda_s = 0^\circ$
 $\gamma_s = 4^\circ$



Ph = Pilot hole

Durchmesserbereich:
9,525 bis 17,0 mm
diameter range:
9,525 to 17,0 mm

| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | W5° | Ph mm | Z |
|-------------|--------------------------------|--------------|----------------|-----|--------------|---|
| 9,52 / 3/8" | P1280952317-100 | 9,525 / 3/8" | 1/4 - 28 | 100 | 3,175 / 1/8" | 2 |
| | P1280952325-100 | 9,525 / 3/8" | 1/4 - 28 | 100 | 3,25 | 2 |
| | P1280952353-100 | 9,525 / 3/8" | 1/4 - 28 | 100 | 3,53 | 2 |
| | P1280952404-100 | 9,525 / 3/8" | 1/4 - 28 | 100 | 4,04 | 2 |
| | P1280952317-130 | 9,525 / 3/8" | 1/4 - 28 | 130 | 3,175 / 1/8" | 2 |
| | P1280952325-130 | 9,525 / 3/8" | 1/4 - 28 | 130 | 3,25 | 2 |
| | P1280952353-130 | 9,525 / 3/8" | 1/4 - 28 | 130 | 3,53 | 2 |
| | P1280952404-130 | 9,525 / 3/8" | 1/4 - 28 | 130 | 4,04 | 2 |
| 10,0 | P128103-100 | 10 | M6 | 100 | 3 | 2 |
| | P128103-130 | 10 | M6 | 130 | 3 | 2 |
| 12,0 | P128123-100 | 12 | M6 | 100 | 3 | 2 |
| | P128123-130 | 12 | M6 | 130 | 3 | 2 |
| 12,7 / 1/2" | P128127317-100 | 12,7 / 1/2" | 1/4 - 28 | 100 | 3,175 / 1/8" | 2 |
| | P128127325-100 | 12,7 / 1/2" | 1/4 - 28 | 100 | 3,25 | 2 |
| | P128127396-100 | 12,7 / 1/2" | 1/4 - 28 | 100 | 3,96 | 2 |
| | P128127478-100 | 12,7 / 1/2" | 1/4 - 28 | 100 | 4,78 | 2 |
| | P12812749-100 | 12,7 / 1/2" | 1/4 - 28 | 100 | 4,9 | 2 |
| | P128127607-100 | 12,7 / 1/2" | 1/4 - 28 | 100 | 6,07 | 2 |
| | P128127317-130 | 12,7 / 1/2" | 1/4 - 28 | 130 | 3,175 / 1/8" | 2 |
| | P128127325-130 | 12,7 / 1/2" | 1/4 - 28 | 130 | 3,25 | 2 |
| | P128127396-130 | 12,7 / 1/2" | 1/4 - 28 | 130 | 3,96 | 2 |
| | P128127478-130 | 12,7 / 1/2" | 1/4 - 28 | 130 | 4,78 | 2 |
| | P12812749-130 | 12,7 / 1/2" | 1/4 - 28 | 130 | 4,9 | 2 |
| | P128127607-130 | 12,7 / 1/2" | 1/4 - 28 | 130 | 6,07 | 2 |
| 14,0 | P128143-100 | 14 | M8x1 | 100 | 3 | 2 |
| | P128143-130 | 14 | M8x1 | 130 | 3 | 2 |
| 17,0 | P128174-100 | 17 | M8x1 | 100 | 4 | 2 |
| | P128174-130 | 17 | M8x1 | 130 | 4 | 2 |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. P128143-100.
Please indicate order number: e.g. P128174-130.



$\lambda_s = 0^\circ$
 $\gamma_s = 4^\circ$

| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | W5° | Ph mm | Z |
|-------------|--------------------------------|--------------|----------------|------|--------------|---|
| 9,52 / 3/8" | P1380952317-100 | 9,525 / 3/8" | 1/4 - 28 | 100 | 3,175 / 1/8" | 3 |
| | P1380952325-100 | 9,525 / 3/8" | 1/4 - 28 | 100 | 3,25 | 3 |
| | P1380952353-100 | 9,525 / 3/8" | 1/4 - 28 | 100 | 3,53 | 3 |
| | P1380952404-100 | 9,525 / 3/8" | 1/4 - 28 | 100 | 4,04 | 3 |
| | P1380952317-130 | 9,525 / 3/8" | 1/4 - 28 | 130 | 3,175 / 1/8" | 3 |
| | P1380952325-130 | 9,525 / 3/8" | 1/4 - 28 | 130 | 3,25 | 3 |
| | P1380952353-130 | 9,525 / 3/8" | 1/4 - 28 | 130 | 3,53 | 3 |
| | P1380952404-130 | 9,525 / 3/8" | 1/4 - 28 | 130 | 4,04 | 3 |
| 10,0 | P138103-100 | 10 | M6 | 100 | 3 | 3 |
| | P138103-130 | 10 | M6 | 130 | 3 | 3 |
| 12,0 | P138123-100 | 12 | M6 | 100 | 3 | 3 |
| | P138123-130 | 12 | M6 | 130 | 3 | 3 |
| 12,7 / 1/2" | P138127317-100 | 12,7 / 1/2" | 1/4 - 28 | 100 | 3,175 / 1/8" | 3 |
| | P138127325-100 | 12,7 / 1/2" | 1/4 - 28 | 100 | 3,25 | 3 |
| | P138127396-100 | 12,7 / 1/2" | 1/4 - 28 | 100 | 3,96 | 3 |
| | P138127478-100 | 12,7 / 1/2" | 1/4 - 28 | 100 | 4,78 | 3 |
| | P13812749-100 | 12,7 / 1/2" | 1/4 - 28 | 100 | 4,9 | 3 |
| | P138127607-100 | 12,7 / 1/2" | 1/4 - 28 | 100 | 6,07 | 3 |
| | P138127317-130 | 12,7 / 1/2" | 1/4 - 28 | 130 | 3,175 / 1/8" | 3 |
| | P138127325-130 | 12,7 / 1/2" | 1/4 - 28 | 130 | 3,25 | 3 |
| | P138127396-130 | 12,7 / 1/2" | 1/4 - 28 | 130 | 3,96 | 3 |
| | P138127478-130 | 12,7 / 1/2" | 1/4 - 28 | 130 | 4,78 | 3 |
| | P13812749-130 | 12,7 / 1/2" | 1/4 - 28 | 130 | 4,9 | 3 |
| | P138127607-130 | 12,7 / 1/2" | 1/4 - 28 | 130 | 6,07 | 3 |
| | 14,0 | P138143-100 | 14 | M8x1 | 100 | 3 |
| P138143-130 | | 14 | M8x1 | 130 | 3 | 3 |
| 17,0 | P138174-100 | 17 | M8x1 | 100 | 4 | 3 |
| | P138174-130 | 17 | M8x1 | 130 | 4 | 3 |

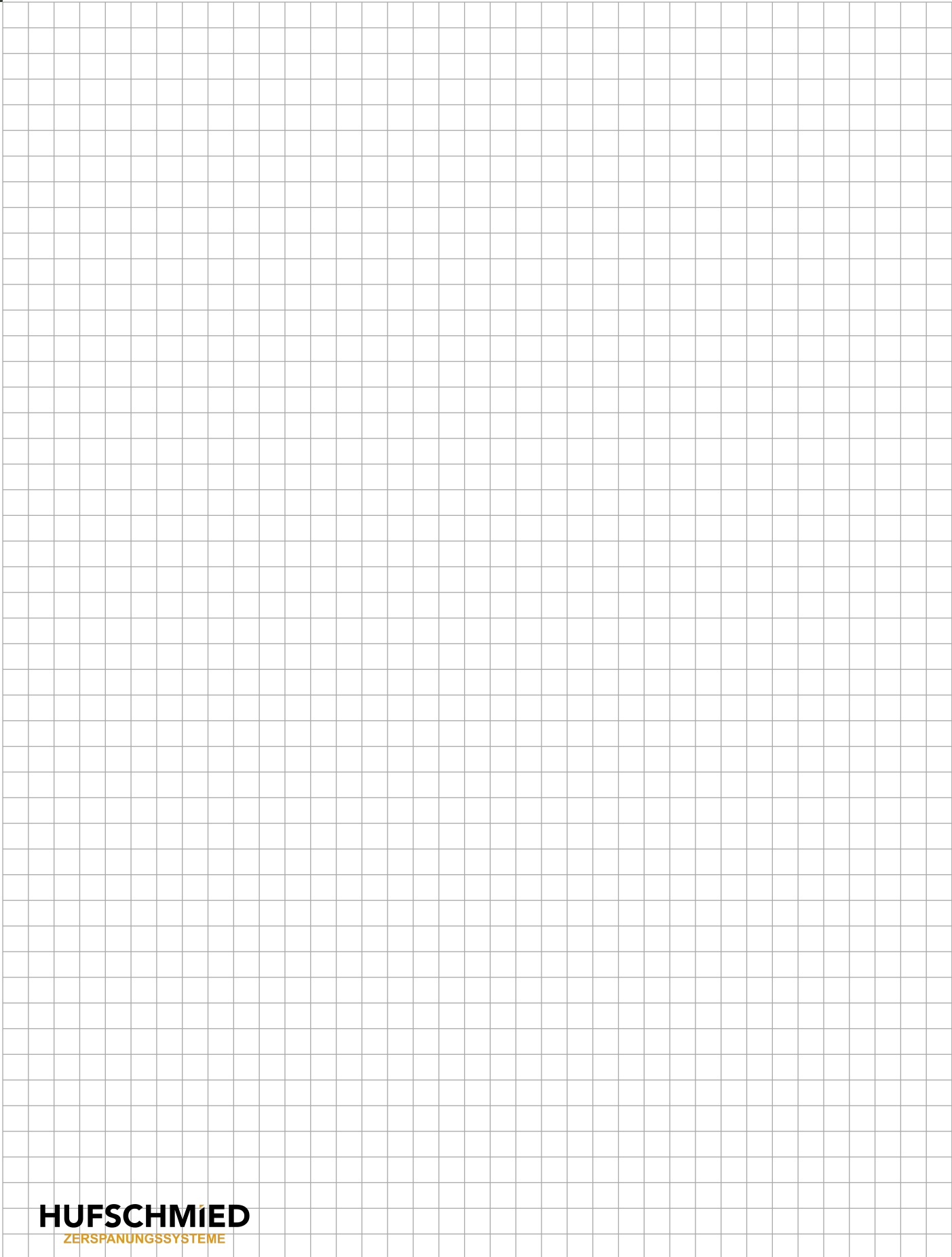


Ph = Pilot hole

Durchmesserbereich:
9,525 bis 17,0 mm
diamter range:
9,525 to 17,0 mm

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. P138143-100.
Please indicate order number: e.g. P138174-130.



CERA MILL®

FRÄSER FÜR HÖCHSTE
ANSPRÜCHE AUS KERAMIK
ZUR BEARBEITUNG VON
KUNSTSTOFFEN UND
NICHT-EISENWERKSTOFFEN

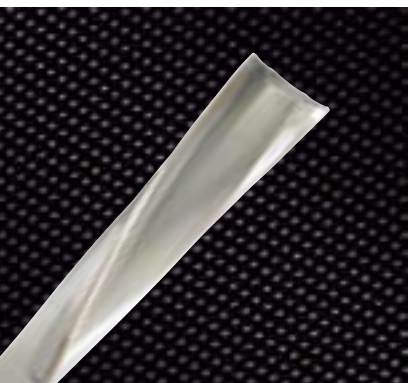
*END MILLS FOR HIGH
DEMAND MADE OUT OF
CERAMIC FOR MILLING
OF PLASTICS AND NONE
FERROUS MATERIALS*



CERA MILL®

CERA-MILL®-WERKZEUGE

CERA-MILL®-TOOLS



Diese Vollkeramikschnidwerkzeuge auf Silizium-Nitrid-Basis wurden für die Volumenzerspanung von Kunststoffen entwickelt.

Der Keramikwerkstoff ist extrem leicht, die Werkzeuge erreichen ohne Belastung der Spindellager höchste Drehzahlwerte. Durch eine neu entwickelte Spangeometrie werden bis jetzt nicht darstellbare, höchste Vorschubwerte erreicht.

Bei labil gespannten Werkstücken führen die Maximaldrehzahl und entsprechend hohe Vorschübe pro Zahn zu besten Bearbeitungsergebnissen.

Keramik heizt sich auch bei solchen extremen Schneidprozessen nicht auf. Dem Verkleben der Bindematerialien im Werkstoff wird vorgebeugt.

Die beim Schneidprozess entstehende Wärme wird ausschließlich über den Span abgeführt. Die Fräsoperation hinterlässt Oberflächen bester Güte.

Die Schneidengeometrie und der optimierte Schliff der Werkzeuge erzeugen perfekte Schnittkanten.

These fully ceramic cutting tools based on silicon-nitride were developed for volume chipping plastic materials.

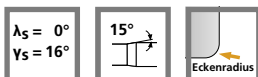
The ceramic material is extremely lightweight and the tools achieve highest rotational speeds without load upon the spindle bearings. A newly developed chip geometry allows for highest - to date impossible - feed rates.

For instable pretensioned work pieces the maximum rotational speed and respectively high feed rates per tooth result in the best machining results.

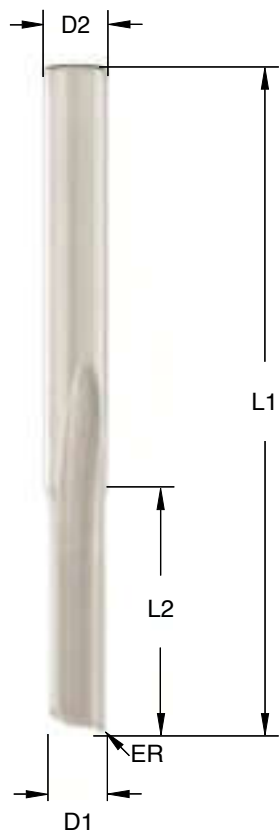
Ceramics does not heat up even at such extreme cutting processes. The gluing up of the binding substances of the materials is prevented.

Heat generated in the cutting process is exclusively dissipated by the chips. The milling process leaves surfaces of highest quality.

The blade geometry and optimized sharpening of the tools create perfectly cut edges.



| BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | ER mm | | | | |
|--------------------------------|----------|----------------|----------|----------------|----------|--|--|--|--|
| 3,0 112KERA030 | 3 | 6 | 10 | 50 | 0,2 | | | | |
| 4,0 112KERA040 | 4 | 6 | 12 | 50 | 0,2 | | | | |
| 5,0 112KERA050 | 5 | 6 | 15 | 50 | 0,25 | | | | |
| 6,0 112KERA060 | 6 | 8 | 18 | 60 | 0,5 | | | | |
| 8,0 112KERA080 | 8 | 10 | 20 | 75 | 0,5 | | | | |
| 10,0 112KERA100 | 10 | 12 | 25 | 75 | 1 | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |



Durchmesserbereich:
3,0 bis 10,0 mm
diameter range:
3,0 bis 10,0 mm

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

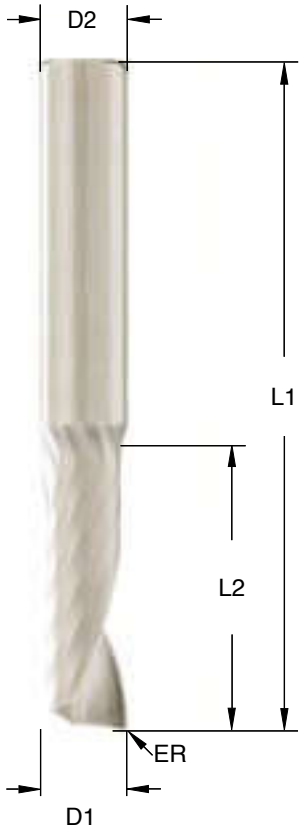
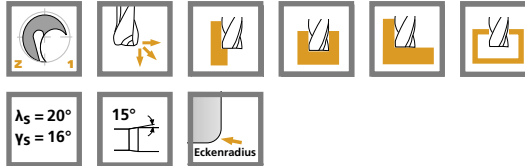
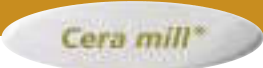
Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 112KERA08.
Please indicate order number: e.g. 112KERA100.

110CT

Cera mill®-Fräser Z1 ZR
rechtsdrall - rechtsschneidend

Cera mill®-End mill 1F ZR
right helix - right cutting

CERA MILL



Durchmesserbereich:
3,0 bis 10,0 mm
diamter range:
3,0 bis 10,0 mm

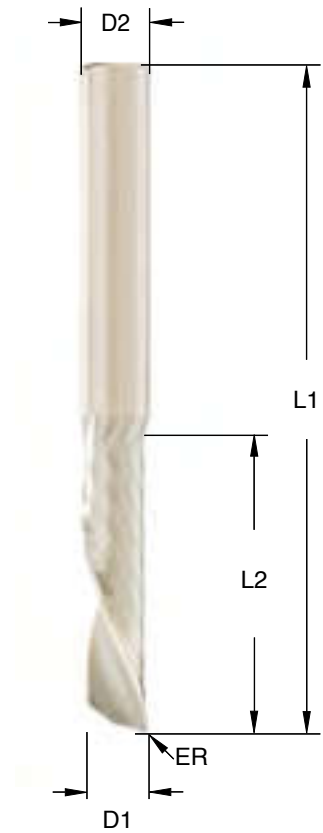
| BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | ER mm | | | |
|--------------------------------|------------|----------------|----------|----------------|----------|------|--|--|
| 3,0 | 110KERA030 | 3 | 6 | 10 | 50 | 0,2 | | |
| 4,0 | 110KERA040 | 4 | 6 | 12 | 50 | 0,2 | | |
| 5,0 | 110KERA050 | 5 | 6 | 15 | 50 | 0,25 | | |
| 6,0 | 110KERA060 | 6 | 8 | 18 | 60 | 0,5 | | |
| 8,0 | 110KERA080 | 8 | 10 | 20 | 75 | 0,5 | | |
| 10,0 | 110KERA100 | 10 | 12 | 25 | 75 | 1 | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 110KERA08.
Please indicate order number: e.g. 110KERA100.



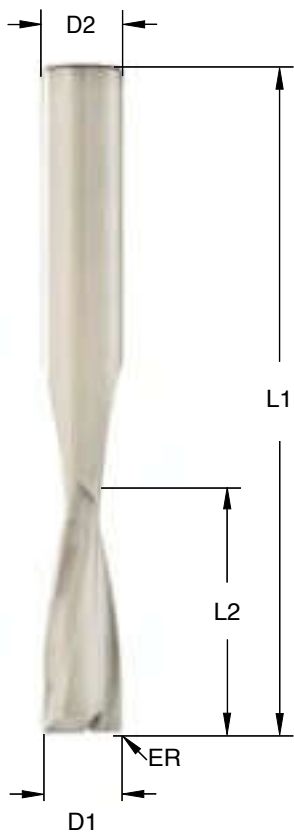
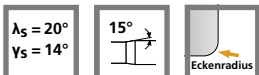
| | BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | ER mm | | | |
|------|--------------------------------|----------|----------------|----------|----------------|----------|--|--|--|
| 3,0 | 111KERA030 | 3 | 6 | 10 | 50 | 0,2 | | | |
| 4,0 | 111KERA040 | 4 | 6 | 12 | 50 | 0,2 | | | |
| 5,0 | 111KERA050 | 5 | 6 | 15 | 50 | 0,25 | | | |
| 6,0 | 111KERA060 | 6 | 8 | 18 | 60 | 0,5 | | | |
| 8,0 | 111KERA080 | 8 | 10 | 20 | 75 | 0,5 | | | |
| 10,0 | 111KERA100 | 10 | 12 | 25 | 75 | 1 | | | |



Durchmesserbereich:
3,0 bis 10,0 mm
diameter range:
3,0 bis 10,0 mm

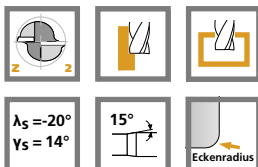
Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 111KERA08.
Please indicate order number: e.g. 111KERA100.

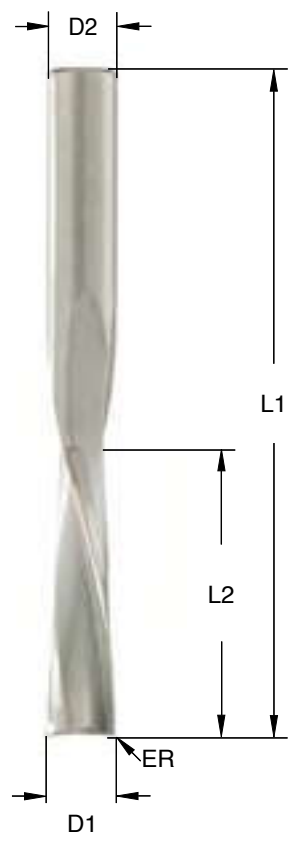


Durchmesserbereich:
3,0 bis 10,0 mm
diameter range:
3,0 bis 10,0 mm

| BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | ER mm | | | |
|--------------------------------|----------|----------------|----------|----------------|----------|--|--|--|
| 3,0 102KERA030 | 3 | 6 | 10 | 50 | 0,2 | | | |
| 4,0 102KERA040 | 4 | 6 | 12 | 50 | 0,2 | | | |
| 5,0 102KERA050 | 5 | 6 | 15 | 50 | 0,25 | | | |
| 6,0 102KERA060 | 6 | 8 | 18 | 60 | 0,5 | | | |
| 8,0 102KERA080 | 8 | 10 | 20 | 75 | 0,5 | | | |
| 10,0 102KERA100 | 10 | 12 | 25 | 75 | 1 | | | |



| BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | ER mm | | | |
|--------------------------------|----------|----------------|----------|----------------|----------|--|--|--|
| 3,0 104KERA030 | 3 | 6 | 10 | 50 | 0,2 | | | |
| 4,0 104KERA040 | 4 | 6 | 12 | 50 | 0,2 | | | |
| 5,0 104KERA050 | 5 | 6 | 15 | 50 | 0,25 | | | |
| 6,0 104KERA060 | 6 | 8 | 18 | 60 | 0,5 | | | |
| 8,0 104KERA080 | 8 | 10 | 20 | 75 | 0,5 | | | |
| 10,0 104KERA100 | 10 | 12 | 25 | 75 | 1 | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |



Durchmesserbereich:
3,0 bis 10,0 mm
diamter range:
3,0 bis 10,0 mm

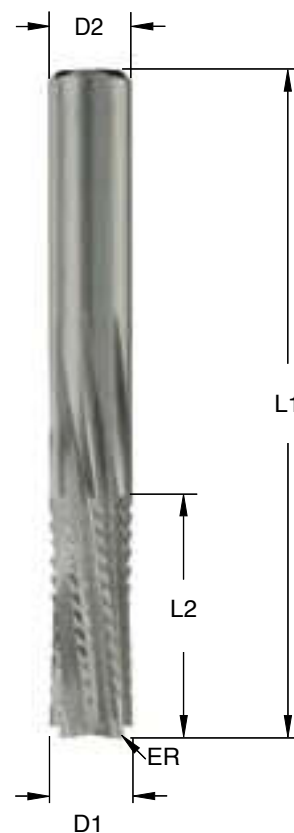
Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 104KERA08.
Please indicate order number: e.g. 104KERA100.



$\lambda_s = 8^\circ$
 $\gamma_s = 12^\circ$

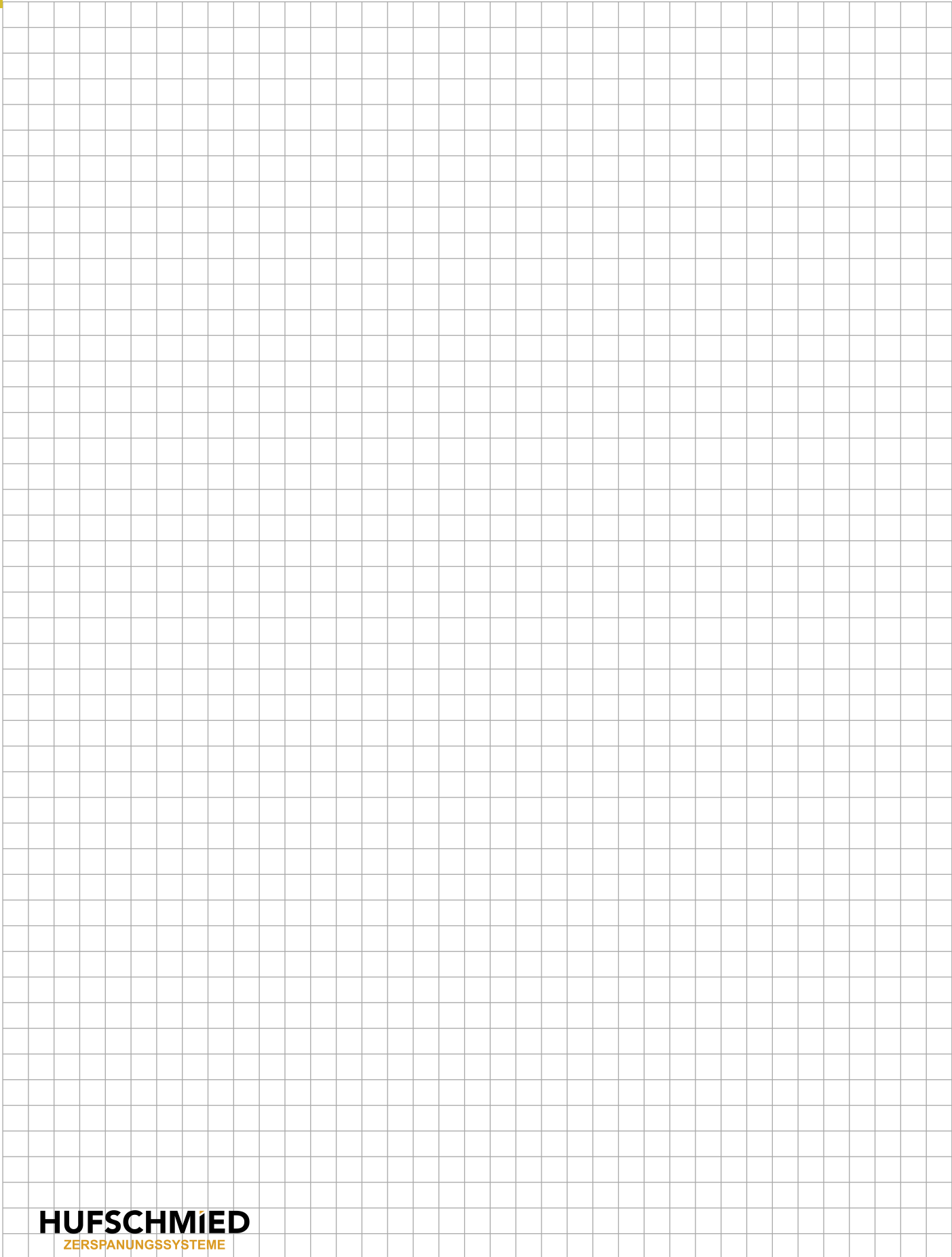
| BESTELL-NUMMER ORDER NUMBER | D1 mm | D2 h6 mm | L2 mm | L1 +2 mm | ER mm | | | |
|--------------------------------|----------|----------------|----------|----------------|----------|--|--|--|
| 3,0 068HOCTA030 | 3 | 6 | 10 | 50 | 0,2 | | | |
| 4,0 068HOCTA040 | 4 | 6 | 12 | 50 | 0,2 | | | |
| 5,0 068HOCTA050 | 5 | 6 | 15 | 50 | 0,25 | | | |
| 6,0 068HOCTA060 | 6 | 8 | 18 | 60 | 0,5 | | | |
| 8,0 068HOCTA080 | 8 | 10 | 20 | 75 | 0,5 | | | |
| 10,0 068HOCTA100 | 10 | 12 | 25 | 75 | 1 | | | |



Durchmesserbereich:
3,0 bis 10,0 mm
diameter range:
3,0 bis 10,0 mm

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Bei der Bestellung bitte die Bestellnummer angeben: Best.Nr.: z.B. 068HOKERA080.
Please indicate order number: e.g. 068HOKERA100.



POWER BLADE

SCHNEIDKLINGEN AUS
HARTMETALL ODER AUS
KERAMIK

*PRECISE CUTTING BLADES
MADE OF TUNGSTEN
CARBIDE OR CERAMICS*



CFK - Gewebe
CFK - texture

GFK - Gewebe
GFK - texture

Honeycombs
Honeycombs

Kunststofffolien
Plastic films

Kunststoffhäute
Plastic skins

POWER BLADE

POWER BLADE
WERKZEUGE

POWER BLADE TOOLS

POWER BLADE



Für die hohen Ansprüche an Standzeiten und Prozesssicherheit beim Schneiden von Kunststoff- und Lederhäuten hat Hufschmied **Schneidklingen aus Hartmetall oder Keramik entwickelt.**

Damit lassen sich zum Beispiel nicht sichtbare Aufrisskanten bei Airbag-Systemen sicher und präzise schneiden.

Massengefertigte Stahlklingen aus Federstahl werden diesen Anforderungen nicht gerecht.

Die individuelle Beschriftung und die Rückverfolgbarkeit der **Vollhartmetall-Klingen (VHM) erhöht die Prozesssicherheit.**

Vorteile der Vollhartmetall-Klingen:

Massengefertigte Stahlklingen sind zwar sehr kostengünstig, schneiden aber in hohem Masse ungenau.

Power Blades von Hufschmied erhöhen die Prozesssicherheit und sind durch die höhere Lebensdauer (Faktor 10 bis 20) mittelfristig die kostengünstigere Lösung.

Vollhartmetall-Klingen für das Schneiden und Scoren von Folien und Häuten im Kaltschnittverfahren:

Die Ausführung in VHM führt zu extremen Standzeiten bei höchster Schnittqualität. Speziell bei Airbagzuschnitten ermöglichen die langen Zykluslaufzeiten die nahezu unterbrechungsfreie Produktion im Serienbetrieb.

Power Blade-Klingen erfüllen die hohen Sicherheitsanforderungen der Automobilindustrie zu 100 Prozent.

*To meet the high demands for tool life and process safety when cutting plastic and leather skin, Hufschmied has developed **cutting edges of hard alloy or ceramics.***

For example these allow invisible tear edges for airbag systems safely and precise.

Mass produced blades made of spring steel cannot fulfil these requirements.

*The individual marking and traceability of the **Solid Hard-Alloy blades (VHM) increases process safety.***

The advantages of VHM-Blades:

Mass produced steel blades are very cheap but cut highly inaccurate. Power Blades by Hufschmied increase process safety and are the more cost-efficient solution in medium-term due to the higher tool life (factors 10 to 20).

Solid hard alloy blades for cutting and scoring foils and skins using cold-cut method:

The VHM results in extremely high tool life at highest cutting quality. Especially when cutting airbags the long cycle-times allow for almost interruption free production in series operation.

Power Blade edges meet the high safety requirements of the automotive industry to 100 percent.

Wir individualisieren für Sie.
Ihr **Anfrageblatt**.

We customize for you.
Your request sheet.

| BESTELL-NUMMER ORDER NUMBER | L mm | B mm | D mm | BR mm | R mm | | | |
|--------------------------------|---------|---------|---------|----------|---------|--|--|--|
| USK-27-85 | 27 | 8,5 | 0,65 | 28 | 0,1 | | | |
| USK-27-85-0 | 27 | 8,5 | 0,65 | 28 | - | | | |

Dieses Werkzeug fertigen wir genau für Ihre Anforderungen auf Anfrage! Bitte füllen Sie das untere Blatt vollständig aus und faxen es an die **+49/ (0) 8234-9664-99** oder per Mail an **info@hufschmied.net** und wir senden Ihnen gerne ein entsprechendes Angebot zu.

Ihr Hufschmied-Team

*We also manufacture tools for your requirements on request. Please fill in the correct parameters and send it by fax to **+49/ (0) 8234 9664-99** or by mail **info@hufschmied.net** and we will gladly send you a quote.*

Sincerely yours Hufschmied-Team



D = Klingendicke = 0,65 ± 0,02
D = blade thickness = 0,65 ± 0,02

MEINE KONTAKTDATEN:
MY CONTACT:

Firma / Company

Name / Surname

Vorname / Name

Funktion / Function

Straße/Hausnr. / Road/House number

PLZ/Ort / Postcode/Location

Telefon / Phone

Telefax / Fax

E-Mail / E-mail

INDIVIDUALANFERTIGUNG
INDIVIDUAL PRODUCTION

Meine individuellen Daten
My individual data

zu bearbeitendes Material:
Material to be processed:

B= mm ±

BR= mm ±

R= mm ±

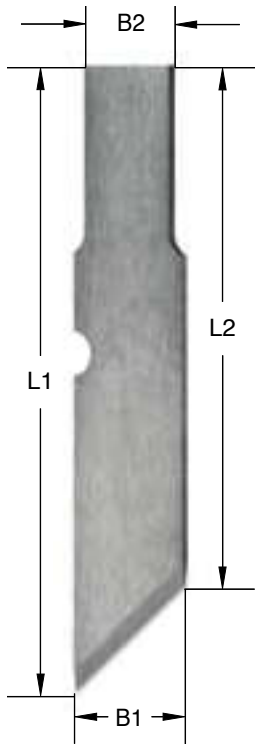
L= mm ±

Sonderabmessungen
auf Anfrage
Special dimensions
on demand

ANMERKUNGEN:
NOTES:

Wir individualisieren für Sie.
Ihr **Anfrageblatt**.

We customize for you.
Your request sheet.



| BESTELL-NUMMER ORDER NUMBER | L1 mm | L2 mm | D mm | B1 mm | B2 mm | | | |
|--------------------------------|----------|----------|---------|----------|----------|--|--|--|
| USK-6012 | 43,25 | 35 | 0,65 | 9,3 | 7,4 | | | |
| | | | | | | | | |
| | | | | | | | | |

Dieses Werkzeug fertigen wir genau für Ihre Anforderungen auf Anfrage!
Bitte füllen Sie das untere Blatt vollständig aus und faxen es an die
+49/ (0) 8234-9664-99
oder per Mail an
info@hufschmied.net und wir senden Ihnen gerne ein entsprechendes Angebot zu.

We also manufacture tools for your requirements on request.
Please fill in the correct parameters and send it by fax to
+49/ (0) 8234 9664-99 *or by mail*
info@hufschmied.net *and we will gladly send you a quote.*
Sincerely yours Hufschmied-Team

Ihr Hufschmied-Team

MEINE KONTAKTDATEN:
MY CONTACT:

D = Klingendicke = 0,65 ± 0,02
D = blade thickness = 0,65 ± 0,02

INDIVIDUALANFERTIGUNG
INDIVIDUAL PRODUCTION

Meine individuellen Daten
My individual data

| | |
|--|----------------------|
| zu bearbeitendes Material: <i>Material to be processed:</i> | <input type="text"/> |
| B1= <input type="text"/> mm ± | |
| B2= <input type="text"/> mm ± | |
| L1= <input type="text"/> mm ± | |
| L2= <input type="text"/> mm ± | |
| D= <input type="text"/> mm ± | |

Sonderabmessungen
auf Anfrage
Special dimensions
on demand

Firma / Company

Name / Surname

Vorname / Name

Funktion / Function

Straße/Hausnr. / Road/House number

PLZ/Ort / Postcode/Location

Telefon / Phone

Telefax / Fax

E-Mail / E-mail

ANMERKUNGEN:
NOTES:

Wir individualisieren für Sie.
Ihr **Anfrageblatt**.

We customize for you.
Your request sheet.

| BESTELL-NUMMER ORDER NUMBER | L2 mm | L1 mm | W1 | SW | M |
|--------------------------------|----------|----------|------|------|---------|
| USK-GFM-380016-S001 | 38 + 1 | 58 + 1 | 16° | 12,7 | 118 x 1 |
| USK-GFM-303023-S001 | 30 + 1 | 50 + 1 | 23° | 12,7 | 118 x 1 |
| USK-GFM-776312-S001 | 77 + 1 | 97 + 1 | 12° | 12,7 | 118 x 1 |
| USK-GFM-067120-S001 | 6 + 1 | 35 + 1 | 120° | 12,7 | 118 x 1 |

Dieses Werkzeug fertigen wir genau für Ihre Anforderungen auf Anfrage! Bitte füllen Sie das untere Blatt vollständig aus und faxen es an die **+49/ (0) 8234-9664-99** oder per Mail an **info@hufschmied.net** und wir senden Ihnen gerne ein entsprechendes Angebot zu.

*We also manufacture tools for your requirements on request. Please fill in the correct parameters and send it by fax to **+49/ (0) 8234 9664-99** or by mail **info@hufschmied.net** and we will gladly send you a quote.*

Sincerely yours Hufschmied-Team

Ihr Hufschmied-Team

MEINE KONTAKTDATEN:
MY CONTACT:

Firma / Company

Name / Surname

Vorname / Name

Funktion / Function

Straße/Hausnr. / Road/House number

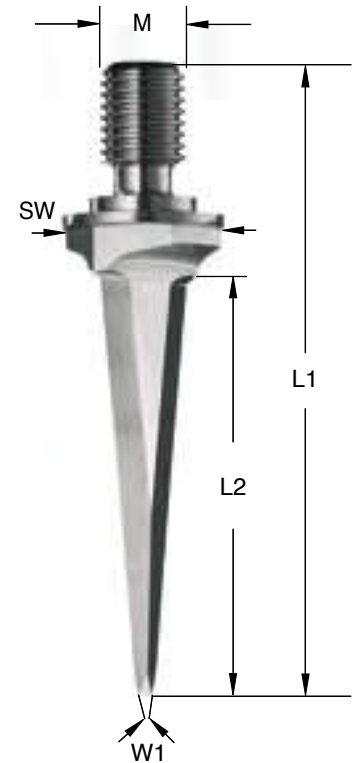
PLZ/Ort / Postcode/Location

Telefon / Phone

Telefax / Fax

E-Mail / E-mail

ANMERKUNGEN:
NOTES:



INDIVIDUALANFERTIGUNG · INDIVIDUAL PRODUCTION

Meine individuellen Daten
My individual data

| | |
|---|----------------------|
| zu bearbeitendes Material: Material to be processed: | <input type="text"/> |
| M= <input type="text"/> mm ± | |
| SW= <input type="text"/> mm ± | |
| W1= <input type="text"/> mm ± | |
| L1= <input type="text"/> mm ± | |
| L2= <input type="text"/> mm ± | |

Sonderabmessungen
auf Anfrage
Special dimensions
on demand

HUFSCHMIED
ZERSpanungssysteme

Die Preise entnehmen Sie bitte unserer aktuellen Preisliste.
Please take prices out of our actual price list.

Wir individualisieren für Sie.
Ihr **Anfrageblatt**.

We customize for you.
Your **request sheet**.



| BESTELL-NUMMER ORDER NUMBER | L2 mm | L1 mm | R mm | SW mm | M mm | | |
|--------------------------------|----------|----------|---------|----------|-----------|--|--|
| USK-6022 | 8 | 21 | 4 | 8 | 116 x 0,5 | | |
| | | | | | | | |
| | | | | | | | |

Dieses Werkzeug fertigen wir genau für Ihre Anforderungen auf Anfrage!
Bitte füllen Sie das untere Blatt vollständig aus und faxen es an die
+49/ (0) 8234-9664-99
oder per Mail an
info@hufschmied.net und wir senden Ihnen gerne ein entsprechendes Angebot zu.

We also manufacture tools for your requirements on request.
Please fill in the correct parameters and send it by fax to
+49/ (0) 8234 9664-99 or by mail
info@hufschmied.net
and we will gladly send you a quote.
Sincerely yours Hufschmied-Team

Ihr Hufschmied-Team

MEINE KONTAKTDATEN:
MY CONTACT:

D = Klingendicke = $0,65 \pm 0,02$
D = blade thickness = $0,65 \pm 0,02$

INDIVIDUALANFERTIGUNG
INDIVIDUAL PRODUCTION

Meine individuellen Daten
My individual data

zu bearbeitendes Material:
Material to be processed:

M= mm ±

SW= mm ±

R= mm ±

L1= mm ±

L2= mm ±

Sonderabmessungen
auf Anfrage
Special dimensions
on demand

Firma / Company

Name / Surname

Vorname / Name

Funktion / Function

Straße/Hausnr. / Road/House number

PLZ/Ort / Postcode/Location

Telefon / Phone

Telefax / Fax

E-Mail / E-mail

ANMERKUNGEN:
NOTES:

WICHTIGE
HINWEISE
ZUM EINSATZ

*IMPORTANT
ADVICES FOR
APPLICATIONS*



Schnittwerte
Cutting parameters

Fräsertoleranzen
Mill tolerances

Formelsammlung
Formulars

Problemlösungen
Trouble shooting

| | Schnittgeschwindigkeit v_c [m/min] | | | Vorschub f_z [mm/Zahn] | | | |
|---------------------------------------|---|-----------|-------------------|---|-------|------|-------|
| | unbeschichtet | TLX | DIP® - Diamant | Fräserdurchmesser [mm] D2 D5 D10 D20 | | | |
| 1. Kunststoffe | | | | | | | |
| Polyamid | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyolefine | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyacetale | 300 | 400 | | 0,15 | 0,3 | 0,4 | 0,5 |
| Polyester | 300 | 400 | | 0,15 | 0,3 | 0,4 | 0,5 |
| Polycarbonat | 300 | 400 | | 0,15 | 0,3 | 0,4 | 0,5 |
| Polyphenylenether | 300 | 400 | | 0,15 | 0,3 | 0,4 | 0,5 |
| Aromat. Polyamid | 300 | 400 | | 0,15 | 0,3 | 0,4 | 0,5 |
| ABS | 300 - 500 | 350 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Fluorpolymere | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polysulfon | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyphenylsulfon | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyethersulfon | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyetherimid | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyphenylensulfid | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyetherkethon | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyimid | 060 - 100 | 080 - 150 | | 0,05 | 0,1 | 0,2 | 0,35 |
| 2. gefüllte Werkstoffe* | | | | | | | |
| | 80 - 100 | 100 - 160 | | 0,05 | 0,12 | 0,25 | 0,4 |
| 3. Faserverstärkte Kunststoffe | | | | | | | |
| CFK | 150 | 200 | | 0,02 | 0,04 | 0,06 | 0,08 |
| GFK | 100 | 150 | | 0,02 | 0,04 | 0,06 | 0,08 |
| Aramidfaser | 90 - 120 | 100 - 140 | | 0,02 | 0,04 | 0,06 | 0,08 |
| 4. Graphit | | | | | | | |
| | 80 - 100 | 100 - 160 | 600 - 1800 | 0,02 | 0,025 | 0,05 | 0,075 |
| 5. Grünlinge | | | | | | | |
| | | | 300 - 500 | 0,1 | 0,2 | 0,35 | 0,45 |

* Füllstoff oder Verstärkung aus Glasfaser, Kohlefaser, Graphit oder Glimmer

Wir empfehlen zur Bearbeitung von Kunststoffen einwandfrei geschärfte, schneidhaltige Hartmetallwerkzeuge, im Rahmen der Werkzeugpflege (Nachschleifen und Nachbeschichten) stehen wir Ihnen gerne zur Verfügung. Bei entsprechenden maschinellen Voraussetzungen empfehlen wir für die wirtschaftliche Zerspannung von Glasfaser, Kohlefaser, Graphit und Glimmer den Einsatz unserer **Fiber-Line-Werkzeuge** DIP®-beschichtet.

Unsere Anwendungstechniker beraten Sie gerne!

DIP® Diamond for Industrial Production - patented

Technische Änderungen unserer Produkte und Änderungen des Lieferprogramms im Zuge der Weiterentwicklung behalten wir uns vor.

| | cutting speed v_c [m/min] | | | feed rate f_z [mm/tooth] | | | |
|-------------------------------------|--------------------------------|-----------|-------------------|-------------------------------|-------|------|-------|
| | uncoated | TLX | DIP® - Diamant | mill diameter [mm] | | | |
| | | | | D2 | D5 | D10 | D20 |
| 1. Synthetics | | | | | | | |
| Polyamid* | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyolefine* | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyacetale | 300 | 400 | | 0,15 | 0,3 | 0,4 | 0,5 |
| Polyester | 300 | 400 | | 0,15 | 0,3 | 0,4 | 0,5 |
| Polycarbonat | 300 | 400 | | 0,15 | 0,3 | 0,4 | 0,5 |
| Polyphenylenether | 300 | 400 | | 0,15 | 0,3 | 0,4 | 0,5 |
| Aromat. Polyamid | 300 | 400 | | 0,15 | 0,3 | 0,4 | 0,5 |
| ABS | 300 - 500 | 350 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Fluorpolymere | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polysulfon | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyphenylsulfon | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyethersulfon | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyetherimid | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyphenylensulfid | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyetherkethon | 250 - 500 | 300 - 600 | | 0,1 | 0,2 | 0,35 | 0,45 |
| Polyimid | 060 - 100 | 080 - 150 | | 0,05 | 0,1 | 0,2 | 0,35 |
| 2. Reinforced materials * | | | | | | | |
| | 80 - 100 | 100 - 160 | | 0,05 | 0,12 | 0,25 | 0,4 |
| 3. Fiber reinforced plastics | | | | | | | |
| CFK | 150 | 200 | | 0,02 | 0,04 | 0,06 | 0,08 |
| GFK | 100 | 150 | | 0,02 | 0,04 | 0,06 | 0,08 |
| Aramidfaser | 90 - 120 | 100 - 140 | | 0,02 | 0,04 | 0,06 | 0,08 |
| 4. Graphite | | | | | | | |
| | 80 - 100 | 100 - 160 | 600 - 1800 | 0,02 | 0,025 | 0,05 | 0,075 |
| 5. Green blanks | | | | | | | |
| | | | 300 - 500 | 0,1 | 0,2 | 0,35 | 0,4 |

* Filler or reinforcement made of glass fiber, carbon fiber, graphits or mica

We recommend best sharpened solid carbide tools for machining plastics.

If your machines fulfill the respective requirements, we suggest DIP® Diamond coated **solid carbid tools** for an economic machining of glasfiber, graphite and glimmer to use.

Our technicians will advise you with pleasure

DIP® Diamond for Industrial Production - patented

Technical changes in our products within research and development are possible at any time.

Fräsertoleranzen für
VHM-FräswerkzeugeEnd mill tolerances for
solid carbide mills

| | | 1 bis 3 1 to 3 | über 3 bis 6 over 3 to 6 | über 6 bis 10 over 6 to 10 | über 10 bis 18 over 10 to 18 | über 18 bis 30 over 18 to 30 | mm |
|---------------------------------------|-----|-------------------|-----------------------------------|-------------------------------------|---------------------------------------|---------------------------------------|----|
| Kopfdurchmesser: Head diameter: | H9 | +25 0 | +30 0 | +36 0 | +43 0 | +52 0 | µm |
| Schaftdurchmesser: shank diameter: | H10 | +40 0 | +48 0 | +58 0 | +70 0 | +110 0 | µm |
| | H11 | +60 0 | +75 0 | +90 0 | +110 0 | +130 0 | µm |
| | h10 | 0 -40 | 0 -48 | 0 -58 | 0 -70 | 0 -110 | µm |
| | h6 | 0 -6 | 0 -8 | 0 -9 | 0 -11 | 0 -13 | µm |

Formelsammlung

formulary

Schnittgeschwindigkeit:
cutting speed in m/min:

$$VC = \frac{\pi \times Dw \times n}{1000}$$

Drehzahl in U/min:
rpm in U/min:

$$n = \frac{VC \times 1000}{Dw \times \pi}$$

Vorschub in mm/min:
feed rate in mm/min:

$$f = n \times fz \times Z$$

Vorschub pro Zahn in mm/Z:
feed rate per tooth in mm/Z:

$$fz = \frac{f}{n \times Z}$$

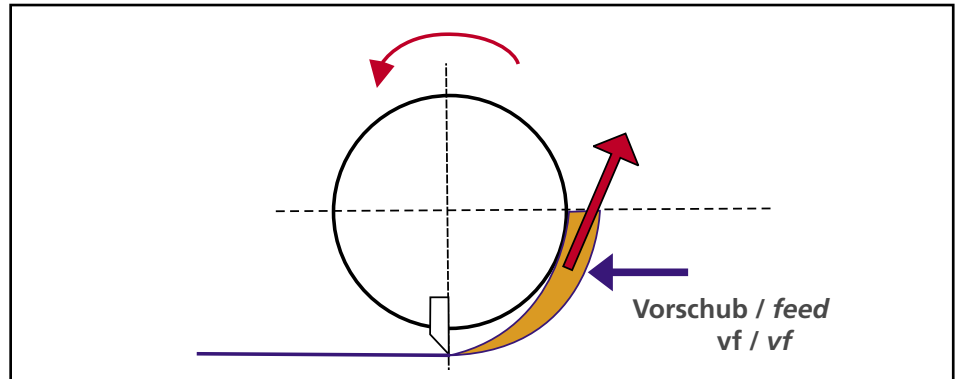
Formelbezeichnung in der
Zerspanungformula classification in
the cutting tool industryNeues Zeichen nach DIN 6580/84
New code acc. DIN 6580/84

| | | | |
|-------------------------|---|--|--------|
| min -1 | Drehzahl | speed | |
| mm | Fräsweg, Bohrweg | milling / drilling | If |
| mm | Schneiddurchmesser | cutting diameter | Dc |
| mm | Schnittbreite, Eingriffgröße | width of cut | ae |
| m/min | Schnittgeschwindigkeit | cutting speed | Vc |
| N | Schnittkraft | cutting force | Fc |
| | Schnittkraftexponent | cutting force | 1 - mc |
| kW | Schnittleistung | cutting power | Pc |
| mm | Schnitttiefe | depth of cut | ap |
| mm | Spannungsdicke | undeformed chip thickness | h |
| mm | Spannungsdicke - mittlere | average undeformed chip thickness | |
| N/mm ² | spezifische Schnittkraft | specific cutting force | kc |
| N/mm ² | spezifische Schnittkraft bei h = 1 mm und b = 1 mm | specific cutting force at h = 1 mm und b = 1 mm | kv1.1 |
| cm ³ /kW-min | Spezifisches Zeitspanvolumen | spec. time-chip volume | Qsp |
| mm | Standweg in Vorschubrichtung | tool life in feed direction | Lf |
| min | Standzeit | tool life | T |
| mm | Vorschub je Umdrehung | feed per revolution | f |
| mm | Vorschub je Zahn | feed per tooth | fz |
| mm | Korrekturfaktor für Vf | correction factor for Vf | f2 |
| mm/min | Vorschubgeschwindigkeit | feed rate | Vf |
| | Zähnezahl | number of teeth | Z |
| cm ³ /min | Zeitspanvolumen | time-chip volume | Q |
| N | Zerspankraft | resultant cutting force | F5 |

| Problem · Problem | | Abhilfe · Solution | |
|--|--|-----------------------|---|
| Schneidenverschleiß <i>wear of cutting edges</i> | Vorschub pro Zahn <i>feed rate</i> | verringern · decrease | Schnittgeschwindigkeit, Zähigkeit des Hartmetalls, Schneidkantenfase, Stabilität der Maschine <i>cutting speed toughness of carbide phase of the cutting edge stability of the machine</i> |
| Schneidenausbruch <i>break out of the cutting edge</i> | Schnittgeschwindigkeit <i>cutting speed</i> | | Vorschub pro Zahn, Verschleißfestigkeit des Hartmetalls, Schneidkantenfase <i>feed rate wear solidity of solid carbide phase of the cutting edge</i> |
| Auskolkung <i>excavation of the cutting edge</i> | Schnittgeschwindigkeit / Vorschub pro Zahn <i>cutting speed / feed rate</i> | | Verschleißfestigkeit des Hartmetalls, Kühlmediumdruck <i>wear solidity of solid carbide, pressure of cooling</i> |
| Aufbauschneide <i>erection of the cutting edge</i> | Schnitttiefe <i>cutting depth</i> | | Schnittgeschwindigkeit, Vorschub pro Zahn, Kühlmediumdruck <i>cutting speed feed rate, pressure of cooling</i> |
| Schlechte Oberflächengüte des Werkstücks <i>bad surface on the part</i> | Vorschub pro Zahn / Schnitttiefe / Schneidkantenfase <i>feed rate / cutting depth / phase of the cutting edge</i> | | Schnittgeschwindigkeit, Stabilität der Maschine, Drallwinkel, Konzentrität des Fräasers, Zahl der Schneiden <i>cutting speed, stability of the machine, helix, concentricity of the end mill, number of flutes</i> |
| Vibrationen / Rattern <i>vibrations / chattering</i> | Schnitttiefe / Schnittgeschwindigkeit <i>cutting depth / cutting speed</i> | | Stabilität der Maschine, Stabilität der Spannung, Kühlmediumviskosität <i>stability of the machine, stability of the part fixture, viscosity of cooling</i> |
| Kantenausbruch am Werkstück <i>breaking of the edges on the part</i> | Vorschub pro Zahn / Schnitttiefe / Schneidkantenfase <i>feed rate / cutting depth / phase of the cutting edge</i> | | |
| Überlastung der Maschine <i>override of the machine</i> | Schnittgeschwindigkeit / Vorschub pro Zahn / Schnitttiefe <i>cutting speed / feed rate / cutting depth</i> | | erhöhen · increase |

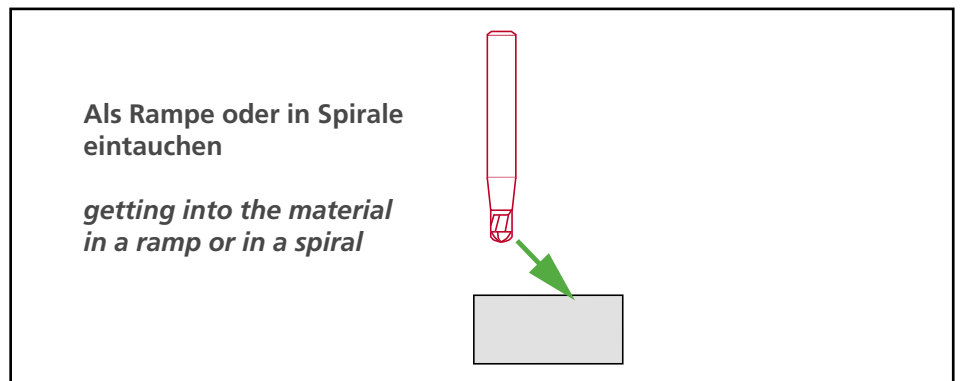
Gegenlauf-Fräsen

counterwise-milling



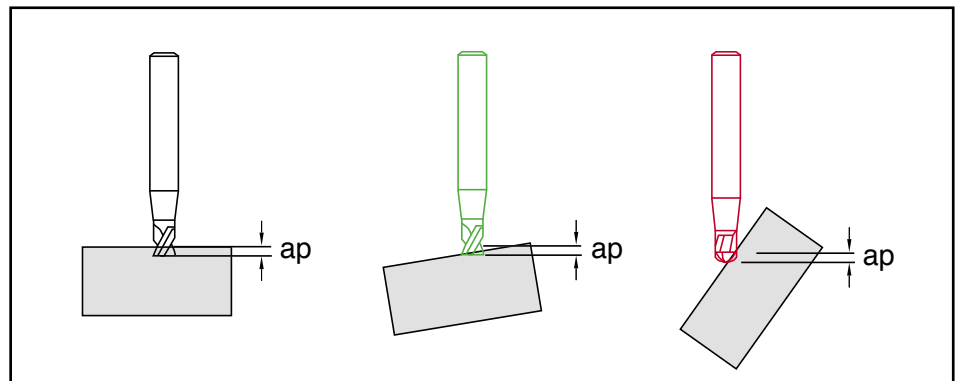
Materialeintritt

start of milling



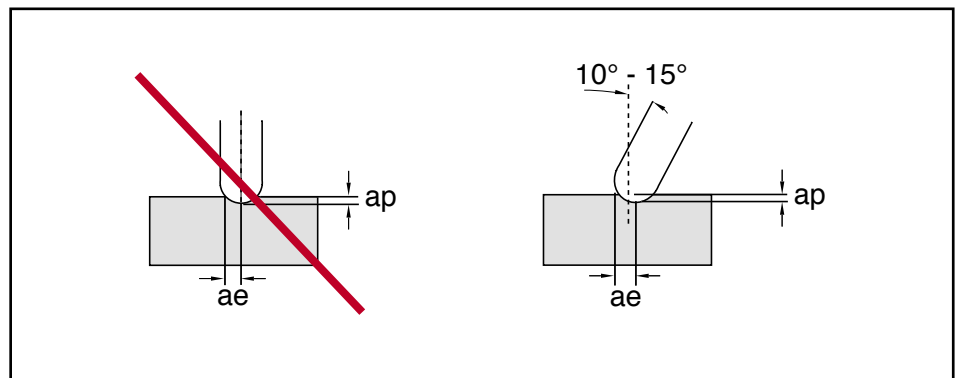
Fräserauswahl

choice of mill



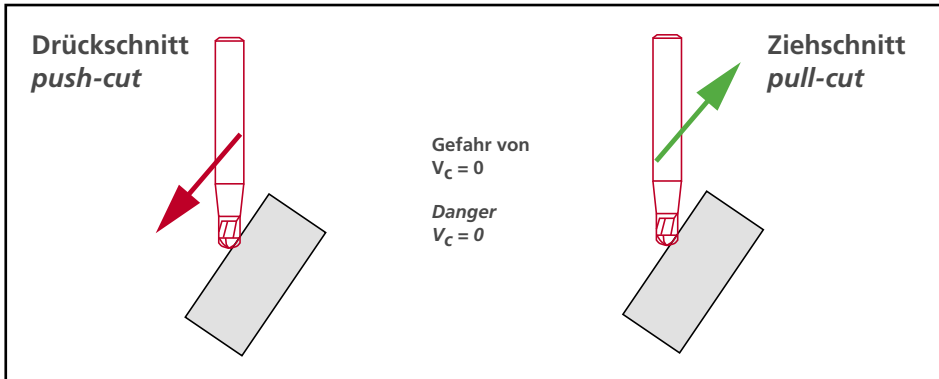
Anstellwinkel

angle of tool direction



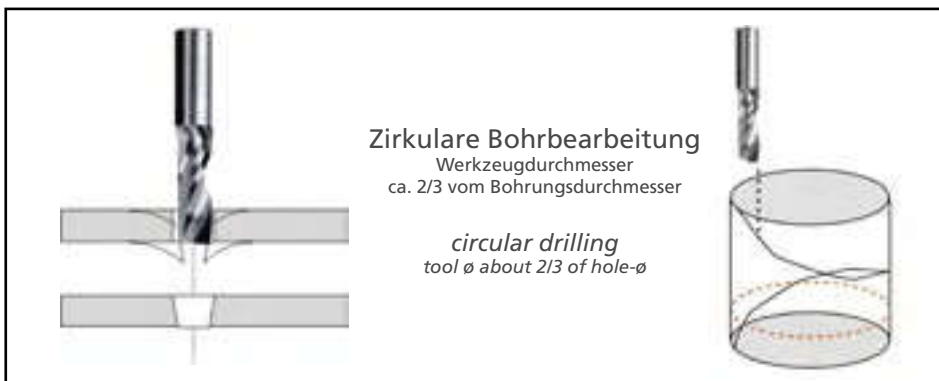
Ziehschnitt

pull cut



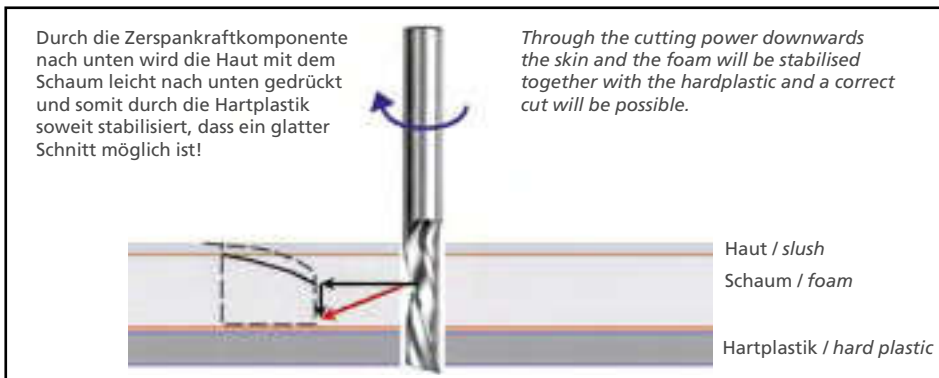
Bohren von Kunststoffen

drilling of plastics



Werkstoffkombinationen

material combination



Führende Werkzeugmaschinenhersteller und Frässpindelhersteller bitten folgendes zu beachten:

Bitte beachten Sie bei Inbetriebnahme der Spindel die Sicherheitsvorschriften genau. Nichtbeachten dieser Vorschriften kann erhebliche Verletzungen des Bedienpersonals zur Folge haben und erhebliche Schäden an der Fräsanlage bzw. am zu bearbeitenden Teil hervorrufen. Bei hohen Drehzahlen und entsprechenden Vorschüben wirken große Fliehkräfte und Belastungen auf die rotierenden Fräswerkzeuge ein.

Bitte überprüfen Sie regelmäßig Ihre Spannaufnahme auf maximal zulässigen Rundlauf und sichere Spannung. Brechende Werkzeuge können erheblichen Schaden anrichten. Die verwendeten Werkzeuge sollen die vom Spindelhersteller vorgegebene Restunwucht nicht überschreiten. Die Werkzeuge müssen so kurz wie möglich gespannt werden. Unnötige Auskraglängen sind zu vermeiden. Bei Werkzeugen, bei denen sich eine extreme Auskraglänge nicht vermeiden lässt, muss in jedem Fall die Abtragsleistung (Radialbelastung) verringert werden. Speziell unsere Cera Mill® Werkzeuge aus Keramik benötigen äußerst guten Rundlauf und exakte Spannmittel.

Cera Mill® Keramik Werkzeuge nicht einschrumpfen. Bitte nehmen Sie die Cera Mill® Werkzeuge für Ihre Spindeln im Hydrodehnspannfutter auf. Bitte beachten Sie auf jeden Fall, dass beim Spannen eine dem Schaftdurchmesser angepasste Spannlänge zur Verfügung steht.

Die überwiegende Mehrheit der Spindelhersteller definiert eine Restunwuchtgüte von G (früher Q) = 2,5 oder besser.

Aus Wuchtgüte, Gewicht des Rotors (Werkzeug + Aufnahme) und Betriebsdrehzahl wird die zulässige Restunwucht berechnet.

$$U_{zul} = \frac{G \times M}{n} \times 9549$$

U = Zulässige Restunwucht des Rotors im gmm

G = Wuchtgröße

M = Gewicht des Rotors in kg

n = Betriebsdrehzahlen des Rotors in 1/min

9549 = konstanter Faktor, der sich aus der Umrechnung der Maßeinheiten ergibt

Rechenbeispiel:
Schrumpfaufnahme: ISO 25 $U_{zul} = \frac{2,5 \times 0,135}{22.000} \times 9549 = 0,146 \text{ gmm}$

Unser Fräsertyp: 110SHAL05 $L_{zul} = \frac{U_{zul}}{\mu\text{m}} = 1,08 \mu\text{m} \rightarrow$ technisch nicht machbar

Bitte beachten Sie: Um optimale Fräsergebnisse zu erzielen, müssen Spindel, Spannung, Fräswerkzeug und Rundlauf optimal aufeinander abgestimmt werden.

Gesamtwuchtfehler einer Frässpindel haben eine ganze Reihe von Ursachen:

- Unwucht des Spindelkörpers
- Lauffehler der Spindelachse
- Fehler der Spannung der Aufnahme
- Rundlauf und Lagefehler der Aufnahme
- Unwucht der Aufnahme
- Rundlauf und Unwucht im Schneidewerkzeug

When operating the spindle for the first time, please follow the instructions precisely. Non-observance of these regulations can result in considerable injury to operating personnel as well as causing substantial damage to the milling machine or the work piece. At high speed and the corresponding feed motions, centrifugal forces and loads have an affect on the rotating milling cutters.

Please examine the tool holder at regular intervals for maximum permissible concentric running and safe tension. A cutter which breaks can cause considerable damage. The cutters used should not exceed the residual unbalance specified by the spindle manufacturer. The cutters must be clamped as short as possible. Unnecessary projection lengths are to be avoided. In the case of cutters for which an extreme projection length cannot be avoided, then in every case the discharge capacity (radial load) must be reduced. In particular our Cera Mill® cutters made of ceramic require extremely good concentric running and exact fixing.

Do not shrink Cera Mill® ceramic cutters. Please take up the Cera Mill® cutters in your spindles with a hydro-expansion chuck. Please consider that in any case of clamping the cutting tool, tool diameter and clamping length in the tool holder must be in a suitable relation.

The great majority of spindle manufacturers define a residual unbalance of G (formerly Q) = 2.5 or better.

The permissible residual unbalance is calculated from momentum, weight of the rotor (tool + uptake) and operating speed.

$$U_{zul} = \frac{G \times M}{n} \times 9549$$

U = Permissible unbalance of the rotor in gmm

G = momentum

M = Weight of rotor in kg

n = Operating speed of the rotor in 1/mi

9549 = Constant factor arising from the conversion of units of measurement

Calculation examples:

Shrinkage chuck: ISO 25

$$U_{zul} = \frac{2,5 \times 0,135}{22.000} \times 9549 = 0,146 \text{ gmm}$$

Our tool: 110SHAL05

$$L_{zul} = \frac{U_{zul}}{\mu\text{m}} = 1,08 \mu\text{m} \rightarrow \text{not possible}$$

Total balance faults in a milling spindle have a number of causes:

- Unbalance of the spindle body
- Running fault of the spindle axle
- Error in tension of the uptake
- Concentric running and position fault of the uptake
- Unbalance of the uptake
- Concentric running and unbalance in the cutter

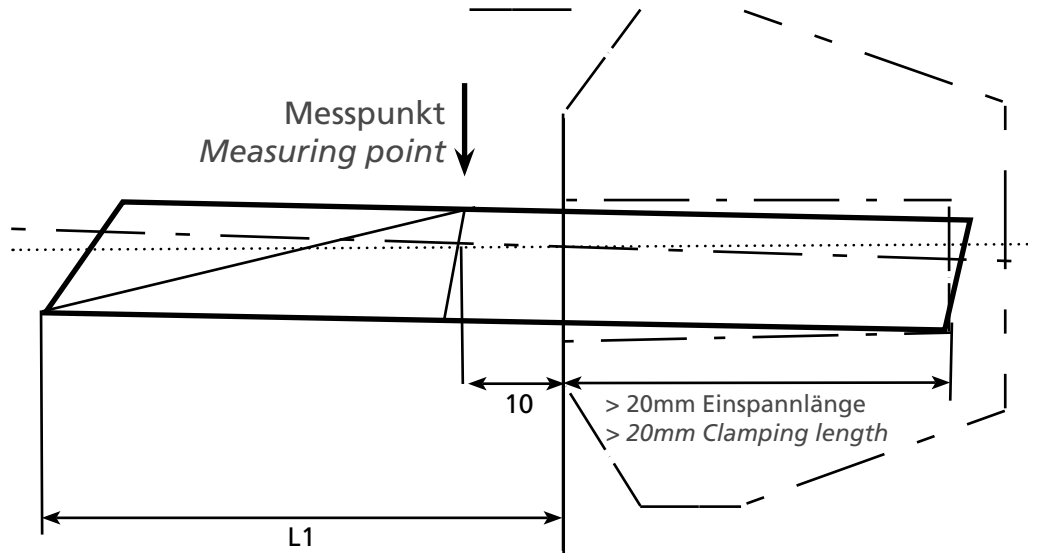
Please note:

In order to achieve optimum milling results, spindle, tension, cutter and concentric running must all be optimally tuned to one another.

Bitte achten Sie beim Einsatz von Fräswerkzeugen auf entsprechenden Rundlauf.

Please pay your attention on appropriate run by using milling tools.

Auswirkungen von Rundlauf Fehlern:
Effects of run out errors:



Gemessener Rundlauffehler bei 10 mm ergibt an der Werkzeugspitze bei Auskraglänge L1 einen Rundlauffehler in mm.

Measured run out error with 10 mm results at the tool tip in the case of discharge length L1 a cyclic testing error in mm:

| L1 10 | L1 20 | L1 30 | L1 40 | L1 55 | L1 80 | L1 125 |
|-------|-------|-------|-------|--------|-------|--------|
| 0,005 | 0,01 | 0,015 | 0,02 | 0,0275 | 0,04 | 0,0625 |
| 0,01 | 0,02 | 0,03 | 0,04 | 0,055 | 0,08 | 0,13 |
| 0,02 | 0,04 | 0,06 | 0,08 | 0,11 | 0,16 | 0,25 |
| 0,03 | 0,06 | 0,09 | 0,12 | 0,165 | 0,24 | 0,375 |
| 0,05 | 0,10 | 0,15 | 0,20 | 0,275 | 0,40 | 0,625 |
| 0,07 | 0,14 | 0,21 | 0,28 | 0,385 | 0,56 | 0,875 |
| 0,10 | 0,20 | 0,30 | 0,40 | 0,55 | 0,80 | 1,25 |
| 0,25 | 0,50 | 0,75 | 1,00 | 1,375 | 2,00 | 3,125 |
| 0,50 | 1,00 | 1,50 | 2,00 | 2,75 | 4,00 | 6,25 |

Prüfmerkmale:

Gesamtlänge, Schneidenlänge,
Schneidendurchmesser,
Schaftdurchmesser,
Rundlauf toleranz,
Kopfradius, Eckenradius,
Fasenbreite, Spiralsteigung,
Freiwinkel, Einstellwinkel,
Optische Begutachtung und
Kennzeichnung der Prüfwerkzeuge.

Die in unserer Preisliste angegebenen
Preise beziehen sich auf unsere Standard-
werkzeuge. Davon abweichende Werk-
zeuge berechnen wir nach Aufwand.

Die Preise entnehmen Sie bitte unserer
aktuellen Preisliste.

Test features:

Total length, cutting edge length,
cutting edge diameter,
shaft diameter,
concentricity tolerance,
head radius, corner radius,
land width, helical pitch,
clearance angle, cutting edge angle,
visual assessment and labelling of the
test tools.

The prices indicated in our price list refer
to our standard tools. The charge for tools
that differ from these depends on our
expenditures.

Please refer to our price list.

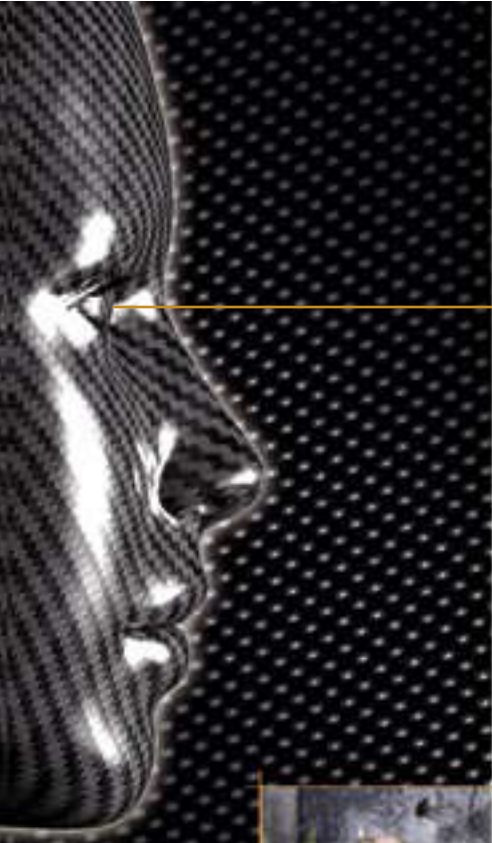


Zoller Messmaschine
„genius III“

Zoller measuring machine
“genius III“

Die von der Produktion unabhängige
Prüfung und Dokumentation erfolgt in
unserem Messraum mit modernsten Mess-
systemen.

Testing and documentation that are
independent of the production take
place in our measuring room with the
most modern measuring systems.



Optimierte Prozesse für die Zerspanung neuer Werkstoffe.

Mit den richtigen Strategien ohne Nacharbeit schneller in Serie fertigen.

Bei der Zerspanung von neuen Werkstoffen gibt es viele Stellschrauben, um die Bearbeitungskosten massiv zu senken und die Qualität nachbearbeitungsfrei zu steigern.

Hufschmied Engineering ist eine neue Dienstleistung, die in drei Schritten Ihre Fertigungsprozesse optimiert. Gemeinsames Ziel aller Maßnahmen ist, die Durchlaufzeiten in Ihrem Unternehmen von der Angebotsabgabe bis zum Beginn der Serienfertigung zu verkürzen, die Bearbeitungsqualität zu verbessern und die Fertigungskosten zu senken.



Dazu soll der gesamte Prozess effizienter und die Bearbeitung insgesamt optimiert werden. Diesen Wettbewerbsvorteil erreichen wir gemeinsam in drei Schritten.



Ziele im ersten Schritt:

- Stärken/Schwächen der eingesetzten Maschinen
- Stärken/Schwächen der Spannsysteme
- Stärken/Schwächen der Aufspannungen
- Stärken/Schwächen der verwendeten Werkzeuge



Ziele im zweiten Schritt:

- Erreichung einer nacharbeitsfreien Qualität
- Kostenoptimierte Fertigungsprozesse
- Senkung der Anzahl der benötigten Werkzeuge
- Kapazitätsoptimierung der Produktionsanlagen des Kunden
- Kürzest mögliche Bearbeitungszeit unter Einhaltung aller Qualitätsvorgaben
- Ressourcenschonender Werkzeugeinsatz
- Technologietransfer



Ziele im dritten Schritt:

- Einfahren des gesamten Prozess vor Ort beim Kunden
- Werkstoffgerechter Einsatz der entsprechend prozessoptimierten Hufschmied-Werkzeuge
- Anpassung und Feinjustierung aller Prozess-Parameter vor Ort
- Musterbearbeitung gemäß den Qualitätsanforderungen des Kunden
- Start Serienfertigung im optimierten Prozess beim Kunden
- Weitere Optimierung der Werkzeuge für maximal erreichbare Standzeiten
- Schulung der Kunden-Mitarbeiter



Optimized processes for the precision machining of new materials.

Manufacture in series faster – with the right strategies and without post-processing.

When chipping new materials there remain many screws to turn to massively reduce processing costs and increase quality without post-processing.

Hufschmied Engineering is a new service which can optimize your manufacturing process. Common goal of all measures is to shorten the pass-through times in your company from quotation to start of series production, to increase machining quality and reduce manufacturing cost.

In addition the whole process should become more efficient and processing as such optimized. We can achieve this competitive edge together in three steps.

Objectives of the first step:

- Advantages/weaknesses of the machines used
- Advantages/weaknesses of the clamping system
- Advantages/weaknesses of the clampings
- Advantages/weaknesses of the tools employed

Objectives of the second step:

- Achieving post-processing-free quality
- Cost optimized manufacturing processes
- Reduce number of required tools
- Capacity optimizing of production systems of the customer
- Shortest possible processing time while meeting all quality requirements
- Resource conserving tool use
- Technology transfer

Objectives of the third step:

- Process startup and supervision of the process on-site for customers
- Material conformant use of accordingly process-optimized Hufschmied tools
- Adapt and fine-tune all process parameter on-site
- Machine samples according to the quality requirements of the customer
- Start series production with optimized process at the customers
- Further optimization of tools to achieve maximum tool life
- Schooling the customer's employees



Zertifizierte Qualität von Hufschmied

– darauf können Sie sich verlassen.

Certified quality by Hufschmied

– you can rely on.



Die Hufschmied Zerspanungssysteme GmbH verfügt über 25 Jahre Erfahrung in der Entwicklung und Fertigung von Zerspanungswerkzeugen und belegt heute einen Spitzenplatz in der spanenden Bearbeitung von neuen Werkstoffen. Das dokumentiert die **ISO-Zertifizierung 9001:2008**. Darauf sind wir bei Hufschmied stolz, denn es bestätigt unseren professionellen Weg in die Spitze der spanenden Bearbeitung. Und Sie als unser Kunde profitieren täglich davon.

Durch die Zusammenarbeit mit führenden Herstellern im Bereich der Kunststoffverarbeitung sowie als Systemlieferant renommierter Werkzeugmaschinen-Hersteller, baut Hufschmied sein Werkstoffverständnis und Anwendungswissen zum Vorteil der Kunden kontinuierlich aus. Überzeugen auch Sie sich von unserem fundierten Anwenderwissen, qualifizierter Prozessberatung und hochwertigen Produkten für wirtschaftliche Bearbeitungsprozesse wie bereits seit vielen Jahren führende Zulieferer-Unternehmen aus der Automobil- und Luftfahrt-Industrie.



*Hufschmied Zerspanungssysteme GmbH can build upon 25 years of experience in development and manufacture of chipping/machining tools and today holds a leading position in milling of new materials. This is documented by the **ISO certification 9001:2008**. We at Hufschmied are proud about this as this documents our professional journey to the top of milling and machining. And you as customer can benefit from this every day.*

By cooperation with leading manufacturers in the segment of plastics processing and machining as well as system supplier for renowned tool makers and manufacturers Hufschmied continuously expands its knowledge of materials and application to the benefit of the customers. Convince yourself Experience for yourself our well-founded application knowledge, qualified process consulting and high quality products for economical processing as many suppliers and companies from automotive and aeronautics industry.



Anzahl der Zähne
number of cutting edges



Anzahl der Zähne, rechts-links
number of cutting edges, right-left



Spanwinkel / Spiralwinkel
cutting angle / helix



polierte Spannut
polished flute



Freilegung
free neck



Bearbeitungsrichtung Torus
machining directions



Bearbeitungsrichtung Kugel
machining directions



Bearbeitungsbeispiel Profil
profiling



Bearbeitungsbeispiel Nuten
flute milling



Bearbeitungsbeispiel Tasche
pocket milling



Bearbeitungsbeispiel
side milling



Radiusfräser
ball end mill



Handwerkzeug
for hand usage



Spirale
helix



Schaftwinkel
shank angle



Bohrsenker
drill and counter sinks



Kompressionswerkzeug
compression tool



Eckenradius
corner radius



Ecken Phase
corner chamfer



Material
material



Bohren
drilling



Trennwerkzeug
cut off milling



Verzahnung
toothing



Reparaturwerkzeug
tool for repair



Gravieren
engraving



Gewinde-Flankenwinkel
thread mill



Bogensegment
circular segment



Senkwinkel
counter sink angle



1 VBS
1 PRE drill step



2 VBS
2 PRE drill steps



Spitzenwinkel
head angle



HPC für höchstes Zerspanungsvolumen
high performance milling



HSC für höchstes Zerspanungsgeschwindigkeit
high-speed-cutting



Freiformbearbeitung
3D-milling



ungleiche Teilung
unequal division



Radius
radius



Fasenwinkel
chamfer angle



Spannutenkehle
flute spot

HUFSCHMIED ist Mitglied



MAI Carbon
MAI Carbon wird durch Unternehmen, Bildungs- und Forschungseinrichtungen sowie unterstützende Organisationen gebildet, die in der MAI-Region München-Augsburg-Ingolstadt auf dem Technologiefeld „Carbonfaserverstärkte Kunststoffe“ agieren.



Carbon Composites
Carbon Composites e.V. (CCeV) ist ein Kompetenznetzwerk, das die gesamten Wertschöpfungsketten der Faserverbundtechnologien umfasst.



Ceramic Composites
Die Abteilung Ceramic Composites im Verein Carbon Composites ist ein Zusammenschluss von Unternehmen und Forschungseinrichtungen im Bereich der keramischen Verbundwerkstoffe.



Kunststoff Cluster
Der Kunststoff-Cluster (KC) ist ein branchenübergreifendes Netzwerk des Kunststoff-Sektors. Er fördert, initiiert und koordiniert die Zusammenarbeit von Unternehmen. Der Kunststoff-Cluster ist eine Initiative der Länder Oberösterreich, Niederösterreich und Salzburg.



CFK-Valley Stade e.V. - Technologiekompetenz mit weltweiter Bedeutung
Das international ausgerichtete CFK-Valley Stade e.V. trägt bereits seit dem Jahr 2003 das Qualitätssiegel „member of kompetenznetze.de“ und zählt somit als Kompetenznetz schon heute zu den leistungsstärksten Netzwerken in Deutschland.

We supply exclusively to our delivery and payment conditions.
 These are on our website www.hufschmied.net available for download.

**How to find
the way to us**



your client number

| | | | | | | |
|--|--|--|--|--|--|--|
| | | | | | | |
|--|--|--|--|--|--|--|

commissioner

| |
|--|
| |
|--|

HUFSCHMIED

ONE CUT AHEAD.

HUFSCHMIED
ZERSPANUNGSSYSTEME
GMBH

Edisonstraße 11 d
D-86399 Bobingen

Tel.: 0 82 34-96 64 0

Fax: 0 82 34-96 64 99



info@hufschmied.net · www.hufschmied.net