Karnasch® PROFESSIONAL TOOLS

# 5 SCHLEIFEN GRINDING

## FRÄSSTIFTE
## BURRS




5.1 735-838

## FRÄSSTIFTE / LOCHSÄGEN FÜR SCHLÜSSELDIENSTE
## ROTARY BURRS / HOLE SAWS FOR LOCKSMITHS



5.2 839-842

## SPEZIAL FRÄSSTIFTE
## SPECIAL BURRS



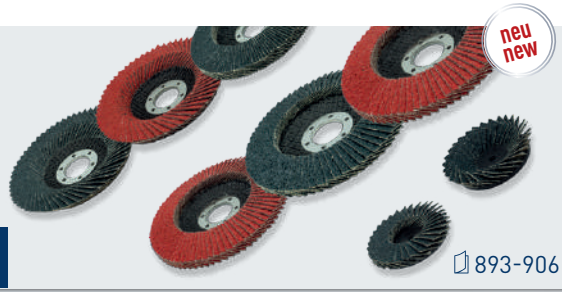
5.3 843-872

## SETS · ZUBEHÖR
## SETS · ACCESSORIES



5.4 873-892

## FÄCHERSCHLEIFSCHEIBEN
## FLAP DISCS




5.5 893-906

## SCHNELLWECHSEL-SCHLEIFSCHEIBEN
## QUICK-CHANGE DISCS



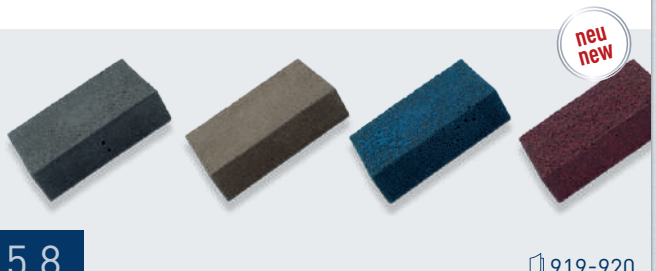

5.6 907-912

## FÄCHERSCHLEIFER
## FLAP WHEELS




5.7 917-918

## SCHLEIFBLÖCKE
## ABRASIVE BLOCKS




5.8 919-920

PATENT PENDING

# HP-3 PRO/Performance 82

## Die revolutionäre neue Universal-PRO Verzahnung

+82%

Bis zu 82 % mehr Materialabtrag als unsere übliche HP-3 Universalverzahnung.
* Ist Ihnen der aggressive Materialabtrag/ Schruppen der neuen Universal-PRO Verzahnung zu stark, kann ergänzend auf unsere bewährte HP-3 Universalverzahnung zurückgegriffen werden.

Hohe Standzeit bei High-Performance.

ANTI-VIBRATION

Nahezu vibrationsfreies und kontrolliertes arbeiten möglich, selbst bei extremen Schrupparbeiten.

GREENTEC BESCHICHTET COATED

Erhältlich in der neuesten GREEN-TEC Beschichtungs-Technologie, für nochmalige signifikante Standzeiterhöhung.




## The revolutionary new Universal-PRO cutting style

+82%

Up to 82% more material removal than our usual HP-3 Universal cutting style.
* If the aggressive material removal / roughing of the new Universal-PRO cut appears too strong for you, please use our proven HP-3 universal cut.

Long tool life comes with high performance.

ANTI-VIBRATION

Almost vibration-free and controlled work even under tough roughing conditions possible.

GREENTEC BESCHICHTET COATED

Available in the latest GREEN-TEC coating technology to further increase tool life

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu |
|---|---|---|---|---|---|---|---|

Unsere neue HP-3 PRO / Performance 82 ist eine Universalverzahnung für nahezu alle Materialien.
Bitte beachten Sie, dass mit unseren Spezialverzahnungen durchaus noch höherer Materialabtrag/Standzeiten möglich sind, wie zum Beispiel:

Our new HP-3 PRO / Performance 82 is a universal cut for almost all materials. Please note that with our special cuts an even higher material removal / tool life is possible. See for example:

Spezialverzahnungen / special cuts

**HP-9** 810-816



Speziell für Edelstahl. Extrem hohe Zerspanleistung

Especially for stainless steel. Extremely high machining output.

**HP-8** 802-808



Speziell für Stahl und Stahlguss. Extrem hohe Zerspanleistung

Especially for steel and cast steel. Extremely high machining output

**HP-7** 786-793



Speziell für NE-Metalle wie Alu, Kupfer, Messing sowie alle Kunststoffe

Especially for non-ferrous materials such as Aluminum, copper, brass. Also for all kinds of plastics.



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www.grampelhuber.at

Karnasch® PROFESSIONAL TOOLS

# HARTMETALL-FRÄSSTIFTE

Ähnlich DIN 8032

# TUNGSTEN CARBIDE BURRS

Similar DIN 8032




5.1

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www.grampelhuber.at

PROFESSIONAL TOOLS

Netto-Preise · Net sales prices

## HP-3 PRO / PERFORMANCE 82

BEST SELLER

746-753



Die revolutionäre neue Universal-PRO Verzahnung

The revolutionary new Universal-PRO cutting style

PATENT PENDING

- Bis zu 82 % mehr Materialabtrag als unsere übliche HP-3 Universal-verzahnung.
- Hohe Standzeit bei High-Performance.
- Nahezu vibrationsfreies und kontrol-liertes arbeiten möglich, selbst bei extremen Schrupparbeiten.
- Erhältlich in der neuesten **GREEN-TEC** Beschichtungs-Technologie, für nochmalige signifikante Standzeit-erhöhung.
- Für alle Stahlsorten wie:
  - Gusseisen
  - Stahl <60 HRC
  - Edelstahl (INOX)
  - Nickelbasis und Titanlegierungen
  - Auch für Kupfer, Messing, Bronze.

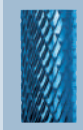
- Up to 82 % more material removal than our usual HP-3 universal cutting style.
- Long tool life comes with high performance.
- Almost vibration-free and con-trolled work even under tough roughing conditions possible.
- Available in the latest **GREEN-TEC** coating technology for another significant increase in tool life.
- For all types of steel such as:
  - Cast iron
  - Steel <60 HRC
  - Stainless steel (INOX)
  - Nickel basis and titanium alloy
  - Also for copper, brass, bronze.

## HP-3

BEST SELLER

VALUETOOL

754-767



Die am meisten verwendete Universalverzahnung

The most widely used universal cutting style

- Hohe Zerspanleistung durch Kreuzverzahnung:
  - Ruhiger Lauf
  - Kurze Späne
- Für alle Stahlsorten wie:
  - Gusseisen
  - Stahl < 60 HRC
  - Edelstahl (INOX)
  - Nickelbasis- und Titanlegierungen
- Auch Kupfer, Messing, Bronze

- High cutting action through cross cutting style
  - Smooth operation
  - Short chips
- For use on all ferrous metals such as:
  - Cast iron
  - Steel < 60 HRC
  - Stainless steel (INOX)
  - Nickel basis and titanium alloy
- Also copper, brass, bronze

## HP-2

768-776



Die am meisten verwendete Einfachverzahnung

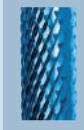
The most widely used single cutting style

- Hohe Zerspanleistung mit guter Oberflächengüte
- Für alle Stahlsorten wie:
  - Gusseisen
  - Stahl < 60 HRC
  - Edelstahl (INOX)
  - Nickelbasis- und Titanlegierungen
- Auch Kupfer, Messing, Bronze

- High cutting action with good surface finish
- For use on all ferrous metals such as:
  - Cast iron
  - Steel < 60 HRC
  - Stainless steel (INOX)
  - Nickel basis and titanium alloy
- Also copper, brass, bronze

## HP-6

778-784



Extrem grobe Kreuzverzahnung

Extremely rough cross cutting style

- Extrem hoher Materialabtrag (Schruppen)
- Für alle Stahlsorten wie:
  - Gusseisen
  - Stahl < 60 HRC
- Auch für Kupfer, Messing, Bronze
- Für den harten Schruppeinsatz wie z.B. auf Werften, Gießereien entwickelt.

- Extremely fast metal removal (roughing)
- For all ferrous metals, such as:
  - Cast iron
  - Steel < 60 HRC
- Also for copper, brass, bronze
- Developed for use in tough roughing conditions, such as, e.g., on shipyards, foundries.

## HP-7

786-793



Speziell für NE-Metalle wie Alu, Kupfer, Messing sowie alle Kunststoffe

Especially for non-ferrous materials such as Aluminum, copper, brass. Also for all kinds of plastics.

- Alulegierungen
- Leichtmetalle
- Weiche Buntmetalle (NE-Metalle)
- Kunststoffe
- Faserverstärkte Kunststoffe GFK/CFK

- Aluminum alloy
- Light metals
- Soft copper and copper alloys (non-ferrous metals)
- Plastics
- Fibre-reinforced plastic (GFK/CFK)

## Spezial-Frässtifte · Special burrs

843-846





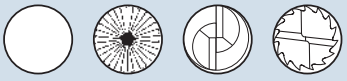


Scheibenform

RIM shape

844



Frässtifte für GFK/CFK

Fiberglass routers

845



Mini-Frässtifte ∅ 1 + 1,5 mm

Mini-burrs ∅ 1 + 1,5 mm

846





Frässtifte + Bohrer für Schlüsseldienste

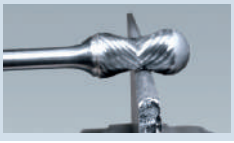
Burrs + drills for locksmiths

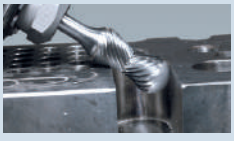
840-842

## Kombinations-Frässtifte · Combination-burrs

847-866

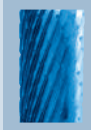




## HP-1

794-801



**Für Superlegierungen. Extrem robuste Kreuzverzahnung**

**For super alloys. Extremely robust cross cutting style**

- Schlagunempfindlichkeit (Zahnausbrüche, Abplatzungen, Kopfbrüche werden minimiert)
- Exzellente Kontrolle und Laufruhe
- Mittlere bis hohe Zerspanleistung
- Speziell für schwierigste Superlegierungen + Edelstähle wie: Titan, Inconel, Hastelloy, Waspaloy, Duplex, Amanox usw. Anwendungsbeispiel: Bearbeitung von Flugzeug Turbinenschaufeln, Gasturbinen

- Impact resistance (tooth breakages, chipping, head breakages are minimised)
- Excellent control and quiet running
- Medium to high cutting action
- Especially for the most difficult super alloys + stainless steel, such as: Titanium, Inconel, Hastelloy, Waspaloy, Duplex, Amanox, etc. Application example: Working aeroplane turbine blades, gas turbines

## HP-8

802-808



**Speziell für Stahl und Stahlguss. Extrem hohe Zerspanleistung**

**Especially for steel and cast steel. Extremely high machining output**

- Bis zu 60% höhere Zerspanleistung im Vergleich zu herkömmlichen Kreuzverzahnungen.
- Hohe Agressivität erzeugt große Späne mit hervorragender Spanabfuhr.
- Keine Anlauffarben am Werkstück durch geringe Wärmeentwicklung

- Up to 60% higher machining output as compared to conventional cross cut.
- High aggressiveness produces large chips with outstanding chip removal.
- No annealing colours at the workpiece due to low heat development.

## HP-9

810-816



**Speziell für Edelstahl. Extrem hohe Zerspanleistung**

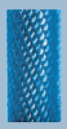
**Especially for stainless steel. Extremely high machining output.**

- Extrem hohe Zerspanleistung und Standzeit für alle austenitischen, rost- und säurebeständigen Stähle.
- Nickelbasis und Titanlegierungen (Drehzahl reduzieren um Funkenbildung zu vermeiden)
- Hochwertige Oberflächengüte
- Keine Anlauffarben am Werkstück durch geringe Wärmeentwicklung

- Extremely high machining output and service life for all austenitic, rust- and acid-resilient steels.
- Nickel basis and titanium alloy (reduce speed to avoid sparking)
- High-quality surface.
- No annealing colours at the workpiece due to low heat development.

## HP-4

818-825



**Feine Kreuzverzahnung**

**Fine cross cutting style**

- Exzellente Kontrolle (auch an schwierig zugänglichen Stellen): Ruhiger Lauf · Kurze Späne · Gute Oberflächengüte
- Mittlere Zerspanleistung
- Für alle Stahlsorten wie:
  - Bis zu extra harten Stählen ca. 70 HRC
  - Gusseisen · Edelstahl (INOX)
  - Hochwarmfeste Werkstoffe wie z.B. Nickel-Basis + Kobalt Basislegierungen

- Excellent control (also at difficult to reach positions)
  - Smooth operation · Short chips
  - Good surface finish
- Medium cutting action
- For all kinds of steel: Up to extra hard steel approx. 70 HRC · Cast iron · Stainless steel (INOX) · Heat-resistant substances, such as e.g. nickel based + cobalt based alloys

## HP-5

826-832



**Extrem feine Einfachverzahnung**

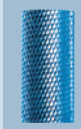
**Extremely fine single cutting style**

- Exzellente Oberflächengüte
- Vorzugsweise für feines Entgraten von allen Stahlsorten wie:
  - Bis zu extra harten Stählen ca. 70 HRC
  - Gusseisen · Edelstahl (INOX)
  - Hochwarmfeste Werkstoffe wie z.B. Nickel-Basis + Kobalt-Basis + Kobalt-Basis Legierungen

- Excellent surface finish
- Preferred for fine deburring all ferrous metals, such as:
  - Up to extra hard steel approx. 70 HRC
  - Cast iron
  - Stainless steel (INOX)
  - Heat resistant substances, such as, e.g. nickel based + cobalt based alloys

## HP-11-Micro

834-838



**Extrem feine Kreuzverzahnung**

**Extremely fine cross cutting style**

- **Exzellent für die:** Feinbearbeitung · Extrem feine Putzarbeiten · Korrekturen im Werkzeug- und Formenbau · Schleifen/Schärfen von Schnittwerkzeugen
- **Eigenschaften:** Gutes Abtragverhalten · Vibrationsarm · Exzellente Kontrolle/Führung im Handeinsatz · Hohe Oberflächengüte
- **Vorteile:** Es können nahezu alle Werkstoffe bis zu einer Härte von 70 HRC bearbeitet werden. **In diesem Bereich werden üblicherweise Keramik-Schleifstifte verwendet.** Die neue Micro-Verzahnung garantiert:
  - Keine Geometrieveränderung durch Abnutzung/ Verschleiß gegenüber Schleifstiften
  - Wesentlich höheren Materialabtrag sowie Standzeit gegenüber Schleifstiften

**English text see page 834**

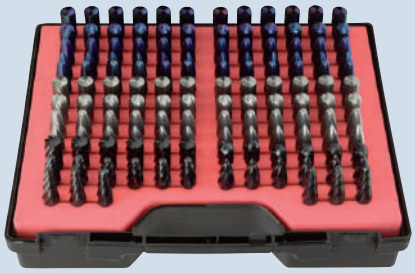
## Druckluftgeradschleifer + Zubehör · Pneumatic straight grinder + accessories

1205-1237




## Sets + Displays · Sets + Displays

873-892



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Seite / Page 885/887



Seite / Page 873-892

## Technische Daten · Technical data

1465



# HP-3 PRO

## Die revolutionäre neue Universal-PRO Verzahnung

## The revolutionary new Universal-PRO cutting style

PATENT PENDING

Lagerartikel Stockrange



BEST SELLER

746-753

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | |

✓ OPTIMAL OPTIMAL
✓ GUT GOOD

- Bis zu 82 % mehr Materialabtrag als unsere übliche HP-3 Universalverzahnung.
- Hohe Standzeit bei High-Performance.
- Nahezu vibrationsfreies und kontrolliertes arbeiten möglich, selbst bei extremen Schrupparbeiten.
- Erhältlich in der neuesten **GREEN-TEC** Beschichtungs-Technologie, für nochmalige signifikante Standzeiterhöhung.
- Für alle Stahlsorten wie:
  - Gusseisen · Stahl <60 HRC · Edelstahl (INOX)
  - Nickelbasis und Titanlegierungen
  - Auch für Kupfer, Messing, Bronze.

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- Almost vibration-free and controlled work even under tough roughing conditions possible.
- Available in the latest **GREEN-TEC** coating technology for another significant increase in tool life.
- For all types of steel such as:
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  - Nickel basis and titanium alloy
  - Also for copper, brass, bronze.

# HP-3

## Die am meisten verwendete Universalverzahnung

## The most widely used universal cutting style

Lagerartikel Stockrange



BEST SELLER

VALUETOOL

754-767

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | |

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✓ GUT GOOD

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  - Ruhiger Lauf
  - Kurze Späne
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  - Edelstahl (INOX)
  - Nickelbasis- und Titanlegierungen
- Auch Kupfer, Messing, Bronze

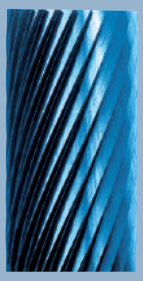
- High cutting action through cross cutting style
  - Smooth operation
  - Short chips
- For use on all ferrous metals such as:
  - Cast iron
  - Steel < 60 HRC
  - Stainless steel (INOX)
  - Nickel basis and titanium alloy
- Also copper, brass, bronze

# HP-2

## Die am meisten verwendete Einfachverzahnung

## The most widely used single cutting style

Lagerartikel Stockrange



768-776

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |

✓ OPTIMAL OPTIMAL
✓ GUT GOOD

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  - Stahl < 60 HRC
  - Edelstahl (INOX)
  - Nickelbasis- und Titanlegierungen
- Auch Kupfer, Messing, Bronze

- High cutting action with good surface finish
- For use on all ferrous metals such as:
  - Cast iron
  - Steel < 60 HRC
  - Stainless steel (INOX)
  - Nickel basis and titanium alloy
- Also copper, brass, bronze

# HP-3 PRO

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 6090<br>Art. 11 4090 | Art. 11 6091<br>Art. 11 4091 | Art. 11 6092<br>Art. 11 4092 | Art. 11 6093<br>Art. 11 4093 | Art. 11 6094<br>Art. 11 4094 | Art. 11 6095<br>Art. 11 4095 | Art. 11 6096<br>Art. 11 4096 | Art. 11 6097<br>Art. 11 4097 | Art. 11 6098<br>Art. 11 4098 | Art. 11 6099<br>Art. 11 4099 |
|  |  |  |  |  |  |  |  |  |  |
| 749 | 749 | 750 | 750 | 751 | 751 | 752 | 752 | 753 | 753 |
| Zylinder<br>Cylinder | Zylinder +<br>Stirnverzahnung<br>Cylinder + end cut | Walzenrund-<br>form<br>Ball nosed<br>cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed<br>tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed<br>cone | Spitzkegel<br>Cone |

# HP-3

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

| ZYA | ZYB | ZYA | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM | WKN | KSJ | KSK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | | C | D | E | F | G | H | L | M | N | J | K |
| Art. 11 5001<br>Art. 11 3001 | Art. 11 5011<br>Art. 11 3011 | Art. 11 6010<br>Art. 11 4010 | Art. 11 5021<br>Art. 11 3021 | Art. 11 5031<br>Art. 11 3031 | Art. 11 5041<br>Art. 11 3041 | Art. 11 5051<br>Art. 11 3051 | Art. 11 5061<br>Art. 11 3061 | Art. 11 5071<br>Art. 11 3071 | Art. 11 5081<br>Art. 11 3081 | Art. 11 5091<br>Art. 11 3091 | Art. 11 5096<br>Art. 11 3096 | Art. 11 5101<br>Art. 11 3101 | Art. 11 5111<br>Art. 11 3111 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 756 | 757 | 759 | 760 | 761 | 762 | 763 | 764 | 765 | 765 | 766 | 766 | 767 | 767 |
| Zylinder<br>Cylinder | Zylinder + Stirn-<br>verzahnung<br>Cylinder + end<br>cut | Zylinder-<br>Radius<br>Cylinder-<br>Radius | Walzenrund-<br>form<br>Ball nosed<br>cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed<br>tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed<br>cone | Spitzkegel<br>Cone | Winkel<br>Inverted<br>cone | Kegel 60°<br>Countersink<br>60° | Kegel 90°<br>Countersink<br>90° |

# HP-2

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

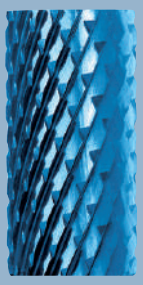
| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM | WKN | KSJ | KSK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M | N | J | K |
| Art. 11 5000<br>Art. 11 3000 | Art. 11 5010<br>Art. 11 3010 | Art. 11 5020<br>Art. 11 3020 | Art. 11 5030<br>Art. 11 3030 | Art. 11 5040<br>Art. 11 3040 | Art. 11 5050<br>Art. 11 3050 | Art. 11 5060<br>Art. 11 3060 | Art. 11 5070<br>Art. 11 3070 | Art. 11 5080<br>Art. 11 3080 | Art. 11 5090<br>Art. 11 3090 | Art. 11 5099<br>Art. 11 3099 | Art. 11 5100<br>Art. 11 3100 | Art. 11 5110<br>Art. 11 3110 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| 770 | 770 | 771 | 771 | 772 | 772 | 773 | 773 | 774 | 774 | 775 | 775 | 776 |
| Zylinder<br>Cylinder | Zylinder + Stirn-<br>verzahnung<br>Cylinder + end<br>cut | Walzenrund-<br>form<br>Ball nosed<br>cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed<br>tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed<br>cone | Spitzkegel<br>Cone | Winkel<br>Inverted cone | Kegel 60°<br>Countersink<br>60° | Kegel 90°<br>Countersink<br>90° |

# HP-6

## Extrem grobe Kreuzverzahnung

## Extremely rough cross cutting style

Lagerartikel
Stockrange



778-784

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | | |

✓ OPTIMAL OPTIMAL
✓ GUT GOOD

- Extrem hoher Materialabtrag (Schruppen)
- Für alle Stahlsorten wie:
  - Gusseisen
  - Stahl < 60 HRC
- Auch für Kupfer, Messing, Bronze
- Für den harten Schruppeinsatz wie z.B. auf Werften, Gießereien entwickelt.

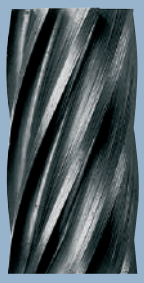
- Extremely fast metal removal (roughing)
- For all ferrous metals, such as:
  - Cast iron
  - Steel < 60 HRC
- Also for copper, brass, bronze
- Developed for use in tough roughing conditions, such as, e.g., on shipyards, foundries.

# HP-7

## Speziell für NE-Metalle wie Alu, Kupfer, Messing sowie alle Kunststoffe

## Especially for non-ferrous materials such as Aluminum, copper, brass. Also for all kinds of plastics.

Lagerartikel
Stockrange



786-793

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | ✓ | ✓ |

✓ OPTIMAL OPTIMAL
✓ GUT GOOD

- Alulegierungen
- Leichtmetalle
- Weiche Buntmetalle (NE-Metalle)
- Kunststoffe
- Faserverstärkte Kunststoffe GFK/CFK

- Aluminum alloy
- Light metals
- Soft copper and copper alloys (non-ferrous metals)
- Plastics
- Fibre-reinforced plastic (GFK/CFK)

# HP-1

## Für Superlegierungen. Extrem robuste Kreuzverzahnung

## For super alloys. Extremely robust cross cutting style

Lagerartikel
Stockrange



794-801

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | | ✓ | | ✓ | | | |

✓ OPTIMAL OPTIMAL
✓ GUT GOOD

- Schlagunempfindlichkeit (Zahnausbrüche, Abplatzungen, Kopfbrüche werden minimiert)
- Exzellente Kontrolle und Laufruhe
- Mittlere bis hohe Zerspanleistung
- Speziell für schwierigste Superlegierungen + Edelstähle wie: Titan, Inconel, Hastelloy, Waspaloy, Duplex, Amanox usw.
  Anwendungsbeispiel: Bearbeitung von Flugzeug Turbinenschaufeln, Gasturbinen

- Impact resistance (tooth breakages, chipping, head breakages are minimised)
- Excellent control and quiet running
- Medium to high cutting action
- Especially for the most difficult super alloys + stainless steel, such as: Titanium, Inconel, Hastelloy, Waspaloy, Duplex, Amanox, etc.
  Application example: Working aeroplane turbine blades, gas turbines



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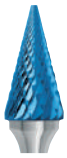
# HP-6

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 5004<br>Art. 11 3004 | Art. 11 5014<br>Art. 11 3014 | Art. 11 5024<br>Art. 11 3024 | Art. 11 5034<br>Art. 11 3034 | Art. 11 5044<br>Art. 11 3044 | Art. 11 5054<br>Art. 11 3054 | Art. 11 5064<br>Art. 11 3064 | Art. 11 5074<br>Art. 11 3074 | Art. 11 5084<br>Art. 11 3084 | Art. 11 5094<br>Art. 11 3094 |
|  |  |  |  |  |  |  |  |  |  |
| 780 | 780 | 781 | 781 | 782 | 782 | 783 | 783 | 784 | 784 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Walzenrundform<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone |

# HP-7

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM | MINI-ALU |
|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M | |
| Art. 11 5005<br>Art. 11 3005 | Art. 11 5015<br>Art. 11 3015 | Art. 11 5025<br>Art. 11 3025 | Art. 11 5035<br>Art. 11 3035 | Art. 11 5045<br>Art. 11 3045 | Art. 11 5055<br>Art. 11 3055 | Art. 11 5065<br>Art. 11 3065 | Art. 11 5075<br>Art. 11 3075 | Art. 11 5085<br>Art. 11 3085 | Art. 11 5095<br>Art. 11 3095 | |
|  |  |  |  |  |  |  |  |  |  |  |
| 788 | 788 | 789 | 789 | 790 | 790 | 791 | 791 | 792 | 792 | 793 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Walzenrundform<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone | Minifrässtifte in feiner Aluverzahnung<br>Mini-burrs in Alu cutting style |

# HP-1

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM | Ø 3 mm |
|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M | |
| Art. 11 5007<br>Art. 11 3007 | Art. 11 5017<br>Art. 11 3017 | Art. 11 5027<br>Art. 11 3027 | Art. 11 5037<br>Art. 11 3037 | Art. 11 5047<br>Art. 11 3047 | Art. 11 5057<br>Art. 11 3057 | Art. 11 5067<br>Art. 11 3067 | Art. 11 5077<br>Art. 11 3077 | Art. 11 5087<br>Art. 11 3087 | Art. 11 5097<br>Art. 11 3097 | |
|  |  |  |  |  |  |  |  |  |  |  |
| 796 | 796 | 797 | 797 | 798 | 798 | 799 | 799 | 800 | 800 | 801 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Walzenrundform<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone | Ø 3 mm, Schaft 3 mm, für Superlegierungen!<br>Ø 3 mm, shank 3 mm, for super alloys! |

# HP-8

## Speziell für Stahl und Stahlguss. Extrem hohe Zerspanleistung

## Especially for steel and cast steel. Extremely high machining output

Lagerartikel Stockrange



802-808

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | | ✓ | | | | | | |

✓ OPTIMAL OPTIMAL
✓ GUT GOOD

- Bis zu 60% höhere Zerspanleistung im Vergleich zu herkömmlichen Kreuzverzahungen.
- Hohe Agressivität erzeugt große Späne mit hervorragender Spanabfuhr.
- Keine Anlauffarben am Werkstück durch geringe Wärmeentwicklung

- Up to 60% higher machining output as compared to conventional cross cut.
- High aggressiveness produces large chips with outstanding chip removal.
- No annealing colours at the workpiece due to low heat development.

# HP-9

## Speziell für Edelstahl. Extrem hohe Zerspanleistung

## Especially for stainless steel. Extremely high machining output.

Lagerartikel Stockrange



810-816

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| | | ✓ | | ✓ | | | | | |

✓ OPTIMAL OPTIMAL
✓ GUT GOOD

- Extrem hohe Zerspanleistung und Standzeit für alle austenitischen, rost- und säurebeständigen Stähle.
- Nickelbasis und Titanlegierungen (Drehzahl reduzieren um Funkenbildung zu vermeiden)
- Hochwertige Oberflächengüte
- Keine Anlauffarben am Werkstück durch geringe Wärmeentwicklung

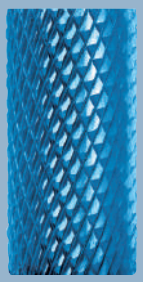
- Extremely high machining output and service life for all austenitic, rust- and acid-resilient steels.
- Nickel basis and titanium alloy (reduce speed to avoid sparking)
- High-quality surface.
- No annealing colours at the workpiece due to low heat development.

# HP-4

## Feine Kreuzverzahnung

## Fine cross cutting style

Lagerartikel Stockrange



818-825

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |

✓ OPTIMAL OPTIMAL
✓ GUT GOOD

- Exzellente Kontrolle (Auch an schwierig zugänglichen Stellen)
  - Ruhiger Lauf
  - Kurze Späne
  - Gute Oberflächengüte
- Mittlere Zerspanleistung
- Für alle Stahlsorten wie:
  - Bis zu extra harten Stählen ca. 70 HRC
  - Gusseisen
  - Edelstahl (INOX)
  - Hochwarmfeste Werkstoffe wie z.B. Nickel-Basis + Kobalt Basislegierungen

- Excellent control (also at difficult to reach positions)
  - Smooth operation
  - Short chips
  - Good surface finish
- Medium cutting action
- For all kinds of steel:
  - Up to extra hard steel approx. 70 HRC
  - Cast iron
  - Stainless steel (INOX)
  - Heat-resistant substances, such as e.g. nickel based + cobalt based alloys

# HP-8

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 6041<br>Art. 11 4041 | Art. 11 6042<br>Art. 11 4042 | Art. 11 6043<br>Art. 11 4043 | Art. 11 6044<br>Art. 11 4044 | Art. 11 6045<br>Art. 11 4045 | Art. 11 6046<br>Art. 11 4046 | Art. 11 6047<br>Art. 11 4047 | Art. 11 6048<br>Art. 11 4048 | Art. 11 6049<br>Art. 11 4049 | Art. 11 6050<br>Art. 11 4050 |
|  |  |  |  |  |  |  |  |  |  |
| 804 | 804 | 805 | 805 | 806 | 806 | 807 | 807 | 808 | 808 |
| Zylinder<br>Cylinder | Zylinder + Stirn-verzahnung<br>Cylinder + end cut | Walzenrund-form<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone |

# HP-9

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 6031<br>Art. 11 4031 | Art. 11 6032<br>Art. 11 4032 | Art. 11 6033<br>Art. 11 4033 | Art. 11 6034<br>Art. 11 4034 | Art. 11 6035<br>Art. 11 4035 | Art. 11 6036<br>Art. 11 4036 | Art. 11 6037<br>Art. 11 4037 | Art. 11 6038<br>Art. 11 4038 | Art. 11 6039<br>Art. 11 4039 | Art. 11 6040<br>Art. 11 4040 |
|  |  |  |  |  |  |  |  |  |  |
| 812 | 812 | 813 | 813 | 814 | 814 | 815 | 815 | 816 | 816 |
| Zylinder<br>Cylinder | Zylinder + Stirn-verzahnung<br>Cylinder + end cut | Walzenrund-form<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone |

# HP-4

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM | WKN |
|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M | N |
| Art. 11 5002<br>Art. 11 3002 | Art. 11 5012<br>Art. 11 3012 | Art. 11 5022<br>Art. 11 3022 | Art. 11 5032<br>Art. 11 3032 | Art. 11 5042<br>Art. 11 3042 | Art. 11 5052<br>Art. 11 3052 | Art. 11 5062<br>Art. 11 3062 | Art. 11 5072<br>Art. 11 3072 | Art. 11 5082<br>Art. 11 3082 | Art. 11 5092<br>Art. 11 3092 | Art. 11 5098<br>Art. 11 3098 |
|  |  |  |  |  |  |  |  |  |  |  |
| 820 | 820 | 821 | 822 | 822 | 823 | 823 | 824 | 824 | 825 | 825 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Walzenrund-form<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone | Winkel<br>Inverted cone |

# HP-5

## Extrem feine Einfachverzahnung

## Extremely fine single cutting style

Lagerartikel
Stockrange

### ANWENDUNG · APPLICATION



826-832

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |

✓ OPTIMAL OPTIMAL
✓ GUT GOOD

- Exzellente Oberflächengüte
- Vorzugsweise für feines Entgraten von allen Stahlsorten wie:
  - Bis zu extra harten Stählen ca. 70 HRC
  - Gusseisen
  - Edelstahl (INOX)
  - Hochwarmfeste Werkstoffe wie z.B. Nickel-Basis + Kobalt-Basis + Kobalt-Basis Legierungen

- Excellent surface finish
- Preferred for fine deburring all ferrous metals, such as:
  - Up to extra hard steel approx. 70 HRC
  - Cast iron
  - Stainless steel (INOX)
  - Heat resistant substances, such as, e.g. nickel based + cobalt based alloys

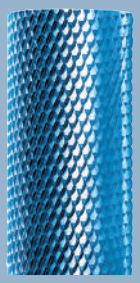
# HP-11

## Extrem feine Kreuzverzahnung

## Extremely fine cross cutting style

Lagerartikel
Stockrange

### ANWENDUNG · APPLICATION



834-838

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |

✓ OPTIMAL OPTIMAL
✓ GUT GOOD

- **Exzellent für die:**
  - Feinbearbeitung
  - Extrem feine Putzarbeiten
  - Korrekturen im Werkzeug- und Formenbau
  - Schleifen/Schärfen von Schnittwerkzeugen
- **Eigenschaften:**
  - Gutes Abtragverhalten
  - Vibrationsarm
  - Exzellente Kontrolle/Führung im Handeinsatz
  - Hohe Oberflächengüte
- **Vorteile:**
  Es können nahezu alle Werkstoffe bis zu einer Härte von 70 HRC bearbeitet werden.
  **In diesem Bereich werden üblicherweise Keramik-Schleifstifte verwendet.**
- Die neue Micro-Verzahnung garantiert:
  - Keine Geometrieveränderung durch Abnutzung/ Verschleiß gegenüber Schleifstiften
  - Wesentlich höheren Materialabtrag sowie Standzeit gegenüber Schleifstiften

- **Excellent for:**
  - Finishing
  - Extremely fine cleaning work
  - Corrections in tool and mould construction
  - Grinding/sharpening of cutting tools
- **Characteristics:**
  - Good stock removal
  - Low vibrations
  - Excellent control and guidance under handheld conditions
  - High surface quality
- **Advantages:**
  Micro-cut can be used for work on almost all materials up to a hardness of 70 HRC.
  **In this area usually mounted points are used.**
- The new micro-cutting style guarantees:
  - Unlike with mounted points, there is no change in geometry due to wear and tear
  - Unlike with mounted points, there is much higher performance, surface quality and lifetime

# HP-5

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 5003<br>Art. 11 3003 | Art. 11 5013<br>Art. 11 3013 | Art. 11 5023<br>Art. 11 3023 | Art. 11 5033<br>Art. 11 3033 | Art. 11 5043<br>Art. 11 3043 | Art. 11 5053<br>Art. 11 3053 | Art. 11 5063<br>Art. 11 3063 | Art. 11 5073<br>Art. 11 3073 | Art. 11 5083<br>Art. 11 3083 | Art. 11 5093<br>Art. 11 3093 |
|  |  |  |  |  |  |  |  |  |  |
| 828 | 828 | 829 | 829 | 830 | 830 | 831 | 831 | 832 | 832 |
| Zylinder<br>Cylinder | Zylinder + Stirn-verzahnung<br>Cylinder + end cut | Walzenrund-form<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone |

# HP-11

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

| ZYA | ZYB | WRC | KUD | RBF | SPG |
|---|---|---|---|---|---|
| A | B | C | D | F | G |
| Art. 11 6080<br>Art. 11 4080 | Art. 11 6081<br>Art. 11 4081 | Art. 11 6082<br>Art. 11 4082 | Art. 11 6083<br>Art. 11 4083 | Art. 11 6084<br>Art. 11 4084 | Art. 11 6085<br>Art. 11 4085 |
|  |  |  |  |  |  |
| 836 | 836 | 837 | 837 | 838 | 838 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Walzenrundform<br>Ball nosed cylinder | Kugel<br>Ball | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree |





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# HP-3 PRO

## Die revolutionäre neue Universal-PRO Verzahnung
## The revolutionary new Universal-PRO cutting style

PATENT PENDING



BEST SELLER

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | |

✓ OPTIMAL OPTIMAL
✓ GUT GOOD

- Bis zu 82 % mehr Materialabtrag als unsere übliche HP-3 Universalverzahnung.
- Hohe Standzeit bei High-Performance.
- Nahezu vibrationsfreies und kontrolliertes arbeiten möglich, selbst bei extremen Schrupparbeiten.
- Erhältlich in der neuesten **GREEN-TEC** Beschichtungs-Technologie, für nochmalige signifikante Standzeiterhöhung.
- Für alle Stahlsorten wie:
  - Gusseisen
  - Stahl <60 HRC
  - Edelstahl (INOX)
  - Nickelbasis und Titanlegierungen
  - Auch für Kupfer, Messing, Bronze.

- Up to 82 % more material removal than our usual HP-3 universal cutting style.
- Long tool life comes with high performance.
- Almost vibration-free and controlled work even under tough roughing conditions possible.
- Available in the latest **GREEN-TEC** coating technology for another significant increase in tool life.
- For all types of steel such as:
  - Cast iron
  - Steel <60 HRC
  - Stainless steel (INOX)
  - Nickel basis and titanium alloy
  - Also for copper, brass, bronze.

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

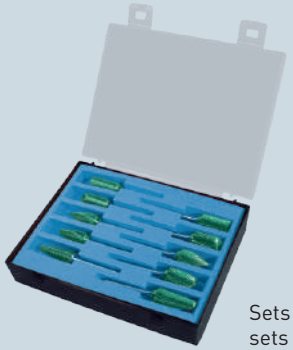
| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 6090<br>Art. 11 4090 | Art. 11 6091<br>Art. 11 4091 | Art. 11 6092<br>Art. 11 4092 | Art. 11 6093<br>Art. 11 4093 | Art. 11 6094<br>Art. 11 4094 | Art. 11 6095<br>Art. 11 4095 | Art. 11 6096<br>Art. 11 4096 | Art. 11 6097<br>Art. 11 4097 | Art. 11 6098<br>Art. 11 4098 | Art. 11 6099<br>Art. 11 4099 |
|  |  |  |  |  |  |  |  |  |  |
| 749 | 749 | 750 | 750 | 751 | 751 | 752 | 752 | 753 | 753 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Walzenrundform<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone |




GREEN-TEC-beschichtet
GREEN-TEC-coated

Erhältlich in der neuesten **GREEN-TEC**-Beschichtungs-Technologie für nochmalige signifikante Standzeiterhöhung.

Available in the latest **GREEN-TEC** coating technology for another significant increase in tool life.



Sets + Displays s. Seite 880
sets + displays see page 880



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PATENT PENDING

# HP-3 PRO/Performance 82

## Die revolutionäre neue Universal-PRO Verzahnung

+82%

Bis zu 82 % mehr Materialabtrag als unsere übliche HP-3 Universalverzahnung.
* Ist Ihnen der aggressive Materialabtrag/ Schruppen der neuen Universal-PRO Verzahnung zu stark, kann ergänzend auf unsere bewährte HP-3 Universalverzahnung zurückgegriffen werden.

Hohe Standzeit bei High-Performance.

ANTI-VIBRATION

Nahezu vibrationsfreies und kontrolliertes arbeiten möglich, selbst bei extremen Schrupparbeiten.

GREENTEC BESCHICHTET COATED

Erhältlich in der neuesten GREEN-TEC Beschichtungs-Technologie, für nochmalige signifikante Standzeiterhöhung.




## The revolutionary new Universal-PRO cutting style

+82%

Up to 82% more material removal than our usual HP-3 Universal cutting style.
* If the aggressive material removal / roughing of the new Universal-PRO cut appears too strong for you, please use our proven HP-3 universal cut.

Long tool life comes with high performance.

ANTI-VIBRATION

Almost vibration-free and controlled work even under tough roughing conditions possible.

GREENTEC BESCHICHTET COATED

Available in the latest GREEN-TEC coating technology to further increase tool life

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu |
|---|---|---|---|---|---|---|---|

Unsere neue HP-3 PRO / Performance 82 ist eine Universalverzahnung für nahezu alle Materialien.
Bitte beachten Sie, dass mit unseren Spezialverzahnungen durchaus noch höherer Materialabtrag/Standzeiten möglich sind, wie zum Beispiel:

Our new HP-3 PRO / Performance 82 is a universal cut for almost all materials. Please note that with our special cuts an even higher material removal / tool life is possible. See for example:

Spezialverzahnungen / special cuts

**HP-9** 810-816

Speziell für Edelstahl. Extrem hohe Zerspanleistung

Especially for stainless steel. Extremely high machining output.

**HP-8** 802-808

Speziell für Stahl und Stahlguss. Extrem hohe Zerspanleistung

Especially for steel and cast steel. Extremely high machining output

**HP-7** 786-793

Speziell für NE-Metalle wie Alu, Kupfer, Messing sowie alle Kunststoffe

Especially for non-ferrous materials such as Aluminum, copper, brass. Also for all kinds of plastics.





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| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---|---|---|---|---|
| Stahl, Stahlguss | Stähle bis 1200 N/mm² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss, Vergütungsstähle | Grobzerspanung | 450–600 |
| | Gehärtete, vergütete Stähle über 1200 N/mm² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 250–350 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Grobzerspanung | 250–350 |
| NE-Metalle | Weiche NE-Metalle | Messing, Kupfer, Zink | Grobzerspanung | 250–350 |
| | Harte NE-Metalle | Bronze, Titan/Titanlegierungen, harte Aluminiumlegierungen (hoher Si-Anteil) | | 300–450 |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/Späroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | Grobzerspanung | 450–600 |

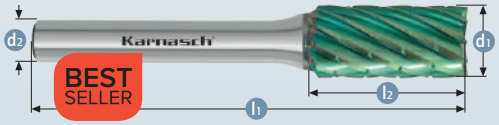
| Material groups | | | Application | Cutting speed m/min |
|---|---|---|---|---|
| Steel, cast steel | Steels up to 1200 N/mm² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels, alloyed steels | Coarse stock removal | 450–600 |
| | Hardened, heat-treated steels exceeding 1200 N/mm² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 250–350 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Coarse stock removal | 250–350 |
| Non-ferrous metals | Soft-non-ferrous metals | Brass, copper, zinc | Coarse stock removal | 250–350 |
| | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard aluminum alloys (high Si content) | | 300–450 |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Coarse stock removal | 450–600 |

**Schnittgeschwindigkeit • Cutting speed (m/min)**

| | 250 | 300 | 350 | 400 | 450 | 500 | 600 |
|---|---|---|---|---|---|---|---|
| ∅ (mm) | Drehzahlen (min⁻¹) • Rotational speed (rpm) | | | | | | |
| 6 | 13.000 | 16.000 | 19.000 | 21.000 | 24.000 | 27.000 | 32.000 |
| 8 | 10.000 | 12.000 | 14.000 | 16.000 | 18.000 | 20.000 | 24.000 |
| 10 | 8.000 | 10.000 | 11.000 | 13.000 | 14.000 | 16.000 | 19.000 |
| 12 | 7.000 | 8.000 | 9.000 | 11.000 | 12.000 | 13.000 | 16.000 |
| 16 | 5.000 | 6.000 | 7.000 | 8.000 | 9.000 | 10.000 | 12.000 |

## 11 6090

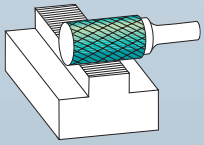
GREENTEC BESCHICHTET COATED




**A** FORM / SHAPE **ZYA**

Zylinder ohne Stirnverzahnung

Cylinder without end cut



Schnittdaten Cutting data 748

Film Movie

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6090 010 | • 6 | 18 | 6 | 50 | | ✔ | 12,50 |
| 11 6090 020 | • 8 | 20 | 6 | 65 | ✔ | | 15,80 |
| 11 6090 030 | • 10 | 20 | 6 | 65 | ✔ | | 18,20 |
| 11 6090 040 | • 12DIN | 25 | 6 | 70 | ✔ | | 26,30 |
| 11 6090 050 | • 16 | 25 | 6 | 70 | ✔ | | 32,15 |

## 11 4090

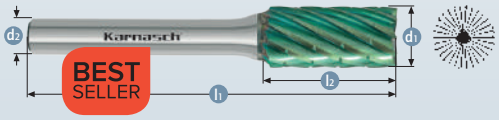



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4090 010 | • 6 | 18 | 6 | 50 | | ✔ | 10,20 |
| 11 4090 020 | • 8 | 20 | 6 | 65 | ✔ | | 13,35 |
| 11 4090 030 | • 10 | 20 | 6 | 65 | ✔ | | 14,35 |
| 11 4090 040 | • 12DIN | 25 | 6 | 70 | ✔ | | 22,40 |
| 11 4090 050 | • 16 | 25 | 6 | 70 | ✔ | | 28,20 |

## 11 6091

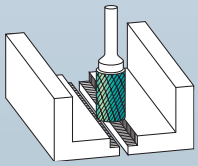
GREENTEC BESCHICHTET COATED




**B** FORM / SHAPE **ZYB**

Zylinder mit Stirnverzahnung

Cylindrical with end cut



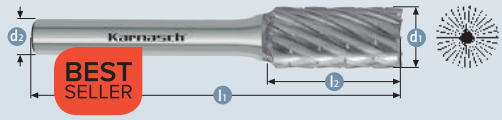
Schnittdaten Cutting data 748

Film Movie

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6091 010 | • 6 | 18 | 6 | 50 | | ✔ | 13,50 |
| 11 6091 020 | • 8 | 20 | 6 | 65 | ✔ | | 17,10 |
| 11 6091 030 | • 10 | 20 | 6 | 65 | ✔ | | 19,65 |
| 11 6091 040 | • 12DIN | 25 | 6 | 70 | ✔ | | 28,55 |
| 11 6091 050 | • 16 | 25 | 6 | 70 | ✔ | | 35,00 |

## 11 4091




Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4091 010 | • 6 | 18 | 6 | 50 | | ✔ | 11,25 |
| 11 4091 020 | • 8 | 20 | 6 | 65 | ✔ | | 14,70 |
| 11 4091 030 | • 10 | 20 | 6 | 65 | ✔ | | 15,80 |
| 11 4091 040 | • 12DIN | 25 | 6 | 70 | ✔ | | 24,60 |
| 11 4091 050 | • 16 | 25 | 6 | 70 | ✔ | | 31,05 |





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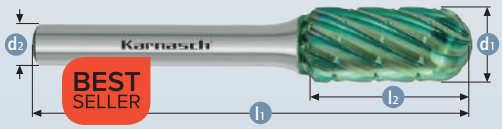
## 11 6092

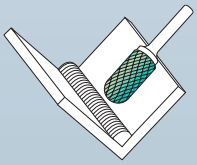
GREENTEC BESCHICHTET COATED



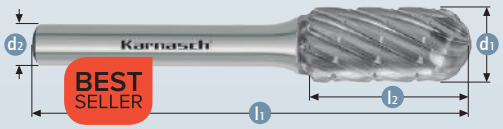

**C** FORM / SHAPE **WRC**

Walzenrundform

Ball nosed cylinder



## 11 4092




Schnittdaten Cutting data 748

Film Movie

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6092 010 | • 6 | 18 | 6 | 50 | | ✔ | 14,15 |
| 11 6092 020 | • 8 | 20 | 6 | 65 | ✔ | | 16,95 |
| 11 6092 030 | • 10 | 20 | 6 | 65 | ✔ | | 19,80 |
| 11 6092 040 | • 12DIN | 25 | 6 | 70 | ✔ | | 29,05 |
| 11 6092 050 | • 16 | 25 | 6 | 70 | ✔ | | 35,50 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4092 010 | • 6 | 18 | 6 | 50 | | ✔ | 11,90 |
| 11 4092 020 | • 8 | 20 | 6 | 65 | ✔ | | 14,55 |
| 11 4092 030 | • 10 | 20 | 6 | 65 | ✔ | | 16,00 |
| 11 4092 040 | • 12DIN | 25 | 6 | 70 | ✔ | | 25,10 |
| 11 4092 050 | • 16 | 25 | 6 | 70 | ✔ | | 31,60 |

## 11 6093

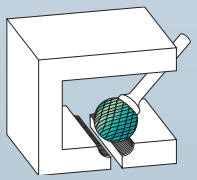
GREENTEC BESCHICHTET COATED




**D** FORM / SHAPE **KUD**

Kugel

Ball



## 11 4093




Schnittdaten Cutting data 748

Film Movie

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6093 010 | • 6 | 4,8 | 6 | 50 | | ✔ | 13,20 |
| 11 6093 020 | • 8 | 7,0 | 6 | 52 | ✔ | | 14,15 |
| 11 6093 030 | • 10 | 9,0 | 6 | 54 | ✔ | | 16,95 |
| 11 6093 040 | • 12DIN | 11,0 | 6 | 56 | ✔ | | 21,65 |
| 11 6093 050 | • 16 | 14,0 | 6 | 59 | ✔ | | 25,85 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4093 010 | • 6 | 4,8 | 6 | 50 | | ✔ | 10,95 |
| 11 4093 020 | • 8 | 7,0 | 6 | 52 | ✔ | | 11,75 |
| 11 4093 030 | • 10 | 9,0 | 6 | 54 | ✔ | | 13,10 |
| 11 4093 040 | • 12DIN | 11,0 | 6 | 56 | ✔ | | 17,70 |
| 11 4093 050 | • 16 | 14,0 | 6 | 59 | ✔ | | 21,90 |



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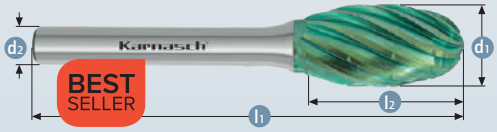
## 11 6094

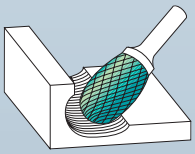
GREENTEC BESCHICHTET COATED



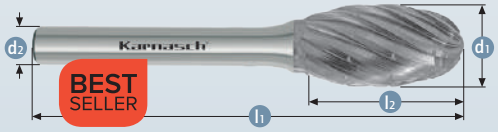

**E** FORM / SHAPE **TRE**

Tropfen

Oval



## 11 4094




Schnittdaten Cutting data 748

Film Movie

Bestseller – preisreduziert · Bestseller – price reduced

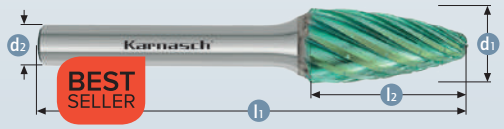
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6094 010 | • 6 | 10 | 6 | 50 | | ✔ | 15,65 |
| 11 6094 020 | • 8 | 15 | 6 | 60 | ✔ | | 17,00 |
| 11 6094 030 | • 10 | 15 | 6 | 60 | ✔ | | 19,80 |
| 11 6094 040 | • 12DIN | 20 | 6 | 65 | ✔ | | 27,35 |
| 11 6094 050 | • 16 | 25 | 6 | 70 | ✔ | | 36,40 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4094 010 | • 6 | 10 | 6 | 50 | | ✔ | 13,35 |
| 11 4094 020 | • 8 | 15 | 6 | 60 | ✔ | | 14,60 |
| 11 4094 030 | • 10 | 15 | 6 | 60 | ✔ | | 16,00 |
| 11 4094 040 | • 12DIN | 20 | 6 | 65 | ✔ | | 23,40 |
| 11 4094 050 | • 16 | 25 | 6 | 70 | ✔ | | 32,50 |

## 11 6095

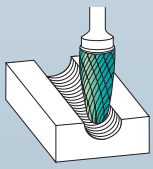
GREENTEC BESCHICHTET COATED



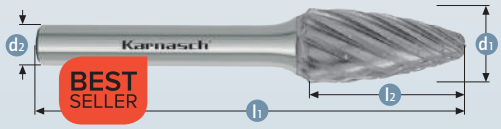

**F** FORM / SHAPE **RBF**

Rundbogen

Ball nosed tree



## 11 4095




Schnittdaten Cutting data 748

Film Movie

Bestseller – preisreduziert · Bestseller – price reduced

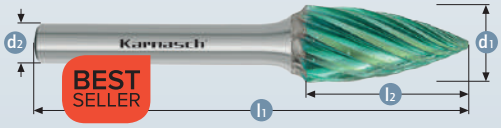
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6095 010 | • 6 | 18 | 6 | 50 | | ✔ | 14,70 |
| 11 6095 020 | • 8 | 20 | 6 | 65 | ✔ | | 17,00 |
| 11 6095 030 | • 10 | 20 | 6 | 65 | ✔ | | 19,45 |
| 11 6095 040 | • 12DIN | 25 | 6 | 70 | ✔ | | 27,05 |
| 11 6095 050 | • 16 | 25 | 6 | 70 | ✔ | | 35,85 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4095 010 | • 6 | 18 | 6 | 50 | | ✔ | 12,40 |
| 11 4095 020 | • 8 | 20 | 6 | 65 | ✔ | | 14,60 |
| 11 4095 030 | • 10 | 20 | 6 | 65 | ✔ | | 15,65 |
| 11 4095 040 | • 12DIN | 25 | 6 | 70 | ✔ | | 23,10 |
| 11 4095 050 | • 16 | 25 | 6 | 70 | ✔ | | 31,90 |

## 11 6096

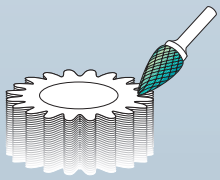


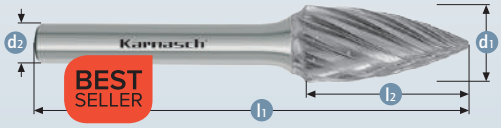

**G** FORM / SHAPE **SPG**

Spitzbogen

Tree



## 11 4096




Schnittdaten Cutting data 748

Film Movie

Bestseller – preisreduziert · Bestseller – price reduced

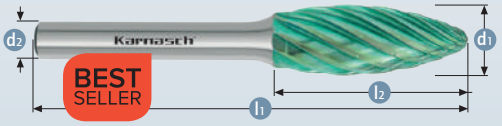
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6096 010 | • 6 | 18 | 6 | 50 | | ✔ | 14,70 |
| 11 6096 020 | • 8 | 20 | 6 | 65 | ✔ | | 17,50 |
| 11 6096 030 | • 10 | 20 | 6 | 65 | ✔ | | 20,50 |
| 11 6096 040 | • 12DIN | 25 | 6 | 70 | ✔ | | 26,60 |
| 11 6096 050 | • 16 | 25 | 6 | 70 | ✔ | | 35,45 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4096 010 | • 6 | 18 | 6 | 50 | | ✔ | 12,40 |
| 11 4096 020 | • 8 | 20 | 6 | 65 | ✔ | | 15,05 |
| 11 4096 030 | • 10 | 20 | 6 | 65 | ✔ | | 16,70 |
| 11 4096 040 | • 12DIN | 25 | 6 | 70 | ✔ | | 22,65 |
| 11 4096 050 | • 16 | 25 | 6 | 70 | ✔ | | 31,50 |

## 11 6097

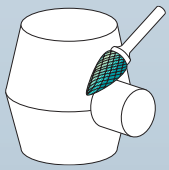


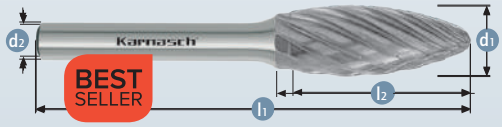

**H** FORM / SHAPE

Flamme

Flame



## 11 4097




Schnittdaten Cutting data 748

Film Movie

Bestseller – preisreduziert · Bestseller – price reduced

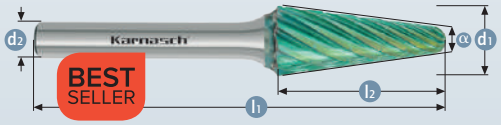
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6097 010 | • 6 | 14 | 6 | 50 | | ✔ | 14,70 |
| 11 6097 020 | • 8 | 20 | 6 | 65 | ✔ | | 18,85 |
| 11 6097 030 | • 10 | 20 | 6 | 65 | ✔ | | 32,40 |
| 11 6097 040 | • 12DIN | 30 | 6 | 75 | ✔ | | 37,40 |
| 11 6097 050 | • 16 | 35 | 6 | 80 | ✔ | | 50,15 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4097 010 | • 6 | 14 | 6 | 50 | | ✔ | 12,40 |
| 11 4097 020 | • 8 | 20 | 6 | 65 | ✔ | | 16,40 |
| 11 4097 030 | • 10 | 20 | 6 | 65 | ✔ | | 28,45 |
| 11 4097 040 | • 12DIN | 30 | 6 | 75 | ✔ | | 33,45 |
| 11 4097 050 | • 16 | 35 | 6 | 80 | ✔ | | 46,20 |

## 11 6098

GREENTEC BESCHICHTET COATED



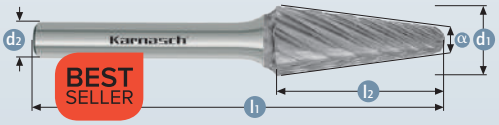

**L** FORM / SHAPE **KEL**

Rundkegel

Ball nosed cone



## 11 4098




Schnittdaten Cutting data 748

Film Movie

Bestseller – preisreduziert · Bestseller – price reduced

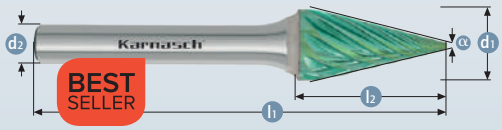
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 6098 010 | • 6 | 18 | 6 | 50 | | ✔ | 14° | 15,00 |
| 11 6098 020 | • 8 | 25 | 6 | 70 | ✔ | | 14° | 19,05 |
| 11 6098 030 | • 10 | 20 | 6 | 65 | ✔ | | 14° | 19,90 |
| 11 6098 040 | • 12DIN | 30 | 6 | 75 | ✔ | | 14° | 28,35 |
| 11 6098 050 | • 16 | 33 | 6 | 78 | ✔ | | 14° | 47,15 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 4098 010 | • 6 | 18 | 6 | 50 | | ✔ | 14° | 12,70 |
| 11 4098 020 | • 8 | 25 | 6 | 70 | ✔ | | 14° | 16,65 |
| 11 4098 030 | • 10 | 20 | 6 | 65 | ✔ | | 14° | 16,00 |
| 11 4098 040 | • 12DIN | 30 | 6 | 75 | ✔ | | 14° | 24,40 |
| 11 4098 050 | • 16 | 33 | 6 | 78 | ✔ | | 14° | 43,20 |

## 11 6099

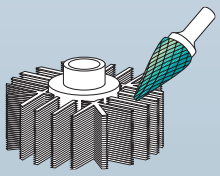
GREENTEC BESCHICHTET COATED



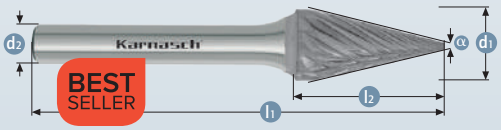

**M** FORM / SHAPE **SKM**

Spitzkegel

Cone



## 11 4099




Schnittdaten Cutting data 748

Film Movie

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 6099 010 | • 6 | 18 | 6 | 50 | | ✔ | 14° | 15,00 |
| 11 6099 020 | • 8 | 20 | 6 | 65 | ✔ | | 13° | 20,95 |
| 11 6099 030 | • 10 | 20 | 6 | 65 | ✔ | | 28° | 23,95 |
| 11 6099 040 | • 12DIN | 26 | 6 | 71 | ✔ | | 28° | 29,00 |
| 11 6099 050 | • 16 | 25 | 6 | 70 | ✔ | | 33° | 37,40 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 4099 010 | • 6 | 18 | 6 | 50 | | ✔ | 14° | 12,70 |
| 11 4099 020 | • 8 | 20 | 6 | 65 | ✔ | | 13° | 18,55 |
| 11 4099 030 | • 10 | 20 | 6 | 65 | ✔ | | 28° | 20,05 |
| 11 4099 040 | • 12DIN | 26 | 6 | 71 | ✔ | | 28° | 25,05 |
| 11 4099 050 | • 16 | 25 | 6 | 70 | ✔ | | 33° | 33,45 |

# HP-3



BEST SELLER

VALUETOOL

## Die am meisten verwendete Universalverzahnung

## The most widely used universal cutting style

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | |

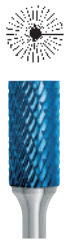
✓ OPTIMAL OPTIMAL

✓ GUT GOOD

- Hohe Zerspanleistung durch Kreuzverzahnung:
  - Ruhiger Lauf
  - Kurze Späne
- Für alle Stahlsorten wie:
  - Gusseisen
  - Stahl < 60 HRC
  - Edelstahl (INOX)
  - Nickelbasis- und Titanlegierungen
- Auch Kupfer, Messing, Bronze

- High cutting action through cross cutting style
  - Smooth operation
  - Short chips
- For use on all ferrous metals such as:
  - Cast iron
  - Steel < 60 HRC
  - Stainless steel (INOX)
  - Nickel basis and titanium alloy
- Also copper, brass, bronze

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

| ZYA | ZYB | ZYA | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM | WKN | KSJ | KSK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | | C | D | E | F | G | H | L | M | N | J | K |
| Art. 11 5001<br>Art. 11 3001 | Art. 11 5011<br>Art. 11 3011 | Art. 11 6010<br>Art. 11 4010 | Art. 11 5021<br>Art. 11 3021 | Art. 11 5031<br>Art. 11 3031 | Art. 11 5041<br>Art. 11 3041 | Art. 11 5051<br>Art. 11 3051 | Art. 11 5061<br>Art. 11 3061 | Art. 11 5071<br>Art. 11 3071 | Art. 11 5081<br>Art. 11 3081 | Art. 11 5091<br>Art. 11 3091 | Art. 11 5096<br>Art. 11 3096 | Art. 11 5101<br>Art. 11 3101 | Art. 11 5111<br>Art. 11 3111 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 756 | 757 | 759 | 760 | 761 | 762 | 763 | 764 | 765 | 765 | 766 | 766 | 767 | 767 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Zylinder-Radius<br>Cylinder-Radius | Walzenrundform<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone | Winkel<br>Inverted cone | Kegel 60°<br>Countersink 60° | Kegel 90°<br>Countersink 90° |




BLUE-TEC-beschichtet
BLUE-TEC-coated

Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.



Sets + Displays s. Seite 881
sets + displays see page 881



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| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---|---|---|---|---|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Grobes Zerspanen mit hohen Materialabtrag | 450–600 |
| | Gehärtete, vergütete Stähle über 1200 N/mm² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 250–350 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Grobes Zerspanen mit hohen Materialabtrag | 250–350 |
| NE-Metalle | Harte NE-Metalle | Bronze, Titan/Titanlegierungen, harte Alulegierungen (hoher Si-Anteil) | Grobes Zerspanen mit hohen Materialabtrag | 250–350 |
| | Hochwarmfeste Werkstoffe | Nickelbasis- und Kobaltbasislegierungen (Triebwerk- und Turbinenbau) | | 300–450 |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/Späroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | Grobes Zerspanen mit hohen Materialabtrag | 450–600 |

| Material groups | | | Application | Cutting speed m/min |
|---|---|---|---|---|
| Steel, cast steel | Non-hardened, non-heat treated steels up to 1200 N/mm² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Coarse machining with high stock removal | 450–600 |
| | Hardened, heat-treated steels exceeding 1200 N/mm² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 250–350 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Coarse machining with high stock removal | 250–350 |
| Non-ferrous metals | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard alu-alloys (high Si content) | Coarse machining with high stock removal | 250–350 |
| | High-temperature resistant materials | Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction) | | 300–450 |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Coarse machining with high stock removal | 450–600 |

**Schnittgeschwindigkeit • Cutting speed (m/min)**

| | 250 | 300 | 350 | 400 | 450 | 500 | 600 |
|---|---|---|---|---|---|---|---|
| ∅ (mm) | Drehzahlen (min⁻¹) • Rotational speed (rpm) | | | | | | |
| 2 | 40.000 | 48.000 | 56.000 | 64.000 | 72.000 | 80.000 | 95.000 |
| 3 | 27.000 | 32.000 | 37.000 | 42.000 | 48.000 | 53.000 | 64.000 |
| 4 | 20.000 | 24.000 | 28.000 | 32.000 | 36.000 | 40.000 | 48.000 |
| 6 | 13.000 | 16.000 | 19.000 | 21.000 | 24.000 | 27.000 | 32.000 |
| 8 | 10.000 | 12.000 | 14.000 | 16.000 | 18.000 | 20.000 | 24.000 |
| 10 | 8.000 | 10.000 | 11.000 | 13.000 | 14.000 | 16.000 | 19.000 |
| 12 | 7.000 | 8.000 | 9.000 | 11.000 | 12.000 | 13.000 | 16.000 |
| 16 | 5.000 | 6.000 | 7.000 | 8.000 | 9.000 | 10.000 | 12.000 |
| 20 | 4.000 | 5.000 | 6.000 | 6.000 | 7.000 | 8.000 | 10.000 |
| 25 | 3.000 | 4.000 | 4.000 | 5.000 | 6.000 | 6.000 | 8.000 |





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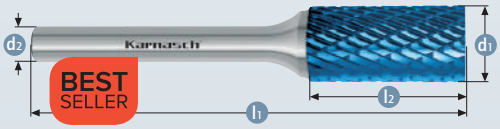
**11 5001**

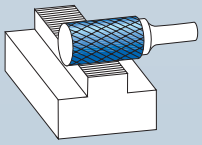
BLUETEC BESCHICHTET COATED



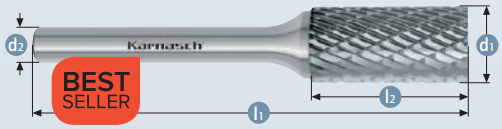

**A** FORM / SHAPE **ZYA**

Zylinder ohne Stirnverzahnung

Cylinder without end cut



**11 3001**




VALUETOOL

Schnittdaten Cutting data 755

Film Movie

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5001 015 | 1,5 | 6 | 3 | 38 | | ✔ | 7,60 |
| 11 5001 025 | 2 | 11 | 3 | 38 | | ✔ | 7,60 |
| 11 5001 027 | 2,5 | 11 | 3 | 38 | | ✔ | 7,60 |
| 11 5001 030 | 3 | 14 | 3 | 38 | | ✔ | 7,60 |
| 11 5001 035 | 3 | 14 | 3 | 50 | | ✔ | 8,95 |
| 11 5001 040 | 3 | 14 | 3 | 65 | | ✔ | 9,90 |
| 11 5001 045 | 3 | 14 | 3 | 75 | | ✔ | 10,90 |
| 11 5001 050 | 3 | 14 | 3 | 100 | | ✔ | 13,60 |
| 11 5001 052 | 3 | 12,7 | 6 | 50 | | ✔ | 10,10 |
| 11 5001 055 | 4 | 14 | 6 | 50 | | ✔ | 10,10 |
| 11 5001 057 | 5 | 12,7 | 3 | 38 | | ✔ | 15,70 |
| 11 5001 058 | 5 | 16 | 6 | 50 | | ✔ | 10,10 |
| 11 5001 059 | 6 | 5 | 3 | 37 | ✔ | | 9,65 |
| 11 5001 060 | 6 | 13 | 3 | 45 | ✔ | | 12,20 |
| 11 5001 065 | 6 | 18 | 6 | 50 | | ✔ | 10,10 |
| 11 5001 067 | 6 | 25 | 6 | 50 | | ✔ | 13,70 |
| 11 5001 070 | 6 | 18 | 6 | 100 | ✔ | | 17,85 |
| 11 5001 075 | 6 | 18 | 6 | 150 | ✔ | | 25,40 |
| 11 5001 080 | 8 | 20 | 6 | 65 | ✔ | | 12,60 |
| 11 5001 085 | 8 | 20 | 6 | 170 | ✔ | | 18,30 |
| 11 5001 087 | 10 | 13 | 6 | 58 | ✔ | | 15,50 |
| 11 5001 090 | 10 | 20 | 6 | 65 | ✔ | | 14,50 |
| 11 5001 095 | 10 | 20 | 6 | 172 | ✔ | | 21,95 |
| 11 5001 100 | 10 | 25 | 6 | 70 | ✔ | | 16,70 |
| 11 5001 103 | 12 | 20 | 6 | 64 | ✔ | | 23,75 |
| 11 5001 105 | 12 | 25 | 6 | 70 | ✔ | | 22,25 |
| 11 5001 107 | 12DIN | 25 | 6 | 70 | ✔ | | 20,50 |
| 11 5001 110 | 12 | 25 | 6 | 175 | ✔ | | 32,25 |
| 11 5001 115 | 12 | 25 | 8 | 70 | ✔ | | 24,20 |
| 11 5001 120 | 16 | 25 | 6 | 70 | ✔ | | 26,95 |
| 11 5001 125 | 16 | 25 | 8 | 70 | ✔ | | 28,95 |
| 11 5001 130 | 20 | 25 | 6 | 70 | ✔ | | 40,90 |
| 11 5001 140 | 25 | 25 | 6 | 70 | ✔ | | 52,80 |
| 11 5001 145 | 25 | 25 | 8 | 70 | ✔ | | 54,75 |

Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3001 015 | 1,5 | 6 | 3 | 38 | | ✔ | 5,80 |
| 11 3001 025 | 2 | 11 | 3 | 38 | | ✔ | 5,80 |
| 11 3001 027 | 2,5 | 11 | 3 | 38 | | ✔ | 3,60 |
| 11 3001 030 | 3 | 14 | 3 | 38 | | ✔ | 5,80 |
| 11 3001 031 | 3 | 14 | 3 | 38 | | ✔ | 3,95 |
| 11 3001 035 | 3 | 14 | 3 | 50 | | ✔ | 7,20 |
| 11 3001 040 | 3 | 14 | 3 | 65 | | ✔ | 8,10 |
| 11 3001 045 | 3 | 14 | 3 | 75 | | ✔ | 9,15 |
| 11 3001 050 | 3 | 14 | 3 | 100 | | ✔ | 11,80 |
| 11 3001 052 | 3 | 12,7 | 6 | 50 | | ✔ | 8,30 |
| 11 3001 055 | 4 | 14 | 6 | 50 | | ✔ | 8,30 |
| 11 3001 057 | 5 | 12,7 | 3 | 38 | | ✔ | 13,95 |
| 11 3001 058 | 5 | 16 | 6 | 50 | | ✔ | 8,30 |
| 11 3001 059 | 6 | 5 | 3 | 37 | ✔ | | 7,85 |
| 11 3001 060 | 6 | 13 | 3 | 45 | ✔ | | 10,45 |
| 11 3001 065 | 6 | 18 | 6 | 50 | | ✔ | 8,30 |
| 11 3001 066 | 6 | 18 | 6 | 50 | | ✔ | 6,20 |
| 11 3001 067 | 6 | 25 | 6 | 50 | | ✔ | 11,95 |
| 11 3001 070 | 6 | 18 | 6 | 100 | ✔ | | 16,05 |
| 11 3001 075 | 6 | 18 | 6 | 150 | ✔ | | 22,60 |
| 11 3001 080 | 8 | 20 | 6 | 65 | ✔ | | 10,80 |
| 11 3001 081 | 8 | 20 | 6 | 65 | ✔ | | 8,10 |
| 11 3001 085 | 8 | 20 | 6 | 170 | ✔ | | 15,50 |
| 11 3001 087 | 10 | 13 | 6 | 58 | ✔ | | 12,65 |
| 11 3001 090 | 10 | 20 | 6 | 65 | ✔ | | 11,60 |
| 11 3001 091 | 10 | 20 | 6 | 65 | ✔ | | 8,70 |
| 11 3001 095 | 10 | 20 | 6 | 172 | ✔ | | 16,20 |
| 11 3001 100 | 10 | 25 | 6 | 70 | ✔ | | 13,80 |
| 11 3001 103 | 12 | 20 | 6 | 64 | ✔ | | 19,55 |
| 11 3001 105 | 12 | 25 | 6 | 70 | ✔ | | 18,05 |
| 11 3001 107 | 12DIN | 25 | 6 | 70 | ✔ | | 16,30 |
| 11 3001 108 | 12DIN | 25 | 6 | 70 | ✔ | | 13,55 |
| 11 3001 110 | 12 | 25 | 6 | 175 | ✔ | | 25,25 |
| 11 3001 115 | 12 | 25 | 8 | 70 | ✔ | | 19,95 |
| 11 3001 120 | 16 | 25 | 6 | 70 | ✔ | | 22,75 |
| 11 3001 121 | 16 | 25 | 6 | 70 | ✔ | | 17,10 |
| 11 3001 125 | 16 | 25 | 8 | 70 | ✔ | | 24,75 |
| 11 3001 130 | 20 | 25 | 6 | 70 | ✔ | | 33,85 |
| 11 3001 140 | 25 | 25 | 6 | 70 | ✔ | | 47,35 |
| 11 3001 145 | 25 | 25 | 8 | 70 | ✔ | | 30,60 |

Der revolutionäre Zylinder-Radius Frässtift siehe Seite 758/759
The revolutionary cylinder-radius burr see page 758/759



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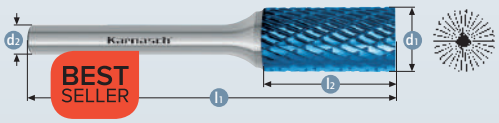
**11 5011**

**11 3011**

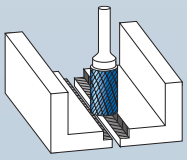
BLUETEC BESCHICHTET COATED

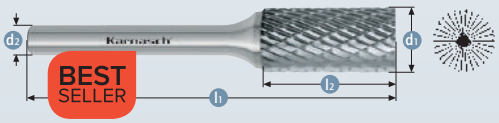



**B** FORM / SHAPE **ZYB**

Zylinder mit Stirnverzahnung

Cylinder with end cut






VALUETOOL

Schnittdaten Cutting data

Film Movie

755

Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5011 005 | • 1,5 | 6 | 3 | 38 | | ✔ | 7,55 |
| 11 5011 010 | • 2 | 11 | 3 | 38 | | ✔ | 8,20 |
| 11 5011 012 | • 2,5 | 11 | 3 | 38 | | ✔ | 7,55 |
| 11 5011 015 | • 3 | 14 | 3 | 38 | | ✔ | 7,45 |
| | | | | | | | |
| 11 5011 020 | • 3 | 14 | 3 | 50 | | ✔ | 9,60 |
| 11 5011 025 | • 3 | 14 | 3 | 65 | | ✔ | 10,70 |
| 11 5011 030 | • 3 | 14 | 3 | 75 | | ✔ | 11,80 |
| 11 5011 035 | • 3 | 14 | 3 | 100 | | ✔ | 14,80 |
| 11 5011 037 | • 3 | 12,7 | 6 | 50 | | ✔ | 10,70 |
| 11 5011 040 | • 4 | 14 | 6 | 50 | | ✔ | 10,70 |
| 11 5011 042 | • 5 | 16 | 6 | 50 | | ✔ | 10,70 |
| 11 5011 043 | • 6 | 5 | 3 | 37 | ✔ | | 11,30 |
| 11 5011 045 | • 6 | 13 | 3 | 45 | ✔ | | 13,25 |
| 11 5011 050 | • 6 | 18 | 6 | 50 | | ✔ | 10,70 |
| | | | | | | | |
| 11 5011 055 | • 6 | 18 | 6 | 75 | | ✔ | 13,45 |
| 11 5011 060 | • 6 | 18 | 6 | 100 | ✔ | | 19,45 |
| 11 5011 065 | • 6 | 18 | 6 | 150 | ✔ | | 27,65 |
| 11 5011 070 | • 6 | 25 | 6 | 50 | | ✔ | 14,90 |
| 11 5011 075 | • 8 | 20 | 6 | 65 | ✔ | | 13,60 |
| | | | | | | | |
| 11 5011 080 | • 8 | 20 | 6 | 170 | ✔ | | 19,85 |
| 11 5011 082 | • 10 | 13 | 6 | 58 | ✔ | | 16,80 |
| 11 5011 085 | • 10 | 20 | 6 | 65 | ✔ | | 15,60 |
| | | | | | | | |
| 11 5011 090 | • 10 | 20 | 6 | 172 | ✔ | | 24,05 |
| 11 5011 095 | • 10 | 25 | 6 | 70 | ✔ | | 17,95 |
| 11 5011 097 | % 11 | 25 | 6 | 70 | ✔ | | 13,25 |
| 11 5011 099 | • 12 | 20 | 6 | 64 | ✔ | | 25,75 |
| 11 5011 100 | • 12 | 25 | 6 | 70 | ✔ | | 24,05 |
| 11 5011 103 | • 12DIN | 25 | 6 | 70 | ✔ | | 22,10 |
| | | | | | | | |
| 11 5011 105 | • 12 | 25 | 6 | 175 | ✔ | | 35,65 |
| 11 5011 110 | • 12 | 25 | 8 | 70 | ✔ | | 26,15 |
| 11 5011 115 | • 16 | 25 | 6 | 70 | ✔ | | 29,20 |
| | | | | | | | |
| 11 5011 120 | • 16 | 25 | 8 | 70 | ✔ | | 31,15 |
| 11 5011 125 | • 20 | 25 | 6 | 70 | ✔ | | 42,70 |
| 11 5011 130 | • 20 | 25 | 8 | 70 | ✔ | | 44,90 |
| 11 5011 135 | • 25 | 25 | 6 | 70 | ✔ | | 57,55 |
| 11 5011 140 | • 25 | 25 | 8 | 70 | ✔ | | 59,50 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3011 005 | • 1,5 | 6 | 3 | 38 | | ✔ | 5,80 |
| 11 3011 010 | • 2 | 11 | 3 | 38 | | ✔ | 6,45 |
| 11 3011 012 | • 2,5 | 11 | 3 | 38 | | ✔ | 5,80 |
| 11 3011 015 | • 3 | 14 | 3 | 38 | | ✔ | 5,70 |
| 11 3011 016 | • 3 | 14 | 3 | 38 | | ✔ | 4,35 |
| 11 3011 020 | • 3 | 14 | 3 | 50 | | ✔ | 7,85 |
| 11 3011 025 | • 3 | 14 | 3 | 65 | | ✔ | 8,90 |
| 11 3011 030 | • 3 | 14 | 3 | 75 | | ✔ | 10,00 |
| 11 3011 035 | • 3 | 14 | 3 | 100 | | ✔ | 13,00 |
| 11 3011 037 | • 3 | 12,7 | 6 | 50 | | ✔ | 8,95 |
| 11 3011 040 | • 4 | 14 | 6 | 50 | | ✔ | 8,95 |
| 11 3011 042 | • 5 | 16 | 6 | 50 | | ✔ | 8,95 |
| 11 3011 043 | • 6 | 5 | 3 | 37 | ✔ | | 9,50 |
| 11 3011 045 | • 6 | 13 | 3 | 45 | ✔ | | 11,50 |
| 11 3011 050 | • 6 | 18 | 6 | 50 | | ✔ | 8,95 |
| 11 3011 051 | • 6 | 18 | 6 | 50 | | ✔ | 6,80 |
| 11 3011 055 | • 6 | 18 | 6 | 75 | | ✔ | 11,65 |
| 11 3011 060 | • 6 | 18 | 6 | 100 | ✔ | | 17,65 |
| 11 3011 065 | • 6 | 18 | 6 | 150 | ✔ | | 24,85 |
| 11 3011 070 | • 6 | 25 | 6 | 50 | | ✔ | 13,10 |
| 11 3011 075 | • 8 | 20 | 6 | 65 | ✔ | | 11,85 |
| 11 3011 076 | • 8 | 20 | 6 | 65 | ✔ | | 8,90 |
| 11 3011 080 | • 8 | 20 | 6 | 170 | ✔ | | 17,00 |
| 11 3011 082 | % 10 | 13 | 6 | 58 | ✔ | | 8,65 |
| 11 3011 085 | • 10 | 20 | 6 | 65 | ✔ | | 12,75 |
| 11 3011 086 | • 10 | 20 | 6 | 65 | ✔ | | 9,60 |
| 11 3011 090 | • 10 | 20 | 6 | 172 | ✔ | | 18,25 |
| 11 3011 095 | • 10 | 25 | 6 | 70 | ✔ | | 15,10 |
| 11 3011 097 | • 11 | 25 | 6 | 70 | ✔ | | 18,50 |
| 11 3011 099 | • 12 | 20 | 6 | 64 | ✔ | | 21,55 |
| 11 3011 100 | • 12 | 25 | 6 | 70 | ✔ | | 19,85 |
| 11 3011 103 | • 12DIN | 25 | 6 | 70 | ✔ | | 17,90 |
| 11 3011 104 | • 12DIN | 25 | 6 | 70 | ✔ | | 14,95 |
| 11 3011 105 | • 12 | 25 | 6 | 175 | ✔ | | 28,60 |
| 11 3011 110 | • 12 | 25 | 8 | 70 | ✔ | | 21,95 |
| 11 3011 115 | • 16 | 25 | 6 | 70 | ✔ | | 25,00 |
| 11 3011 116 | • 16 | 25 | 6 | 70 | ✔ | | 18,80 |
| 11 3011 120 | • 16 | 25 | 8 | 70 | ✔ | | 26,95 |
| 11 3011 125 | • 20 | 25 | 6 | 70 | ✔ | | 37,25 |
| 11 3011 130 | • 20 | 25 | 8 | 70 | ✔ | | 39,45 |
| 11 3011 135 | • 25 | 25 | 6 | 70 | ✔ | | 52,10 |
| 11 3011 140 | • 25 | 25 | 8 | 70 | ✔ | | 54,05 |

Der revolutionäre Zylinder-Radius Frässtift siehe Seite 758/759
The revolutionary cylinder-radius burr see page 758/759




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



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# CYLINDER+RADIUS




## Das einzigartige **CYLINDER+RADIUS** Design verwandelt den herkömmlichen Zylinder Frässtift in ein Hightech Werkzeug.

Diese neue Entwicklung erfüllt die höchsten Herstellungsstandards für alle Arten der Anwendung in der Industrie, darunter speziell auch für die Luft- und Raumfahrtindustrie.

Das spezielle Radius-Design an der Spitze des Zylinders vermeidet Zahnbruch und erhöht wesentlich die Standzeit.

**Durch Radiusdesign:**
- kein Verkanten / Abrutschen in das Werkstück.
- Beschädigungen von teuren Werkzeugen werden vermieden.

**Durch Kreuzverzahnung:**
- exzellente Kontrolle und Führung beim Entgratvorgang.

**Eigenschaften und Vorteile:**
Der Radius an der Spitze des Fräsers ergibt:
- verbesserte Nutenstabilität durch verrundete Kanten.
- Der Radius ermöglicht eine bessere Kontrolle während des Schleifvorgangs.
- Die Rundung verhindert das Verkanten / Abrutschen in das Werkstück.
- Erzeugung eines Radius' auf dem Werkstück
- Rundung reduziert Bruch an der Schnittkante des Fräsers.

## The **CYLINDER+RADIUS** unique design transforms the conventional cylinder burr into a hightech tool.

The new development meets the highest manufacturing standards for all kind of industries, especially the aerospace industry.

**The radius design** at the top of the cylinder provides an extended tool life avoiding teeth breakage.

This unique design with its **double cut** will improve operator control, reduce the size of chips and prevent damage to expensive parts.

**Features and benefits:**
Radius at the top of the cylinder results:
- Offers improved flute strength at the start of the bur.
- The radius provides better control of the burr.
- Prevents digging into work piece at the intersecting point.
- Produces a cylinder radius on the work piece.
- Reduces flute chipping at the intersecting point.



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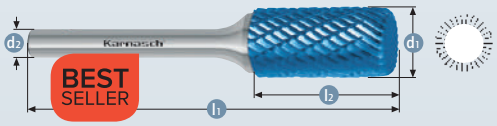
11 6010

BLUETEC BESCHICHTET COATED

HP-3

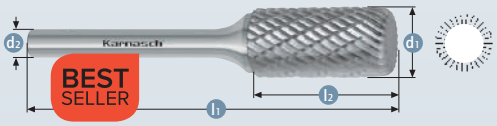
11 4010




**A** FORM / SHAPE **ZYA**

Zylinder-Radius

Cylinder-Radius




Schnittdaten
Cutting data

755

Film
Movie

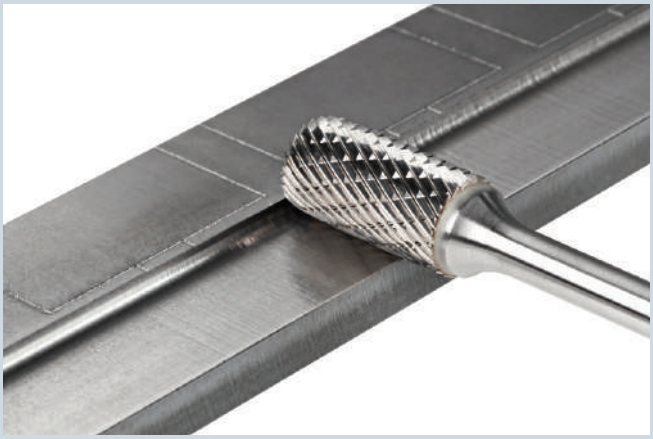
Bestseller – preisreduziert · Bestseller – price reduced

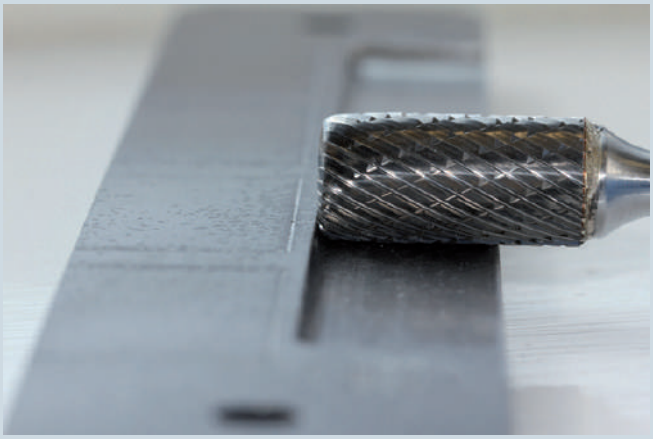
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6010 005 | 3 | 14 | 3 | 38 | | ✔ | 8,45 |
| 11 6010 010 | 6 | 18 | 6 | 50 | | ✔ | 11,30 |
| 11 6010 015 | 8 | 19 | 6 | 64 | ✔ | | 14,15 |
| 11 6010 020 | 10 | 19 | 6 | 64 | ✔ | | 16,25 |
| 11 6010 025 | 12 | 25 | 6 | 70 | ✔ | | 24,95 |
| 11 6010 030 | 16 | 25 | 6 | 70 | ✔ | | 30,35 |

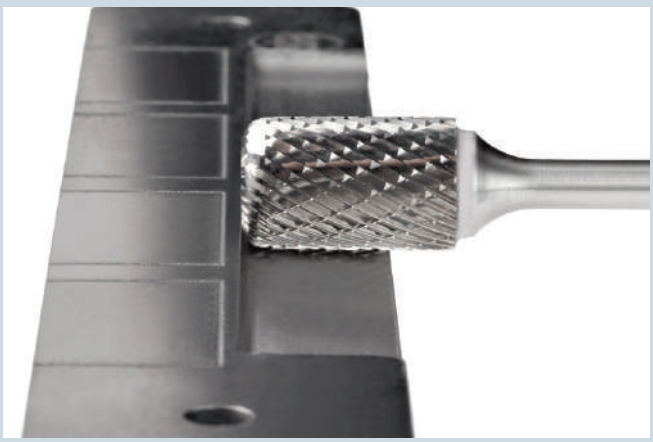
Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4010 005 | 3 | 14 | 3 | 38 | | ✔ | 6,65 |
| 11 4010 010 | 6 | 18 | 6 | 50 | | ✔ | 9,55 |
| 11 4010 015 | 8 | 19 | 6 | 64 | ✔ | | 12,40 |
| 11 4010 020 | 10 | 19 | 6 | 64 | ✔ | | 13,35 |
| 11 4010 025 | 12 | 25 | 6 | 70 | ✔ | | 20,75 |
| 11 4010 030 | 16 | 25 | 6 | 70 | ✔ | | 26,15 |

## Anwendungsbeispiele / Application examples











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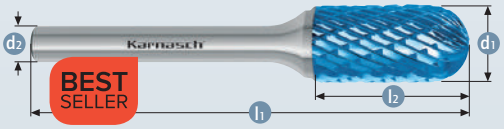
## 11 5021

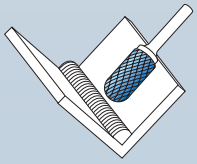
BLUETEC BESCHICHTET COATED



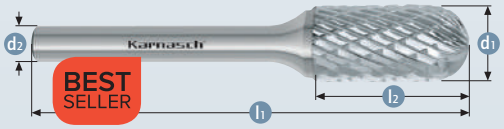

**C** FORM / SHAPE **WRC**

Walzenrundform

Ball nosed cylinder



## 11 3021




VALUETOOL

Schnittdaten Cutting data

Film Movie

755

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5021 020 | • 2 | 11 | 3 | 38 | | ✔ | 7,60 |
| 11 5021 022 | • 2,5 | 11 | 3 | 38 | | ✔ | 7,45 |
| 11 5021 025 | • 3 | 14 | 3 | 38 | | ✔ | 7,60 |
| | | | | | | | |
| 11 5021 030 | •• 3 | 14 | 3 | 50 | | ✔ | 9,90 |
| 11 5021 032 | •• 3 | 14 | 3 | 60 | | ✔ | 10,40 |
| 11 5021 035 | •• 3 | 14 | 3 | 75 | | ✔ | 10,90 |
| 11 5021 040 | •• 3 | 14 | 3 | 100 | | ✔ | 13,70 |
| 11 5021 042 | • 3 | 12,7 | 6 | 50 | | ✔ | 11,75 |
| 11 5021 043 | •• 3 | 30*(15) | 6 | 60 | | ✔ | 21,70 |
| 11 5021 045 | • 4 | 16 | 6 | 50 | | ✔ | 11,35 |
| 11 5021 046 | •• 4 | 30*(15) | 6 | 60 | | ✔ | 22,25 |
| 11 5021 047 | • 5 | 12,7 | 3 | 38 | | ✔ | 15,70 |
| 11 5021 049 | • 5 | 16 | 6 | 50 | | ✔ | 11,35 |
| 11 5021 050 | • 6 | 12,7 | 3 | 44 | ✔ | | 11,30 |
| | | | | | | | |
| 11 5021 055 | •• 6 | 18 | 6 | 50 | | ✔ | 11,35 |
| 11 5021 056 | •• 6 | 18 | 6 | 60 | | ✔ | 15,20 |
| 11 5021 058 | •• 6 | 18 | 6 | 80 | | ✔ | 18,05 |
| 11 5021 060 | •• 6 | 18 | 6 | 100 | ✔ | | 20,40 |
| 11 5021 065 | •• 6 | 18 | 6 | 150 | ✔ | | 29,00 |
| 11 5021 070 | • 6 | 25 | 6 | 50 | | ✔ | 14,90 |
| 11 5021 075 | • 8 | 20 | 6 | 65 | ✔ | | 13,50 |
| | | | | | | | |
| 11 5021 080 | • 8 | 20 | 6 | 170 | ✔ | | 19,70 |
| 11 5021 085 | • 10 | 20 | 6 | 65 | ✔ | | 15,75 |
| | | | | | | | |
| 11 5021 090 | • 10 | 20 | 6 | 170 | ✔ | | 23,80 |
| 11 5021 095 | • 10 | 25 | 6 | 70 | ✔ | | 18,00 |
| 11 5021 097 | • 11 | 25 | 6 | 70 | ✔ | | 22,65 |
| 11 5021 099 | • 12 | 10 | 6 | 54 | ✔ | | 26,20 |
| 11 5021 100 | • 12 | 20 | 6 | 65 | ✔ | | 25,80 |
| 11 5021 105 | • 12 | 25 | 6 | 70 | ✔ | | 24,45 |
| 11 5021 107 | • 12DIN | 25 | 6 | 70 | ✔ | | 22,50 |
| | | | | | | | |
| 11 5021 110 | • 12 | 25 | 6 | 175 | ✔ | | 35,35 |
| 11 5021 115 | • 12 | 25 | 8 | 70 | ✔ | | 26,60 |
| 11 5021 120 | • 16 | 25 | 6 | 70 | ✔ | | 29,75 |
| | | | | | | | |
| 11 5021 125 | • 16 | 25 | 8 | 70 | ✔ | | 32,60 |
| 11 5021 130 | • 20 | 25 | 6 | 70 | ✔ | | 42,10 |
| 11 5021 135 | • 20 | 25 | 8 | 70 | ✔ | | 44,00 |

Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

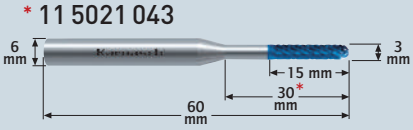
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3021 020 | • 2 | 11 | 3 | 38 | | ✔ | 5,80 |
| 11 3021 022 | • 2,5 | 11 | 3 | 38 | | ✔ | 5,70 |
| 11 3021 025 | • 3 | 14 | 3 | 38 | | ✔ | 5,80 |
| 11 3021 026 | • 3 | 14 | 3 | 38 | | ✔ | 3,95 |
| 11 3021 030 | •• 3 | 14 | 3 | 50 | | ✔ | 8,10 |
| 11 3021 032 | •• 3 | 14 | 3 | 60 | | ✔ | 8,60 |
| 11 3021 035 | •• 3 | 14 | 3 | 75 | | ✔ | 9,15 |
| 11 3021 040 | •• 3 | 14 | 3 | 100 | | ✔ | 11,90 |
| 11 3021 042 | • 3 | 12,7 | 6 | 50 | | ✔ | 9,95 |
| 11 3021 043 | •• 3 | 30*(15) | 6 | 60 | | ✔ | 19,95 |
| 11 3021 045 | • 4 | 16 | 6 | 50 | | ✔ | 9,60 |
| 11 3021 046 | •• 4 | 30*(15) | 6 | 60 | | ✔ | 20,50 |
| 11 3021 047 | • 5 | 12,7 | 3 | 38 | | ✔ | 13,95 |
| 11 3021 049 | • 5 | 16 | 6 | 50 | | ✔ | 9,60 |
| 11 3021 050 | • 6 | 12,7 | 3 | 44 | ✔ | | 9,50 |
| 11 3021 054 | •• 6 | 18 | 6 | 50 | | ✔ | 7,20 |
| 11 3021 055 | •• 6 | 18 | 6 | 50 | | ✔ | 9,60 |
| 11 3021 056 | •• 6 | 18 | 6 | 60 | | ✔ | 13,40 |
| 11 3021 058 | •• 6 | 18 | 6 | 80 | | ✔ | 16,30 |
| 11 3021 060 | •• 6 | 18 | 6 | 100 | ✔ | | 18,65 |
| 11 3021 065 | •• 6 | 18 | 6 | 150 | ✔ | | 26,20 |
| 11 3021 070 | • 6 | 25 | 6 | 50 | | ✔ | 13,10 |
| 11 3021 075 | • 8 | 20 | 6 | 65 | ✔ | | 11,75 |
| 11 3021 076 | • 8 | 20 | 6 | 65 | ✔ | | 8,85 |
| 11 3021 080 | • 8 | 20 | 6 | 170 | ✔ | | 16,90 |
| 11 3021 085 | • 10 | 20 | 6 | 65 | ✔ | | 12,90 |
| 11 3021 086 | • 10 | 20 | 6 | 65 | ✔ | | 9,70 |
| 11 3021 090 | • 10 | 20 | 6 | 170 | ✔ | | 18,00 |
| 11 3021 095 | • 10 | 25 | 6 | 70 | ✔ | | 15,10 |
| 11 3021 097 | • 11 | 25 | 6 | 70 | ✔ | | 18,45 |
| | | | | | | | |
| 11 3021 100 | • 12 | 20 | 6 | 65 | ✔ | | 21,60 |
| 11 3021 105 | • 12 | 25 | 6 | 70 | ✔ | | 20,25 |
| 11 3021 107 | • 12DIN | 25 | 6 | 70 | ✔ | | 18,30 |
| 11 3021 108 | • 12DIN | 25 | 6 | 70 | ✔ | | 15,25 |
| 11 3021 110 | • 12 | 25 | 6 | 175 | ✔ | | 28,35 |
| 11 3021 115 | • 12 | 25 | 8 | 70 | ✔ | | 22,40 |
| 11 3021 120 | • 16 | 25 | 6 | 70 | ✔ | | 25,55 |
| 11 3021 121 | • 16 | 25 | 6 | 70 | ✔ | | 19,10 |
| 11 3021 125 | • 16 | 25 | 8 | 70 | ✔ | | 28,35 |
| 11 3021 130 | • 20 | 25 | 6 | 70 | ✔ | | 36,60 |
| 11 3021 135 | • 20 | 25 | 8 | 70 | ✔ | | 38,55 |

• Frässtifte speziell für Schlüsseldienste siehe Seite 840/841

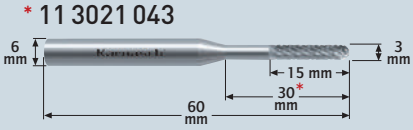
Burrs specially for locksmiths see page 840/841

* Von 30 mm sind 15 mm verzahnt
15 mm by 30 mm are not machined

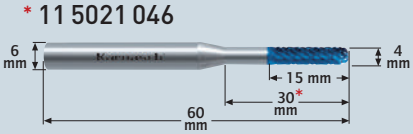
* 11 5021 043



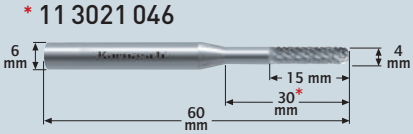

* 11 3021 043




* 11 5021 046




* 11 3021 046





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# 11 5031

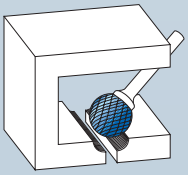
BLUETEC BESCHICHTET COATED




**D** FORM / SHAPE **KUD**

Kugel

Ball



# 11 3031




VALUETOOL

Schnittdaten Cutting data

Film Movie

755

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5031 020 | • 2 | 1,8 | 3 | 38 | | ✔ | 7,60 |
| 11 5031 022 | • 2,5 | 2,3 | 3 | 38 | | ✔ | 7,60 |
| 11 5031 025 | • 3 | 2,5 | 3 | 38 | | ✔ | 7,60 |
| | | | | | | | |
| 11 5031 030 | • 3 | 2,5 | 3 | 50 | | ✔ | 9,30 |
| 11 5031 035 | • 3 | 2,5 | 3 | 75 | | ✔ | 10,30 |
| 11 5031 040 | • 3 | 2,5 | 6 | 50 | | ✔ | 10,55 |
| 11 5031 045 | • 4 | 3,4 | 3 | 38 | | ✔ | 15,70 |
| 11 5031 046 | • 4 | 3,4 | 6 | 50 | | ✔ | 10,95 |
| 11 5031 047 | • 5 | 4,7 | 3 | 38 | | ✔ | 15,70 |
| 11 5031 048 | • 5 | 5,0 | 6 | 50 | | ✔ | 10,55 |
| 11 5031 050 | • 6 | 5,0 | 3 | 38 | ✔ | | 10,95 |
| 11 5031 055 | • 6 | 4,7 | 6 | 50 | | ✔ | 10,55 |
| | | | | | | | |
| 11 5031 060 | • 8 | 6,0 | 6 | 52 | ✔ | | 11,25 |
| | | | | | | | |
| 11 5031 065 | • 8 | 6,0 | 6 | 180 | ✔ | | 16,35 |
| 11 5031 070 | • 10 | 8,0 | 6 | 54 | ✔ | | 13,45 |
| | | | | | | | |
| 11 5031 075 | • 10 | 8,0 | 6 | 185 | ✔ | | 20,65 |
| 11 5031 077 | • 11 | 9,5 | 6 | 55 | ✔ | | 16,45 |
| 11 5031 080 | • 12 | 11,4 | 6 | 56 | ✔ | | 18,40 |
| 11 5031 083 | • 12DIN | 11,0 | 6 | 56 | ✔ | | 17,05 |
| | | | | | | | |
| 11 5031 085 | • 12 | 11,0 | 8 | 56 | ✔ | | 19,30 |
| 11 5031 090 | • 12 | 11,0 | 6 | 162 | ✔ | | 27,00 |
| 11 5031 095 | • 16 | 14,0 | 6 | 60 | ✔ | | 21,90 |
| | | | | | | | |
| 11 5031 100 | • 16 | 14,0 | 8 | 60 | ✔ | | 23,90 |
| 11 5031 105 | • 20 | 16,5 | 6 | 62 | ✔ | | 29,85 |
| 11 5031 110 | • 20 | 16,5 | 8 | 62 | ✔ | | 31,90 |
| 11 5031 115 | • 25 | 22,0 | 6 | 68 | ✔ | | 47,40 |
| 11 5031 120 | • 25 | 22,0 | 8 | 68 | ✔ | | 49,30 |

Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3031 020 | • 2 | 1,8 | 3 | 38 | | ✔ | 5,80 |
| 11 3031 022 | • 2,5 | 2,3 | 3 | 38 | | ✔ | 5,80 |
| 11 3031 025 | • 3 | 2,5 | 3 | 38 | | ✔ | 5,80 |
| 11 3031 026 | • 3 | 2,5 | 3 | 38 | | ✔ | 3,95 |
| 11 3031 030 | • 3 | 2,5 | 3 | 50 | | ✔ | 7,50 |
| 11 3031 035 | • 3 | 2,5 | 3 | 75 | | ✔ | 8,55 |
| 11 3031 040 | • 3 | 2,5 | 6 | 50 | | ✔ | 8,75 |
| 11 3031 045 | • 4 | 3,4 | 3 | 38 | | ✔ | 13,95 |
| 11 3031 046 | • 4 | 3,4 | 6 | 50 | | ✔ | 9,15 |
| 11 3031 047 | • 5 | 4,7 | 3 | 38 | | ✔ | 13,95 |
| 11 3031 048 | • 5 | 5,0 | 6 | 50 | | ✔ | 8,75 |
| 11 3031 050 | • 6 | 5,0 | 3 | 38 | ✔ | | 9,15 |
| 11 3031 055 | • 6 | 4,7 | 6 | 50 | | ✔ | 8,75 |
| 11 3031 056 | • 6 | 4,7 | 6 | 50 | | ✔ | 6,65 |
| 11 3031 060 | • 8 | 6,0 | 6 | 52 | ✔ | | 9,45 |
| 11 3031 061 | • 8 | 7,0 | 6 | 52 | ✔ | | 7,10 |
| 11 3031 065 | • 8 | 6,0 | 6 | 180 | ✔ | | 13,55 |
| 11 3031 070 | • 10 | 8,0 | 6 | 54 | ✔ | | 10,60 |
| 11 3031 071 | • 10 | 9,0 | 6 | 54 | ✔ | | 7,95 |
| 11 3031 075 | • 10 | 8,0 | 6 | 185 | ✔ | | 14,85 |
| 11 3031 077 | • 11 | 9,5 | 6 | 55 | ✔ | | 12,25 |
| 11 3031 080 | • 12 | 11,4 | 6 | 56 | ✔ | | 14,20 |
| 11 3031 083 | • 12DIN | 11,0 | 6 | 56 | ✔ | | 12,85 |
| 11 3031 084 | • 12DIN | 11,0 | 6 | 56 | ✔ | | 10,70 |
| 11 3031 085 | • 12 | 11,0 | 8 | 56 | ✔ | | 15,10 |
| 11 3031 090 | • 12 | 11,0 | 6 | 162 | ✔ | | 19,95 |
| 11 3031 095 | • 16 | 14,0 | 6 | 60 | ✔ | | 17,65 |
| 11 3031 096 | • 16 | 14,0 | 6 | 60 | ✔ | | 13,30 |
| 11 3031 100 | • 16 | 14,0 | 8 | 60 | ✔ | | 19,70 |
| 11 3031 105 | • 20 | 16,5 | 6 | 62 | ✔ | | 24,35 |
| 11 3031 110 | • 20 | 16,5 | 8 | 62 | ✔ | | 26,40 |
| 11 3031 115 | • 25 | 22,0 | 6 | 68 | ✔ | | 41,90 |
| 11 3031 120 | • 25 | 22,0 | 8 | 68 | ✔ | | 43,85 |

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Special price / sale article. While stocks last.



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## 11 5041

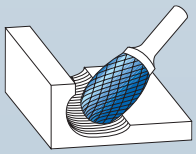
BLUETEC BESCHICHTET COATED




**E** FORM / SHAPE **TRE**

Tropfen

Oval



## 11 3041




VALUETOOL

Schnittdaten Cutting data 755

Film Movie

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5041 010 | • 3 | 6 | 3 | 38 | | ✔ | 7,60 |
| 11 5041 011 | • 3 | 6 | 3 | 75 | | ✔ | 11,10 |
| 11 5041 012 | • 5 | 7,1 | 3 | 38 | | ✔ | 15,70 |
| 11 5041 015 | • 6 | 10 | 3 | 42 | ✔ | | 11,30 |
| 11 5041 020 | • 6 | 10 | 6 | 50 | | ✔ | 12,60 |
| 11 5041 025 | • 8 | 15 | 6 | 60 | ✔ | | 14,80 |
| 11 5041 030 | • 10 | 16 | 6 | 60 | ✔ | | 15,75 |
| 11 5041 032 | • 10 | 16 | 6 | 170 | ✔ | | 29,30 |
| 11 5041 035 | • 12 | 22 | 6 | 67 | ✔ | | 23,05 |
| 11 5041 037 | • 12DIN | 21 | 6 | 66 | ✔ | | 21,25 |
| 11 5041 038 | % 12 | 22 | 6 | 175 | ✔ | | 22,45 |
| 11 5041 040 | • 12 | 22 | 8 | 67 | ✔ | | 25,05 |
| 11 5041 045 | • 16 | 25 | 6 | 70 | ✔ | | 30,35 |
| 11 5041 050 | • 16 | 25 | 8 | 70 | ✔ | | 33,30 |
| 11 5041 055 | • 20 | 25 | 6 | 70 | ✔ | | 40,70 |
| 11 5041 060 | • 20 | 25 | 8 | 70 | ✔ | | 42,65 |

Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3041 005 | • 3 | 6 | 3 | 50 | | ✔ | 7,60 |
| 11 3041 009 | • 3 | 6 | 3 | 38 | | ✔ | 3,95 |
| 11 3041 010 | • 3 | 6 | 3 | 38 | | ✔ | 5,80 |
| 11 3041 011 | • 3 | 6 | 3 | 75 | | ✔ | 9,35 |
| 11 3041 012 | • 5 | 7,1 | 3 | 38 | | ✔ | 13,95 |
| 11 3041 015 | • 6 | 10 | 3 | 42 | ✔ | | 9,50 |
| 11 3041 020 | • 6 | 10 | 6 | 50 | | ✔ | 10,80 |
| 11 3041 021 | • 6 | 10 | 6 | 50 | | ✔ | 8,10 |
| 11 3041 025 | • 8 | 15 | 6 | 60 | ✔ | | 13,05 |
| 11 3041 026 | • 8 | 15 | 6 | 60 | ✔ | | 8,85 |
| 11 3041 030 | • 10 | 16 | 6 | 60 | ✔ | | 12,90 |
| 11 3041 031 | • 10 | 16 | 6 | 60 | ✔ | | 9,70 |
| 11 3041 035 | • 12 | 22 | 6 | 67 | ✔ | | 18,80 |
| 11 3041 036 | • 12DIN | 21 | 6 | 66 | ✔ | | 12,95 |
| 11 3041 037 | • 12DIN | 21 | 6 | 66 | ✔ | | 17,05 |
| 11 3041 038 | • 12 | 22 | 6 | 175 | ✔ | | 29,20 |
| 11 3041 040 | • 12 | 22 | 8 | 67 | ✔ | | 20,85 |
| 11 3041 045 | • 16 | 25 | 6 | 70 | ✔ | | 26,15 |
| 11 3041 046 | • 16 | 25 | 6 | 70 | ✔ | | 19,70 |
| 11 3041 050 | • 16 | 25 | 8 | 70 | ✔ | | 29,10 |
| 11 3041 055 | % 20 | 25 | 6 | 70 | ✔ | | 21,85 |
| 11 3041 060 | • 20 | 25 | 8 | 70 | ✔ | | 37,20 |



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# 11 5051

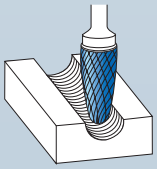
BLUETEC BESCHICHTET COATED



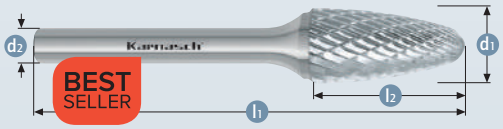

**F** FORM / SHAPE **RBF**

Rundbogen

Ball nosed tree



# 11 3051




VALUETOOL

Schnittdaten Cutting data 755

Film Movie

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5051 007 | • 3 | 6 | 3 | 38 | ✔ | | 7,60 |
| 11 5051 010 | • 3 | 8 | 3 | 38 | | ✔ | 7,60 |
| 11 5051 015 | • 3 | 14 | 3 | 38 | | ✔ | 7,60 |
| | | | | | | | |
| 11 5051 020 | • 3 | 14 | 3 | 50 | | ✔ | 9,90 |
| 11 5051 021 | • 3 | 14 | 3 | 75 | | ✔ | 10,90 |
| 11 5051 022 | • 5 | 12,7 | 3 | 38 | | ✔ | 15,70 |
| 11 5051 025 | • 6 | 12 | 3 | 44 | ✔ | | 11,30 |
| 11 5051 030 | • 6 | 18 | 6 | 50 | | ✔ | 11,80 |
| | | | | | | | |
| 11 5051 033 | • 6 | 18 | 6 | 168 | ✔ | | 28,65 |
| 11 5051 035 | • 8 | 20 | 6 | 65 | ✔ | | 15,70 |
| | | | | | | | |
| 11 5051 040 | • 10 | 20 | 6 | 65 | ✔ | | 15,45 |
| | | | | | | | |
| 11 5051 045 | • 10 | 20 | 6 | 170 | ✔ | | 23,45 |
| 11 5051 047 | • 11 | 25 | 6 | 70 | ✔ | | 21,70 |
| 11 5051 048 | • 12 | 20 | 6 | 65 | ✔ | | 22,80 |
| 11 5051 050 | • 12 | 25 | 6 | 70 | ✔ | | 21,50 |
| 11 5051 053 | • 12DIN | 25 | 6 | 70 | ✔ | | 19,85 |
| | | | | | | | |
| 11 5051 055 | • 12 | 25 | 8 | 70 | ✔ | | 21,50 |
| 11 5051 060 | • 12 | 25 | 6 | 175 | ✔ | | 33,05 |
| 11 5051 065 | • 16 | 25 | 6 | 70 | ✔ | | 29,95 |
| | | | | | | | |
| 11 5051 070 | • 16 | 25 | 8 | 70 | ✔ | | 32,35 |
| 11 5051 075 | • 20 | 25 | 6 | 70 | ✔ | | 39,35 |
| 11 5051 080 | • 20 | 25 | 8 | 70 | ✔ | | 42,45 |
| 11 5051 082 | • 20 | 32 | 6 | 77 | ✔ | | 48,05 |
| 11 5051 085 | • 20 | 38 | 6 | 83 | ✔ | | 55,50 |
| 11 5051 090 | • 20 | 38 | 8 | 83 | ✔ | | 60,00 |

Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3051 007 | • 3 | 6 | 3 | 38 | ✔ | | 5,80 |
| 11 3051 010 | • 3 | 8 | 3 | 38 | | ✔ | 5,80 |
| 11 3051 015 | • 3 | 14 | 3 | 38 | | ✔ | 5,80 |
| 11 3051 016 | • 3 | 14 | 3 | 38 | | ✔ | 3,95 |
| 11 3051 020 | • 3 | 14 | 3 | 50 | | ✔ | 8,10 |
| | | | | | | | |
| 11 3051 022 | • 5 | 12,7 | 3 | 38 | | ✔ | 13,95 |
| 11 3051 025 | • 6 | 12 | 3 | 44 | ✔ | | 9,50 |
| 11 3051 030 | • 6 | 18 | 6 | 50 | | ✔ | 10,00 |
| 11 3051 031 | • 6 | 18 | 6 | 50 | | ✔ | 7,55 |
| 11 3051 033 | • 6 | 18 | 6 | 168 | ✔ | | 25,85 |
| 11 3051 035 | • 8 | 20 | 6 | 65 | ✔ | | 13,95 |
| 11 3051 036 | • 8 | 20 | 6 | 65 | ✔ | | 9,65 |
| 11 3051 040 | • 10 | 20 | 6 | 65 | ✔ | | 12,55 |
| 11 3051 041 | • 10 | 20 | 6 | 65 | ✔ | | 9,50 |
| 11 3051 045 | • 10 | 20 | 6 | 170 | ✔ | | 17,65 |
| 11 3051 047 | • 11 | 25 | 6 | 70 | ✔ | | 17,50 |
| 11 3051 048 | • 12 | 20 | 6 | 65 | ✔ | | 18,60 |
| 11 3051 050 | • 12 | 25 | 6 | 70 | ✔ | | 17,30 |
| 11 3051 053 | • 12DIN | 25 | 6 | 70 | ✔ | | 15,65 |
| 11 3051 054 | • 12DIN | 25 | 6 | 70 | ✔ | | 14,00 |
| 11 3051 055 | • 12 | 25 | 8 | 70 | ✔ | | 17,30 |
| 11 3051 060 | • 12 | 25 | 6 | 175 | ✔ | | 26,00 |
| 11 3051 065 | • 16 | 25 | 6 | 70 | ✔ | | 25,75 |
| 11 3051 066 | • 16 | 25 | 6 | 70 | ✔ | | 19,35 |
| 11 3051 070 | • 16 | 25 | 8 | 70 | ✔ | | 28,15 |
| 11 3051 075 | • 20 | 25 | 6 | 70 | ✔ | | 33,85 |
| 11 3051 080 | • 20 | 25 | 8 | 70 | ✔ | | 36,95 |
| 11 3051 082 | • 20 | 32 | 6 | 77 | ✔ | | 42,55 |
| 11 3051 085 | • 20 | 38 | 6 | 83 | ✔ | | 50,00 |
| 11 3051 090 | • 20 | 38 | 8 | 83 | ✔ | | 54,55 |

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**11 5061**

**11 3061**

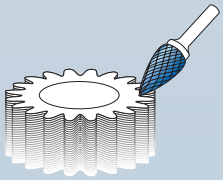
BLUETEC BESCHICHTET COATED




**G** FORM / SHAPE **SPG**

Spitzbogen

Tree






VALUETOOL

Schnittdaten Cutting data

755

Film Movie

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5061 010 | • 3 | 6 | 3 | 38 | | ✔ | 7,60 |
| 11 5061 012 | • 3 | 10 | 3 | 38 | | ✔ | 7,60 |
| 11 5061 015 | • 3 | 14 | 3 | 38 | | ✔ | 7,60 |
| | | | | | | | |
| 11 5061 020 | • 3 | 14 | 3 | 50 | | ✔ | 9,05 |
| 11 5061 025 | • 3 | 14 | 3 | 75 | | ✔ | 10,70 |
| 11 5061 028 | • 5 | 12,7 | 3 | 38 | | ✔ | 15,70 |
| 11 5061 030 | • 6 | 12 | 3 | 44 | ✔ | | 11,30 |
| 11 5061 035 | • 6 | 18 | 6 | 50 | | ✔ | 11,80 |
| | | | | | | | |
| 11 5061 040 | • 8 | 20 | 6 | 65 | ✔ | | 13,85 |
| | | | | | | | |
| 11 5061 045 | • 10 | 20 | 6 | 65 | ✔ | | 16,30 |
| | | | | | | | |
| 11 5061 050 | • 10 | 20 | 6 | 170 | ✔ | | 24,55 |
| 11 5061 055 | • 12 | 20 | 6 | 65 | ✔ | | 22,50 |
| 11 5061 060 | • 12 | 25 | 6 | 70 | ✔ | | 22,50 |
| 11 5061 063 | • 12DIN | 25 | 6 | 70 | ✔ | | 20,70 |
| | | | | | | | |
| 11 5061 065 | • 12 | 25 | 8 | 70 | ✔ | | 24,15 |
| 11 5061 070 | • 12 | 25 | 6 | 175 | ✔ | | 32,75 |
| 11 5061 075 | • 12 | 30 | 6 | 75 | ✔ | | 26,25 |
| 11 5061 080 | • 12 | 30 | 8 | 75 | ✔ | | 26,25 |
| 11 5061 085 | • 16 | 25 | 6 | 70 | ✔ | | 29,55 |
| | | | | | | | |
| 11 5061 090 | • 16 | 25 | 8 | 70 | ✔ | | 31,55 |
| 11 5061 095 | • 16 | 30 | 6 | 75 | ✔ | | 38,90 |
| 11 5061 100 | • 16 | 30 | 8 | 75 | ✔ | | 38,90 |
| 11 5061 105 | • 20 | 25 | 6 | 70 | ✔ | | 39,35 |
| 11 5061 110 | • 20 | 25 | 8 | 70 | ✔ | | 41,30 |
| 11 5061 115 | • 20 | 38 | 6 | 83 | ✔ | | 55,50 |
| 11 5061 120 | % 20 | 38 | 8 | 83 | ✔ | | 35,80 |

Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3061 010 | • 3 | 6 | 3 | 38 | | ✔ | 5,80 |
| 11 3061 012 | • 3 | 10 | 3 | 38 | | ✔ | 5,80 |
| 11 3061 015 | • 3 | 14 | 3 | 38 | | ✔ | 5,80 |
| 11 3061 016 | • 3 | 14 | 3 | 38 | | ✔ | 3,95 |
| 11 3061 020 | • 3 | 14 | 3 | 50 | | ✔ | 7,30 |
| | | | | | | | |
| 11 3061 028 | • 5 | 12,7 | 3 | 38 | | ✔ | 13,95 |
| 11 3061 030 | • 6 | 12 | 3 | 44 | ✔ | | 9,50 |
| 11 3061 035 | • 6 | 18 | 6 | 50 | | ✔ | 10,00 |
| 11 3061 036 | • 6 | 18 | 6 | 50 | | ✔ | 7,55 |
| 11 3061 040 | • 8 | 20 | 6 | 65 | ✔ | | 12,10 |
| 11 3061 041 | • 8 | 20 | 6 | 65 | ✔ | | 9,15 |
| 11 3061 045 | • 10 | 20 | 6 | 65 | ✔ | | 13,40 |
| 11 3061 046 | • 10 | 20 | 6 | 65 | ✔ | | 10,15 |
| 11 3061 050 | • 10 | 20 | 6 | 170 | ✔ | | 18,75 |
| 11 3061 055 | • 12 | 20 | 6 | 65 | ✔ | | 18,30 |
| 11 3061 060 | • 12 | 25 | 6 | 70 | ✔ | | 18,30 |
| 11 3061 063 | • 12DIN | 25 | 6 | 70 | ✔ | | 16,45 |
| 11 3061 064 | • 12DIN | 25 | 6 | 70 | ✔ | | 13,75 |
| 11 3061 065 | • 12 | 25 | 8 | 70 | ✔ | | 19,95 |
| 11 3061 070 | • 12 | 25 | 6 | 175 | ✔ | | 25,70 |
| 11 3061 075 | • 12 | 30 | 6 | 75 | ✔ | | 22,05 |
| 11 3061 080 | • 12 | 30 | 8 | 75 | ✔ | | 22,05 |
| 11 3061 085 | • 16 | 25 | 6 | 70 | ✔ | | 25,35 |
| 11 3061 086 | • 16 | 25 | 6 | 70 | ✔ | | 19,10 |
| 11 3061 090 | • 16 | 25 | 8 | 70 | ✔ | | 27,35 |
| 11 3061 095 | • 16 | 30 | 6 | 75 | ✔ | | 34,70 |
| 11 3061 100 | • 16 | 30 | 8 | 75 | ✔ | | 34,70 |
| 11 3061 105 | • 20 | 25 | 6 | 70 | ✔ | | 33,85 |
| 11 3061 110 | % 20 | 25 | 8 | 70 | ✔ | | 22,25 |
| 11 3061 115 | • 20 | 38 | 6 | 83 | ✔ | | 50,00 |
| 11 3061 120 | % 20 | 38 | 8 | 83 | ✔ | | 32,45 |



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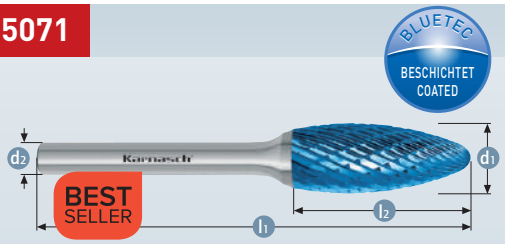
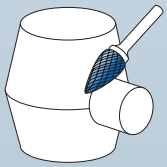
## 11 5071




**H** FORM / SHAPE

Flamme

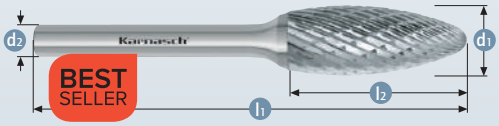
Flame



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5071 003 | • 3 | 6 | 3 | 50 | | ✔ | 9,35 |
| 11 5071 005 | • 3 | 6 | 3 | 38 | | ✔ | 7,60 |
| 11 5071 006 | • 3 | 6 | 3 | 75 | | ✔ | 11,10 |
| 11 5071 007 | • 5 | 9,5 | 3 | 38 | | ✔ | 15,70 |
| 11 5071 010 | • 6 | 14 | 6 | 50 | | ✔ | 15,05 |
| 11 5071 015 | • 8 | 20 | 6 | 65 | ✔ | | 15,00 |
| 11 5071 017 | • 8 | 20 | 6 | 170 | ✔ | | 25,20 |
| 11 5071 020 | • 10 | 20 | 6 | 65 | ✔ | | 27,45 |
| 11 5071 025 | • 12 | 32 | 6 | 77 | ✔ | | 32,35 |
| 11 5071 027 | • 12DIN | 30 | 6 | 75 | ✔ | | 29,60 |
| 11 5071 028 | • 12 | 32 | 6 | 180 | ✔ | | 36,25 |
| 11 5071 030 | • 12 | 32 | 8 | 77 | ✔ | | 32,35 |
| 11 5071 035 | • 16 | 36 | 6 | 82 | ✔ | | 41,45 |
| 11 5071 040 | • 16 | 36 | 8 | 82 | ✔ | | 43,40 |
| 11 5071 045 | • 20 | 41 | 6 | 86 | ✔ | | 52,80 |
| 11 5071 050 | • 20 | 41 | 8 | 86 | ✔ | | 54,75 |

## 11 3071




VALUETOOL

Schnittdaten Cutting data

Film Movie

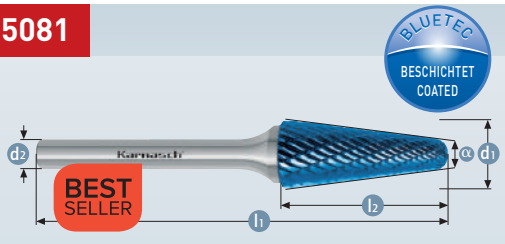
755

Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3071 003 | • 3 | 6 | 3 | 50 | | ✔ | 7,60 |
| 11 3071 004 | • 3 | 6 | 3 | 38 | | ✔ | 3,95 |
| 11 3071 005 | • 3 | 6 | 3 | 38 | | ✔ | 5,80 |
| 11 3071 006 | • 3 | 6 | 3 | 75 | | ✔ | 9,35 |
| 11 3071 007 | • 5 | 9,5 | 3 | 38 | | ✔ | 13,95 |
| 11 3071 010 | • 6 | 14 | 6 | 50 | | ✔ | 13,30 |
| 11 3071 011 | • 6 | 14 | 6 | 50 | | ✔ | 8,20 |
| 11 3071 015 | • 8 | 20 | 6 | 65 | ✔ | | 13,25 |
| 11 3071 016 | • 8 | 20 | 6 | 65 | ✔ | | 9,95 |
| 11 3071 017 | • 8 | 20 | 6 | 170 | ✔ | | 22,35 |
| 11 3071 020 | • 10 | 20 | 6 | 65 | ✔ | | 24,55 |
| 11 3071 021 | • 10 | 20 | 6 | 65 | ✔ | | 13,40 |
| 11 3071 025 | • 12 | 32 | 6 | 77 | ✔ | | 28,15 |
| 11 3071 026 | • 12DIN | 30 | 6 | 75 | ✔ | | 18,50 |
| 11 3071 027 | • 12DIN | 30 | 6 | 75 | ✔ | | 25,35 |
| 11 3071 028 | • 12 | 32 | 6 | 180 | ✔ | | 29,20 |
| 11 3071 030 | • 12 | 32 | 8 | 77 | ✔ | | 28,15 |
| 11 3071 035 | • 16 | 36 | 6 | 82 | ✔ | | 37,25 |
| 11 3071 036 | • 16 | 36 | 6 | 82 | ✔ | | 28,00 |
| 11 3071 040 | • 16 | 36 | 8 | 82 | ✔ | | 39,20 |
| 11 3071 045 | • 20 | 41 | 6 | 86 | ✔ | | 47,35 |
| 11 3071 050 | • 20 | 41 | 8 | 86 | ✔ | | 49,25 |

## 11 5081




**L** FORM / SHAPE **KEL**

Rundkegel

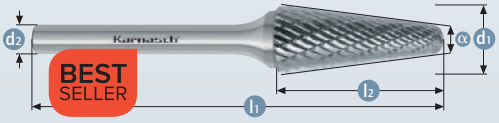
Ball nosed cone



Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5081 005 | • 3 | 10 | 3 | 38 | | ✔ | 10° | 7,60 |
| 11 5081 009 | • 3 | 14 | 3 | 50 | ✔ | | 8° | 9,35 |
| 11 5081 010 | • 3 | 14 | 3 | 38 | | ✔ | 8° | 7,60 |
| 11 5081 011 | • 3 | 14 | 3 | 75 | ✔ | | 8° | 11,10 |
| 11 5081 012 | • 5 | 12,7 | 3 | 38 | | ✔ | 14° | 15,70 |
| 11 5081 015 | • 6 | 16 | 3 | 48 | ✔ | | 22° | 12,20 |
| 11 5081 020 | • 6 | 18 | 6 | 50 | | ✔ | 14° | 12,00 |
| 11 5081 025 | • 8 | 25 | 6 | 70 | ✔ | | 14° | 15,15 |
| 11 5081 030 | • 10 | 20 | 6 | 65 | ✔ | | 14° | 20,65 |
| 11 5081 035 | • 10 | 30 | 6 | 75 | ✔ | | 14° | 19,00 |
| 11 5081 040 | • 10 | 30 | 6 | 176 | ✔ | | 14° | 28,30 |
| 11 5081 045 | • 12 | 32 | 6 | 77 | ✔ | | 14° | 24,75 |
| 11 5081 047 | • 12DIN | 25 | 6 | 70 | ✔ | | 14° | 22,75 |
| 11 5081 050 | • 12 | 32 | 8 | 77 | ✔ | | 14° | 24,75 |
| 11 5081 055 | • 12 | 32 | 6 | 182 | ✔ | | 14° | 36,85 |
| 11 5081 060 | • 16 | 33 | 6 | 78 | ✔ | | 14° | 35,95 |
| 11 5081 065 | • 16 | 33 | 8 | 78 | ✔ | | 14° | 35,95 |
| 11 5081 070 | • 20 | 41 | 6 | 86 | ✔ | | 14° | 47,40 |
| 11 5081 075 | • 20 | 41 | 8 | 86 | ✔ | | 14° | 47,40 |

## 11 3081




VALUETOOL

Schnittdaten Cutting data

Film Movie

755

Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3081 005 | • 3 | 10 | 3 | 38 | | ✔ | 10° | 5,80 |
| 11 3081 008 | • 3 | 14 | 3 | 38 | | ✔ | 10° | 3,95 |
| 11 3081 009 | • 3 | 14 | 3 | 50 | ✔ | | 8° | 7,60 |
| 11 3081 010 | • 3 | 14 | 3 | 38 | | ✔ | 8° | 5,80 |
| 11 3081 011 | • 3 | 14 | 3 | 75 | ✔ | | 8° | 9,35 |
| 11 3081 012 | • 5 | 12,7 | 3 | 38 | | ✔ | 14° | 13,95 |
| 11 3081 015 | • 6 | 16 | 3 | 48 | ✔ | | 22° | 10,45 |
| 11 3081 020 | • 6 | 18 | 6 | 50 | | ✔ | 14° | 10,20 |
| 11 3081 021 | • 6 | 18 | 6 | 50 | | ✔ | 14° | 7,70 |
| 11 3081 025 | • 8 | 25 | 6 | 70 | ✔ | | 14° | 13,35 |
| 11 3081 026 | • 8 | 25 | 6 | 70 | ✔ | | 14° | 10,10 |
| 11 3081 030 | • 10 | 20 | 6 | 65 | ✔ | | 14° | 17,80 |
| 11 3081 031 | • 10 | 20 | 6 | 65 | ✔ | | 14° | 13,15 |
| 11 3081 035 | • 10 | 30 | 6 | 75 | ✔ | | 14° | 16,15 |
| 11 3081 040 | • 10 | 30 | 6 | 176 | ✔ | | 14° | 22,50 |
| 11 3081 045 | • 12 | 32 | 6 | 77 | ✔ | | 14° | 20,55 |
| 11 3081 047 | • 12DIN | 25 | 6 | 70 | ✔ | | 14° | 18,55 |
| 11 3081 048 | • 12DIN | 25 | 6 | 70 | ✔ | | 14° | 14,80 |
| 11 3081 050 | • 12 | 32 | 8 | 77 | ✔ | | 14° | 20,55 |
| 11 3081 055 | • 12 | 32 | 6 | 182 | ✔ | | 14° | 29,80 |
| 11 3081 060 | • 16 | 33 | 6 | 78 | ✔ | | 14° | 31,75 |
| 11 3081 061 | • 16 | 33 | 6 | 78 | ✔ | | 14° | 26,70 |
| 11 3081 065 | • 16 | 33 | 8 | 78 | ✔ | | 14° | 31,75 |
| 11 3081 070 | • 20 | 41 | 6 | 86 | ✔ | | 14° | 41,95 |
| 11 3081 075 | • 20 | 41 | 8 | 86 | ✔ | | 14° | 41,95 |

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



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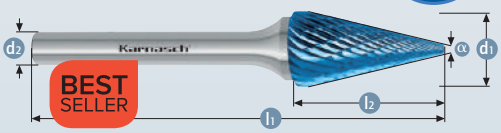
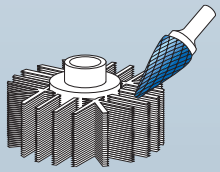
## 11 5091

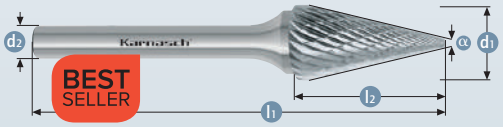



**M** FORM / SHAPE **SKM**

Spitzkegel

Cone






VALUETOOL

Schnittdaten Cutting data

Film Movie

755

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5091 010 | ● 3 | 8 | 3 | 38 | | ✔ | 18° | 7,60 |
| 11 5091 015 | ● 3 | 11 | 3 | 38 | | ✔ | 14° | 7,60 |
| 11 5091 020 | ● 3 | 15 | 3 | 38 | | ✔ | 10° | 7,60 |
| 11 5091 025 | ● 6 | 12 | 3 | 48 | ✔ | | 22° | 11,30 |
| 11 5091 027 | ● 6 | 12,7 | 6 | 50 | | ✔ | 14° | 11,45 |
| 11 5091 030 | ● 6 | 20 | 6 | 50 | | ✔ | 14° | 12,00 |
| 11 5091 032 | ● 6 | 25 | 6 | 50 | | ✔ | 11° | 12,70 |
| 11 5091 035 | ● 8 | 18 | 6 | 63 | ✔ | | 13° | 15,15 |
| 11 5091 040 | ● 10 | 20 | 6 | 65 | ✔ | | 28° | 19,45 |
| 11 5091 045 | ● 12 | 25 | 6 | 70 | ✔ | | 28° | 24,15 |
| 11 5091 047 | ● 12DIN | 25 | 6 | 70 | ✔ | | 28° | 23,55 |
| 11 5091 050 | ● 12 | 25 | 8 | 70 | ✔ | | 28° | 24,15 |
| 11 5091 055 | ● 16 | 26 | 6 | 74 | ✔ | | 33° | 31,15 |
| 11 5091 060 | ● 16 | 26 | 8 | 74 | ✔ | | 33° | 33,95 |

## 11 3091

Bestseller – preisreduziert · Bestseller – price reduced

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3091 010 | ● 3 | 8 | 3 | 38 | | ✔ | 18° | 5,80 |
| 11 3091 015 | ● 3 | 11 | 3 | 38 | | ✔ | 14° | 5,80 |
| 11 3091 016 | ● 3 | 11 | 3 | 38 | | ✔ | 14° | 3,95 |
| 11 3091 020 | ● 3 | 15 | 3 | 38 | | ✔ | 10° | 5,80 |
| 11 3091 025 | ● 6 | 12 | 3 | 48 | ✔ | | 22° | 9,50 |
| 11 3091 027 | ● 6 | 12,7 | 6 | 50 | | ✔ | 14° | 9,70 |
| 11 3091 030 | ● 6 | 20 | 6 | 50 | | ✔ | 14° | 10,20 |
| 11 3091 031 | ● 6 | 20 | 6 | 50 | | ✔ | 14° | 7,70 |
| 11 3091 032 | ● 6 | 25 | 6 | 50 | | ✔ | 11° | 10,95 |
| 11 3091 035 | ● 8 | 18 | 6 | 63 | ✔ | | 13° | 13,35 |
| 11 3091 036 | ● 8 | 18 | 6 | 63 | ✔ | | 13° | 11,25 |
| 11 3091 040 | ● 10 | 20 | 6 | 65 | ✔ | | 28° | 16,55 |
| 11 3091 041 | ● 10 | 20 | 6 | 65 | ✔ | | 28° | 12,15 |
| 11 3091 045 | ● 12 | 25 | 6 | 70 | ✔ | | 28° | 19,95 |
| 11 3091 047 | ● 12DIN | 25 | 6 | 70 | ✔ | | 28° | 18,00 |
| 11 3091 048 | ● 12DIN | 25 | 6 | 70 | ✔ | | 28° | 15,20 |
| 11 3091 050 | ● 12 | 25 | 8 | 70 | ✔ | | 28° | 19,95 |
| 11 3091 055 | ● 16 | 26 | 6 | 74 | ✔ | | 33° | 26,95 |
| 11 3091 056 | ● 16 | 26 | 6 | 74 | ✔ | | 33° | 20,25 |
| 11 3091 060 | ● 16 | 26 | 8 | 74 | ✔ | | 33° | 29,75 |

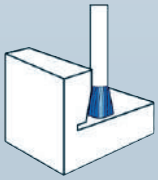
## 11 5096




**N** FORM / SHAPE **WKN**

Winkel

Inverted cone






Schnittdaten Cutting data

Film Movie

755

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5096 005 | ● 3 | 5 | 3 | 38 | | ✔ | 10° | 7,45 |
| 11 5096 010 | ● 6 | 7 | 3 | 39 | ✔ | | 10° | 11,30 |
| 11 5096 015 | ● 6 | 8 | 6 | 50 | | ✔ | 10° | 11,50 |
| 11 5096 020 | ● 10 | 10 | 6 | 55 | ✔ | | 13° | 17,10 |
| 11 5096 025 | ● 12 | 13 | 6 | 58 | ✔ | | 30° | 24,35 |
| 11 5096 030 | ● 12 | 13 | 8 | 58 | ✔ | | 30° | 26,45 |
| 11 5096 035 | ● 16 | 19 | 6 | 64 | ✔ | | 18° | 30,05 |
| 11 5096 040 | ● 16 | 19 | 8 | 64 | ✔ | | 18° | 32,05 |
| 11 5096 045 | ● 20 | 16 | 6 | 61 | ✔ | | 30° | 34,50 |

## 11 3096

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3096 005 | ● 3 | 5 | 3 | 38 | | ✔ | 10° | 5,70 |
| 11 3096 010 | ● 6 | 7 | 3 | 39 | ✔ | | 10° | 9,50 |
| 11 3096 015 | ● 6 | 8 | 6 | 50 | | ✔ | 10° | 9,75 |
| 11 3096 020 | ● 10 | 10 | 6 | 55 | ✔ | | 13° | 14,20 |
| 11 3096 025 | ● 12 | 13 | 6 | 58 | ✔ | | 30° | 20,15 |
| 11 3096 030 | ● 12 | 13 | 8 | 58 | ✔ | | 30° | 22,25 |
| 11 3096 035 | ● 16 | 19 | 6 | 64 | ✔ | | 18° | 25,85 |
| 11 3096 040 | ● 16 | 19 | 8 | 64 | ✔ | | 18° | 27,85 |
| 11 3096 045 | ● 20 | 16 | 6 | 61 | ✔ | | 30° | 29,00 |



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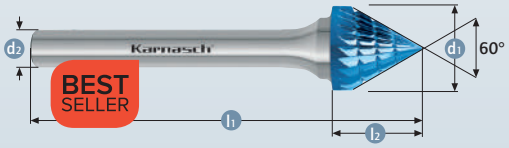
## 11 5101

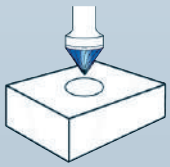
BLUETEC BESCHICHTET COATED



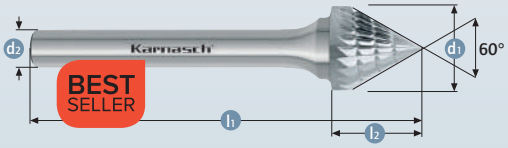

**J** FORM / SHAPE **KSJ**

Kegel 60°

Countersink 60°



## 11 3101




Schnittdaten Cutting data | Film Movie

755

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5101 005 | • 3 | 3 | 3 | 38 | | ✔ | 7,60 |
| 11 5101 010 | • 6 | 6 | 6 | 50 | | ✔ | 10,55 |
| 11 5101 015 | • 10 | 8 | 6 | 56 | ✔ | | 14,45 |
| 11 5101 020 | • 12 | 11 | 6 | 60 | ✔ | | 18,20 |
| 11 5101 025 | • 16 | 15 | 6 | 62 | ✔ | | 22,80 |
| 11 5101 030 | • 16 | 15 | 8 | 62 | ✔ | | 24,80 |
| 11 5101 035 | • 20 | 17 | 6 | 65 | ✔ | | 29,90 |
| 11 5101 040 | • 25 | 24,5 | 6 | 68 | ✔ | | 44,70 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3101 005 | • 3 | 3 | 3 | 38 | | ✔ | 5,80 |
| 11 3101 010 | • 6 | 6 | 6 | 50 | | ✔ | 8,75 |
| 11 3101 015 | • 10 | 8 | 6 | 56 | ✔ | | 11,55 |
| 11 3101 020 | • 12 | 11 | 6 | 60 | ✔ | | 13,95 |
| 11 3101 025 | • 16 | 15 | 6 | 62 | ✔ | | 18,60 |
| | | | | | | | |
| 11 3101 035 | % 20 | 17 | 6 | 65 | ✔ | | 12,75 |
| 11 3101 040 | • 25 | 24,5 | 6 | 68 | ✔ | | 39,20 |

## 11 5111

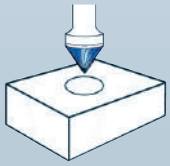
BLUETEC BESCHICHTET COATED




**K** FORM / SHAPE **KSK**

Kegel 90°

Countersink 90°



## 11 3111




Schnittdaten Cutting data | Film Movie

755

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5111 005 | • 3 | 3 | 3 | 38 | | ✔ | 7,60 |
| 11 5111 010 | • 6 | 3 | 6 | 50 | | ✔ | 10,55 |
| 11 5111 015 | • 10 | 5 | 6 | 53 | ✔ | | 14,45 |
| 11 5111 020 | • 12 | 7 | 6 | 55 | ✔ | | 18,20 |
| 11 5111 025 | • 12 | 7 | 8 | 55 | ✔ | | 19,75 |
| 11 5111 030 | • 16 | 8 | 6 | 57 | ✔ | | 22,80 |
| 11 5111 035 | • 16 | 8 | 8 | 57 | ✔ | | 24,80 |
| 11 5111 040 | • 20 | 12 | 6 | 60 | ✔ | | 29,90 |
| 11 5111 045 | • 25 | 12,7 | 6 | 60 | ✔ | | 44,70 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3111 005 | • 3 | 3 | 3 | 38 | | ✔ | 5,80 |
| 11 3111 010 | • 6 | 3 | 6 | 50 | | ✔ | 8,75 |
| 11 3111 015 | • 10 | 5 | 6 | 53 | ✔ | | 11,55 |
| 11 3111 020 | • 12 | 7 | 6 | 55 | ✔ | | 13,95 |
| 11 3111 025 | • 12 | 7 | 8 | 55 | ✔ | | 15,55 |
| 11 3111 030 | • 16 | 8 | 6 | 57 | ✔ | | 18,60 |
| 11 3111 035 | • 16 | 8 | 8 | 57 | ✔ | | 20,55 |
| 11 3111 040 | • 20 | 12 | 6 | 60 | ✔ | | 24,45 |
| 11 3111 045 | • 25 | 12,7 | 6 | 60 | ✔ | | 39,20 |

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



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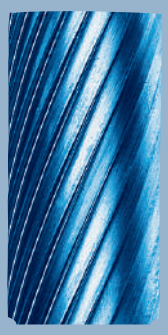
# HP-2



## Die am meisten verwendete Einfachverzahnung

## The most widely used single cutting style

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |

✓ OPTIMAL OPTIMAL

✓ GUT GOOD

- Hohe Zerspanleistung mit guter Oberflächengüte
- Für alle Stahlsorten wie:
  - Gusseisen
  - Stahl < 60 HRC
  - Edelstahl (INOX)
  - Nickelbasis- und Titanlegierungen
- Auch Kupfer, Messing, Bronze

- High cutting action with good surface finish
- For use on all ferrous metals such as:
  - Cast iron
  - Steel < 60 HRC
  - Stainless steel (INOX)
  - Nickel basis and titanium alloy
- Also copper, brass, bronze

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM | WKN | KSJ | KSK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M | N | J | K |
| Art. 11 5000<br>Art. 11 3000 | Art. 11 5010<br>Art. 11 3010 | Art. 11 5020<br>Art. 11 3020 | Art. 11 5030<br>Art. 11 3030 | Art. 11 5040<br>Art. 11 3040 | Art. 11 5050<br>Art. 11 3050 | Art. 11 5060<br>Art. 11 3060 | Art. 11 5070<br>Art. 11 3070 | Art. 11 5080<br>Art. 11 3080 | Art. 11 5090<br>Art. 11 3090 | Art. 11 5099<br>Art. 11 3099 | Art. 11 5100<br>Art. 11 3100 | Art. 11 5110<br>Art. 11 3110 |
| 770 | 770 | 771 | 771 | 772 | 772 | 773 | 773 | 774 | 774 | 775 | 775 | 776 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Walzenrundform<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone | Winkel<br>Inverted cone | Kegel 60°<br>Countersink 60° | Kegel 90°<br>Countersink 90° |




Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.



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| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---|---|---|---|---|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Grobes Zerspanen mit hohen Materialabtrag | 450–600 |
| | Gehärtete, vergütete Stähle über 1200 N/mm² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 250–350 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Grobes Zerspanen mit hohen Materialabtrag | 250–350 |
| NE-Metalle | Harte NE-Metalle | Bronze, Titan/Titanlegierungen, harte Alulegierungen (hoher Si-Anteil) | Grobes Zerspanen mit hohen Materialabtrag | 250–350 |
| | Hochwarmfeste Werkstoffe | Nickelbasis- und Kobaltbasislegierungen (Triebwerk- und Turbinenbau) | | 300–450 |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/Späroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | Grobes Zerspanen mit hohen Materialabtrag | 450–600 |

| Material groups | | | Application | Cutting speed m/min |
|---|---|---|---|---|
| Steel, cast steel | Non-hardened, non-heat treated-steels up to 1200 N/mm² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Coarse machining with high stock removal | 450–600 |
| | Hardened, heat-treated steels exceeding 1200 N/mm² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 250–350 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Coarse machining with high stock removal | 250–350 |
| Non-ferrous metals | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard alu-alloys (high Si content) | Coarse machining with high stock removal | 250–350 |
| | High-temperature resistant materials | Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction) | | 300–450 |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Coarse machining with high stock removal | 450–600 |

**Schnittgeschwindigkeit • Cutting speed (m/min)**

| | 250 | 300 | 350 | 400 | 450 | 500 | 600 |
|---|---|---|---|---|---|---|---|
| ∅ (mm) | Drehzahlen (min⁻¹) • Rotational speed (rpm) | | | | | | |
| 2 | 40.000 | 48.000 | 56.000 | 64.000 | 72.000 | 80.000 | 95.000 |
| 3 | 27.000 | 32.000 | 37.000 | 42.000 | 48.000 | 53.000 | 64.000 |
| 4 | 20.000 | 24.000 | 28.000 | 32.000 | 36.000 | 40.000 | 48.000 |
| 6 | 13.000 | 16.000 | 19.000 | 21.000 | 24.000 | 27.000 | 32.000 |
| 8 | 10.000 | 12.000 | 14.000 | 16.000 | 18.000 | 20.000 | 24.000 |
| 10 | 8.000 | 10.000 | 11.000 | 13.000 | 14.000 | 16.000 | 19.000 |
| 12 | 7.000 | 8.000 | 9.000 | 11.000 | 12.000 | 13.000 | 16.000 |
| 16 | 5.000 | 6.000 | 7.000 | 8.000 | 9.000 | 10.000 | 12.000 |
| 20 | 4.000 | 5.000 | 6.000 | 6.000 | 7.000 | 8.000 | 10.000 |
| 25 | 3.000 | 4.000 | 4.000 | 5.000 | 6.000 | 6.000 | 8.000 |





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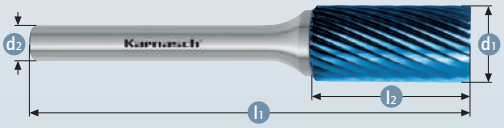
## 11 5000

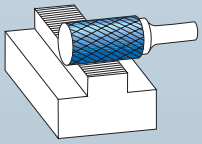
BLUETEC BESCHICHTET COATED

**A** FORM / SHAPE **ZYA**

Zylinder ohne Stirnverzahnung

Cylindrical without end cut






Schnittdaten Cutting data — 769

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5000 030 | 3 | 14 | 3 | 38 | | ✔ | 8,70 |
| 11 5000 060 | 6 | 13 | 3 | 45 | ✔ | | 13,90 |
| 11 5000 065 | 6 | 18 | 6 | 50 | | ✔ | 11,75 |
| 11 5000 080 | 8 | 20 | 6 | 65 | ✔ | | 14,45 |
| 11 5000 090 | 10 | 20 | 6 | 65 | ✔ | | 16,90 |
| 11 5000 105 | 12 | 25 | 6 | 70 | ✔ | | 25,95 |

## 11 3000

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3000 030 | 3 | 14 | 3 | 38 | | ✔ | 6,65 |
| 11 3000 060 | 6 | 13 | 3 | 45 | ✔ | | 11,80 |
| 11 3000 065 | 6 | 18 | 6 | 50 | | ✔ | 9,70 |
| 11 3000 080 | 8 | 20 | 6 | 65 | ✔ | | 12,40 |
| 11 3000 090 | 10 | 20 | 6 | 65 | ✔ | | 13,55 |
| 11 3000 105 | 12 | 25 | 6 | 70 | ✔ | | 21,05 |

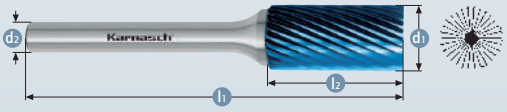
## 11 5010

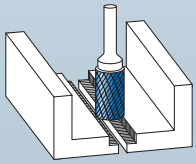
BLUETEC BESCHICHTET COATED

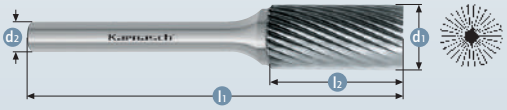
**B** FORM / SHAPE **ZYB**

Zylinder mit Stirnverzahnung

Cylindrical with end cut






Schnittdaten Cutting data — 769

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5010 015 | 3 | 14 | 3 | 38 | | ✔ | 8,80 |
| 11 5010 045 | 6 | 13 | 3 | 45 | ✔ | | 15,10 |
| 11 5010 050 | 6 | 18 | 6 | 50 | | ✔ | 12,50 |
| 11 5010 070 | 6 | 25 | 6 | 50 | | ✔ | 17,20 |
| 11 5010 075 | 8 | 20 | 6 | 65 | ✔ | | 15,85 |
| 11 5010 085 | 10 | 20 | 6 | 65 | ✔ | | 18,20 |
| 11 5010 100 | 12 | 25 | 6 | 70 | ✔ | | 27,10 |

## 11 3010

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3010 015 | 3 | 14 | 3 | 38 | | ✔ | 6,75 |
| 11 3010 045 | 6 | 13 | 3 | 45 | ✔ | | 13,00 |
| 11 3010 050 | 6 | 18 | 6 | 50 | | ✔ | 10,40 |
| 11 3010 070 | 6 | 25 | 6 | 50 | | ✔ | 15,15 |
| 11 3010 075 | 8 | 20 | 6 | 65 | ✔ | | 13,80 |
| 11 3010 085 | 10 | 20 | 6 | 65 | ✔ | | 14,85 |
| 11 3010 100 | 12 | 25 | 6 | 70 | ✔ | | 22,20 |



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## 11 5020

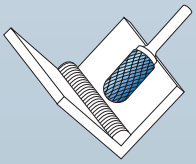
BLUETEC BESCHICHTET COATED



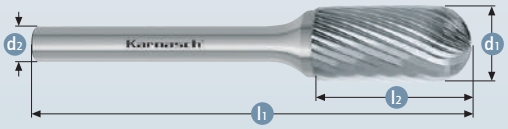

**C** FORM / SHAPE **WRC**

Walzenrundform

Ball nosed cylinder



## 11 3020




Schnittdaten Cutting data

Film Movie

769

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5020 022 | • 2,5 | 11 | 3 | 38 | | ✔ | 8,70 |
| 11 5020 025 | • 3 | 14 | 3 | 38 | | ✔ | 8,70 |
| 11 5020 050 | • 6 | 12,7 | 3 | 44 | ✔ | | 13,15 |
| 11 5020 055 | • 6 | 18 | 6 | 50 | | ✔ | 13,25 |
| 11 5020 075 | • 8 | 20 | 6 | 65 | ✔ | | 15,75 |
| 11 5020 085 | • 10 | 20 | 6 | 65 | ✔ | | 18,25 |
| 11 5020 105 | • 12 | 25 | 6 | 70 | ✔ | | 28,25 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3020 022 | % 2,5 | 11 | 3 | 38 | | ✔ | 3,55 |
| 11 3020 025 | • 3 | 14 | 3 | 38 | | ✔ | 6,65 |
| 11 3020 050 | • 6 | 12,7 | 3 | 44 | ✔ | | 11,10 |
| 11 3020 055 | • 6 | 18 | 6 | 50 | | ✔ | 11,15 |
| 11 3020 075 | • 8 | 20 | 6 | 65 | ✔ | | 13,70 |
| 11 3020 085 | • 10 | 20 | 6 | 65 | ✔ | | 14,85 |
| 11 3020 105 | • 12 | 25 | 6 | 70 | ✔ | | 23,35 |

## 11 5030

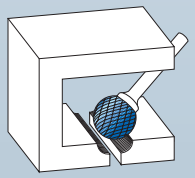
BLUETEC BESCHICHTET COATED




**D** FORM / SHAPE **KUD**

Kugel

Ball



## 11 3030




Schnittdaten Cutting data

Film Movie

769

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5030 025 | • 3 | 2,5 | 3 | 38 | | ✔ | 8,70 |
| 11 5030 045 | • 4 | 3,4 | 3 | 38 | | ✔ | 18,30 |
| 11 5030 047 | • 5 | 4,7 | 3 | 38 | | ✔ | 18,15 |
| 11 5030 048 | • 5 | 4,0 | 6 | 50 | | ✔ | 12,20 |
| 11 5030 050 | • 6 | 5,0 | 3 | 38 | ✔ | | 11,95 |
| 11 5030 055 | • 6 | 4,7 | 6 | 50 | | ✔ | 12,30 |
| 11 5030 060 | • 8 | 7,0 | 6 | 52 | ✔ | | 13,10 |
| 11 5030 070 | • 10 | 8,0 | 6 | 54 | ✔ | | 15,70 |
| 11 5030 080 | • 12 | 11,0 | 6 | 56 | ✔ | | 21,50 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3030 025 | • 3 | 2,5 | 3 | 38 | | ✔ | 6,65 |
| 11 3030 045 | • 4 | 3,4 | 3 | 38 | | ✔ | 16,25 |
| 11 3030 047 | • 5 | 4,7 | 3 | 38 | | ✔ | 16,05 |
| 11 3030 048 | • 5 | 4,0 | 6 | 50 | | ✔ | 10,15 |
| 11 3030 050 | • 6 | 5,0 | 3 | 38 | ✔ | | 9,90 |
| 11 3030 055 | • 6 | 4,7 | 6 | 50 | | ✔ | 10,20 |
| 11 3030 060 | • 8 | 7,0 | 6 | 52 | ✔ | | 11,05 |
| 11 3030 070 | • 10 | 8,0 | 6 | 54 | ✔ | | 12,35 |
| 11 3030 080 | • 12 | 11,0 | 6 | 56 | ✔ | | 16,60 |

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Special price / sale article. While stocks last.



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## 11 5040

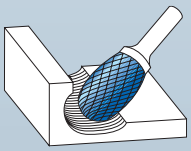
BLUETEC BESCHICHTET COATED

**E** FORM / SHAPE **TRE**

Tropfen

Oval



## 11 3040




Schnittdaten Cutting data 769

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5040 010 | • 3 | 6 | 3 | 38 | | ✔ | 8,70 |
| 11 5040 015 | • 6 | 10 | 3 | 42 | ✔ | | 13,15 |
| 11 5040 020 | • 6 | 10 | 6 | 50 | | ✔ | 14,65 |
| 11 5040 025 | • 8 | 15 | 6 | 60 | ✔ | | 16,80 |
| 11 5040 030 | • 10 | 16 | 6 | 60 | ✔ | | 18,40 |
| 11 5040 035 | • 12 | 22 | 6 | 67 | ✔ | | 26,85 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3040 010 | % 3 | 6 | 3 | 38 | | ✔ | 3,60 |
| 11 3040 015 | % 6 | 10 | 3 | 42 | ✔ | | 6,05 |
| 11 3040 020 | % 6 | 10 | 6 | 50 | | ✔ | 6,85 |
| 11 3040 025 | % 8 | 15 | 6 | 60 | ✔ | | 8,00 |
| 11 3040 030 | % 10 | 16 | 6 | 60 | ✔ | | 8,15 |
| 11 3040 035 | % 12 | 22 | 6 | 67 | ✔ | | 11,95 |

## 11 5050

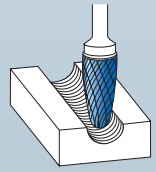
BLUETEC BESCHICHTET COATED

**F** FORM / SHAPE **RBF**

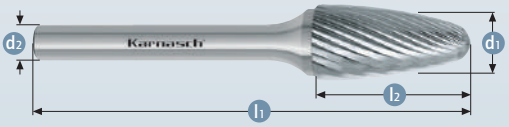
Rundbogen

Ball nosed tree



## 11 3050




Schnittdaten Cutting data 769

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5050 015 | • 3 | 14 | 3 | 38 | | ✔ | 8,70 |
| 11 5050 025 | • 6 | 12 | 3 | 44 | ✔ | | 13,00 |
| 11 5050 030 | • 6 | 18 | 6 | 50 | | ✔ | 13,75 |
| 11 5050 035 | • 8 | 20 | 6 | 65 | ✔ | | 17,85 |
| 11 5050 040 | • 10 | 20 | 6 | 65 | ✔ | | 18,00 |
| 11 5050 050 | • 12 | 25 | 6 | 70 | ✔ | | 26,60 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3050 015 | • 3 | 14 | 3 | 38 | | ✔ | 6,65 |
| 11 3050 025 | • 6 | 12 | 3 | 44 | ✔ | | 10,90 |
| 11 3050 030 | • 6 | 18 | 6 | 50 | | ✔ | 11,70 |
| 11 3050 035 | • 8 | 20 | 6 | 65 | ✔ | | 15,75 |
| 11 3050 040 | • 10 | 20 | 6 | 65 | ✔ | | 14,65 |
| 11 3050 050 | • 12 | 25 | 6 | 70 | ✔ | | 21,70 |

## 11 5060

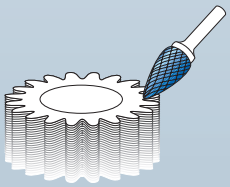
BLUETEC BESCHICHTET COATED




**G** FORM / SHAPE **SPG**

Spitzbogen

Tree



## 11 3060




Schnittdaten Cutting data

Film Movie

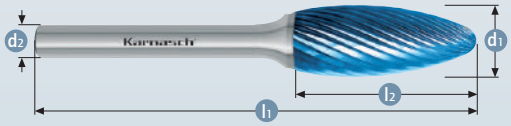
769

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5060 012 | • 3 | 10 | 3 | 38 | | ✔ | 8,70 |
| 11 5060 015 | • 3 | 14 | 3 | 38 | | ✔ | 8,70 |
| 11 5060 030 | • 6 | 12 | 3 | 44 | ✔ | | 13,00 |
| 11 5060 035 | • 6 | 18 | 6 | 50 | | ✔ | 13,75 |
| 11 5060 040 | • 8 | 20 | 6 | 65 | ✔ | | 16,05 |
| 11 5060 045 | • 10 | 20 | 6 | 65 | ✔ | | 18,80 |
| 11 5060 060 | • 12 | 25 | 6 | 70 | ✔ | | 26,00 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3060 012 | • 3 | 10 | 3 | 38 | | ✔ | 6,65 |
| 11 3060 015 | • 3 | 14 | 3 | 38 | | ✔ | 6,65 |
| 11 3060 030 | • 6 | 12 | 3 | 44 | ✔ | | 10,90 |
| 11 3060 035 | • 6 | 18 | 6 | 50 | | ✔ | 11,70 |
| 11 3060 040 | • 8 | 20 | 6 | 65 | ✔ | | 14,00 |
| 11 3060 045 | • 10 | 20 | 6 | 65 | ✔ | | 15,45 |
| 11 3060 060 | • 12 | 25 | 6 | 70 | ✔ | | 21,10 |

## 11 5070

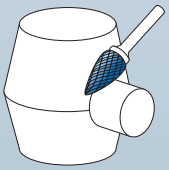
BLUETEC BESCHICHTET COATED



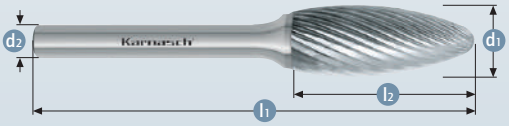

**H** FORM / SHAPE

Flamme

Flame



## 11 3070




Schnittdaten Cutting data

Film Movie

769

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5070 005 | • 3 | 6 | 3 | 38 | | ✔ | 8,80 |
| 11 5070 015 | • 8 | 20 | 6 | 65 | ✔ | | 17,50 |
| 11 5070 020 | • 10 | 20 | 6 | 65 | ✔ | | 31,10 |
| 11 5070 025 | • 12 | 32 | 6 | 77 | ✔ | | 36,70 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3070 005 | • 3 | 6 | 3 | 38 | | ✔ | 6,70 |
| 11 3070 015 | • 8 | 20 | 6 | 65 | ✔ | | 15,45 |
| 11 3070 020 | • 10 | 20 | 6 | 65 | ✔ | | 27,75 |
| 11 3070 025 | • 12 | 32 | 6 | 77 | ✔ | | 31,80 |

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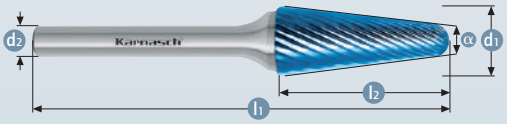
## 11 5080

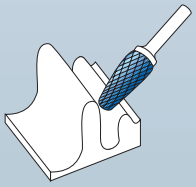
BLUETEC BESCHICHTET COATED

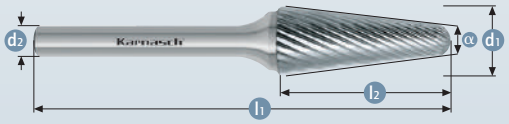
**L** FORM / SHAPE **KEL**

Rundkegel

Ball nosed cone






Schnittdaten Cutting data 769

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5080 010 | 3 | 14 | 3 | 38 | | ✔ | 8° | 8,70 |
| 11 5080 015 | 6 | 16 | 3 | 48 | ✔ | | 22° | 13,90 |
| 11 5080 020 | 6 | 18 | 6 | 50 | | ✔ | 14° | 13,85 |
| 11 5080 025 | 8 | 25 | 6 | 70 | ✔ | | 14° | 17,65 |
| 11 5080 030 | 10 | 20 | 6 | 65 | ✔ | | 14° | 23,90 |
| 11 5080 045 | 12 | 32 | 6 | 77 | ✔ | | 14° | 28,15 |

## 11 3080

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3080 010 | 3 | 14 | 3 | 38 | | ✔ | 8° | 6,65 |
| 11 3080 015 | 6 | 16 | 3 | 48 | ✔ | | 22° | 11,80 |
| 11 3080 020 | 6 | 18 | 6 | 50 | | ✔ | 14° | 11,80 |
| 11 3080 025 | 8 | 25 | 6 | 70 | ✔ | | 14° | 15,60 |
| 11 3080 030 | 10 | 20 | 6 | 65 | ✔ | | 14° | 20,55 |
| 11 3080 045 | 12 | 32 | 6 | 77 | ✔ | | 14° | 23,25 |

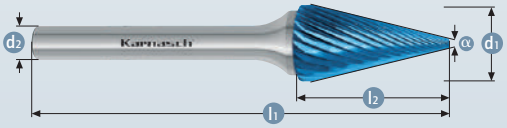
## 11 5090

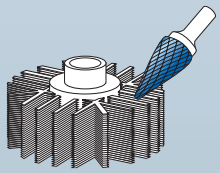
BLUETEC BESCHICHTET COATED

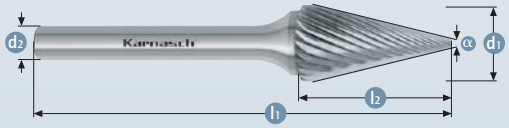
**M** FORM / SHAPE **SKM**

Spitzkegel

Cone






Schnittdaten Cutting data 769

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5090 015 | 3 | 11 | 3 | 38 | | ✔ | 14° | 8,70 |
| 11 5090 025 | 6 | 12 | 3 | 48 | ✔ | | 22° | 13,15 |
| 11 5090 030 | 6 | 20 | 6 | 50 | | ✔ | 14° | 13,85 |
| 11 5090 040 | 10 | 20 | 6 | 65 | ✔ | | 28° | 22,10 |
| 11 5090 045 | 12 | 25 | 6 | 70 | ✔ | | 28° | 27,45 |

## 11 3090

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3090 015 | 3 | 11 | 3 | 38 | | ✔ | 14° | 6,65 |
| 11 3090 025 | 6 | 12 | 3 | 48 | ✔ | | 22° | 11,10 |
| 11 3090 030 | 6 | 20 | 6 | 50 | | ✔ | 14° | 11,80 |
| 11 3090 040 | 10 | 20 | 6 | 65 | ✔ | | 28° | 18,75 |
| 11 3090 045 | 12 | 25 | 6 | 70 | ✔ | | 28° | 22,55 |



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## 11 5099

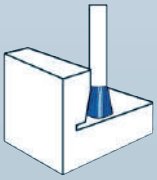
BLUETEC BESCHICHTET COATED




**N** FORM / SHAPE **WKN**

Winkel

Inverted cone



## 11 3099




Schnittdaten Cutting data 769

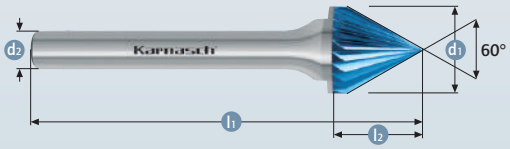
Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5099 005 | • 3 | 5 | 3 | 38 | | ✔ | 10° | 8,80 |
| 11 5099 010 | • 6 | 7 | 3 | 39 | ✔ | | 10° | 13,15 |
| 11 5099 015 | • 6 | 8 | 6 | 50 | | ✔ | 10° | 13,45 |
| 11 5099 020 | • 10 | 10 | 6 | 55 | ✔ | | 13° | 19,75 |
| 11 5099 025 | • 12 | 13 | 6 | 58 | ✔ | | 30° | 28,40 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3099 005 | • 3 | 5 | 3 | 38 | | ✔ | 10° | 6,75 |
| 11 3099 010 | • 6 | 7 | 3 | 39 | ✔ | | 10° | 11,10 |
| 11 3099 015 | • 6 | 8 | 6 | 50 | | ✔ | 10° | 11,35 |
| 11 3099 020 | • 10 | 10 | 6 | 55 | ✔ | | 13° | 16,40 |
| 11 3099 025 | • 12 | 13 | 6 | 58 | ✔ | | 30° | 23,50 |

## 11 5100

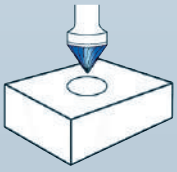
BLUETEC BESCHICHTET COATED



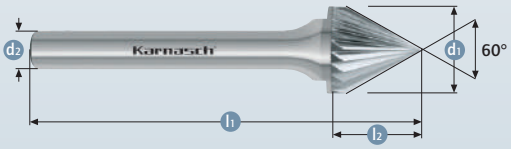

**J** FORM / SHAPE **KSJ**

Kegel 60°

Countersink 60°



## 11 3100




Schnittdaten Cutting data 769

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5100 005 | • 3 | 3 | 3 | 38 | | ✔ | 8,70 |
| 11 5100 010 | • 6 | 6 | 6 | 50 | | ✔ | 12,20 |
| 11 5100 015 | • 10 | 8 | 6 | 56 | ✔ | | 16,85 |
| 11 5100 020 | • 12 | 11 | 6 | 60 | ✔ | | 21,20 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3100 005 | • 3 | 3 | 3 | 38 | | ✔ | 6,65 |
| 11 3100 010 | • 6 | 6 | 6 | 50 | | ✔ | 10,15 |
| 11 3100 015 | • 10 | 8 | 6 | 56 | ✔ | | 13,45 |
| 11 3100 020 | • 12 | 11 | 6 | 60 | ✔ | | 16,30 |

**11 5110**

**11 3110**

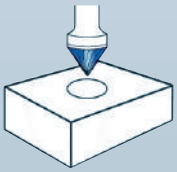
BLUETEC BESCHICHTET COATED




**K** FORM / SHAPE **KSK**

Kegel 90°

Countersink 90°






Schnittdaten Cutting data

769

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5110 005 | • 3 | 1,5 | 3 | 38 | | ✔ | 8,70 |
| 11 5110 010 | • 6 | 3 | 6 | 50 | | ✔ | 12,20 |
| 11 5110 015 | • 10 | 5 | 6 | 56 | ✔ | | 16,85 |
| 11 5110 020 | • 12 | 7 | 6 | 60 | ✔ | | 21,20 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3110 005 | • 3 | 1,5 | 3 | 38 | | ✔ | 6,65 |
| 11 3110 010 | • 6 | 3 | 6 | 50 | | ✔ | 10,15 |
| 11 3110 015 | • 10 | 5 | 6 | 56 | ✔ | | 13,45 |
| 11 3110 020 | • 12 | 7 | 6 | 60 | ✔ | | 16,30 |

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# HP-6



## Extrem grobe Kreuzverzahnung

## Extremely rough cross cutting style

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | | |

✓ OPTIMAL OPTIMAL

✓ GUT GOOD

- Extrem hoher Materialabtrag (Schruppen)
- Für alle Stahlsorten wie:
  - Gusseisen
  - Stahl < 60 HRC
- Auch für Kupfer, Messing, Bronze
- Für den harten Schruppeinsatz wie z.B. auf Werften, Gießereien entwickelt.

- Extremely fast metal removal (roughing)
- For all ferrous metals, such as:
  - Cast iron
  - Steel < 60 HRC
- Also for copper, brass, bronze
- Developed for use in tough roughing conditions, such as, e.g., on shipyards, foundries.

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 5004<br>Art. 11 5004 | Art. 11 5014<br>Art. 11 3014 | Art. 11 5024<br>Art. 11 3024 | Art. 11 5034<br>Art. 11 3034 | Art. 11 5044<br>Art. 11 3044 | Art. 11 5054<br>Art. 11 3054 | Art. 11 5064<br>Art. 11 3064 | Art. 11 5074<br>Art. 11 3074 | Art. 11 5084<br>Art. 11 3084 | Art. 11 5094<br>Art. 11 3094 |
|  |  |  |  |  |  |  |  |  |  |
| 780 | 780 | 781 | 781 | 782 | 782 | 783 | 783 | 784 | 784 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Walzenrundform<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone |




Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.



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| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---|---|---|---|---|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Grobes Zerspanen = hoher Meterialabtrag mit Schlagbelastung | 250 - 600 |
| | Gehärtete, vergütete Stähle über 1200 N/mm² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 250 - 350 |
| NE-Metalle | Hochwarmfeste Werkstoffe | Nickelbasis- und Kobaltbasislegierungen, (Triebwerk- und Turbinenbau) | Grobes Zerspanen = hoher Meterialabtrag mit Schlagbelastung | 250 - 450 |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/ Sphäroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | Grobes Zerspanen = hoher Meterialabtrag mit Schlagbelastung | 250 - 600 |

| Material groups | | | Application | Cutting speed m/min |
|---|---|---|---|---|
| Steel cast steel | Non-hardened, non-heat treated steels up to 1200 N/mm² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Coarse machining = high stock removal with impact load | 250 - 600 |
| | Hardened, heat treated steels exceeding 1200 N/mm² (> 38 HRC) | tool steels, tempering steels, alloyed steels, cast steels | | 250 - 350 |
| Non-Ferrous metals | High-temperature resistant materiales | Nickel based alloys cabalt based alloys (aircraft engine and turbine construction) | Coarse machining = high stock removal with impact load | 250 - 450 |
| Cast iron | Grey cast iron, white cast iron | Cast-iron with flake graphite EN-GJL (GG), with nodular graphite cast iron EN-GJS (GGG), white anneales cast iron EN-GJMW (GTW), black cast iron EN-GJMB (GTS) | Coarse machining = high stock removal with impact load | 250 - 600 |

**Schnittgeschwindigkeit • Cutting speed (m/min)**

| | 250 | 500 | 600 | 900 |
|---|---|---|---|---|
| ∅ (mm) | Drehzahlen (min⁻¹) • Rotational speed (rpm) | | | |
| 6 | 13.000 | 27.000 | 32.000 | 48.000 |
| 8 | 10.000 | 20.000 | 24.000 | 36.000 |
| 10 | 8.000 | 16.000 | 19.000 | 29.000 |
| 12 | 7.000 | 13.000 | 16.000 | 24.000 |
| 16 | 5.000 | 10.000 | 12.000 | 18.000 |





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## 11 5004

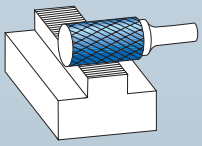
BLUETEC BESCHICHTET COATED



**A** FORM / SHAPE **ZYA**

Zylinder ohne Stirnverzahnung

Cylinder without end cut



## 11 3004



Schnittdaten Cutting data

Film Movie

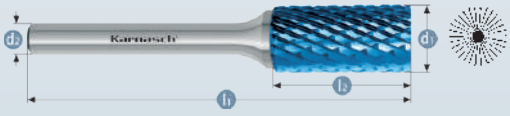
779

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5004 065 | • 6 | 18 | 6 | 50 | | ✔ | 12,65 |
| 11 5004 080 | • 8 | 20 | 6 | 65 | ✔ | | 15,85 |
| 11 5004 090 | • 10 | 20 | 6 | 65 | ✔ | | 18,85 |
| 11 5004 100 | • 10 | 25 | 6 | 70 | ✔ | | 21,00 |
| 11 5004 105 | • 12 | 25 | 6 | 70 | ✔ | | 28,05 |
| 11 5004 115 | • 12 | 25 | 8 | 70 | ✔ | | 29,40 |
| 11 5004 120 | • 16 | 25 | 6 | 70 | ✔ | | 34,05 |
| 11 5004 125 | % 16 | 25 | 8 | 70 | ✔ | | 19,45 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3004 065 | • 6 | 18 | 6 | 50 | | ✔ | 10,60 |
| 11 3004 080 | • 8 | 20 | 6 | 65 | ✔ | | 13,80 |
| 11 3004 090 | • 10 | 20 | 6 | 65 | ✔ | | 15,50 |
| 11 3004 100 | • 10 | 25 | 6 | 70 | ✔ | | 17,65 |
| 11 3004 105 | • 12 | 25 | 6 | 70 | ✔ | | 23,15 |
| 11 3004 115 | • 12 | 25 | 8 | 70 | ✔ | | 24,50 |
| 11 3004 120 | • 16 | 25 | 6 | 70 | ✔ | | 29,15 |
| 11 3004 125 | % 16 | 25 | 8 | 70 | ✔ | | 16,90 |

## 11 5014

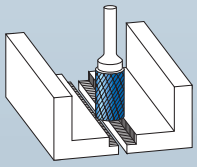
BLUETEC BESCHICHTET COATED



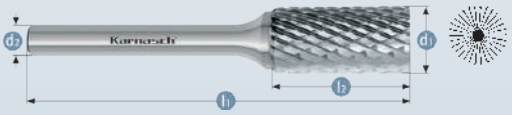
**B** FORM / SHAPE **ZYB**

Zylinder mit Stirnverzahnung

Cylinder with end cut



## 11 3014



Schnittdaten Cutting data

Film Movie

779

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5014 050 | • 6 | 18 | 6 | 50 | | ✔ | 13,60 |
| 11 5014 075 | • 8 | 20 | 6 | 65 | ✔ | | 17,25 |
| 11 5014 085 | • 10 | 20 | 6 | 65 | ✔ | | 19,70 |
| 11 5014 100 | • 12 | 25 | 6 | 70 | ✔ | | 30,35 |
| 11 5014 110 | % 12 | 25 | 8 | 70 | ✔ | | 16,85 |
| | | | | | | | |
| 11 5014 120 | • 16 | 25 | 8 | 70 | ✔ | | 39,50 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3014 050 | • 6 | 18 | 6 | 50 | | ✔ | 11,50 |
| 11 3014 075 | • 8 | 20 | 6 | 65 | ✔ | | 15,20 |
| 11 3014 085 | • 10 | 20 | 6 | 65 | ✔ | | 16,35 |
| 11 3014 100 | • 12 | 25 | 6 | 70 | ✔ | | 25,45 |
| 11 3014 110 | • 12 | 25 | 8 | 70 | ✔ | | 26,85 |
| 11 3014 115 | • 16 | 25 | 6 | 70 | ✔ | | 32,00 |
| 11 3014 120 | % 16 | 25 | 8 | 70 | ✔ | | 18,45 |



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## 11 5024

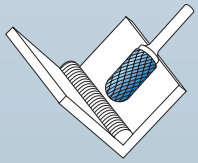
BLUETEC BESCHICHTET COATED



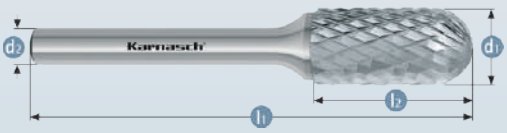
**C** FORM / SHAPE **WRC**

Walzenrundform

Ball nosed cylinder



## 11 3024



Schnittdaten Cutting data | Film Movie

779

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5024 055 | • 6 | 18 | 6 | 50 | | ✔ | 14,30 |
| 11 5024 075 | • 8 | 20 | 6 | 65 | ✔ | | 17,10 |
| 11 5024 085 | • 10 | 20 | 6 | 65 | ✔ | | 19,90 |
| 11 5024 105 | • 12 | 25 | 6 | 70 | ✔ | | 30,90 |
| 11 5024 115 | • 12 | 25 | 8 | 70 | ✔ | | 32,35 |
| 11 5024 120 | • 16 | 25 | 6 | 70 | ✔ | | 37,55 |
| 11 5024 125 | • 16 | 25 | 8 | 70 | ✔ | | 39,65 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3024 055 | • 6 | 18 | 6 | 50 | | ✔ | 12,25 |
| 11 3024 075 | • 8 | 20 | 6 | 65 | ✔ | | 15,05 |
| 11 3024 085 | • 10 | 20 | 6 | 65 | ✔ | | 16,50 |
| 11 3024 105 | • 12 | 25 | 6 | 70 | ✔ | | 26,00 |
| 11 3024 115 | • 12 | 25 | 8 | 70 | ✔ | | 27,45 |
| 11 3024 120 | • 16 | 25 | 6 | 70 | ✔ | | 32,60 |
| 11 3024 125 | • 16 | 25 | 8 | 70 | ✔ | | 34,70 |

## 11 5034

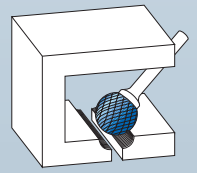
BLUETEC BESCHICHTET COATED



**D** FORM / SHAPE **KUD**

Kugel

Ball



## 11 3034



Schnittdaten Cutting data | Film Movie

779

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5034 055 | • 6 | 4,7 | 6 | 50 | | ✔ | 13,35 |
| 11 5034 060 | • 8 | 6,0 | 6 | 52 | ✔ | | 14,20 |
| 11 5034 070 | • 10 | 8,0 | 6 | 54 | ✔ | | 17,10 |
| 11 5034 080 | • 12 | 11,0 | 6 | 56 | ✔ | | 23,45 |
| 11 5034 085 | % 12 | 11,0 | 8 | 56 | ✔ | | 12,45 |
| 11 5034 095 | • 16 | 14,0 | 6 | 60 | ✔ | | 27,60 |
| 11 5034 100 | % 16 | 14,0 | 8 | 60 | ✔ | | 16,60 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3034 055 | • 6 | 4,7 | 6 | 50 | | ✔ | 11,30 |
| 11 3034 060 | • 8 | 6,0 | 6 | 52 | ✔ | | 12,15 |
| 11 3034 070 | • 10 | 8,0 | 6 | 54 | ✔ | | 13,75 |
| 11 3034 080 | • 12 | 11,0 | 6 | 56 | ✔ | | 18,55 |
| 11 3034 085 | • 12 | 11,0 | 8 | 56 | ✔ | | 18,55 |
| 11 3034 095 | • 16 | 14,0 | 6 | 60 | ✔ | | 22,70 |
| 11 3034 100 | % 16 | 14,0 | 8 | 60 | ✔ | | 14,05 |

% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
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## 11 5044

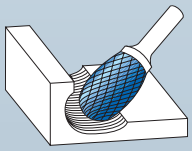
BLUETEC BESCHICHTET COATED



**E** FORM / SHAPE **TRE**

Tropfen

Oval



## 11 3044



Schnittdaten Cutting data — 779

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5044 020 | • 6 | 10 | 6 | 50 | | ✔ | 15,85 |
| 11 5044 025 | • 8 | 15 | 6 | 60 | ✔ | | 18,00 |
| 11 5044 030 | • 10 | 16 | 6 | 60 | ✔ | | 19,90 |
| 11 5044 035 | • 12 | 22 | 6 | 67 | ✔ | | 29,10 |
| 11 5044 040 | • 12 | 22 | 8 | 67 | ✔ | | 30,40 |
| 11 5044 045 | • 16 | 25 | 6 | 70 | ✔ | | 38,55 |
| 11 5044 050 | • 16 | 25 | 8 | 70 | ✔ | | 40,60 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3044 020 | • 6 | 10 | 6 | 50 | | ✔ | 13,80 |
| 11 3044 025 | • 8 | 15 | 6 | 60 | ✔ | | 15,95 |
| 11 3044 030 | • 10 | 16 | 6 | 60 | ✔ | | 16,50 |
| 11 3044 035 | • 12 | 22 | 6 | 67 | ✔ | | 24,20 |
| 11 3044 040 | % 12 | 22 | 8 | 67 | ✔ | | 13,60 |
| 11 3044 045 | • 16 | 25 | 6 | 70 | ✔ | | 33,65 |

## 11 5054

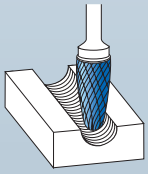
BLUETEC BESCHICHTET COATED



**F** FORM / SHAPE **RBF**

Rundbogen

Ball nosed tree



## 11 3054



Schnittdaten Cutting data — 779

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5054 030 | • 6 | 18 | 6 | 50 | | ✔ | 14,90 |
| 11 5054 035 | • 8 | 20 | 6 | 65 | ✔ | | 19,15 |
| 11 5054 040 | • 10 | 20 | 6 | 65 | ✔ | | 19,50 |
| 11 5054 050 | • 12 | 25 | 6 | 70 | ✔ | | 29,75 |
| 11 5054 055 | • 12 | 25 | 8 | 70 | ✔ | | 29,75 |
| 11 5054 065 | • 16 | 25 | 6 | 70 | ✔ | | 39,40 |
| 11 5054 070 | • 16 | 25 | 8 | 70 | ✔ | | 39,40 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3054 030 | • 6 | 18 | 6 | 50 | | ✔ | 12,85 |
| 11 3054 035 | • 8 | 20 | 6 | 65 | ✔ | | 17,10 |
| 11 3054 040 | • 10 | 20 | 6 | 65 | ✔ | | 16,15 |
| 11 3054 050 | • 12 | 25 | 6 | 70 | ✔ | | 24,85 |
| 11 3054 055 | • 12 | 25 | 8 | 70 | ✔ | | 24,85 |
| 11 3054 065 | • 16 | 25 | 6 | 70 | ✔ | | 34,45 |

## 11 5064

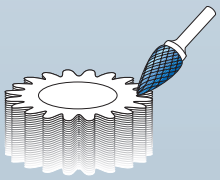
BLUETEC BESCHICHTET COATED



**G** FORM / SHAPE **SPG**

Spitzbogen

Tree



## 11 3064



Schnittdaten Cutting data

Film Movie

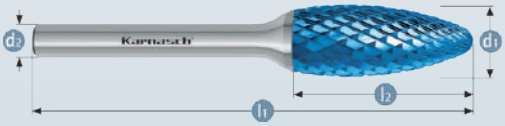
779

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5064 035 | • 6 | 18 | 6 | 50 | | ✔ | 14,90 |
| 11 5064 040 | • 8 | 20 | 6 | 65 | ✔ | | 17,65 |
| 11 5064 045 | • 10 | 20 | 6 | 65 | ✔ | | 20,60 |
| 11 5064 060 | • 12 | 25 | 6 | 70 | ✔ | | 29,35 |
| 11 5064 065 | • 12 | 25 | 8 | 70 | ✔ | | 29,35 |
| 11 5064 085 | • 16 | 25 | 6 | 70 | ✔ | | 37,45 |
| 11 5064 090 | % 16 | 25 | 8 | 70 | ✔ | | 21,70 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3064 035 | • 6 | 18 | 6 | 50 | | ✔ | 12,85 |
| 11 3064 040 | • 8 | 20 | 6 | 65 | ✔ | | 15,55 |
| 11 3064 045 | • 10 | 20 | 6 | 65 | ✔ | | 17,25 |
| 11 3064 060 | • 12 | 25 | 6 | 70 | ✔ | | 24,40 |
| 11 3064 065 | % 12 | 25 | 8 | 70 | ✔ | | 13,00 |

## 11 5074

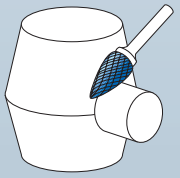
BLUETEC BESCHICHTET COATED



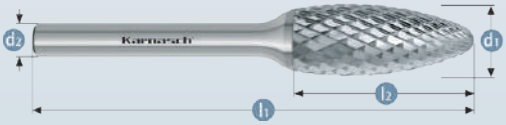
**H** FORM / SHAPE

Flamme

Flame



## 11 3074



Schnittdaten Cutting data

Film Movie

779

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5074 010 | • 6 | 14 | 6 | 50 | | ✔ | 18,35 |
| 11 5074 015 | • 8 | 20 | 6 | 65 | ✔ | | 19,70 |
| 11 5074 020 | • 10 | 20 | 6 | 65 | ✔ | | 33,45 |
| 11 5074 025 | • 12 | 32 | 6 | 77 | ✔ | | 39,40 |
| 11 5074 030 | • 12 | 32 | 8 | 77 | ✔ | | 39,40 |
| 11 5074 035 | • 16 | 36 | 6 | 82 | ✔ | | 52,65 |
| 11 5074 040 | • 16 | 36 | 8 | 82 | ✔ | | 55,20 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3074 010 | • 6 | 14 | 6 | 50 | | ✔ | 16,25 |
| 11 3074 015 | • 8 | 20 | 6 | 65 | ✔ | | 17,65 |
| 11 3074 020 | • 10 | 20 | 6 | 65 | ✔ | | 30,10 |
| 11 3074 025 | • 12 | 32 | 6 | 77 | ✔ | | 34,45 |
| 11 3074 030 | • 12 | 32 | 8 | 77 | ✔ | | 34,45 |
| 11 3074 035 | • 16 | 36 | 6 | 82 | ✔ | | 47,75 |
| 11 3074 040 | % 16 | 36 | 8 | 82 | ✔ | | 26,75 |

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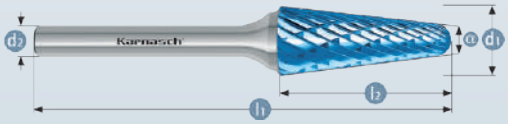
## 11 5084

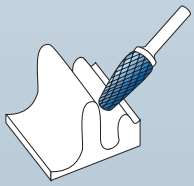
BLUETEC BESCHICHTET COATED



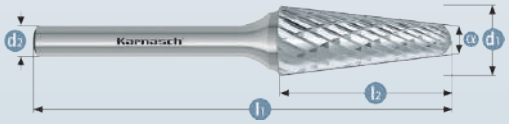
**L** FORM / SHAPE **KEL**

Rundkegel

Ball nosed cone



## 11 3084



Schnittdaten Cutting data 779

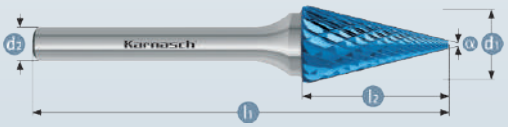
Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5084 020 | • 6 | 18 | 6 | 50 | | ✔ | 14° | 15,15 |
| 11 5084 025 | • 8 | 25 | 6 | 70 | ✔ | | 14° | 19,30 |
| 11 5084 035 | • 10 | 30 | 6 | 75 | ✔ | | 14° | 24,00 |
| 11 5084 045 | • 12 | 32 | 6 | 77 | ✔ | | 14° | 30,10 |
| 11 5084 050 | • 12 | 32 | 8 | 77 | ✔ | | 14° | 30,10 |
| 11 5084 060 | • 16 | 33 | 6 | 78 | ✔ | | 14° | 43,85 |
| 11 5084 065 | % 16 | 33 | 8 | 78 | ✔ | | 14° | 23,30 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3084 020 | • 6 | 18 | 6 | 50 | | ✔ | 14° | 13,10 |
| 11 3084 025 | • 8 | 25 | 6 | 70 | ✔ | | 14° | 17,20 |
| 11 3084 035 | • 10 | 30 | 6 | 75 | ✔ | | 14° | 20,65 |
| 11 3084 045 | • 12 | 32 | 6 | 77 | ✔ | | 14° | 25,20 |
| 11 3084 050 | • 12 | 32 | 8 | 77 | ✔ | | 14° | 25,20 |
| | | | | | | | | |
| 11 3084 065 | • 16 | 33 | 8 | 78 | ✔ | | 14° | 38,90 |

## 11 5094

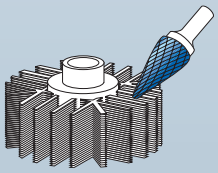
BLUETEC BESCHICHTET COATED



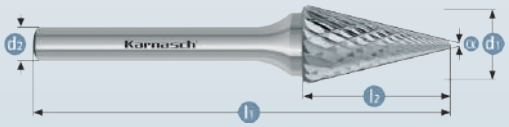
**M** FORM / SHAPE **SKM**

Spitzkegel

Cone



## 11 3094



Schnittdaten Cutting data 779

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5094 030 | • 6 | 20 | 6 | 50 | | ✔ | 14° | 15,15 |
| 11 5094 040 | • 10 | 20 | 6 | 65 | ✔ | | 13° | 23,60 |
| 11 5094 045 | • 12 | 25 | 6 | 70 | ✔ | | 28° | 29,35 |
| 11 5094 050 | % 12 | 25 | 8 | 70 | ✔ | | 28° | 15,60 |
| 11 5094 055 | • 16 | 26 | 6 | 74 | ✔ | | 33° | 39,50 |
| | | | | | | | | |

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

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3094 030 | • 6 | 20 | 6 | 50 | | ✔ | 14° | 13,10 |
| 11 3094 040 | • 10 | 20 | 6 | 65 | ✔ | | 13° | 20,20 |
| 11 3094 045 | • 12 | 25 | 6 | 70 | ✔ | | 28° | 24,40 |
| 11 3094 050 | % 12 | 25 | 8 | 70 | ✔ | | 28° | 13,00 |
| 11 3094 055 | % 16 | 26 | 6 | 74 | ✔ | | 33° | 18,40 |
| 11 3094 060 | % 16 | 26 | 8 | 74 | ✔ | | 33° | 19,45 |





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# HP-7



## Speziell für NE-Metalle wie Alu, Kupfer, Messing sowie alle Kunststoffe

## Especially for non-ferrous materials such as Aluminum, copper, brass. Also for all kinds of plastics.

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | ✓ | ✓ |

✓ OPTIMAL OPTIMAL

✓ GUT GOOD

- Alulegierungen
- Leichtmetalle
- Weiche Buntmetalle (NE-Metalle)
- Kunststoffe
- Faserverstärkte Kunststoffe GFK/CFK

- Aluminum alloy
- Light metals
- Soft copper and copper alloys (non-ferrous metals)
- Plastics
- Fibre-reinforced plastic (GFK/CFK)

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM | MINI-ALU |
|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M | |
| Art. 11 5005<br>Art. 11 3005 | Art. 11 5015<br>Art. 11 3015 | Art. 11 5025<br>Art. 11 3025 | Art. 11 5035<br>Art. 11 3035 | Art. 11 5045<br>Art. 11 3045 | Art. 11 5055<br>Art. 11 3055 | Art. 11 5065<br>Art. 11 3065 | Art. 11 5075<br>Art. 11 3075 | Art. 11 5085<br>Art. 11 3085 | Art. 11 5095<br>Art. 11 3095 | |
|  |  |  |  |  |  |  |  |  |  |  |
| 788 | 788 | 789 | 789 | 790 | 790 | 791 | 791 | 792 | 792 | 793 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Walzenrundform<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone | Minifrässtifte in feiner Aluverzahnung<br>Mini-burrs in Alu cutting style |




Karnasch BLACK-TEC-Beschichtung wurde speziell für NE-Metalle entwickelt (Verzahnung HP-7) hervorragende Reib- und Gleiteigenschaften verringern die Bildung von Aufbauschneiden.

Karnasch BLACK-TEC coating is specifically designed for non-ferrous metals (Cut HP-7). Low friction and excellent chip clearance characteristics reduce clogging of the flutes.



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| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---|---|---|---|---|
| NE-Metalle | Weiche NE- Metalle | Alulegierungen, Messing, Kupfer, Zink | Grobes Zerspanen = Hoher Materialabtrag | 600 - 1100 |
| | | | Feines Zerspanen = Geringer Materialabtrag | 900 - 1100 |
| | Harte NE- Metalle | Bronze, Titan, harte Alulegierungen (hoher Si-Anteil) | Grobes Zerspanen = Hoher Materialabtrag | 600 - 1100 |
| | | | Feines Zerspanen = Geringer Materialabtrag | 900 - 1100 |
| Kunststoff, andere Werkstoffe | Faserverstärkte Kunststoffe (GFK/CFK) thermoplastische Kunststoffe, Hartgummi | | Grobes Zerspanen = Hoher Meterialabtrag | 500 - 1100 |
| | | | Feines Zerspanen = Geringer Materialabtrag | 500 - 1100 |

| Material groups | | | Application | Cutting speed m/min |
|---|---|---|---|---|
| Non-ferrous metals | Soft non-ferrous metals | Alu alloys, brass copper, zinc | Coarse machining = high stock removal | 600 - 1100 |
| | | | Fine machining = low stock removal | 900 - 1100 |
| | Hard non-ferrous metals | Bronze, titanium, hard aluminum alloys, (high Si content) | Coarse machining = high stock removal | 600 - 1100 |
| | | | Fine machining = low stock removal | 900 - 1100 |
| Plastics, other materials | Fibre-reinforced plastic (GFK/CFK) thermoplastics, hard rubber | | Coarse machining = high stock removal | 500 - 1100 |
| | | | Fine machining = low stock removal | 500 - 1100 |

**Schnittgeschwindigkeit • Cutting speed (m/min)**

| | 500 | 600 | 900 | 1100 |
|---|---|---|---|---|
| ∅ (mm) | Drehzahlen (min$^{-1}$) • Rotational speed (rpm) | | | |
| 2 | 80.000 | 95.000 | 143.000 | 175.000 |
| 3 | 53.000 | 64.000 | 95.000 | 116.000 |
| 4 | 40.000 | 48.000 | 72.000 | 88.000 |
| 6 | 27.000 | 32.000 | 48.000 | 59.000 |
| 8 | 20.000 | 24.000 | 36.000 | 44.000 |
| 10 | 16.000 | 19.000 | 29.000 | 35.000 |
| 12 | 13.000 | 16.000 | 24.000 | 30.000 |
| 16 | 10.000 | 12.000 | 18.000 | 22.000 |
| 20 | 8.000 | 10.000 | 14.000 | 17.000 |
| 25 | 6.000 | 8.000 | 11.000 | 13.500 |

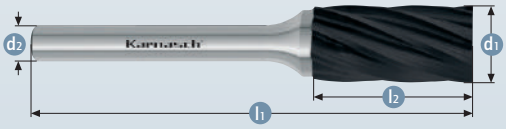
## 11 5005

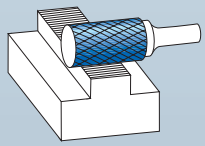
BLACKTEC BESCHICHTET COATED

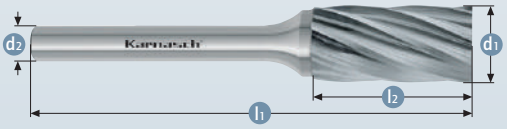
**A** FORM / SHAPE **ZYA**

Zylinder ohne Stirnverzahnung

Cylinder without end cut






Schnittdaten Cutting data — 787

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5005 030 | • 3 | 14 | 3 | 38 | | ✔ | 12,55 |
| 11 5005 060 | • 6 | 13 | 3 | 45 | ✔ | | 21,05 |
| 11 5005 065 | • 6 | 18 | 6 | 50 | | ✔ | 17,85 |
| 11 5005 080 | • 8 | 20 | 6 | 65 | ✔ | | 22,20 |
| 11 5005 090 | • 10 | 20 | 6 | 65 | ✔ | | 26,00 |
| 11 5005 105 | • 12 | 25 | 6 | 70 | ✔ | | 36,95 |
| 11 5005 120 | • 16 | 25 | 6 | 70 | ✔ | | 43,05 |
| 11 5005 125 | % 16 | 25 | 8 | 70 | ✔ | | 24,20 |
| 11 5005 130 | • 20 | 25 | 6 | 70 | ✔ | | 62,00 |
| 11 5005 135 | % 20 | 25 | 8 | 70 | ✔ | | 34,00 |

## 11 3005

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3005 030 | • 3 | 14 | 3 | 38 | | ✔ | 9,00 |
| 11 3005 060 | • 6 | 13 | 3 | 45 | ✔ | | 16,25 |
| 11 3005 065 | • 6 | 18 | 6 | 50 | | ✔ | 13,00 |
| 11 3005 080 | • 8 | 20 | 6 | 65 | ✔ | | 17,35 |
| 11 3005 090 | • 10 | 20 | 6 | 65 | ✔ | | 19,50 |
| 11 3005 105 | • 12 | 25 | 6 | 70 | ✔ | | 29,00 |
| 11 3005 120 | • 16 | 25 | 6 | 70 | ✔ | | 35,10 |
| | | | | | | | |
| 11 3005 130 | • 20 | 25 | 6 | 70 | ✔ | | 48,20 |
| 11 3005 135 | % 20 | 25 | 8 | 70 | ✔ | | 26,90 |
| 11 3005 140 | • 25 | 25 | 6 | 70 | ✔ | | 90,80 |

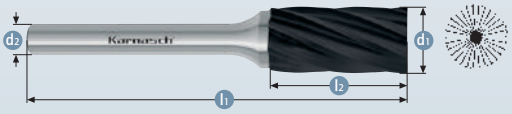
## 11 5015

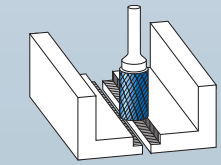
BLACKTEC BESCHICHTET COATED

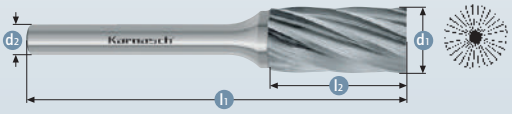
**B** FORM / SHAPE **ZYB**

Zylinder mit Stirnverzahnung

Cylinder wit end cut






Schnittdaten Cutting data — 787

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5015 015 | • 3 | 14 | 3 | 38 | | ✔ | 13,55 |
| 11 5015 045 | • 6 | 13 | 3 | 45 | ✔ | | 23,60 |
| 11 5015 050 | • 6 | 18 | 6 | 50 | | ✔ | 19,25 |
| 11 5015 075 | • 8 | 20 | 6 | 65 | ✔ | | 23,90 |
| 11 5015 085 | • 10 | 20 | 6 | 65 | ✔ | | 28,00 |
| 11 5015 100 | • 12 | 25 | 6 | 70 | ✔ | | 39,40 |
| 11 5015 110 | • 12 | 25 | 8 | 70 | ✔ | | 41,75 |
| 11 5015 115 | • 16 | 25 | 6 | 70 | ✔ | | 46,50 |
| 11 5015 120 | • 16 | 25 | 8 | 70 | ✔ | | 49,20 |
| 11 5015 125 | • 20 | 25 | 6 | 70 | ✔ | | 66,80 |
| | | | | | | | |
| 11 5015 135 | • 25 | 25 | 6 | 70 | ✔ | | 117,75 |

## 11 3015

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3015 015 | • 3 | 14 | 3 | 38 | | ✔ | 10,00 |
| 11 3015 045 | • 6 | 13 | 3 | 45 | ✔ | | 18,75 |
| 11 3015 050 | • 6 | 18 | 6 | 50 | | ✔ | 14,40 |
| 11 3015 075 | • 8 | 20 | 6 | 65 | ✔ | | 19,05 |
| 11 3015 085 | • 10 | 20 | 6 | 65 | ✔ | | 21,50 |
| 11 3015 100 | • 12 | 25 | 6 | 70 | ✔ | | 31,45 |
| 11 3015 110 | • 12 | 25 | 8 | 70 | ✔ | | 33,80 |
| 11 3015 115 | • 16 | 25 | 6 | 70 | ✔ | | 38,55 |
| 11 3015 120 | • 16 | 25 | 8 | 70 | ✔ | | 41,25 |
| 11 3015 125 | • 20 | 25 | 6 | 70 | ✔ | | 53,00 |
| 11 3015 130 | % 20 | 25 | 8 | 70 | ✔ | | 29,50 |
| 11 3015 135 | • 25 | 25 | 6 | 70 | ✔ | | 103,95 |

## 11 5025

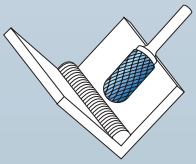
BLACKTEC BESCHICHTET COATED



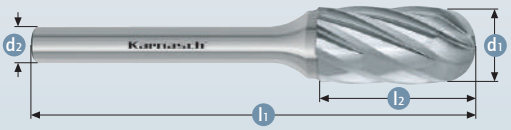

**C** FORM / SHAPE **WRC**

Walzenrundform

Ball nosed cylinder



## 11 3025




Schnittdaten Cutting data

Film Movie

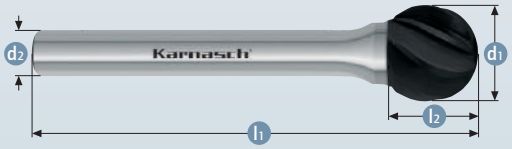
787

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5025 020 | ● 2 | 11 | 3 | 38 | | ✔ | 12,55 |
| 11 5025 025 | ● 3 | 14 | 3 | 38 | | ✔ | 12,55 |
| 11 5025 050 | ● 6 | 12,7 | 3 | 44 | ✔ | | 21,70 |
| 11 5025 055 | ● 6 | 18 | 6 | 50 | | ✔ | 19,40 |
| 11 5025 075 | ● 8 | 20 | 6 | 65 | ✔ | | 27,10 |
| 11 5025 085 | ● 10 | 20 | 6 | 65 | ✔ | | 26,00 |
| 11 5025 100 | ● 12 | 20 | 6 | 65 | ✔ | | 41,35 |
| 11 5025 105 | ● 12 | 25 | 6 | 70 | ✔ | | 36,55 |
| 11 5025 120 | ● 16 | 25 | 6 | 70 | ✔ | | 55,20 |
| 11 5025 125 | ● 16 | 25 | 8 | 70 | ✔ | | 55,20 |
| 11 5025 130 | ● 20 | 25 | 6 | 70 | ✔ | | 73,30 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3025 020 | ● 2 | 11 | 3 | 38 | | ✔ | 9,00 |
| 11 3025 025 | ● 3 | 14 | 3 | 38 | | ✔ | 9,00 |
| 11 3025 050 | ● 6 | 12,7 | 3 | 44 | ✔ | | 16,90 |
| 11 3025 055 | ● 6 | 18 | 6 | 50 | | ✔ | 14,55 |
| 11 3025 075 | ● 8 | 20 | 6 | 65 | ✔ | | 22,30 |
| 11 3025 085 | ● 10 | 20 | 6 | 65 | ✔ | | 19,50 |
| 11 3025 100 | ● 12 | 20 | 6 | 65 | ✔ | | 33,40 |
| 11 3025 105 | ● 12 | 25 | 6 | 70 | ✔ | | 28,60 |
| 11 3025 115 | ● 12 | 25 | 8 | 70 | ✔ | | 31,45 |
| 11 3025 120 | ● 16 | 25 | 6 | 70 | ✔ | | 47,25 |
| 11 3025 125 | % 16 | 25 | 8 | 70 | ✔ | | 25,15 |
| 11 3025 130 | ● 20 | 25 | 6 | 70 | ✔ | | 59,45 |
| 11 3025 135 | % 20 | 25 | 8 | 70 | ✔ | | 31,65 |

## 11 5035

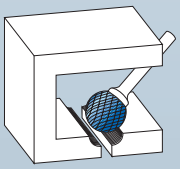
BLACKTEC BESCHICHTET COATED



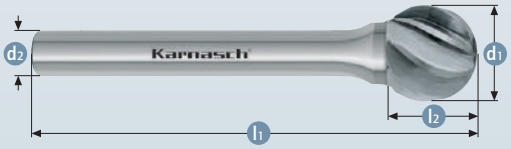

**D** FORM / SHAPE **KUD**

Kugel

Ball



## 11 3035




Schnittdaten Cutting data

Film Movie

787

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5035 020 | ● 2 | 1,8 | 3 | 38 | | ✔ | 12,55 |
| 11 5035 025 | ● 3 | 2,7 | 3 | 38 | | ✔ | 12,55 |
| 11 5035 045 | ● 4 | 3,4 | 3 | 38 | | ✔ | 28,10 |
| 11 5035 050 | ● 6 | 5,0 | 3 | 38 | ✔ | | 19,10 |
| 11 5035 055 | ● 6 | 4,7 | 6 | 50 | | ✔ | 19,25 |
| 11 5035 060 | ● 8 | 6,0 | 6 | 52 | ✔ | | 24,55 |
| 11 5035 070 | ● 10 | 8,0 | 6 | 54 | ✔ | | 22,60 |
| 11 5035 080 | ● 12 | 11,0 | 6 | 56 | ✔ | | 36,55 |
| 11 5035 085 | ● 12 | 11,0 | 8 | 56 | ✔ | | 38,15 |
| 11 5035 095 | ● 16 | 11,0 | 6 | 60 | ✔ | | 45,15 |
| 11 5035 100 | % 16 | 11,0 | 8 | 60 | ✔ | | 23,90 |
| 11 5035 105 | ● 20 | 16,5 | 6 | 62 | ✔ | | 62,15 |
| 11 5035 110 | ● 20 | 16,5 | 8 | 62 | ✔ | | 62,15 |
| 11 5035 115 | ● 25 | 22,0 | 6 | 68 | ✔ | | 90,90 |
| 11 5035 120 | ● 25 | 22,0 | 8 | 68 | ✔ | | 90,90 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3035 020 | ● 2 | 1,8 | 3 | 38 | | ✔ | 9,00 |
| 11 3035 025 | ● 3 | 2,7 | 3 | 38 | | ✔ | 9,00 |
| 11 3035 045 | ● 4 | 3,4 | 3 | 38 | | ✔ | 23,90 |
| 11 3035 050 | ● 6 | 5,0 | 3 | 38 | ✔ | | 14,30 |
| 11 3035 055 | ● 6 | 4,7 | 6 | 50 | | ✔ | 14,40 |
| 11 3035 060 | ● 8 | 6,0 | 6 | 52 | ✔ | | 19,75 |
| 11 3035 070 | ● 10 | 8,0 | 6 | 54 | ✔ | | 16,10 |
| 11 3035 080 | ● 12 | 11,0 | 6 | 56 | ✔ | | 28,60 |
| 11 3035 085 | ● 12 | 11,0 | 8 | 56 | ✔ | | 30,20 |
| 11 3035 095 | ● 16 | 11,0 | 6 | 60 | ✔ | | 37,20 |
| 11 3035 105 | ● 20 | 16,5 | 6 | 62 | ✔ | | 48,35 |
| 11 3035 110 | % 20 | 16,5 | 8 | 62 | ✔ | | 25,75 |
| 11 3035 115 | ● 25 | 22,0 | 6 | 68 | ✔ | | 77,10 |

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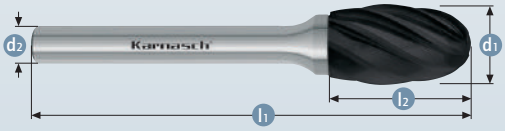
## 11 5045

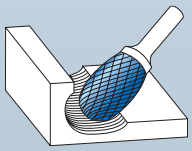
BLACKTEC BESCHICHTET COATED



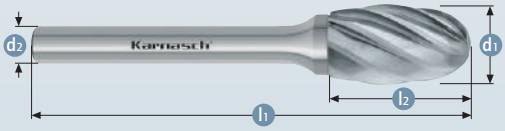

**E** FORM / SHAPE **TRE**

Tropfen

Oval



## 11 3045




Schnittdaten Cutting data

Film Movie

787

| Art. | | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 5045 010 | ● | 3 | 6 | 3 | 38 | | ✔ | 12,55 |
| 11 5045 015 | ● | 6 | 10 | 3 | 42 | ✔ | | 21,90 |
| 11 5045 020 | ● | 6 | 10 | 6 | 50 | | ✔ | 26,50 |
| 11 5045 025 | ● | 8 | 15 | 6 | 60 | ✔ | | 24,60 |
| 11 5045 030 | ● | 10 | 16 | 6 | 60 | ✔ | | 27,25 |
| 11 5045 035 | ● | 12 | 22 | 6 | 67 | ✔ | | 34,05 |
| 11 5045 045 | ● | 16 | 25 | 6 | 70 | ✔ | | 50,45 |
| 11 5045 050 | % | 16 | 25 | 8 | 70 | ✔ | | 26,70 |
| 11 5045 055 | ● | 20 | 25 | 6 | 70 | ✔ | | 70,80 |
| 11 5045 060 | % | 20 | 25 | 8 | 70 | ✔ | | 37,45 |

| Art. | | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 3045 010 | ● | 3 | 6 | 3 | 38 | | ✔ | 9,00 |
| 11 3045 015 | ● | 6 | 10 | 3 | 42 | ✔ | | 17,05 |
| 11 3045 020 | ● | 6 | 10 | 6 | 50 | | ✔ | 21,70 |
| 11 3045 025 | ● | 8 | 15 | 6 | 60 | ✔ | | 19,80 |
| 11 3045 030 | ● | 10 | 16 | 6 | 60 | ✔ | | 20,80 |
| 11 3045 035 | ● | 12 | 22 | 6 | 67 | ✔ | | 26,10 |
| 11 3045 045 | ● | 16 | 25 | 6 | 70 | ✔ | | 42,50 |
| 11 3045 050 | % | 16 | 25 | 8 | 70 | ✔ | | 22,60 |
| 11 3045 055 | ● | 20 | 25 | 6 | 70 | ✔ | | 57,00 |
| 11 3045 060 | % | 20 | 25 | 8 | 70 | ✔ | | 30,35 |

## 11 5055

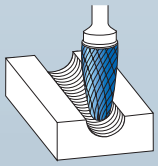
BLACKTEC BESCHICHTET COATED



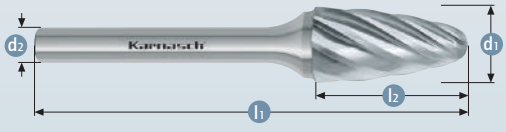

**F** FORM / SHAPE **RBF**

Rundbogen

Ball nosed tree



## 11 3055




Schnittdaten Cutting data

Film Movie

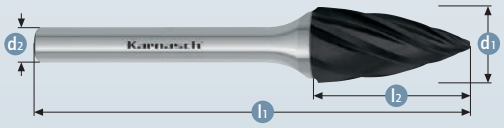
787

| Art. | | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 5055 015 | ● | 3 | 14 | 3 | 38 | | ✔ | 12,55 |
| 11 5055 025 | ● | 6 | 12 | 3 | 44 | ✔ | | 21,90 |
| 11 5055 030 | ● | 6 | 18 | 6 | 50 | | ✔ | 19,40 |
| 11 5055 035 | ● | 8 | 20 | 6 | 65 | ✔ | | 25,90 |
| 11 5055 040 | ● | 10 | 20 | 6 | 65 | ✔ | | 27,15 |
| 11 5055 050 | ● | 12 | 25 | 6 | 70 | ✔ | | 38,35 |
| 11 5055 055 | ● | 12 | 25 | 8 | 70 | ✔ | | 38,35 |
| 11 5055 065 | ● | 16 | 25 | 6 | 70 | ✔ | | 45,15 |
| 11 5055 070 | ● | 16 | 25 | 8 | 70 | ✔ | | 45,15 |
| 11 5055 075 | ● | 20 | 25 | 6 | 70 | ✔ | | 67,60 |
| 11 5055 080 | % | 20 | 25 | 8 | 70 | ✔ | | 35,75 |

| Art. | | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 3055 015 | ● | 3 | 14 | 3 | 38 | | ✔ | 9,00 |
| 11 3055 025 | ● | 6 | 12 | 3 | 44 | ✔ | | 17,05 |
| 11 3055 030 | ● | 6 | 18 | 6 | 50 | | ✔ | 14,55 |
| 11 3055 035 | ● | 8 | 20 | 6 | 65 | ✔ | | 21,10 |
| 11 3055 040 | ● | 10 | 20 | 6 | 65 | ✔ | | 20,65 |
| 11 3055 050 | ● | 12 | 25 | 6 | 70 | ✔ | | 30,40 |
| 11 3055 055 | ● | 12 | 25 | 8 | 70 | ✔ | | 30,40 |
| 11 3055 065 | ● | 16 | 25 | 6 | 70 | ✔ | | 37,20 |
| 11 3055 070 | ● | 16 | 25 | 8 | 70 | ✔ | | 37,20 |
| 11 3055 075 | ● | 20 | 25 | 6 | 70 | ✔ | | 53,80 |
| 11 3055 080 | % | 20 | 25 | 8 | 70 | ✔ | | 28,65 |

## 11 5065

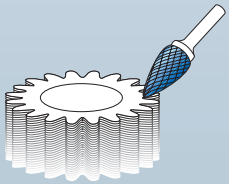
BLACKTEC BESCHICHTET COATED



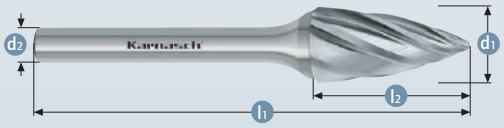

**G** FORM / SHAPE **SPG**

Spitzbogen

Tree



## 11 3065




Schnittdaten Cutting data 787

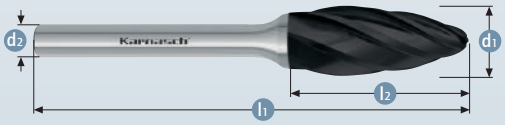
Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5065 015 | • 3 | 14 | 3 | 38 | | ✔ | 12,55 |
| 11 5065 030 | • 6 | 12 | 3 | 44 | ✔ | | 21,90 |
| 11 5065 035 | • 6 | 18 | 6 | 50 | | ✔ | 24,95 |
| 11 5065 040 | • 8 | 20 | 6 | 65 | ✔ | | 25,15 |
| 11 5065 045 | • 10 | 20 | 6 | 65 | ✔ | | 29,05 |
| 11 5065 060 | • 12 | 25 | 6 | 70 | ✔ | | 38,20 |
| 11 5065 085 | • 16 | 25 | 6 | 70 | ✔ | | 54,75 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3065 015 | • 3 | 14 | 3 | 38 | | ✔ | 9,00 |
| 11 3065 030 | • 6 | 12 | 3 | 44 | ✔ | | 17,05 |
| 11 3065 035 | • 6 | 18 | 6 | 50 | | ✔ | 20,10 |
| 11 3065 040 | • 8 | 20 | 6 | 65 | ✔ | | 20,35 |
| 11 3065 045 | • 10 | 20 | 6 | 65 | ✔ | | 22,55 |
| 11 3065 060 | • 12 | 25 | 6 | 70 | ✔ | | 30,25 |
| 11 3065 085 | • 16 | 25 | 6 | 70 | ✔ | | 46,80 |

## 11 5075

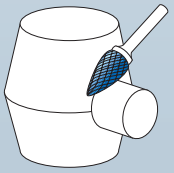
BLACKTEC BESCHICHTET COATED



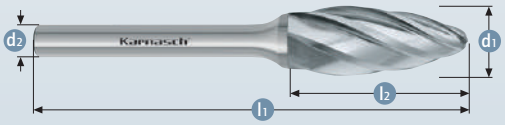

**H** FORM / SHAPE

Flamme

Flame



## 11 3075




Schnittdaten Cutting data 787

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5075 015 | • 8 | 20 | 6 | 65 | ✔ | | 26,75 |
| 11 5075 020 | • 10 | 20 | 6 | 65 | ✔ | | 46,65 |
| 11 5075 025 | • 12 | 32 | 6 | 77 | ✔ | | 50,55 |
| 11 5075 035 | • 16 | 36 | 6 | 82 | ✔ | | 76,60 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3075 015 | • 8 | 20 | 6 | 65 | ✔ | | 21,95 |
| 11 3075 020 | • 10 | 20 | 6 | 65 | ✔ | | 40,15 |
| 11 3075 025 | • 12 | 32 | 6 | 77 | ✔ | | 42,60 |
| 11 3075 035 | • 16 | 36 | 6 | 82 | ✔ | | 68,65 |

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



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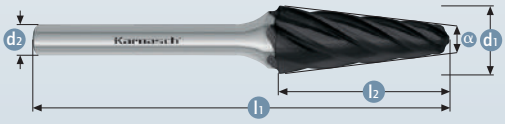
## 11 5085

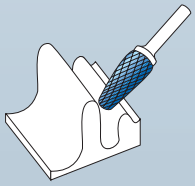
BLACKTEC BESCHICHTET COATED

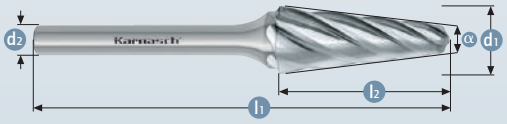
**L** FORM / SHAPE **KEL**

Rundkegel

Ball nosed cone






Schnittdaten Cutting data 787 | Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5085 010 | 3 | 14 | 3 | 38 | | ✔ | 8° | 12,55 |
| 11 5085 015 | 6 | 16 | 3 | 48 | ✔ | | 22° | 21,90 |
| 11 5085 020 | 6 | 18 | 6 | 50 | | ✔ | 14° | 26,20 |
| 11 5085 025 | 8 | 25 | 6 | 70 | ✔ | | 14° | 27,30 |
| 11 5085 035 | 10 | 30 | 6 | 75 | ✔ | | 14° | 33,00 |
| 11 5085 045 | 12 | 32 | 6 | 77 | ✔ | | 14° | 41,10 |
| 11 5085 050 | 12 | 32 | 8 | 77 | ✔ | | 14° | 41,10 |
| 11 5085 055 | 12 | 32 | 6 | 182 | ✔ | | 14° | 33,10 |
| 11 5085 060 | 16 | 33 | 6 | 78 | ✔ | | 14° | 55,20 |
| 11 5085 065 | 16 | 33 | 8 | 78 | ✔ | | 14° | 55,20 |

## 11 3085

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3085 010 | 3 | 14 | 3 | 38 | | ✔ | 8° | 9,00 |
| 11 3085 015 | 6 | 16 | 3 | 48 | ✔ | | 22° | 17,05 |
| 11 3085 020 | 6 | 18 | 6 | 50 | | ✔ | 14° | 21,35 |
| 11 3085 025 | 8 | 25 | 6 | 70 | ✔ | | 14° | 22,50 |
| 11 3085 035 | 10 | 30 | 6 | 75 | ✔ | | 14° | 26,50 |
| 11 3085 045 | 12 | 32 | 6 | 77 | ✔ | | 14° | 33,15 |
| 11 3085 050 | 12 | 32 | 8 | 77 | ✔ | | 14° | 33,15 |
| 11 3085 055 | 12 | 32 | 6 | 182 | ✔ | | 14° | 49,15 |
| 11 3085 060 | 16 | 33 | 6 | 78 | ✔ | | 14° | 47,25 |

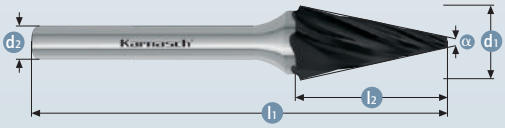
## 11 5095

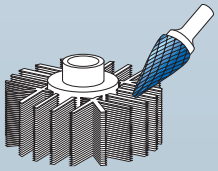
BLACKTEC BESCHICHTET COATED

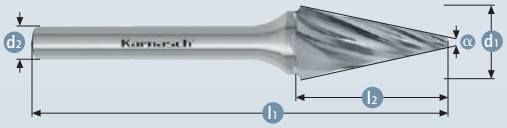
**M** FORM / SHAPE **SKM**

Spitzkegel

Cone






Schnittdaten Cutting data 787 | Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5095 015 | 3 | 11 | 3 | 38 | | ✔ | 8° | 12,55 |
| 11 5095 025 | 6 | 12 | 3 | 44 | ✔ | | 22° | 21,05 |
| 11 5095 030 | 6 | 20 | 6 | 50 | | ✔ | 14° | 24,15 |
| 11 5095 040 | 10 | 20 | 6 | 65 | ✔ | | 14° | 30,40 |
| 11 5095 045 | 12 | 25 | 6 | 70 | ✔ | | 14° | 36,75 |

## 11 3095

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3095 015 | 3 | 11 | 3 | 38 | | ✔ | 8° | 9,00 |
| 11 3095 025 | 6 | 12 | 3 | 44 | ✔ | | 22° | 16,25 |
| 11 3095 030 | 6 | 20 | 6 | 50 | | ✔ | 14° | 19,30 |
| 11 3095 040 | 10 | 20 | 6 | 65 | ✔ | | 14° | 23,90 |
| 11 3095 045 | 12 | 25 | 6 | 70 | ✔ | | 14° | 28,80 |



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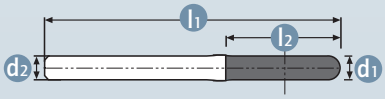
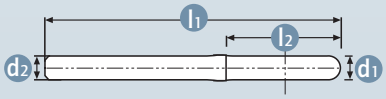
**Einsatzgebiete:** Feinmechanik, Werkzeugbau
**Zu bearbeitende Werkstoffe:** Alulegierungen, Leichtmetalle, Buntmetalle, Kunststoffe
**Drehzahlempfehlung:** ca. 70.000 U/min

**Applications:** Precision engineering, tool manufacture
**For use on:** Aluminum alloys, light metals, copper and copper alloys, plastics
**Recommended operating speed:** approx. 70,000 RPM




| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | | € |
|---|---|---|---|---|---|---|---|---|
| 11 5005 030 | • 3 | 14 | 3 | 38 | A | ZYA | | 12,55 |
| 11 5015 015 | • 3 | 14 | 3 | 38 | B | ZYB | | 13,55 |
| 11 5025 020 | • 2 | 11 | 3 | 38 | C | WRC | | 12,55 |
| 11 5025 025 | • 3 | 14 | 3 | 38 | C | WRC | | 12,55 |
| 11 5035 020 | • 2 | 1,75 | 3 | 38 | D | KUD | | 12,55 |
| 11 5035 025 | • 3 | 2,7 | 3 | 38 | D | KUD | | 12,55 |
| 11 5045 010 | • 3 | 6 | 3 | 38 | E | TRE | | 12,55 |
| 11 5055 015 | • 3 | 14 | 3 | 38 | F | RBF | | 12,55 |
| 11 5065 015 | • 3 | 14 | 3 | 38 | G | SPG | | 12,55 |
| 11 5085 010 | • 3 | 14 | 3 | 38 | L | KEL | | 12,55 |
| 11 5095 015 | • 3 | 11 | 3 | 38 | M | SKM | | 12,55 |

| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | | € |
|---|---|---|---|---|---|---|---|---|
| 11 3005 030 | • 3 | 14 | 3 | 38 | A | ZYA | | 9,00 |
| 11 3015 015 | • 3 | 14 | 3 | 38 | B | ZYB | | 10,00 |
| 11 3025 020 | • 2 | 11 | 3 | 38 | C | WRC | | 9,00 |
| 11 3025 025 | • 3 | 14 | 3 | 38 | C | WRC | | 9,00 |
| 11 3035 020 | • 2 | 1,75 | 3 | 38 | D | KUD | | 9,00 |
| 11 3035 025 | • 3 | 2,7 | 3 | 38 | D | KUD | | 9,00 |
| 11 3045 010 | • 3 | 6 | 3 | 38 | E | TRE | | 9,00 |
| 11 3055 015 | • 3 | 14 | 3 | 38 | F | RBF | | 9,00 |
| 11 3065 015 | • 3 | 14 | 3 | 38 | G | SPG | | 9,00 |
| 11 3085 010 | • 3 | 14 | 3 | 38 | L | KEL | | 9,00 |
| 11 3095 015 | • 3 | 11 | 3 | 38 | M | SKM | | 9,00 |

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Special price / sale article. While stocks last.



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# HP-1



## Für Superlegierungen. Extrem robuste Kreuzverzahnung

## For super alloys. Extremely robust cross cutting style

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | | ✓ | | ✓ | | | |

✓ OPTIMAL OPTIMAL

✓ GUT GOOD

- Schlagunempfindlichkeit (Zahnausbrüche, Abplatzungen, Kopfbrüche werden minimiert)
- Exzellente Kontrolle und Laufruhe
- Mittlere bis hohe Zerspanleistung
- Speziell für schwierigste Superlegierungen + Edelstähle wie: Titan, Inconel, Hastelloy, Waspaloy, Duplex, Amanox usw.
  Anwendungsbeispiel: Bearbeitung von Flugzeug Turbinenschaufeln, Gasturbinen

- Impact resistance (tooth breakages, chipping, head breakages are minimised)
- Excellent control and quiet running
- Medium to high cutting action
- Especially for the most difficult super alloys + stainless steel, such as: Titanium, Inconel, Hastelloy, Waspaloy, Duplex, Amanox, etc.
  Application example: Working aeroplane turbine blades, gas turbines

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM | Ø 3 mm |
|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M | |
| Art. 11 5007<br>Art. 11 3007 | Art. 11 5017<br>Art. 11 3017 | Art. 11 5027<br>Art. 11 3027 | Art. 11 5037<br>Art. 11 3037 | Art. 11 5047<br>Art. 11 3047 | Art. 11 5057<br>Art. 11 3057 | Art. 11 5067<br>Art. 11 3067 | Art. 11 5077<br>Art. 11 3077 | Art. 11 5087<br>Art. 11 3087 | Art. 11 5097<br>Art. 11 3097 | |
|  |  |  |  |  |  |  |  |  |  |  |
| 796 | 796 | 797 | 797 | 798 | 798 | 799 | 799 | 800 | 800 | 801 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Walzenrundform<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone | Ø 3 mm, Schaft 3 mm, für Superlegierungen!<br>Ø 3 mm, shank 3 mm, for super alloys! |




Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---|---|---|---|---|
| Schwierigste Legierungen Superlegierungen | Titan, Inconel, Hastelloy, Waspaloy, Duplex, Amanox Udimet, Nicrofer, Conicro, René | Motoren-, Turbinen- und Triebwerksbau Energietechnik, Luft- und Raumfahrt Öl- und Gasindustrie, Gasturbinen | grobes Zerspanen = hoher bis mittlerer Materialabtrag | 250-350 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | grobes Zerspanen = hoher bis mittlerer Materialabtrag | 250-350 |
| Stahl, Stahlguss | Ungehärtet, nicht vergütete Stähle bis 1200 N/mm² (<38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | grobes Zerspanen = hoher bis mittlerer Materialabtrag | 450-600 |
| | Gehärtete, vergütete Stähle über 1200 N/mm² (>38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 250-350 |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/ Sphäroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | grobes Zerspanen = hoher bis mittlerer Materialabtrag | 450-600 |

| Material groups | | | Application | Cutting speed m/min |
|---|---|---|---|---|
| difficult alloys superalloys | Titan, Inconel, Hastelloy, Waspaloy, Duplex, Amanox Udimet, Nicrofer, Conicro, René | Engines, aircraft engine and turbine construction, energy technology, aerospace oil and gas industry, gas turbines | Coarse machining = high to medium stock removal | 250-350 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Coarse machining = high to medium stock removal | 250-350 |
| Steel cast steel | Non-hardened, non-heat treated steels up to 1200 N/mm² (<38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Coarse machining = high to medium stock removal | 450-600 |
| | Hardened, heat treated steels exceeding 1200 N/mm² (>38 HRC) | tool steels, tempering steels, alloyed steels, cast steels | | 250-350 |
| Cast iron | Grey cast iron, white cast iron | Cast-iron with flake graphite EN-GJL (GG), with nodular graphite cast iron EN-GJS (GGG), white anneales cast iron EN-GJMW (GTW), black cast iron EN-GJMB (GTS) | Coarse machining = high to medium stock removal | 450-600 |

| Schnittgeschwindigkeit • Cutting speed (m/min) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 250 | 300 | 350 | 400 | 450 | 500 | 600 |
| ∅ (mm) | Drehzahlen (min⁻¹) • Rotational speed (rpm) | | | | | | |
| 3 | 27.000 | 32.000 | 37.000 | 42.000 | 48.000 | 53.000 | 64.000 |
| 6 | 13.000 | 16.000 | 19.000 | 21.000 | 24.000 | 27.000 | 32.000 |
| 8 | 10.000 | 12.000 | 14.000 | 16.000 | 18.000 | 20.000 | 24.000 |
| 10 | 8.000 | 10.000 | 11.000 | 13.000 | 14.000 | 16.000 | 19.000 |
| 12 | 7.000 | 8.000 | 9.000 | 11.000 | 12.000 | 13.000 | 16.000 |
| 16 | 5.000 | 6.000 | 7.000 | 8.000 | 9.000 | 10.000 | 12.000 |





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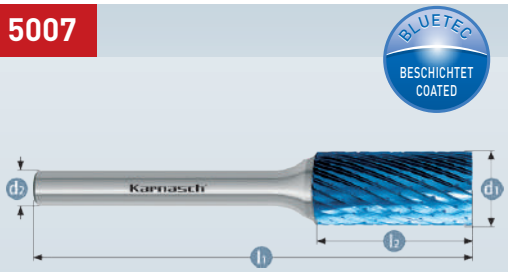
## 11 5007



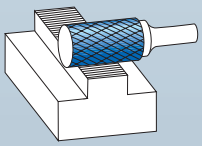




**A** FORM / SHAPE **ZYA**

Zylinder ohne Stirnverzahnung

Cylinder without end cut



## 11 3007



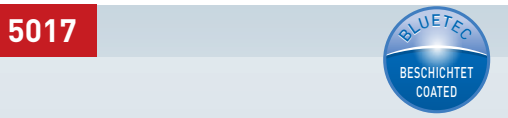

Schnittdaten Cutting data — 795

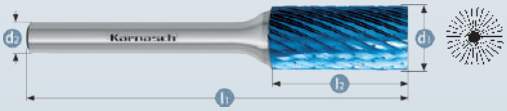
Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5007 030 | • 3 | 14 | 3 | 38 | | ✔ | 9,65 |
| 11 5007 060 | • 6 | 13 | 3 | 45 | ✔ | | 11,65 |
| 11 5007 065 | • 6 | 18 | 6 | 50 | | ✔ | 15,50 |
| 11 5007 080 | • 8 | 20 | 6 | 65 | ✔ | | 15,50 |
| 11 5007 090 | • 10 | 20 | 6 | 65 | ✔ | | 17,85 |
| 11 5007 100 | • 10 | 25 | 6 | 70 | ✔ | | 20,60 |
| 11 5007 107 | • 12DIN | 25 | 6 | 70 | ✔ | | 25,50 |
| 11 5007 120 | • 16 | 25 | 6 | 70 | ✔ | | 33,25 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3007 030 | • 3 | 14 | 3 | 38 | | ✔ | 7,55 |
| 11 3007 060 | • 6 | 13 | 3 | 45 | ✔ | | 9,60 |
| 11 3007 065 | • 6 | 18 | 6 | 50 | | ✔ | 13,45 |
| 11 3007 080 | • 8 | 20 | 6 | 65 | ✔ | | 13,45 |
| 11 3007 090 | • 10 | 20 | 6 | 65 | ✔ | | 14,50 |
| 11 3007 100 | • 10 | 25 | 6 | 70 | ✔ | | 17,25 |
| 11 3007 107 | • 12DIN | 25 | 6 | 70 | ✔ | | 20,60 |
| 11 3007 120 | • 16 | 25 | 6 | 70 | ✔ | | 28,35 |

## 11 5017

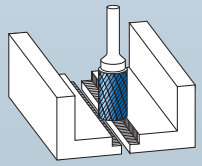


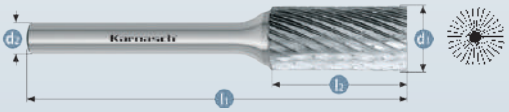

**B** FORM / SHAPE **ZYB**

Zylinder mit Stirnverzahnung

Cylinder with end cut



## 11 3017




Schnittdaten Cutting data — 795

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5017 015 | • 3 | 14 | 3 | 38 | | ✔ | 10,40 |
| 11 5017 045 | • 6 | 13 | 3 | 45 | ✔ | | 12,50 |
| 11 5017 050 | • 6 | 18 | 6 | 50 | | ✔ | 13,25 |
| 11 5017 075 | • 8 | 20 | 6 | 65 | ✔ | | 16,80 |
| 11 5017 085 | • 10 | 20 | 6 | 65 | ✔ | | 19,25 |
| 11 5017 103 | • 12DIN | 25 | 6 | 70 | ✔ | | 27,75 |
| 11 5017 115 | • 16 | 25 | 6 | 70 | ✔ | | 36,10 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3017 015 | • 3 | 14 | 3 | 38 | | ✔ | 8,35 |
| 11 3017 045 | • 6 | 13 | 3 | 45 | ✔ | | 10,45 |
| 11 3017 050 | • 6 | 18 | 6 | 50 | | ✔ | 11,20 |
| 11 3017 075 | • 8 | 20 | 6 | 65 | ✔ | | 14,75 |
| 11 3017 085 | • 10 | 20 | 6 | 65 | ✔ | | 15,90 |
| 11 3017 103 | • 12DIN | 25 | 6 | 70 | ✔ | | 22,80 |
| 11 3017 115 | • 16 | 25 | 6 | 70 | ✔ | | 31,20 |





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## 11 5027

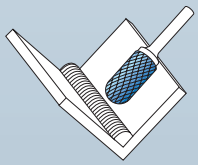
BLUETEC BESCHICHTET COATED




**C** FORM / SHAPE **WRC**

Walzenrundform

Ball nosed cylinder



## 11 3027




Schnittdaten Cutting data

Film Movie

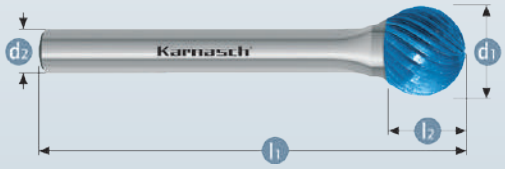
795

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5027 025 | • 3 | 14 | 3 | 38 | | ✔ | 9,65 |
| 11 5027 050 | • 6 | 12,7 | 3 | 44 | ✔ | | 11,65 |
| 11 5027 055 | • 6 | 18 | 6 | 50 | | ✔ | 13,95 |
| 11 5027 075 | • 8 | 20 | 6 | 65 | ✔ | | 16,70 |
| 11 5027 085 | • 10 | 20 | 6 | 65 | ✔ | | 19,50 |
| 11 5027 107 | • 12DIN | 25 | 6 | 70 | ✔ | | 28,25 |
| 11 5027 120 | • 16 | 25 | 6 | 70 | ✔ | | 36,75 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3027 025 | • 3 | 14 | 3 | 38 | | ✔ | 7,55 |
| 11 3027 050 | • 6 | 12,7 | 3 | 44 | ✔ | | 9,60 |
| 11 3027 055 | • 6 | 18 | 6 | 50 | | ✔ | 11,90 |
| 11 3027 075 | • 8 | 20 | 6 | 65 | ✔ | | 14,60 |
| 11 3027 085 | • 10 | 20 | 6 | 65 | ✔ | | 16,15 |
| 11 3027 107 | • 12DIN | 25 | 6 | 70 | ✔ | | 23,35 |

## 11 5037

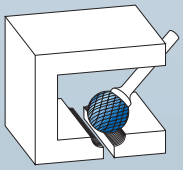
BLUETEC BESCHICHTET COATED



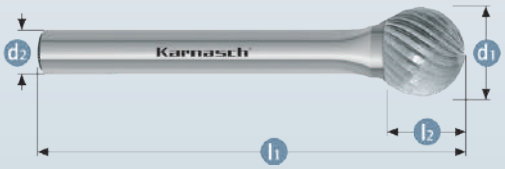

**D** FORM / SHAPE **KUD**

Kugel

Ball



## 11 3037




Schnittdaten Cutting data

Film Movie

795

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5037 025 | • 3 | 2,5 | 3 | 38 | | ✔ | 9,65 |
| 11 5037 050 | • 6 | 5,0 | 3 | 38 | ✔ | | 11,65 |
| 11 5037 055 | • 6 | 5,4 | 6 | 50 | | ✔ | 13,05 |
| 11 5037 060 | • 8 | 6,0 | 6 | 52 | ✔ | | 13,85 |
| 11 5037 070 | • 10 | 8,0 | 6 | 54 | ✔ | | 16,55 |
| 11 5037 083 | • 12DIN | 11,0 | 6 | 56 | ✔ | | 20,75 |
| 11 5037 095 | • 16 | 14,0 | 6 | 60 | ✔ | | 26,90 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3037 025 | • 3 | 2,5 | 3 | 38 | | ✔ | 7,55 |
| 11 3037 050 | • 6 | 5,0 | 3 | 38 | ✔ | | 9,60 |
| 11 3037 055 | • 6 | 5,4 | 6 | 50 | | ✔ | 11,00 |
| 11 3037 060 | • 8 | 6,0 | 6 | 52 | ✔ | | 11,80 |
| 11 3037 070 | • 10 | 8,0 | 6 | 54 | ✔ | | 13,20 |
| 11 3037 083 | • 12DIN | 11,0 | 6 | 56 | ✔ | | 15,80 |

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## 11 5047

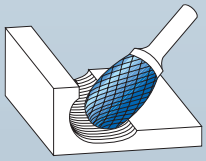
BLUETEC BESCHICHTET COATED




**E** FORM / SHAPE **TRE**

Tropfen

Oval



## 11 3047




Schnittdaten Cutting data 795

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5047 010 | • 3 | 6 | 3 | 38 | | ✔ | 9,65 |
| 11 5047 015 | • 6 | 10 | 3 | 42 | ✔ | | 11,65 |
| 11 5047 020 | • 6 | 10 | 6 | 50 | | ✔ | 15,50 |
| 11 5047 025 | • 8 | 15 | 6 | 60 | ✔ | | 18,35 |
| 11 5047 030 | • 10 | 16 | 6 | 60 | ✔ | | 19,50 |
| 11 5047 037 | • 12DIN | 21 | 6 | 66 | ✔ | | 26,50 |
| 11 5047 045 | • 16 | 25 | 6 | 70 | ✔ | | 37,60 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3047 010 | • 3 | 6 | 3 | 38 | | ✔ | 7,55 |
| 11 3047 015 | • 6 | 10 | 3 | 42 | ✔ | | 9,60 |
| 11 3047 020 | • 6 | 10 | 6 | 50 | | ✔ | 13,45 |
| 11 3047 025 | • 8 | 15 | 6 | 60 | ✔ | | 16,25 |
| 11 3047 030 | • 10 | 16 | 6 | 60 | ✔ | | 16,15 |
| 11 3047 037 | • 12DIN | 21 | 6 | 66 | ✔ | | 21,60 |
| 11 3047 045 | % 16 | 25 | 6 | 70 | ✔ | | 17,40 |

## 11 5057

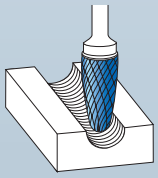
BLUETEC BESCHICHTET COATED




**F** FORM / SHAPE **RBF**

Rundbogen

Ball nosed tree



## 11 3057




Schnittdaten Cutting data 795

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5057 015 | • 3 | 14 | 3 | 38 | | ✔ | 9,65 |
| 11 5057 025 | • 6 | 12 | 3 | 44 | ✔ | | 11,65 |
| 11 5057 030 | • 6 | 18 | 6 | 50 | | ✔ | 14,55 |
| 11 5057 035 | • 8 | 20 | 6 | 65 | ✔ | | 19,45 |
| 11 5057 040 | • 10 | 20 | 6 | 65 | ✔ | | 19,00 |
| 11 5057 053 | • 12DIN | 25 | 6 | 70 | ✔ | | 24,60 |
| 11 5057 065 | • 16 | 25 | 6 | 70 | ✔ | | 37,05 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3057 015 | • 3 | 14 | 3 | 38 | | ✔ | 7,55 |
| 11 3057 025 | • 6 | 12 | 3 | 44 | ✔ | | 9,60 |
| 11 3057 030 | • 6 | 18 | 6 | 50 | | ✔ | 12,50 |
| 11 3057 035 | • 8 | 20 | 6 | 65 | ✔ | | 17,35 |
| 11 3057 040 | • 10 | 20 | 6 | 65 | ✔ | | 15,65 |
| 11 3057 053 | • 12DIN | 25 | 6 | 70 | ✔ | | 19,70 |
| 11 3057 065 | % 16 | 25 | 6 | 70 | ✔ | | 17,10 |



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## 11 5067

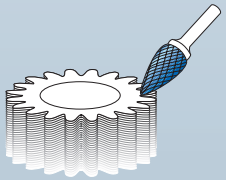
BLUETEC BESCHICHTET COATED



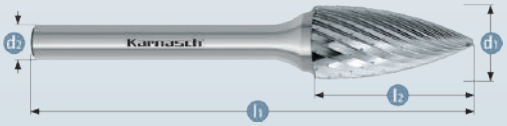
**G** FORM / SHAPE **SPG**

Spitzbogen

Tree



## 11 3067



Schnittdaten Cutting data

Film Movie

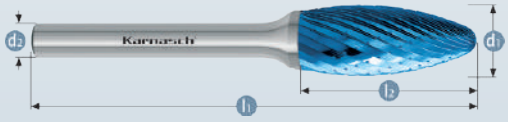
795

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5067 015 | • 3 | 14 | 3 | 38 | | ✔ | 9,65 |
| 11 5067 030 | • 6 | 12 | 3 | 44 | ✔ | | 11,65 |
| 11 5067 035 | • 6 | 18 | 6 | 50 | | ✔ | 14,55 |
| 11 5067 040 | • 8 | 20 | 6 | 65 | ✔ | | 17,20 |
| 11 5067 045 | • 10 | 20 | 6 | 65 | ✔ | | 20,10 |
| 11 5067 063 | • 12DIN | 25 | 6 | 70 | ✔ | | 25,75 |
| 11 5067 085 | • 16 | 25 | 6 | 70 | ✔ | | 36,65 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3067 015 | • 3 | 14 | 3 | 38 | | ✔ | 7,55 |
| 11 3067 030 | • 6 | 12 | 3 | 44 | ✔ | | 9,60 |
| 11 3067 035 | • 6 | 18 | 6 | 50 | | ✔ | 12,50 |
| 11 3067 040 | • 8 | 20 | 6 | 65 | ✔ | | 15,15 |
| 11 3067 045 | • 10 | 20 | 6 | 65 | ✔ | | 16,70 |
| 11 3067 063 | • 12DIN | 25 | 6 | 70 | ✔ | | 20,85 |
| 11 3067 085 | % 16 | 25 | 6 | 70 | ✔ | | 16,90 |

## 11 5077

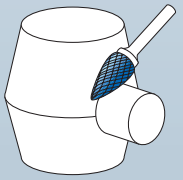
BLUETEC BESCHICHTET COATED



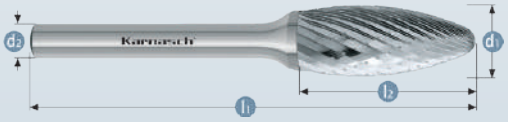
**H** FORM / SHAPE

Flamme

Flame



## 11 3077



Schnittdaten Cutting data

Film Movie

795

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5077 005 | • 3 | 6 | 3 | 38 | | ✔ | 9,65 |
| 11 5077 009 | • 6 | 10 | 3 | 43 | | ✔ | 11,65 |
| 11 5077 010 | • 6 | 14 | 6 | 50 | | ✔ | 18,60 |
| 11 5077 015 | • 8 | 20 | 6 | 65 | ✔ | | 18,55 |
| 11 5077 020 | • 10 | 20 | 6 | 65 | ✔ | | 34,05 |
| 11 5077 027 | • 12DIN | 30 | 6 | 75 | ✔ | | 38,00 |
| 11 5077 035 | • 16 | 36 | 6 | 82 | ✔ | | 51,40 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3077 005 | • 3 | 6 | 3 | 38 | | ✔ | 7,55 |
| 11 3077 009 | • 6 | 10 | 3 | 43 | | ✔ | 9,60 |
| 11 3077 010 | % 6 | 14 | 6 | 50 | | ✔ | 9,00 |
| 11 3077 015 | • 8 | 20 | 6 | 65 | ✔ | | 16,50 |
| 11 3077 020 | • 10 | 20 | 6 | 65 | ✔ | | 30,70 |
| 11 3077 027 | • 12DIN | 30 | 6 | 75 | ✔ | | 33,10 |

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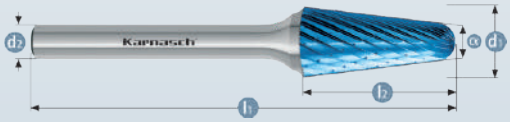
## 11 5087

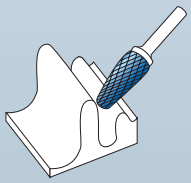
BLUETEC BESCHICHTET COATED



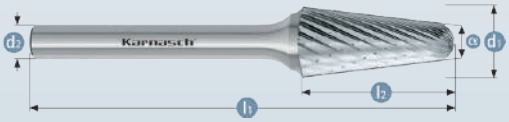
**L** FORM / SHAPE **KEL**

Rundkegel

Ball nosed cone



## 11 3087



Schnittdaten Cutting data

Film Movie

795

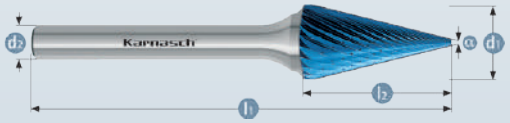
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5087 010 | • 3 | 14 | 3 | 38 | | ✔ | 8° | 9,65 |
| 11 5087 015 | • 6 | 16 | 3 | 48 | ✔ | | 22° | 11,65 |
| 11 5087 020 | • 6 | 18 | 6 | 50 | | ✔ | 14° | 14,85 |
| 11 5087 025 | • 8 | 25 | 6 | 70 | ✔ | | 14° | 18,75 |
| 11 5087 030 | • 10 | 20 | 6 | 65 | ✔ | | 14° | 23,45 |
| 11 5087 047 | • 12DIN | 25 | 6 | 70 | ✔ | | 14° | 28,65 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3087 010 | • 3 | 14 | 3 | 38 | | ✔ | 8° | 7,55 |
| 11 3087 015 | • 6 | 16 | 3 | 48 | ✔ | | 22° | 9,60 |
| 11 3087 020 | • 6 | 18 | 6 | 50 | | ✔ | 14° | 12,75 |
| 11 3087 025 | • 8 | 25 | 6 | 70 | ✔ | | 14° | 16,65 |
| 11 3087 030 | • 10 | 20 | 6 | 65 | ✔ | | 14° | 20,10 |
| 11 3087 047 | • 12DIN | 25 | 6 | 70 | ✔ | | 14° | 23,75 |
| 11 3087 060 | % 16 | 33 | 6 | 78 | ✔ | | 14° | 21,10 |

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

## 11 5097

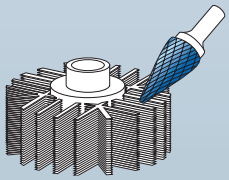
BLUETEC BESCHICHTET COATED



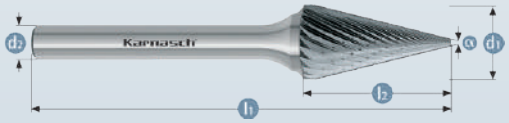
**M** FORM / SHAPE **SKM**

Spitzkegel

Cone



## 11 3097



Schnittdaten Cutting data

Film Movie

795

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5097 015 | • 3 | 11 | 3 | 38 | | ✔ | 14° | 9,65 |
| 11 5097 025 | • 6 | 12 | 3 | 48 | ✔ | | 22° | 11,65 |
| 11 5097 030 | • 6 | 20 | 6 | 50 | | ✔ | 14° | 14,85 |
| 11 5097 040 | • 10 | 20 | 6 | 65 | ✔ | | 28° | 24,00 |
| 11 5097 047 | • 12DIN | 25 | 6 | 70 | ✔ | | 28° | 27,85 |
| 11 5097 055 | • 16 | 26 | 6 | 74 | ✔ | | 33° | 38,55 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3097 015 | • 3 | 11 | 3 | 38 | | ✔ | 14° | 7,55 |
| 11 3097 025 | • 6 | 12 | 3 | 48 | ✔ | | 22° | 9,60 |
| 11 3097 030 | • 6 | 20 | 6 | 50 | | ✔ | 14° | 12,75 |
| 11 3097 040 | • 10 | 20 | 6 | 65 | ✔ | | 28° | 20,65 |
| 11 3097 047 | • 12DIN | 25 | 6 | 70 | ✔ | | 28° | 22,95 |
| 11 3097 055 | % 16 | 26 | 6 | 74 | ✔ | | 33° | 17,90 |

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Speziell optimierte HP-1 Verzahnung für Rotierfräser 3 mm

Specially optimized HP-1 cut for burrs 3 mm

TITAN HASTELLOY INCONEL

BLUETEC BESCHICHTET COATED

| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | | € |
|---|---|---|---|---|---|---|---|---|
| 11 5007 030 | • 3 | 14 | 3 | 38 | A | ZYA |  | 9,65 |
| 11 5017 015 | • 3 | 14 | 3 | 38 | B | ZYB |  | 10,40 |
| 11 5027 025 | • 3 | 14 | 3 | 38 | C | WRC |  | 9,65 |
| 11 5037 025 | • 3 | 2,7 | 3 | 38 | D | KUD |  | 9,65 |
| 11 5047 010 | • 3 | 6,0 | 3 | 38 | E | TRE |  | 9,65 |
| 11 5057 015 | • 3 | 14 | 3 | 38 | F | RBF |  | 9,65 |
| 11 5067 015 | • 3 | 14 | 3 | 38 | G | SPG |  | 9,65 |
| 11 5077 005 | • 3 | 6 | 3 | 38 | H | – |  | 9,65 |
| 11 5087 010 | • 3 | 14 | 3 | 38 | L | KEL |  | 9,65 |
| 11 5097 015 | • 3 | 15 | 3 | 38 | M | SKM |  | 9,65 |

| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | | € |
|---|---|---|---|---|---|---|---|---|
| 11 3007 030 | • 3 | 14 | 3 | 38 | A | ZYA |  | 7,55 |
| 11 3017 015 | • 3 | 14 | 3 | 38 | B | ZYB |  | 8,35 |
| 11 3027 025 | • 3 | 14 | 3 | 38 | C | WRC |  | 7,55 |
| 11 3037 025 | • 3 | 2,7 | 3 | 38 | D | KUD |  | 7,55 |
| 11 3047 010 | • 3 | 6,0 | 3 | 38 | E | TRE |  | 7,55 |
| 11 3057 015 | • 3 | 14 | 3 | 38 | F | RBF |  | 7,55 |
| 11 3067 015 | • 3 | 14 | 3 | 38 | G | SPG |  | 7,55 |
| 11 3077 005 | • 3 | 6 | 3 | 38 | H | – |  | 7,55 |
| 11 3087 010 | • 3 | 14 | 3 | 38 | L | KEL |  | 7,55 |
| 11 3097 015 | • 3 | 15 | 3 | 38 | M | SKM |  | 7,55 |





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# HP-8



## Speziell für Stahl und Stahlguss. Extrem hohe Zerspanleistung

## Especially for steel and cast steel. Extremely high machining output

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | | ✓ | | | | | | |

✓ OPTIMAL OPTIMAL

✓ GUT GOOD

- Bis zu 60% höhere Zerspanleistung im Vergleich zu herkömmlichen Kreuzverzahungen.
- Hohe Agressivität erzeugt große Späne mit hervorragender Spanabfuhr.
- Keine Anlauffarben am Werkstück durch geringe Wärmeentwicklung

- Up to 60% higher machining output as compared to conventional cross cut.
- High aggressiveness produces large chips with outstanding chip removal.
- No annealing colours at the workpiece due to low heat development.

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 6041<br>Art. 11 4041 | Art. 11 6042<br>Art. 11 4042 | Art. 11 6043<br>Art. 11 4043 | Art. 11 6044<br>Art. 11 4044 | Art. 11 6045<br>Art. 11 4045 | Art. 11 6046<br>Art. 11 4046 | Art. 11 6047<br>Art. 11 4047 | Art. 11 6048<br>Art. 11 4048 | Art. 11 6049<br>Art. 11 4049 | Art. 11 6050<br>Art. 11 4050 |
|  |  |  |  |  |  |  |  |  |  |
| 804 | 804 | 805 | 805 | 806 | 806 | 807 | 807 | 808 | 808 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Walzenrundform<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone |




Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.



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| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---|---|---|---|---|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Grobes Zerspanen = hoher Meterialabtrag mit Schlagbelastung | 450 - 750 |
| | Gehärtete, vergütete Stähle über 1200 N/mm² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | |

| Material groups | | | Application | Cutting speed m/min |
|---|---|---|---|---|
| Steel cast steel | Non-hardened, non-heat treated steels up to 1200 N/mm² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Coarse machining = high stock removal with impact load | 450 - 750 |
| | Hardened, heat treated steels exceeding 1200 N/mm² (> 38 HRC) | tool steels, tempering steels, alloyed steels, cast steels | | |

**Schnittgeschwindigkeit • Cutting speed (m/min)**

| | 450 | 750 |
|---|---|---|
| ∅ (mm) | Drehzahlen (min⁻¹) • Rotational speed (rpm) | |
| 3 | 48.000 | 80.000 |
| 6 | 24.000 | 40.000 |
| 8 | 18.000 | 30.000 |
| 10 | 14.000 | 24.000 |
| 12 | 12.000 | 20.000 |
| 16 | 9.000 | 17.000 |





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## 11 6041

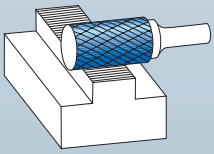
BLUETEC BESCHICHTET COATED



**A** FORM / SHAPE **ZYA**

Zylinder ohne Stirnverzahnung

Cylinder without end cut



## 11 4041



Schnittdaten Cutting data 803

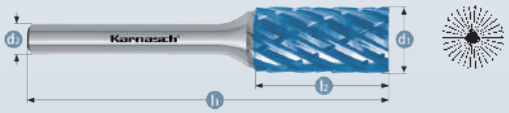
Film Movie

| Art. | | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 6041 010 | ● | 6 | 18 | 6 | 50 | | ✔ | 12,70 |
| 11 6041 015 | ● | 8 | 20 | 6 | 65 | ✔ | | 15,90 |
| 11 6041 020 | ● | 10 | 20 | 6 | 65 | ✔ | | 18,25 |
| 11 6041 025 | ● | 12 | 25 | 6 | 70 | ✔ | | 28,05 |
| 11 6041 030 | ○ | 16 | 25 | 6 | 70 | ✔ | | – |

| Art. | | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 4041 010 | ● | 6 | 18 | 6 | 50 | | ✔ | 10,60 |
| 11 4041 015 | ● | 8 | 20 | 6 | 65 | ✔ | | 13,85 |
| 11 4041 020 | ● | 10 | 20 | 6 | 65 | ✔ | | 14,85 |
| 11 4041 025 | ● | 12 | 25 | 6 | 70 | ✔ | | 23,15 |
| 11 4041 030 | ○ | 16 | 25 | 6 | 70 | ✔ | | – |

## 11 6042

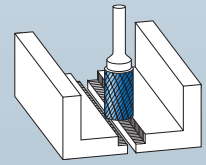
BLUETEC BESCHICHTET COATED



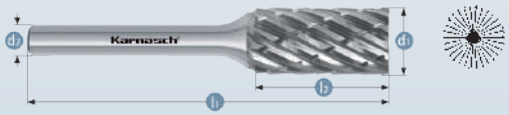
**B** FORM / SHAPE **ZYB**

Zylinder mit Stirnverzahnung

Cylinder with end cut



## 11 4042



Schnittdaten Cutting data 803

Film Movie

| Art. | | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 6042 010 | ● | 6 | 18 | 6 | 50 | | ✔ | 13,55 |
| 11 6042 015 | ● | 8 | 20 | 6 | 65 | ✔ | | 17,25 |
| 11 6042 020 | ● | 10 | 20 | 6 | 65 | ✔ | | 19,70 |
| 11 6042 025 | ● | 12 | 25 | 6 | 70 | ✔ | | 30,35 |
| 11 6042 030 | ○ | 16 | 25 | 6 | 70 | ✔ | | – |

| Art. | | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 4042 010 | ● | 6 | 18 | 6 | 50 | | ✔ | 11,50 |
| 11 4042 015 | ● | 8 | 20 | 6 | 65 | ✔ | | 15,20 |
| 11 4042 020 | ● | 10 | 20 | 6 | 65 | ✔ | | 16,35 |
| 11 4042 025 | ● | 12 | 25 | 6 | 70 | ✔ | | 25,45 |
| 11 4042 030 | ○ | 16 | 25 | 6 | 70 | ✔ | | – |

## 11 6043

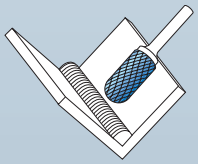
BLUETEC BESCHICHTET COATED




**C** FORM / SHAPE **WRC**

Walzenrundform

Ball nosed cylinder



## 11 4043




Schnittdaten Cutting data 803

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6043 010 | • 6 | 18 | 6 | 50 | | ✔ | 14,35 |
| 11 6043 015 | • 8 | 20 | 6 | 65 | ✔ | | 17,10 |
| 11 6043 020 | • 10 | 20 | 6 | 65 | ✔ | | 19,90 |
| 11 6043 025 | • 12 | 25 | 6 | 70 | ✔ | | 30,90 |
| 11 6043 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4043 010 | • 6 | 18 | 6 | 50 | | ✔ | 12,25 |
| 11 4043 015 | • 8 | 20 | 6 | 65 | ✔ | | 15,05 |
| 11 4043 020 | • 10 | 20 | 6 | 65 | ✔ | | 16,50 |
| 11 4043 025 | • 12 | 25 | 6 | 70 | ✔ | | 26,00 |
| 11 4043 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

## 11 6044

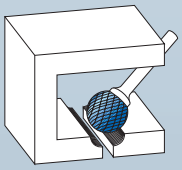
BLUETEC BESCHICHTET COATED




**D** FORM / SHAPE **KUD**

Kugel

Ball



## 11 4044




Schnittdaten Cutting data 803

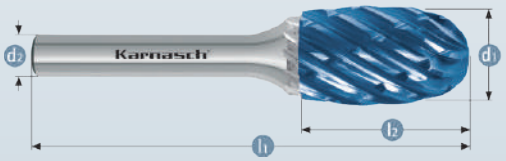
Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6044 010 | • 6 | 4,7 | 6 | 50 | | ✔ | 13,30 |
| 11 6044 015 | • 8 | 6,0 | 6 | 52 | ✔ | | 14,15 |
| 11 6044 020 | • 10 | 8,0 | 6 | 54 | ✔ | | 16,95 |
| 11 6044 025 | • 12 | 11,0 | 6 | 56 | ✔ | | 23,15 |
| 11 6044 030 | ○ 16 | 11,0 | 6 | 60 | ✔ | | – |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4044 010 | • 6 | 4,7 | 6 | 50 | | ✔ | 11,25 |
| 11 4044 015 | • 8 | 6,0 | 6 | 52 | ✔ | | 12,05 |
| 11 4044 020 | • 10 | 8,0 | 6 | 54 | ✔ | | 13,60 |
| 11 4044 025 | • 12 | 11,0 | 6 | 56 | ✔ | | 18,25 |
| 11 4044 030 | ○ 16 | 11,0 | 6 | 60 | ✔ | | – |

## 11 6045

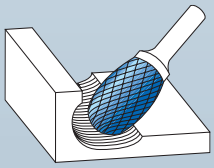
BLUETEC BESCHICHTET COATED



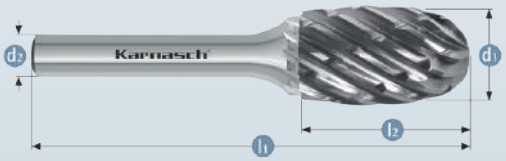

**E** FORM / SHAPE **TRE**

Tropfen

Oval



## 11 4045




Schnittdaten Cutting data

Film Movie

803

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6045 015 | ○ 8 | 15 | 6 | 60 | ✔ | | – |
| 11 6045 020 | ○ 10 | 16 | 6 | 60 | ✔ | | – |
| 11 6045 025 | ● 12 | 22 | 6 | 67 | ✔ | | 29,10 |
| 11 6045 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4045 015 | ○ 8 | 15 | 6 | 60 | ✔ | | – |
| 11 4045 020 | ○ 10 | 16 | 6 | 60 | ✔ | | – |
| 11 4045 025 | % 12 | 22 | 6 | 67 | ✔ | | 13,15 |
| 11 4045 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

## 11 6046

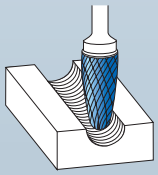
BLUETEC BESCHICHTET COATED




**F** FORM / SHAPE **RBF**

Rundbogen

Ball nosed tree



## 11 4046




Schnittdaten Cutting data

Film Movie

803

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6046 010 | ● 6 | 18 | 6 | 50 | | ✔ | 14,90 |
| 11 6046 015 | ● 8 | 20 | 6 | 65 | ✔ | | 19,90 |
| 11 6046 020 | ● 10 | 20 | 6 | 65 | ✔ | | 19,45 |
| 11 6046 025 | ● 12 | 25 | 6 | 70 | ✔ | | 27,15 |
| 11 6046 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4046 010 | ● 6 | 18 | 6 | 50 | | ✔ | 12,85 |
| 11 4046 015 | ● 8 | 20 | 6 | 65 | ✔ | | 17,85 |
| 11 4046 020 | ● 10 | 20 | 6 | 65 | ✔ | | 16,10 |
| 11 4046 025 | ● 12 | 25 | 6 | 70 | ✔ | | 22,25 |
| 11 4046 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |



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## 11 6047

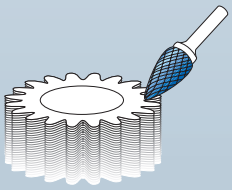
BLUETEC BESCHICHTET COATED




**G** FORM / SHAPE **SPG**

Spitzbogen

Tree



## 11 4047




Schnittdaten Cutting data 803

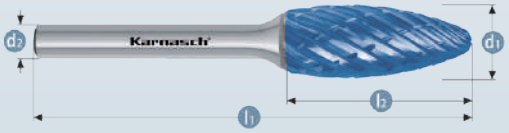
Film Movie

| Art. | | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 6047 010 | ● | 6 | 18 | 6 | 50 | | ✔ | 14,90 |
| 11 6047 015 | ● | 8 | 20 | 6 | 65 | ✔ | | 17,65 |
| 11 6047 020 | ● | 10 | 20 | 6 | 65 | ✔ | | 20,55 |
| 11 6047 025 | ● | 12 | 25 | 6 | 70 | ✔ | | 28,35 |
| 11 6047 030 | ○ | 16 | 25 | 6 | 70 | ✔ | | – |

| Art. | | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 4047 010 | ● | 6 | 18 | 6 | 50 | | ✔ | 12,85 |
| 11 4047 015 | ● | 8 | 20 | 6 | 65 | ✔ | | 15,55 |
| 11 4047 020 | ● | 10 | 20 | 6 | 65 | ✔ | | 17,20 |
| 11 4047 025 | ● | 12 | 25 | 6 | 70 | ✔ | | 23,45 |
| 11 4047 030 | ○ | 16 | 25 | 6 | 70 | ✔ | | – |

## 11 6048

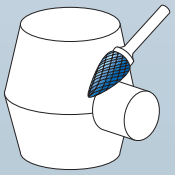
BLUETEC BESCHICHTET COATED



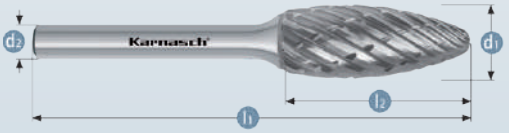

**H** FORM / SHAPE

Flamme

Flame



## 11 4048




Schnittdaten Cutting data 803

Film Movie

| Art. | | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 6048 015 | ● | 8 | 20 | 6 | 65 | ✔ | | 19,05 |
| 11 6048 020 | ○ | 10 | 20 | 6 | 65 | ✔ | | – |
| 11 6048 025 | ● | 12 | 32 | 6 | 77 | ✔ | | 40,95 |
| 11 6048 030 | ○ | 16 | 36 | 6 | 82 | ✔ | | – |

| Art. | | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 4048 015 | ● | 8 | 20 | 6 | 65 | ✔ | | 17,00 |
| 11 4048 020 | ○ | 10 | 20 | 6 | 65 | ✔ | | – |
| 11 4048 025 | ● | 12 | 32 | 6 | 77 | ✔ | | 36,05 |
| 11 4048 030 | ○ | 16 | 36 | 6 | 82 | ✔ | | – |

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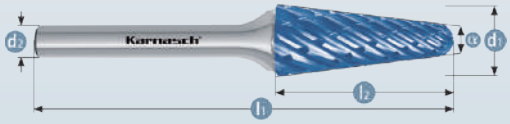
## 11 6049

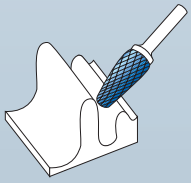
BLUETEC BESCHICHTET COATED



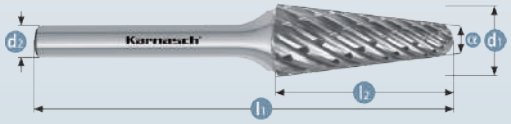
**L** FORM / SHAPE **KEL**

Rundkegel

Ball nosed cone



## 11 4049



Schnittdaten Cutting data

Film Movie

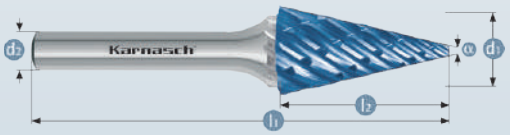
803

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 6049 015 | ○ 8 | 25 | 6 | 70 | ✔ | | 14° | – |
| 11 6049 017 | ● 10 | 20 | 6 | 65 | ✔ | | 14° | 26,20 |
| 11 6049 020 | ● 10 | 30 | 6 | 75 | ✔ | | 14° | 26,15 |
| 11 6049 025 | ● 12 | 32 | 6 | 77 | ✔ | | 14° | 31,25 |
| 11 6049 030 | ○ 16 | 33 | 6 | 78 | ✔ | | 14° | – |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 4049 015 | ○ 8 | 25 | 6 | 70 | ✔ | | 14° | – |
| 11 4049 017 | ● 10 | 20 | 6 | 65 | ✔ | | 14° | 22,80 |
| 11 4049 020 | ● 10 | 30 | 6 | 75 | ✔ | | 14° | 24,10 |
| 11 4049 025 | ● 12 | 32 | 6 | 77 | ✔ | | 14° | 26,35 |
| 11 4049 030 | ○ 16 | 33 | 6 | 78 | ✔ | | 14° | – |

## 11 6050

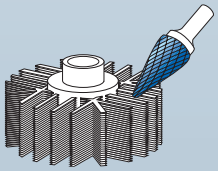
BLUETEC BESCHICHTET COATED



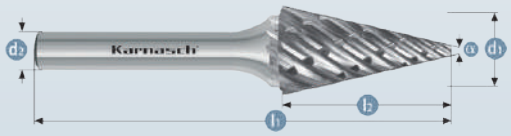
**M** FORM / SHAPE **SKM**

Spitzkegel

Cone



## 11 4050



Schnittdaten Cutting data

Film Movie

803

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 6050 020 | ○ 10 | 20 | 6 | 65 | ✔ | | 14° | – |
| 11 6050 025 | ○ 12 | 25 | 6 | 70 | ✔ | | 14° | – |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 4050 020 | ○ 10 | 20 | 6 | 65 | ✔ | | 14° | – |
| 11 4050 025 | ○ 12 | 25 | 6 | 70 | ✔ | | 14° | – |

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PROFESSIONAL TOOLS

Qualitätsprodukte für die Metallbearbeitung.
Quality products for metalworking.






# HP-9



## Speziell für Edelstahl. Extrem hohe Zerspanleistung

## Especially for stainless steel. Extremely high machining output.

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| | | ✓ | | ✓ | | | | | |

✓ OPTIMAL OPTIMAL
✓ GUT GOOD

- Extrem hohe Zerspanleistung und Standzeit für alle austenitischen, rost- und säurebeständigen Stähle.
- Nickelbasis und Titanlegierungen (Drehzahl reduzieren um Funkenbildung zu vermeiden)
- Hochwertige Oberflächengüte
- Keine Anlauffarben am Werkstück durch geringe Wärmeentwicklung

- Extremely high machining output and service life for all austenitic, rust- and acid-resilient steels.
- Nickel basis and titanium alloy (reduce speed to avoid sparking)
- High-quality surface.
- No annealing colours at the workpiece due to low heat development.

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 6031<br>Art. 11 4031 | Art. 11 6032<br>Art. 11 4032 | Art. 11 6033<br>Art. 11 4033 | Art. 11 6034<br>Art. 11 4034 | Art. 11 6035<br>Art. 11 4035 | Art. 11 6036<br>Art. 11 4036 | Art. 11 6037<br>Art. 11 4037 | Art. 11 6038<br>Art. 11 4038 | Art. 11 6039<br>Art. 11 4039 | Art. 11 6040<br>Art. 11 4040 |
|  |  |  |  |  |  |  |  |  |  |
| 812 | 812 | 813 | 813 | 814 | 814 | 815 | 815 | 816 | 816 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Walzenrundform<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone |




Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---|---|---|---|---|
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Grobes Zerspanen = Hoher Materialabtrag<br>Feines Zerspanen = Geringer Materialabtrag | 450 - 600 |

| Material groups | | | Application | Cutting speed m/min |
|---|---|---|---|---|
| Stainless steel INOX | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Coarse machining = high stock removal<br>Fine machining = low stock removal | 450 - 600 |

| Schnittgeschwindigkeit • Cutting speed (m/min) | | |
|---|---|---|
| | 450 | 600 |
| ∅ (mm) | Drehzahlen ($min^{-1}$) • Rotational speed (rpm) | |
| 3 | 48.000 | 64.000 |
| 6 | 24.000 | 32.000 |
| 8 | 18.000 | 24.000 |
| 10 | 14.000 | 19.000 |
| 12 | 12.000 | 16.000 |
| 16 | 9.000 | 12.000 |





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## 11 6031

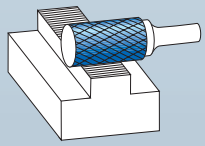
BLUETEC BESCHICHTET COATED

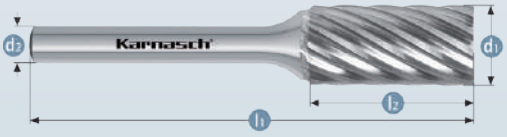
**A** FORM / SHAPE **ZYA**

Zylinder ohne Stirnverzahnung

Cylinder without end cut






Schnittdaten Cutting data 811

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6031 005 | • 3 | 14 | 3 | 38 | | ✔ | 11,20 |
| 11 6031 007 | • 6,3 | 12,7 | 3 | 45 | | ✔ | 18,45 |
| 11 6031 010 | • 6 | 18 | 6 | 50 | | ✔ | 13,65 |
| 11 6031 015 | • 8 | 20 | 6 | 65 | ✔ | | 17,15 |
| 11 6031 020 | • 10 | 20 | 6 | 65 | ✔ | | 19,55 |
| 11 6031 025 | • 12 | 25 | 6 | 70 | ✔ | | 30,10 |
| 11 6031 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

## 11 4031

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4031 005 | • 3 | 14 | 3 | 38 | | ✔ | 9,15 |
| 11 4031 007 | • 6,3 | 12,7 | 3 | 45 | | ✔ | 16,40 |
| 11 4031 010 | • 6 | 18 | 6 | 50 | | ✔ | 11,55 |
| 11 4031 015 | • 8 | 20 | 6 | 65 | ✔ | | 15,05 |
| 11 4031 020 | • 10 | 20 | 6 | 65 | ✔ | | 16,20 |
| 11 4031 025 | • 12 | 25 | 6 | 70 | ✔ | | 25,15 |
| 11 4031 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

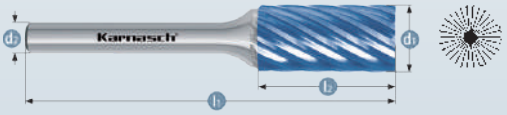
## 11 6032

BLUETEC BESCHICHTET COATED

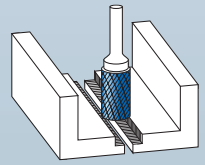
**B** FORM / SHAPE **ZYB**

Zylinder mit Stirnverzahnung

Cylinder with end cut










Schnittdaten Cutting data 811

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6032 015 | ○ 8 | 20 | 6 | 65 | ✔ | | – |
| 11 6032 020 | ○ 10 | 20 | 6 | 65 | ✔ | | – |
| 11 6032 025 | ○ 12 | 25 | 6 | 70 | ✔ | | – |
| 11 6032 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4032 015 | ○ 8 | 20 | 6 | 65 | ✔ | | – |
| 11 4032 020 | ○ 10 | 20 | 6 | 65 | ✔ | | – |
| 11 4032 025 | ○ 12 | 25 | 6 | 70 | ✔ | | – |
| 11 4032 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

## 11 6033

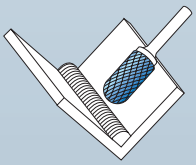
BLUETEC BESCHICHTET COATED




**C** FORM / SHAPE **WRC**

Walzenrundform

Ball nosed cylinder



## 11 4033




Schnittdaten Cutting data 811

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6033 005 | • 3 | 14 | 3 | 38 | | ✔ | 11,20 |
| 11 6033 007 | • 6,3 | 12,7 | 3 | 45 | | ✔ | 16,95 |
| 11 6033 010 | • 6 | 18 | 6 | 50 | | ✔ | 15,45 |
| 11 6033 015 | • 8 | 20 | 6 | 65 | ✔ | | 18,45 |
| 11 6033 020 | • 10 | 20 | 6 | 65 | ✔ | | 21,40 |
| 11 6033 025 | • 12 | 25 | 6 | 70 | ✔ | | 33,25 |
| 11 6033 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4033 005 | • 3 | 14 | 3 | 38 | | ✔ | 9,15 |
| 11 4033 007 | • 6,3 | 12,7 | 3 | 45 | | ✔ | 14,90 |
| 11 4033 010 | • 6 | 18 | 6 | 50 | | ✔ | 13,40 |
| 11 4033 015 | • 8 | 20 | 6 | 65 | ✔ | | 16,40 |
| 11 4033 020 | • 10 | 20 | 6 | 65 | ✔ | | 18,05 |
| 11 4033 025 | • 12 | 25 | 6 | 70 | ✔ | | 28,35 |
| 11 4033 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

## 11 6034

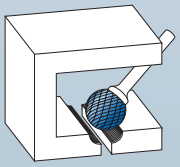
BLUETEC BESCHICHTET COATED




**D** FORM / SHAPE **KUD**

Kugel

Ball



## 11 4034




Schnittdaten Cutting data 811

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6034 005 | • 3 | 2,5 | 3 | 38 | | ✔ | 11,20 |
| 11 6034 007 | • 6,3 | 5,0 | 3 | 38 | | ✔ | 16,40 |
| 11 6034 010 | • 6 | 4,7 | 6 | 50 | | ✔ | 14,35 |
| 11 6034 015 | • 8 | 6,0 | 6 | 52 | ✔ | | 15,25 |
| 11 6034 020 | • 10 | 8,0 | 6 | 54 | ✔ | | 18,15 |
| 11 6034 025 | • 12 | 11,0 | 6 | 56 | ✔ | | 24,85 |
| 11 6034 030 | ○ 16 | 11,0 | 6 | 60 | ✔ | | – |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4034 005 | • 3 | 2,5 | 3 | 38 | | ✔ | 9,15 |
| 11 4034 007 | • 6,3 | 5,0 | 3 | 38 | | ✔ | 14,35 |
| 11 4034 010 | % 6 | 4,7 | 6 | 50 | | ✔ | 6,65 |
| 11 4034 015 | • 8 | 6,0 | 6 | 52 | ✔ | | 13,15 |
| 11 4034 020 | • 10 | 8,0 | 6 | 54 | ✔ | | 14,80 |
| 11 4034 025 | • 12 | 11,0 | 6 | 56 | ✔ | | 19,95 |
| 11 4034 030 | ○ 16 | 11,0 | 6 | 60 | ✔ | | – |

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Special price / sale article. While stocks last.

## 11 6035

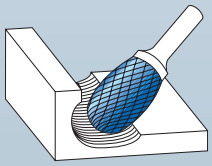
BLUETEC BESCHICHTET COATED



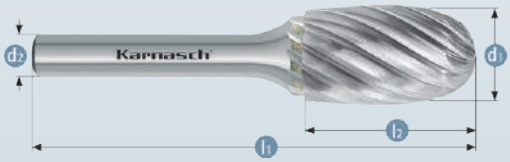
**E** FORM / SHAPE **TRE**

Tropfen

Oval



## 11 4035



Schnittdaten Cutting data — 811

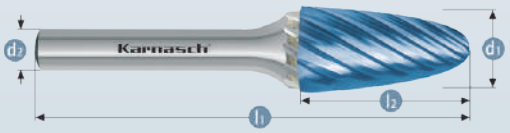
Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6035 015 | ● 8 | 15 | 6 | 60 | ✔ | | 20,30 |
| 11 6035 020 | ● 10 | 16 | 6 | 60 | ✔ | | 21,40 |
| 11 6035 025 | ● 12 | 22 | 6 | 67 | ✔ | | 31,30 |
| 11 6035 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4035 015 | ● 8 | 15 | 6 | 60 | ✔ | | 18,25 |
| 11 4035 020 | ● 10 | 16 | 6 | 60 | ✔ | | 18,05 |
| 11 4035 025 | ● 12 | 22 | 6 | 67 | ✔ | | 26,40 |
| 11 4035 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

## 11 6036

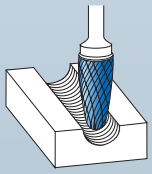
BLUETEC BESCHICHTET COATED



**F** FORM / SHAPE **RBF**

Rundbogen

Ball nosed tree



## 11 4036



Schnittdaten Cutting data — 811

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6036 005 | ● 3 | 14 | 3 | 38 | | ✔ | 11,20 |
| 11 6036 007 | ● 6,3 | 12,7 | 3 | 45 | | ✔ | 16,95 |
| 11 6036 010 | ● 6 | 18 | 6 | 50 | | ✔ | 16,10 |
| 11 6036 015 | ● 8 | 20 | 6 | 65 | ✔ | | 21,55 |
| 11 6036 020 | ● 10 | 20 | 6 | 65 | ✔ | | 20,90 |
| 11 6036 025 | ● 12 | 25 | 6 | 70 | ✔ | | 29,15 |
| 11 6036 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4036 005 | ● 3 | 14 | 3 | 38 | | ✔ | 9,15 |
| 11 4036 007 | % 6,3 | 12,7 | 3 | 45 | | ✔ | 8,10 |
| 11 4036 010 | ● 6 | 18 | 6 | 50 | | ✔ | 14,05 |
| 11 4036 015 | ● 8 | 20 | 6 | 65 | ✔ | | 19,50 |
| 11 4036 020 | ● 10 | 20 | 6 | 65 | ✔ | | 17,55 |
| 11 4036 025 | ● 12 | 25 | 6 | 70 | ✔ | | 24,25 |
| 11 4036 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

## 11 6037

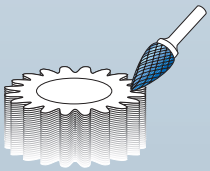
BLUETEC BESCHICHTET COATED



**G** FORM / SHAPE **SPG**

Spitzbogen

Tree



## 11 4037



Schnittdaten Cutting data | Film Movie

811

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6037 010 | ● 6 | 18 | 6 | 50 | | ✔ | 16,05 |
| 11 6037 015 | ● 8 | 20 | 6 | 65 | ✔ | | 19,05 |
| 11 6037 020 | ● 10 | 20 | 6 | 65 | ✔ | | 22,10 |
| 11 6037 025 | ● 12 | 25 | 6 | 70 | ✔ | | 30,55 |
| 11 6037 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4037 010 | ● 6 | 18 | 6 | 50 | | ✔ | 14,00 |
| 11 4037 015 | ● 8 | 20 | 6 | 65 | ✔ | | 16,95 |
| 11 4037 020 | ● 10 | 20 | 6 | 65 | ✔ | | 18,75 |
| 11 4037 025 | ● 12 | 25 | 6 | 70 | ✔ | | 25,65 |
| 11 4037 030 | ○ 16 | 25 | 6 | 70 | ✔ | | – |

## 11 6038

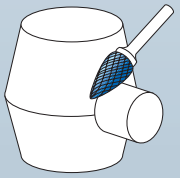
BLUETEC BESCHICHTET COATED



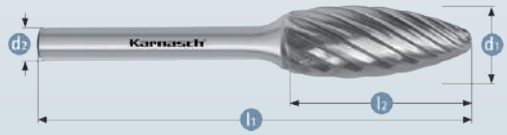
**H** FORM / SHAPE

Flamme

Flame



## 11 4038



Schnittdaten Cutting data | Film Movie

811

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6038 015 | ● 8 | 20 | 6 | 65 | ✔ | | 20,60 |
| 11 6038 020 | ● 10 | 20 | 6 | 65 | ✔ | | 37,70 |
| 11 6038 025 | ● 12 | 32 | 6 | 77 | ✔ | | 44,30 |
| 11 6038 030 | ○ 16 | 36 | 6 | 82 | ✔ | | – |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4038 015 | ● 8 | 20 | 6 | 65 | ✔ | | 18,50 |
| 11 4038 020 | ● 10 | 20 | 6 | 65 | ✔ | | 34,35 |
| 11 4038 025 | ● 12 | 32 | 6 | 77 | ✔ | | 39,35 |
| 11 4038 030 | ○ 16 | 36 | 6 | 82 | ✔ | | – |

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## 11 6039

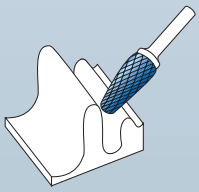
BLUETEC BESCHICHTET COATED



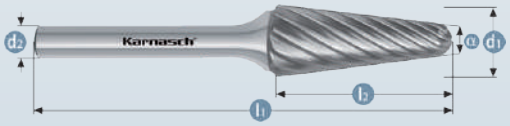
**L** FORM / SHAPE **KEL**

Rundkegel

Ball nosed cone



## 11 4039



Schnittdaten Cutting data

Film Movie

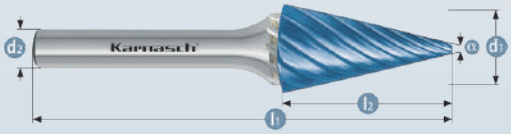
811

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 6039 015 | • 8 | 25 | 6 | 70 | ✔ | | 14° | 20,75 |
| 11 6039 020 | • 10 | 30 | 6 | 65 | ✔ | | 14° | 28,25 |
| 11 6039 025 | • 12 | 32 | 6 | 77 | ✔ | | 14° | 33,65 |
| 11 6039 030 | ○ 16 | 33 | 6 | 78 | ✔ | | 14° | – |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 4039 015 | • 8 | 25 | 6 | 70 | ✔ | | 14° | 18,70 |
| 11 4039 020 | • 10 | 30 | 6 | 65 | ✔ | | 14° | 24,90 |
| 11 4039 025 | • 12 | 32 | 6 | 77 | ✔ | | 14° | 28,75 |
| 11 4039 030 | ○ 16 | 33 | 6 | 78 | ✔ | | 14° | – |

## 11 6040

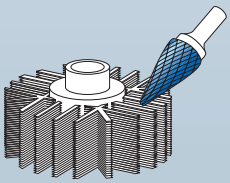
BLUETEC BESCHICHTET COATED



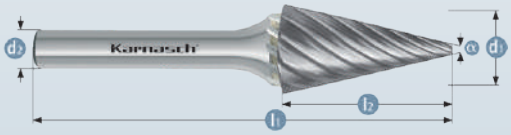
**M** FORM / SHAPE **SKM**

Spitzkegel

Cone



## 11 4040



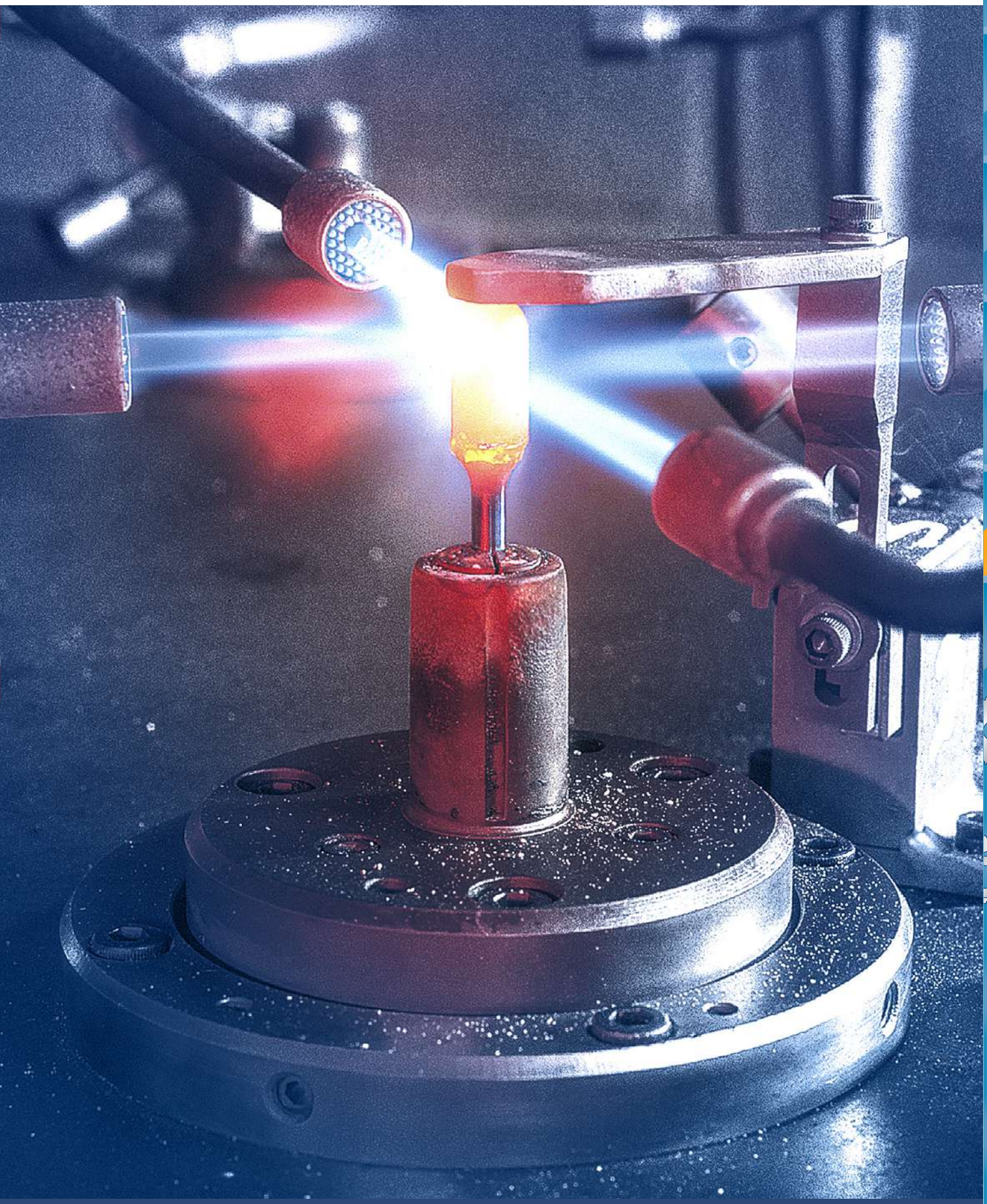
Schnittdaten Cutting data

Film Movie

811

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 6040 020 | ○ 10 | 20 | 6 | 65 | ✔ | | 14° | – |
| 11 6040 025 | ○ 12 | 25 | 6 | 70 | ✔ | | 14° | – |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 4040 020 | ○ 10 | 20 | 6 | 65 | ✔ | | 14° | – |
| 11 4040 025 | ○ 12 | 25 | 6 | 70 | ✔ | | 14° | – |



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# HP-4



## Feine Kreuzverzahnung

## Fine cross cutting style

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |

✓ OPTIMAL OPTIMAL

✓ GUT GOOD

- Exzellente Kontrolle (Auch an schwierig zugänglichen Stellen)
  - Ruhiger Lauf
  - Kurze Späne
  - Gute Oberflächengüte
- Mittlere Zerspanleistung
- Für alle Stahlsorten wie:
  - Bis zu extra harten Stählen ca. 70 HRC
  - Gusseisen
  - Edelstahl (INOX)
  - Hochwarmfeste Werkstoffe wie z.B. Nickel-Basis + Kobalt Basislegierungen

- Excellent control (also at difficult to reach positions)
  - Smooth operation
  - Short chips
  - Good surface finish
- Medium cutting action
- For all kinds of steel:
  - Up to extra hard steel approx. 70 HRC
  - Cast iron
  - Stainless steel (INOX)
  - Heat-resistant substances, such as e.g. nickel based + cobalt based alloys

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM | WKN |
|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M | N |
| Art. 11 5002<br>Art. 11 3002 | Art. 11 5012<br>Art. 11 3012 | Art. 11 5022<br>Art. 11 3022 | Art. 11 5032<br>Art. 11 3032 | Art. 11 5042<br>Art. 11 3042 | Art. 11 5052<br>Art. 11 3052 | Art. 11 5062<br>Art. 11 3062 | Art. 11 5072<br>Art. 11 3072 | Art. 11 5082<br>Art. 11 3082 | Art. 11 5092<br>Art. 11 3092 | Art. 11 5098<br>Art. 11 3098 |
|  |  |  |  |  |  |  |  |  |  |  |
| 820 | 820 | 821 | 822 | 822 | 823 | 823 | 824 | 824 | 825 | 825 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Walzenrundform<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone | Winkel<br>Inverted cone |




Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---|---|---|---|---|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Feines Zerspanen = mittlerer Materialabtrag | 650–750 |
| | Gehärtete, vergütete Stähle über 1200 N/mm² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 450–600 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Feines Zerspanen = mittlerer Materialabtrag | 450–600 |
| NE-Metalle | Harte NE-Metalle | Bronze, Titan/Titanlegierungen, harte Alulegierungen (hoher Si-Anteil) | Feines Zerspanen = mittlerer Materialabtrag | 450–600 |
| | Hochwarmfeste Werkstoffe | Nickelbasis- und Kobaltbasislegierungen (Triebwerk- und Turbinenbau) | | |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/Späroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | Feines Zerspanen = mittlerer Materialabtrag | 650–750 |

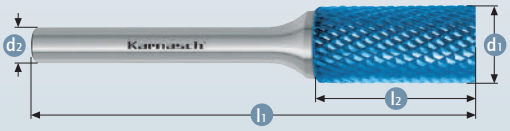
| Material groups | | | Application | Cutting speed m/min |
|---|---|---|---|---|
| Steel, cast steel | Non-hardened, non-heat treated-steels up to 1200 N/mm² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Fine machining = medium stock removal | 650–750 |
| | Hardened, heat-treated steels exceeding 1200 N/mm² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 450–600 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Fine machining = medium stock removal | 450–600 |
| Non-ferrous metals | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard alu-alloys (high Si content) | Fine machining = medium stock removal | 450–600 |
| | High-temperature resistant materials | Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction) | | |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Fine machining = medium stock removal | 650–750 |

**Schnittgeschwindigkeit • Cutting speed (m/min)**

| | 450 | 600 | 650 | 750 |
|---|---|---|---|---|
| ∅ (mm) | Drehzahlen (min⁻¹) • Rotational speed (rpm) | | | |
| 2 | 72.000 | 95.000 | 104.000 | 120.000 |
| 3 | 48.000 | 64.000 | 68.000 | 80.000 |
| 4 | 36.000 | 48.000 | 52.000 | 60.000 |
| 6 | 24.000 | 32.000 | 34.000 | 40.000 |
| 8 | 18.000 | 24.000 | 26.000 | 30.000 |
| 10 | 14.000 | 19.000 | 21.000 | 24.000 |
| 12 | 12.000 | 16.000 | 18.000 | 21.000 |
| 16 | 9.000 | 12.000 | 14.000 | 17.000 |

## 11 5002

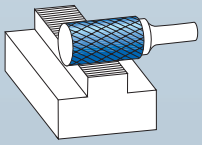
BLUETEC BESCHICHTET COATED



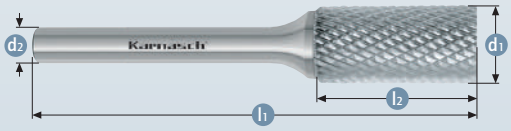

**A** FORM / SHAPE **ZYA**

Zylinder ohne Stirnverzahnung

Cylinder without end cut



## 11 3002




Schnittdaten Cutting data

Film Movie

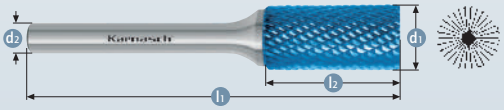
819

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5002 015 | ● 1,5 | 6 | 3 | 38 | | ✔ | 9,45 |
| 11 5002 025 | ● 2 | 11 | 3 | 38 | | ✔ | 9,45 |
| 11 5002 030 | ● 3 | 14 | 3 | 38 | | ✔ | 9,45 |
| 11 5002 035 | ● 3 | 14 | 3 | 50 | | ✔ | 10,95 |
| 11 5002 040 | ● 3 | 14 | 3 | 65 | | ✔ | 12,25 |
| 11 5002 045 | ● 3 | 14 | 3 | 75 | | ✔ | 13,40 |
| 11 5002 050 | ● 3 | 14 | 3 | 100 | | ✔ | 16,00 |
| 11 5002 055 | ● 4 | 14 | 6 | 50 | | ✔ | 13,60 |
| 11 5002 060 | ● 6 | 13 | 3 | 45 | ✔ | | 15,10 |
| 11 5002 065 | ● 6 | 18 | 6 | 50 | | ✔ | 13,60 |
| 11 5002 080 | ● 8 | 20 | 6 | 65 | ✔ | | 16,90 |
| 11 5002 090 | ● 10 | 20 | 6 | 65 | ✔ | | 19,10 |
| 11 5002 095 | ● 10 | 20 | 6 | 172 | ✔ | | 29,40 |
| 11 5002 100 | ● 10 | 25 | 6 | 70 | ✔ | | 19,45 |
| 11 5002 105 | ● 12 | 25 | 6 | 70 | ✔ | | 29,75 |
| 11 5002 115 | ● 12 | 25 | 8 | 70 | ✔ | | 29,85 |
| 11 5002 120 | ● 16 | 25 | 6 | 70 | ✔ | | 36,70 |
| 11 5002 125 | % 16 | 25 | 8 | 70 | ✔ | | 21,00 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3002 015 | % 1,5 | 6 | 3 | 38 | | ✔ | 3,95 |
| 11 3002 025 | ● 2 | 11 | 3 | 38 | | ✔ | 7,35 |
| 11 3002 030 | ● 3 | 14 | 3 | 38 | | ✔ | 7,35 |
| 11 3002 035 | % 3 | 14 | 3 | 50 | | ✔ | 4,75 |
| 11 3002 040 | % 3 | 14 | 3 | 65 | | ✔ | 6,05 |
| 11 3002 045 | % 3 | 14 | 3 | 75 | | ✔ | 6,05 |
| 11 3002 050 | % 3 | 14 | 3 | 100 | | ✔ | 7,40 |
| 11 3002 055 | ● 4 | 14 | 6 | 50 | | ✔ | 11,55 |
| 11 3002 060 | ● 6 | 13 | 3 | 45 | ✔ | | 13,00 |
| 11 3002 065 | ● 6 | 18 | 6 | 50 | | ✔ | 11,55 |
| 11 3002 080 | ● 8 | 20 | 6 | 65 | ✔ | | 14,85 |
| 11 3002 090 | ● 10 | 20 | 6 | 65 | ✔ | | 15,75 |
| 11 3002 100 | ● 10 | 25 | 6 | 70 | ✔ | | 16,10 |
| 11 3002 105 | ● 12 | 25 | 6 | 70 | ✔ | | 24,85 |
| 11 3002 115 | ● 12 | 25 | 8 | 70 | ✔ | | 24,95 |
| 11 3002 125 | ● 16 | 25 | 8 | 70 | ✔ | | 34,60 |

## 11 5012

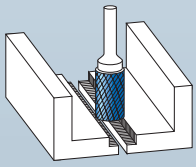
BLUETEC BESCHICHTET COATED



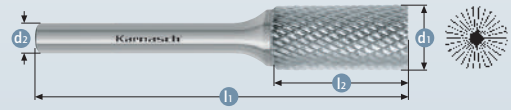

**B** FORM / SHAPE **ZYB**

Zylinder mit Stirnverzahnung

Cylinder with end cut



## 11 3012




Schnittdaten Cutting data

Film Movie

819

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5012 005 | ● 1,5 | 6 | 3 | 38 | | ✔ | 10,00 |
| 11 5012 010 | ● 2 | 11 | 3 | 38 | | ✔ | 10,00 |
| 11 5012 015 | ● 3 | 14 | 3 | 38 | | ✔ | 10,00 |
| 11 5012 020 | ● 3 | 14 | 3 | 50 | | ✔ | 11,90 |
| 11 5012 025 | ● 3 | 14 | 3 | 65 | | ✔ | 13,20 |
| 11 5012 030 | ● 3 | 14 | 3 | 75 | | ✔ | 14,55 |
| 11 5012 035 | ● 3 | 14 | 3 | 100 | | ✔ | 17,80 |
| 11 5012 040 | ● 4 | 14 | 6 | 50 | | ✔ | 14,60 |
| 11 5012 045 | ● 6 | 13 | 3 | 45 | ✔ | | 16,45 |
| 11 5012 050 | ● 6 | 18 | 6 | 50 | | ✔ | 14,60 |
| 11 5012 060 | ● 6 | 18 | 6 | 100 | ✔ | | 20,85 |
| 11 5012 075 | ● 8 | 20 | 6 | 65 | ✔ | | 18,35 |
| 11 5012 080 | ● 8 | 20 | 6 | 170 | ✔ | | 27,15 |
| 11 5012 085 | ● 10 | 20 | 6 | 65 | ✔ | | 20,85 |
| 11 5012 090 | ● 10 | 20 | 6 | 172 | ✔ | | 32,35 |
| 11 5012 100 | ● 12 | 25 | 6 | 70 | ✔ | | 32,30 |
| 11 5012 105 | ● 12 | 25 | 6 | 175 | ✔ | | 48,15 |
| 11 5012 110 | ● 12 | 25 | 8 | 70 | ✔ | | 32,30 |
| 11 5012 115 | ● 16 | 25 | 6 | 70 | ✔ | | 39,90 |
| 11 5012 120 | ● 16 | 25 | 8 | 70 | ✔ | | 42,70 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3012 005 | % 1,5 | 6 | 3 | 38 | | ✔ | 4,25 |
| 11 3012 010 | % 2 | 11 | 3 | 38 | | ✔ | 4,25 |
| 11 3012 015 | ● 3 | 14 | 3 | 38 | | ✔ | 7,95 |
| 11 3012 020 | ● 3 | 14 | 3 | 50 | | ✔ | 9,85 |
| 11 3012 025 | % 3 | 14 | 3 | 65 | | ✔ | 5,90 |
| 11 3012 030 | % 3 | 14 | 3 | 75 | | ✔ | 6,65 |
| 11 3012 035 | % 3 | 14 | 3 | 100 | | ✔ | 8,55 |
| 11 3012 040 | ● 4 | 14 | 6 | 50 | | ✔ | 12,50 |
| 11 3012 045 | ● 6 | 13 | 3 | 45 | ✔ | | 14,35 |
| 11 3012 050 | ● 6 | 18 | 6 | 50 | | ✔ | 12,50 |
| 11 3012 075 | ● 8 | 20 | 6 | 65 | ✔ | | 16,30 |
| 11 3012 085 | ● 10 | 20 | 6 | 65 | ✔ | | 17,50 |
| 11 3012 090 | ● 10 | 20 | 6 | 172 | ✔ | | 25,60 |
| 11 3012 100 | ● 12 | 25 | 6 | 70 | ✔ | | 27,40 |
| 11 3012 105 | % 12 | 25 | 6 | 175 | ✔ | | 21,30 |
| 11 3012 110 | % 12 | 25 | 8 | 70 | ✔ | | 14,60 |

**11 5022**

**11 3022**

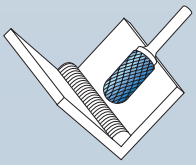
BLUETEC BESCHICHTET COATED




**C** FORM / SHAPE **WRC**

Walzenrundform

Ball nosed cylinder






Schnittdaten Cutting data

819

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5022 020 | ● 2 | 11 | 3 | 38 | | ✔ | 9,45 |
| 11 5022 025 | ● 3 | 14 | 3 | 38 | | ✔ | 9,45 |
| 11 5022 030 | ●● 3 | 14 | 3 | 50 | | ✔ | 12,25 |
| 11 5022 032 | ●● 3 | 14 | 3 | 60 | | ✔ | 12,80 |
| 11 5022 035 | ●● 3 | 14 | 3 | 75 | | ✔ | 13,40 |
| 11 5022 040 | ●● 3 | 14 | 3 | 100 | | ✔ | 16,90 |
| 11 5022 043 | ●● 3 | 30*(15) | 6 | 60 | | ✔ | 27,85 |
| 11 5022 045 | ● 4 | 16 | 6 | 50 | | ✔ | 15,40 |
| 11 5022 046 | ●● 4 | 30*(15) | 6 | 60 | | ✔ | 28,45 |
| 11 5022 050 | ● 6 | 12,7 | 3 | 44 | ✔ | | 15,10 |
| 11 5022 055 | ●● 6 | 18 | 6 | 50 | | ✔ | 15,40 |
| 11 5022 056 | ●● 6 | 18 | 6 | 60 | | ✔ | 19,30 |
| 11 5022 058 | ●● 6 | 18 | 6 | 80 | | ✔ | 23,00 |
| 11 5022 060 | ●● 6 | 18 | 6 | 100 | ✔ | | 28,15 |
| 11 5022 065 | ●● 6 | 18 | 6 | 150 | ✔ | | 40,00 |
| 11 5022 070 | ● 6 | 25 | 6 | 50 | | ✔ | 19,30 |
| 11 5022 075 | ● 8 | 20 | 6 | 65 | ✔ | | 18,20 |
| 11 5022 080 | ● 8 | 20 | 6 | 170 | ✔ | | 24,35 |
| 11 5022 085 | ● 10 | 20 | 6 | 65 | ✔ | | 21,10 |
| 11 5022 090 | ● 10 | 20 | 6 | 170 | ✔ | | 31,95 |
| 11 5022 095 | ● 10 | 25 | 6 | 70 | ✔ | | 24,55 |
| 11 5022 100 | ● 12 | 20 | 6 | 65 | ✔ | | 31,80 |
| 11 5022 105 | ● 12 | 25 | 6 | 70 | ✔ | | 32,65 |
| 11 5022 110 | ● 12 | 25 | 6 | 175 | ✔ | | 47,85 |
| 11 5022 115 | % 12 | 25 | 8 | 70 | ✔ | | 17,80 |
| 11 5022 120 | ● 16 | 25 | 6 | 70 | ✔ | | 40,40 |
| 11 5022 125 | ● 16 | 25 | 8 | 70 | ✔ | | 40,40 |

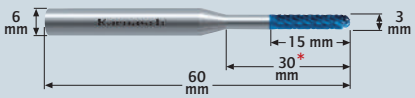
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3022 020 | % 2 | 11 | 3 | 38 | | ✔ | 3,95 |
| 11 3022 025 | ● 3 | 14 | 3 | 38 | | ✔ | 7,35 |
| | | | | | | | |
| 11 3022 032 | ●● 3 | 14 | 3 | 60 | | ✔ | 10,75 |
| | | | | | | | |
| 11 3022 040 | ●● 3 | 14 | 3 | 100 | | ✔ | 14,85 |
| 11 3022 043 | ●● 3 | 30*(15) | 6 | 60 | | ✔ | 25,75 |
| 11 3022 045 | ● 4 | 16 | 6 | 50 | | ✔ | 13,35 |
| 11 3022 046 | ●● 4 | 30*(15) | 6 | 60 | | ✔ | 26,40 |
| 11 3022 050 | ● 6 | 12,7 | 3 | 44 | ✔ | | 13,00 |
| 11 3022 055 | ●● 6 | 18 | 6 | 50 | | ✔ | 13,35 |
| 11 3022 056 | ●● 6 | 18 | 6 | 60 | | ✔ | 17,20 |
| 11 3022 058 | ●● 6 | 18 | 6 | 80 | | ✔ | 20,95 |
| 11 3022 060 | ●● 6 | 18 | 6 | 100 | ✔ | | 26,05 |
| | | | | | | | |
| | | | | | | | |
| 11 3022 075 | ● 8 | 20 | 6 | 65 | ✔ | | 16,15 |
| 11 3022 080 | ● 8 | 20 | 6 | 170 | ✔ | | 21,05 |
| 11 3022 085 | ● 10 | 20 | 6 | 65 | ✔ | | 17,75 |
| 11 3022 090 | ● 10 | 20 | 6 | 170 | ✔ | | 25,25 |
| 11 3022 095 | ● 10 | 25 | 6 | 70 | ✔ | | 21,20 |
| | | | | | | | |
| 11 3022 105 | ● 12 | 25 | 6 | 70 | ✔ | | 27,75 |
| 11 3022 110 | % 12 | 25 | 6 | 175 | ✔ | | 21,10 |
| 11 3022 115 | ● 12 | 25 | 8 | 70 | ✔ | | 27,95 |
| | | | | | | | |
| 11 3022 125 | % 16 | 25 | 8 | 70 | ✔ | | 18,90 |

● Frässtifte speziell für Schlüsseldienste siehe Seite 840/841

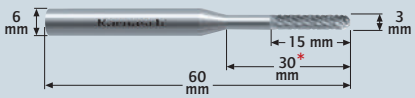
Burrs specially for locksmiths see page 840/841

* Von 30 mm sind 15 mm verzahnt
15 mm by 30 mm are not machined

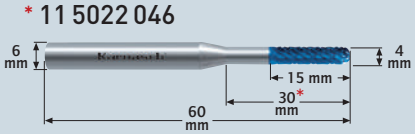
* 11 5022 043



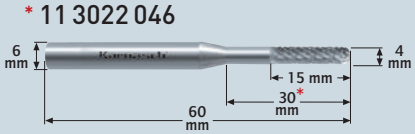

* 11 3022 043




* 11 5022 046




* 11 3022 046






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

## 11 5032

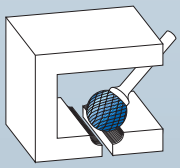
BLUETEC BESCHICHTET COATED

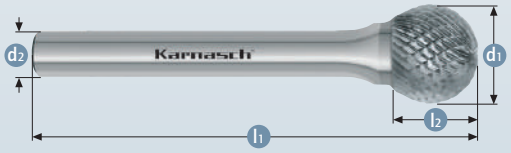
**D** FORM / SHAPE **KUD**

Kugel

Ball






Schnittdaten Cutting data

Film Movie

819

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5032 020 | ● 2 | 1,8 | 3 | 38 | | ✔ | 9,45 |
| 11 5032 025 | ● 3 | 2,5 | 3 | 38 | | ✔ | 9,45 |
| 11 5032 030 | ● 3 | 2,5 | 3 | 50 | | ✔ | 11,45 |
| 11 5032 035 | ● 3 | 2,5 | 3 | 75 | | ✔ | 12,70 |
| 11 5032 040 | ● 3 | 2,5 | 6 | 50 | | ✔ | 14,35 |
| 11 5032 045 | ● 4 | 3,4 | 3 | 38 | | ✔ | 21,20 |
| 11 5032 050 | ● 6 | 5,0 | 3 | 38 | ✔ | | 12,95 |
| 11 5032 055 | ● 6 | 4,7 | 6 | 50 | | ✔ | 14,35 |
| 11 5032 060 | ● 8 | 6,0 | 6 | 52 | ✔ | | 15,10 |
| 11 5032 065 | ● 8 | 6,0 | 6 | 180 | ✔ | | 22,25 |
| 11 5032 070 | ● 10 | 8,0 | 6 | 54 | ✔ | | 17,35 |
| 11 5032 075 | ● 10 | 8,0 | 6 | 185 | ✔ | | 27,50 |
| 11 5032 080 | ● 12 | 11,0 | 6 | 56 | ✔ | | 23,80 |
| 11 5032 085 | ● 12 | 11,0 | 8 | 56 | ✔ | | 23,80 |
| 11 5032 090 | ● 12 | 11,0 | 6 | 162 | ✔ | | 36,25 |
| 11 5032 095 | ● 16 | 14,0 | 6 | 60 | ✔ | | 29,60 |
| 11 5032 100 | ● 16 | 14,0 | 8 | 60 | ✔ | | 31,75 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3032 020 | ● 2 | 1,8 | 3 | 38 | | ✔ | 7,35 |
| 11 3032 025 | ● 3 | 2,5 | 3 | 38 | | ✔ | 7,35 |
| 11 3032 030 | ● 3 | 2,5 | 3 | 50 | | ✔ | 9,40 |
| 11 3032 035 | ● 3 | 2,5 | 3 | 75 | | ✔ | 10,65 |
| 11 3032 040 | % 3 | 2,5 | 6 | 50 | | ✔ | 6,55 |
| 11 3032 045 | ● 4 | 3,4 | 3 | 38 | | ✔ | 19,15 |
| 11 3032 050 | ● 6 | 5,0 | 3 | 38 | ✔ | | 10,90 |
| 11 3032 055 | ● 6 | 4,7 | 6 | 50 | | ✔ | 12,25 |
| 11 3032 060 | ● 8 | 6,0 | 6 | 52 | ✔ | | 13,00 |
| 11 3032 065 | ● 8 | 6,0 | 6 | 180 | ✔ | | 19,00 |
| 11 3032 070 | ● 10 | 8,0 | 6 | 54 | ✔ | | 14,00 |
| | | | | | | | |
| 11 3032 080 | ● 12 | 11,0 | 6 | 56 | ✔ | | 18,90 |
| 11 3032 085 | % 12 | 11,0 | 8 | 56 | ✔ | | 10,05 |
| 11 3032 090 | ● 12 | 11,0 | 6 | 162 | ✔ | | 28,05 |
| 11 3032 095 | ● 16 | 14,0 | 6 | 60 | ✔ | | 24,70 |
| 11 3032 100 | % 16 | 14,0 | 8 | 60 | ✔ | | 14,30 |

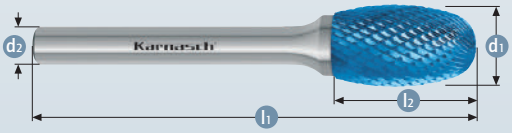
## 11 5042

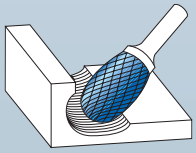
BLUETEC BESCHICHTET COATED

**E** FORM / SHAPE **TRE**

Tropfen

Oval






Schnittdaten Cutting data

Film Movie

819

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5042 010 | ● 3 | 6 | 3 | 38 | | ✔ | 9,45 |
| 11 5042 015 | ● 6 | 10 | 3 | 42 | ✔ | | 15,10 |
| 11 5042 020 | ● 6 | 10 | 6 | 50 | | ✔ | 17,10 |
| 11 5042 025 | ● 8 | 15 | 6 | 60 | ✔ | | 18,30 |
| 11 5042 030 | ● 10 | 16 | 6 | 60 | ✔ | | 21,10 |
| 11 5042 035 | ● 12 | 22 | 6 | 67 | ✔ | | 30,90 |
| 11 5042 040 | ● 12 | 22 | 8 | 67 | ✔ | | 30,90 |
| 11 5042 045 | ● 16 | 25 | 6 | 70 | ✔ | | 41,25 |
| 11 5042 050 | % 16 | 25 | 8 | 70 | ✔ | | 21,95 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3042 010 | ● 3 | 6 | 3 | 38 | | ✔ | 7,35 |
| 11 3042 015 | ● 6 | 10 | 3 | 42 | ✔ | | 13,00 |
| 11 3042 020 | ● 6 | 10 | 6 | 50 | | ✔ | 15,05 |
| 11 3042 025 | ● 8 | 15 | 6 | 60 | ✔ | | 16,25 |
| 11 3042 030 | ● 10 | 16 | 6 | 60 | ✔ | | 17,75 |
| 11 3042 035 | ● 12 | 22 | 6 | 67 | ✔ | | 26,00 |
| 11 3042 040 | % 12 | 22 | 8 | 67 | ✔ | | 13,85 |
| 11 3042 045 | % 16 | 25 | 6 | 70 | ✔ | | 19,35 |
| 11 3042 050 | % 16 | 25 | 8 | 70 | ✔ | | 19,35 |

## 11 5052

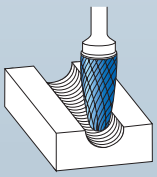
BLUETEC BESCHICHTET COATED



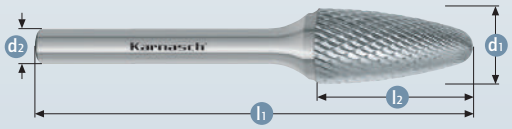

**F** FORM / SHAPE **RBF**

Rundbogen

Ball nosed tree



## 11 3052




Schnittdaten Cutting data

Film Movie

819

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5052 010 | ● 3 | 8 | 3 | 38 | | ✔ | 9,45 |
| 11 5052 015 | ● 3 | 14 | 3 | 38 | | ✔ | 9,45 |
| 11 5052 020 | ● 3 | 14 | 3 | 50 | | ✔ | 12,25 |
| 11 5052 025 | ● 6 | 12 | 3 | 44 | ✔ | | 15,10 |
| 11 5052 030 | ● 6 | 18 | 6 | 50 | | ✔ | 16,05 |
| 11 5052 035 | ● 8 | 20 | 6 | 65 | ✔ | | 19,45 |
| 11 5052 040 | ● 10 | 20 | 6 | 65 | ✔ | | 21,50 |
| 11 5052 045 | ● 10 | 20 | 6 | 170 | ✔ | | 31,45 |
| 11 5052 050 | ● 12 | 25 | 6 | 70 | ✔ | | 30,20 |
| 11 5052 055 | ● 12 | 25 | 8 | 70 | ✔ | | 30,20 |
| 11 5052 060 | ● 12 | 25 | 6 | 175 | ✔ | | 44,55 |
| 11 5052 065 | ● 16 | 25 | 6 | 70 | ✔ | | 40,00 |
| 11 5052 070 | % 16 | 25 | 8 | 80 | ✔ | | 21,25 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3052 010 | % 3 | 8 | 3 | 38 | | ✔ | 4,00 |
| 11 3052 015 | ● 3 | 14 | 3 | 38 | | ✔ | 7,35 |
| 11 3052 020 | % 3 | 14 | 3 | 50 | | ✔ | 5,40 |
| 11 3052 025 | ● 6 | 12 | 3 | 44 | ✔ | | 13,00 |
| 11 3052 030 | ● 6 | 18 | 6 | 50 | | ✔ | 14,00 |
| 11 3052 035 | ● 8 | 20 | 6 | 65 | ✔ | | 17,40 |
| 11 3052 040 | ● 10 | 20 | 6 | 65 | ✔ | | 18,15 |
| 11 3052 045 | ● 10 | 20 | 6 | 170 | ✔ | | 24,70 |
| 11 3052 050 | ● 12 | 25 | 6 | 70 | ✔ | | 25,30 |
| 11 3052 055 | % 12 | 25 | 8 | 70 | ✔ | | 13,45 |
| 11 3052 060 | ● 12 | 25 | 6 | 175 | ✔ | | 36,30 |
| 11 3052 065 | ● 16 | 25 | 6 | 70 | ✔ | | 35,10 |
| 11 3052 070 | % 16 | 25 | 8 | 80 | ✔ | | 18,70 |

## 11 5062

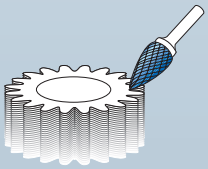
BLUETEC BESCHICHTET COATED



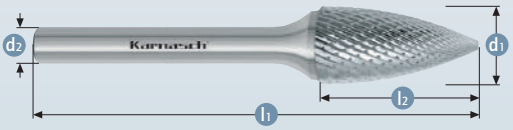

**G** FORM / SHAPE **SPG**

Spitzbogen

Tree



## 11 3062




Schnittdaten Cutting data

Film Movie

819

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5062 010 | ● 3 | 6 | 3 | 38 | | ✔ | 9,45 |
| 11 5062 015 | ● 3 | 14 | 3 | 38 | | ✔ | 9,45 |
| 11 5062 020 | ● 3 | 14 | 3 | 50 | | ✔ | 11,15 |
| 11 5062 025 | ● 3 | 14 | 3 | 75 | | ✔ | 13,25 |
| 11 5062 030 | ● 6 | 12 | 3 | 44 | ✔ | | 15,10 |
| 11 5062 035 | ● 6 | 18 | 6 | 50 | | ✔ | 16,05 |
| 11 5062 040 | ● 8 | 20 | 6 | 65 | ✔ | | 18,80 |
| 11 5062 045 | ● 10 | 20 | 6 | 65 | ✔ | | 21,95 |
| 11 5062 050 | % 10 | 20 | 6 | 170 | ✔ | | 17,50 |
| 11 5062 055 | ● 12 | 20 | 6 | 65 | ✔ | | 29,75 |
| 11 5062 060 | ● 12 | 25 | 6 | 70 | ✔ | | 29,75 |
| 11 5062 065 | ● 12 | 25 | 8 | 70 | ✔ | | 29,75 |
| 11 5062 070 | ● 12 | 25 | 6 | 175 | ✔ | | 44,15 |
| 11 5062 075 | % 12 | 30 | 6 | 75 | ✔ | | 17,60 |
| 11 5062 080 | % 12 | 30 | 8 | 75 | ✔ | | 17,20 |
| 11 5062 085 | ● 16 | 25 | 6 | 70 | ✔ | | 40,40 |
| 11 5062 090 | % 16 | 25 | 8 | 70 | ✔ | | 23,10 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3062 010 | % 3 | 6 | 3 | 38 | | ✔ | 3,95 |
| 11 3062 015 | ● 3 | 14 | 3 | 38 | | ✔ | 7,35 |
| 11 3062 025 | ● 3 | 14 | 3 | 75 | | ✔ | 11,15 |
| 11 3062 030 | ● 6 | 12 | 3 | 44 | ✔ | | 13,00 |
| 11 3062 035 | ● 6 | 18 | 6 | 50 | | ✔ | 14,00 |
| 11 3062 040 | ● 8 | 20 | 6 | 65 | ✔ | | 16,70 |
| 11 3062 045 | ● 10 | 20 | 6 | 65 | ✔ | | 18,60 |
| 11 3062 050 | ● 10 | 20 | 6 | 170 | ✔ | | 26,25 |
| 11 3062 055 | % 12 | 20 | 6 | 65 | ✔ | | 13,25 |
| 11 3062 060 | ● 12 | 25 | 6 | 70 | ✔ | | 24,85 |
| 11 3062 065 | % 12 | 25 | 8 | 70 | ✔ | | 13,25 |
| 11 3062 070 | ● 12 | 25 | 6 | 175 | ✔ | | 35,95 |
| 11 3062 075 | % 12 | 30 | 6 | 75 | ✔ | | 14,65 |
| 11 3062 080 | % 12 | 30 | 8 | 75 | ✔ | | 14,65 |
| 11 3062 085 | % 16 | 25 | 6 | 70 | ✔ | | 18,90 |
| 11 3062 090 | % 16 | 25 | 8 | 70 | ✔ | | 20,50 |

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

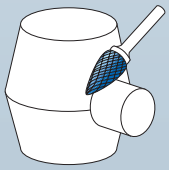
## 11 5072

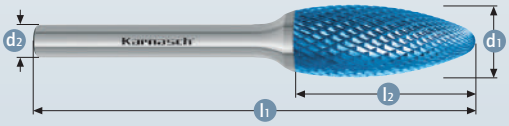
BLUETEC BESCHICHTET COATED

**H** FORM / SHAPE

Flamme

Flame





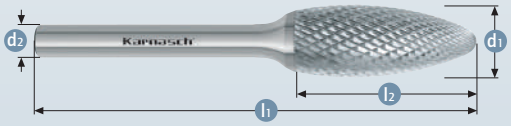

Schnittdaten Cutting data

Film Movie

819

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5072 005 | • 3 | 6 | 3 | 38 | | ✔ | 9,45 |
| 11 5072 010 | • 6 | 14 | 6 | 60 | | ✔ | 18,60 |
| 11 5072 015 | • 8 | 20 | 6 | 65 | ✔ | | 20,20 |
| 11 5072 020 | • 10 | 20 | 6 | 65 | ✔ | | 34,05 |
| 11 5072 025 | • 12 | 32 | 6 | 77 | ✔ | | 40,00 |
| 11 5072 030 | • 12 | 32 | 8 | 77 | ✔ | | 40,00 |
| 11 5072 035 | • 16 | 36 | 6 | 82 | ✔ | | 57,00 |
| 11 5072 040 | % 16 | 36 | 8 | 82 | ✔ | | 33,35 |

## 11 3072




| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3072 005 | • 3 | 6 | 3 | 38 | | ✔ | 7,35 |
| 11 3072 010 | • 6 | 14 | 6 | 60 | | ✔ | 16,55 |
| 11 3072 015 | • 8 | 20 | 6 | 65 | ✔ | | 18,10 |
| 11 3072 020 | • 10 | 20 | 6 | 65 | ✔ | | 30,70 |
| 11 3072 025 | • 12 | 32 | 6 | 77 | ✔ | | 35,10 |
| 11 3072 030 | % 12 | 32 | 8 | 77 | ✔ | | 18,70 |
| 11 3072 035 | % 16 | 36 | 6 | 82 | ✔ | | 27,75 |
| 11 3072 040 | % 16 | 36 | 8 | 82 | ✔ | | 30,10 |

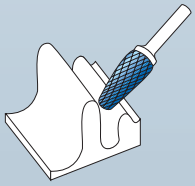
## 11 5082

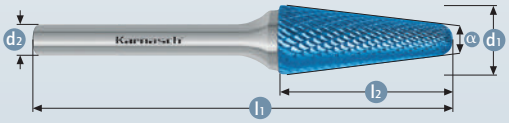
BLUETEC BESCHICHTET COATED

**L** FORM / SHAPE **KEL**

Rundkegel

Ball nosed cone





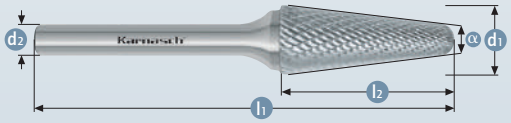

Schnittdaten Cutting data

Film Movie

819

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5082 005 | • 3 | 10 | 3 | 38 | | ✔ | 10° | 9,45 |
| 11 5082 010 | • 3 | 14 | 3 | 38 | | ✔ | 8° | 9,45 |
| 11 5082 015 | • 6 | 16 | 3 | 48 | ✔ | | 22° | 15,10 |
| 11 5082 020 | • 6 | 18 | 6 | 50 | | ✔ | 14° | 16,40 |
| 11 5082 025 | • 8 | 25 | 6 | 70 | ✔ | | 14° | 20,60 |
| 11 5082 030 | • 10 | 20 | 6 | 65 | ✔ | | 14° | 25,55 |
| 11 5082 035 | • 10 | 30 | 6 | 75 | ✔ | | 14° | 25,55 |
| 11 5082 040 | • 10 | 30 | 6 | 176 | ✔ | | 14° | 38,35 |
| 11 5082 045 | • 12 | 32 | 6 | 77 | ✔ | | 14° | 30,65 |
| 11 5082 050 | • 12 | 32 | 8 | 77 | ✔ | | 14° | 30,65 |
| 11 5082 055 | • 12 | 32 | 6 | 182 | ✔ | | 14° | 50,30 |
| 11 5082 060 | • 16 | 33 | 6 | 78 | ✔ | | 14° | 44,55 |
| 11 5082 065 | • 16 | 33 | 8 | 78 | ✔ | | 14° | 44,55 |

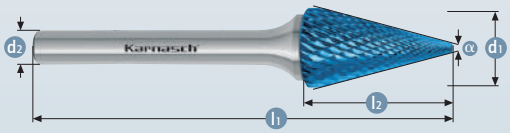
## 11 3082




| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3082 010 | • 3 | 14 | 3 | 38 | | ✔ | 8° | 7,35 |
| 11 3082 015 | • 6 | 16 | 3 | 48 | ✔ | | 22° | 13,00 |
| 11 3082 020 | % 6 | 18 | 6 | 50 | | ✔ | 14° | 7,80 |
| 11 3082 025 | • 8 | 25 | 6 | 70 | ✔ | | 14° | 18,55 |
| 11 3082 030 | • 10 | 20 | 6 | 65 | ✔ | | 14° | 22,20 |
| 11 3082 035 | • 10 | 30 | 6 | 75 | ✔ | | 14° | 22,20 |
| 11 3082 040 | % 10 | 30 | 6 | 176 | ✔ | | 14° | 17,15 |
| 11 3082 045 | • 12 | 32 | 6 | 77 | ✔ | | 14° | 25,75 |
| 11 3082 050 | • 12 | 32 | 8 | 77 | ✔ | | 14° | 25,75 |
| 11 3082 055 | % 12 | 32 | 6 | 182 | ✔ | | 14° | 22,45 |
| 11 3082 060 | % 16 | 33 | 6 | 78 | ✔ | | 14° | 21,10 |
| 11 3082 065 | % 16 | 33 | 8 | 78 | ✔ | | 14° | 21,10 |

## 11 5092

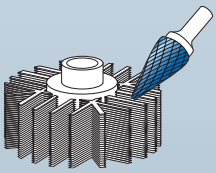
BLUETEC BESCHICHTET COATED



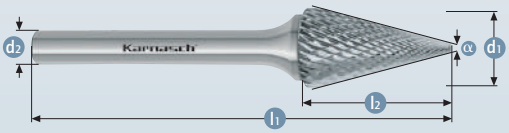

**M** FORM / SHAPE **SKM**

Spitzkegel

Cone



## 11 3092




Schnittdaten Cutting data

819

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5092 010 | • 3 | 8 | 3 | 38 | | ✔ | 18° | 9,45 |
| 11 5092 015 | • 3 | 11 | 3 | 38 | | ✔ | 14° | 9,45 |
| 11 5092 020 | • 3 | 15 | 3 | 38 | | ✔ | 10° | 9,45 |
| 11 5092 025 | • 6 | 12 | 3 | 48 | ✔ | | 22° | 15,10 |
| 11 5092 030 | • 6 | 20 | 6 | 50 | | ✔ | 14° | 16,40 |
| 11 5092 035 | • 8 | 18 | 6 | 63 | ✔ | | 13° | 18,75 |
| 11 5092 040 | • 10 | 20 | 6 | 65 | ✔ | | 28° | 24,00 |
| 11 5092 045 | • 12 | 25 | 6 | 70 | ✔ | | 28° | 29,75 |
| 11 5092 055 | • 16 | 26 | 6 | 74 | ✔ | | 33° | 42,15 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3092 010 | • 3 | 8 | 3 | 38 | | ✔ | 18° | 7,35 |
| 11 3092 015 | • 3 | 11 | 3 | 38 | | ✔ | 14° | 7,35 |
| 11 3092 020 | • 3 | 15 | 3 | 38 | | ✔ | 10° | 7,35 |
| 11 3092 025 | • 6 | 12 | 3 | 48 | ✔ | | 22° | 13,00 |
| 11 3092 030 | • 6 | 20 | 6 | 50 | | ✔ | 14° | 14,35 |
| 11 3092 035 | • 8 | 18 | 6 | 63 | ✔ | | 13° | 16,65 |
| 11 3092 040 | • 10 | 20 | 6 | 65 | ✔ | | 28° | 20,65 |
| 11 3092 045 | • 12 | 25 | 6 | 70 | ✔ | | 28° | 24,85 |
| 11 3092 050 | % 12 | 25 | 8 | 70 | ✔ | | 28° | 13,25 |
| 11 3092 055 | % 16 | 26 | 6 | 74 | ✔ | | 33° | 19,80 |
| 11 3092 060 | % 16 | 26 | 8 | 74 | ✔ | | 33° | 19,80 |

## 11 5098

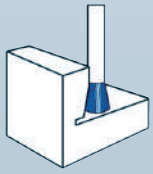
BLUETEC BESCHICHTET COATED




**N** FORM / SHAPE **WKN**

Winkel

Inverted cone



## 11 3098




Schnittdaten Cutting data

819

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5098 015 | • 6 | 8 | 6 | 50 | | ✔ | 10° | 17,45 |
| 11 5098 020 | • 10 | 10 | 6 | 55 | ✔ | | 13° | 21,65 |
| 11 5098 025 | • 12 | 13 | 6 | 58 | ✔ | | 30° | 32,60 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3098 015 | • 6 | 8 | 6 | 50 | | ✔ | 10° | 15,40 |
| 11 3098 020 | • 10 | 10 | 6 | 55 | ✔ | | 13° | 18,30 |
| 11 3098 025 | • 12 | 13 | 6 | 58 | ✔ | | 30° | 27,70 |

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

# HP-5



## Extrem feine Einfachverzahnung

## Extremely fine single cutting style

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |

✓ OPTIMAL OPTIMAL

✓ GUT GOOD

- Exzellente Oberflächengüte
- Vorzugsweise für feines Entgraten von allen Stahlsorten wie:
  - Bis zu extra harten Stählen ca. 70 HRC
  - Gusseisen
  - Edelstahl (INOX)
  - Hochwarmfeste Werkstoffe wie z.B. Nickel-Basis + Kobalt-Basis + Kobalt-Basis Legierungen

- Excellent surface finish
- Preferred for fine deburring all ferrous metals, such as:
  - Up to extra hard steel approx. 70 HRC
  - Cast iron
  - Stainless steel (INOX)
  - Heat resistant substances, such as, e.g. nickel based + cobalt based alloys

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

| ZYA | ZYB | WRC | KUD | TRE | RBF | SPG | – | KEL | SKM |
|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | L | M |
| Art. 11 5003<br>Art. 11 3003 | Art. 11 5013<br>Art. 11 3013 | Art. 11 5023<br>Art. 11 3023 | Art. 11 5033<br>Art. 11 3033 | Art. 11 5043<br>Art. 11 3043 | Art. 11 5053<br>Art. 11 3053 | Art. 11 5063<br>Art. 11 3063 | Art. 11 5073<br>Art. 11 3073 | Art. 11 5083<br>Art. 11 3083 | Art. 11 5093<br>Art. 11 3093 |
|  |  |  |  |  |  |  |  |  |  |
| 828 | 828 | 829 | 829 | 830 | 830 | 831 | 831 | 832 | 832 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Walzenrundform<br>Ball nosed cylinder | Kugel<br>Ball | Tropfen<br>Oval | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree | Flamme<br>Flame | Rundkegel<br>Ball nosed cone | Spitzkegel<br>Cone |




Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---|---|---|---|---|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Feines Zerspanen = mittlerer Materialabtrag | 650–750 |
| | Gehärtete, vergütete Stähle über 1200 N/mm² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 450–600 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Feines Zerspanen = mittlerer Materialabtrag | 450–600 |
| NE-Metalle | Harte NE-Metalle | Bronze, Titan/Titanlegierungen, harte Alulegierungen (hoher Si-Anteil) | Feines Zerspanen = mittlerer Materialabtrag | 450–600 |
| | Hochwarmfeste Werkstoffe | Nickelbasis- und Kobaltbasislegierungen (Triebwerk- und Turbinenbau) | | |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/Späroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | Feines Zerspanen = mittlerer Materialabtrag | 650–750 |

| Material groups | | | Application | Cutting speed m/min |
|---|---|---|---|---|
| Steel, cast steel | Non-hardened, non-heat treated-steels up to 1200 N/mm² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Fine machining = medium stock removal | 650–750 |
| | Hardened, heat-treated steels exceeding 1200 N/mm² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 450–600 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Fine machining = medium stock removal | 450–600 |
| Non-ferrous metals | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard alu-alloys (high Si content) | Fine machining = medium stock removal | 450–600 |
| | High-temperature resistant materials | Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction) | | |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Fine machining = medium stock removal | 650–750 |

**Schnittgeschwindigkeit • Cutting speed (m/min)**

| | 450 | 600 | 650 | 750 |
|---|---|---|---|---|
| ∅ (mm) | Drehzahlen (min⁻¹) • Rotational speed (rpm) | | | |
| 2 | 72.000 | 95.000 | 104.000 | 120.000 |
| 3 | 48.000 | 64.000 | 68.000 | 80.000 |
| 4 | 36.000 | 48.000 | 52.000 | 60.000 |
| 6 | 24.000 | 32.000 | 34.000 | 40.000 |
| 8 | 18.000 | 24.000 | 26.000 | 30.000 |
| 10 | 14.000 | 19.000 | 21.000 | 24.000 |
| 12 | 12.000 | 16.000 | 18.000 | 21.000 |
| 16 | 9.000 | 12.000 | 14.000 | 17.000 |

## 11 5003

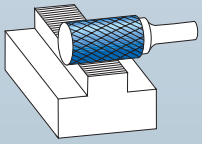
BLUETEC BESCHICHTET COATED



**A** FORM / SHAPE **ZYA**

Zylinder ohne Stirnverzahnung

Cylinder without end cut



Schnittdaten Cutting data

827

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5003 015 | ● 1,5 | 6 | 3 | 38 | | ✔ | 9,45 |
| 11 5003 025 | ● 2 | 11 | 3 | 38 | | ✔ | 9,00 |
| 11 5003 030 | ● 3 | 14 | 3 | 38 | | ✔ | 9,45 |
| 11 5003 035 | ● 3 | 14 | 3 | 50 | | ✔ | 10,95 |
| 11 5003 040 | % 3 | 14 | 3 | 65 | | ✔ | 6,75 |
| 11 5003 045 | % 3 | 14 | 3 | 75 | | ✔ | 7,15 |
| 11 5003 050 | % 3 | 14 | 3 | 100 | | ✔ | 9,20 |
| 11 5003 055 | ● 4 | 14 | 6 | 50 | | ✔ | 12,65 |
| 11 5003 060 | ● 6 | 13 | 3 | 45 | ✔ | | 15,10 |
| 11 5003 065 | ● 6 | 18 | 6 | 50 | | ✔ | 12,65 |
| 11 5003 070 | % 6 | 18 | 6 | 100 | ✔ | | 12,05 |
| 11 5003 080 | ● 8 | 20 | 6 | 65 | ✔ | | 15,85 |
| 11 5003 090 | ● 10 | 20 | 6 | 65 | ✔ | | 18,20 |
| 11 5003 095 | ● 10 | 20 | 6 | 172 | ✔ | | 27,50 |
| 11 5003 100 | % 10 | 25 | 6 | 70 | ✔ | | 11,15 |
| 11 5003 105 | ● 12 | 25 | 6 | 70 | ✔ | | 28,05 |
| 11 5003 110 | ● 12 | 25 | 6 | 175 | ✔ | | 40,60 |
| 11 5003 115 | ● 12 | 25 | 8 | 70 | ✔ | | 29,85 |
| 11 5003 120 | ● 16 | 25 | 6 | 70 | ✔ | | 34,05 |
| 11 5003 125 | % 16 | 25 | 8 | 70 | ✔ | | 19,45 |

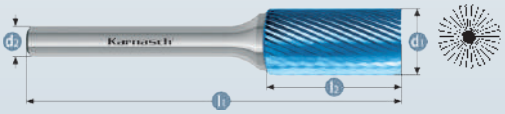
## 11 3003



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3003 025 | ● 2 | 11 | 3 | 38 | | ✔ | 6,90 |
| 11 3003 030 | ● 3 | 14 | 3 | 38 | | ✔ | 7,35 |
| 11 3003 040 | % 3 | 14 | 3 | 65 | | ✔ | 5,55 |
| 11 3003 045 | % 3 | 14 | 3 | 75 | | ✔ | 6,05 |
| 11 3003 055 | ● 4 | 14 | 6 | 50 | | ✔ | 10,60 |
| 11 3003 060 | ● 6 | 13 | 3 | 45 | ✔ | | 13,00 |
| 11 3003 065 | ● 6 | 18 | 6 | 50 | | ✔ | 10,60 |
| 11 3003 070 | % 6 | 18 | 6 | 100 | ✔ | | 10,95 |
| 11 3003 080 | ● 8 | 20 | 6 | 65 | ✔ | | 13,80 |
| 11 3003 090 | ● 10 | 20 | 6 | 65 | ✔ | | 14,85 |
| 11 3003 095 | % 10 | 20 | 6 | 172 | ✔ | | 11,05 |
| 11 3003 100 | % 10 | 25 | 6 | 70 | ✔ | | 9,40 |
| 11 3003 105 | ● 12 | 25 | 6 | 70 | ✔ | | 23,15 |
| 11 3003 110 | % 12 | 25 | 6 | 175 | ✔ | | 17,25 |
| 11 3003 115 | % 12 | 25 | 8 | 70 | ✔ | | 13,30 |
| 11 3003 120 | ● 16 | 25 | 6 | 70 | ✔ | | 29,15 |
| 11 3003 125 | % 16 | 25 | 8 | 70 | ✔ | | 16,90 |

## 11 5013

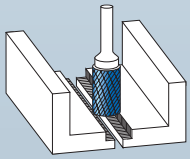
BLUETEC BESCHICHTET COATED



**B** FORM / SHAPE **ZYB**

Zylinder mit Stirnverzahnung

Cylinder with end cut



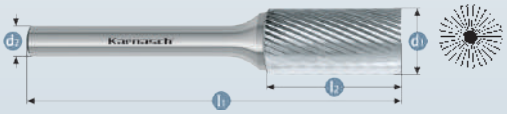
Schnittdaten Cutting data

827

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5013 005 | % 1,5 | 6 | 3 | 38 | | ✔ | 4,70 |
| 11 5013 010 | ● 2 | 11 | 3 | 38 | | ✔ | 10,00 |
| 11 5013 015 | ● 3 | 14 | 3 | 38 | | ✔ | 9,55 |
| 11 5013 020 | ● 3 | 14 | 3 | 50 | | ✔ | 11,90 |
| 11 5013 030 | % 3 | 14 | 3 | 75 | | ✔ | 7,75 |
| 11 5013 035 | % 3 | 14 | 3 | 100 | | ✔ | 11,10 |
| 11 5013 040 | ● 4 | 12 | 6 | 50 | | ✔ | 13,60 |
| 11 5013 045 | ● 6 | 13 | 3 | 45 | ✔ | | 16,45 |
| 11 5013 050 | ● 6 | 18 | 6 | 50 | | ✔ | 13,60 |
| 11 5013 060 | ● 6 | 18 | 6 | 100 | ✔ | | 24,75 |
| 11 5013 075 | ● 8 | 20 | 6 | 65 | ✔ | | 17,25 |
| 11 5013 080 | % 8 | 20 | 6 | 170 | ✔ | | 12,65 |
| 11 5013 085 | ● 10 | 20 | 6 | 65 | ✔ | | 19,70 |
| 11 5013 100 | ● 12 | 25 | 6 | 70 | ✔ | | 30,35 |
| 11 5013 105 | % 12 | 25 | 6 | 175 | ✔ | | 23,80 |
| 11 5013 110 | % 12 | 25 | 8 | 70 | ✔ | | 17,15 |
| 11 5013 115 | ● 16 | 25 | 6 | 70 | ✔ | | 36,90 |
| 11 5013 120 | % 16 | 25 | 8 | 70 | ✔ | | 21,00 |

## 11 3013



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3013 005 | % 1,5 | 6 | 3 | 38 | | ✔ | 3,60 |
| 11 3013 010 | % 2 | 11 | 3 | 38 | | ✔ | 4,25 |
| 11 3013 015 | ● 3 | 14 | 3 | 38 | | ✔ | 7,50 |
| 11 3013 020 | % 3 | 14 | 3 | 50 | | ✔ | 5,25 |
| 11 3013 025 | % 3 | 14 | 3 | 65 | | ✔ | 5,75 |
| 11 3013 030 | % 3 | 14 | 3 | 75 | | ✔ | 6,65 |
| 11 3013 035 | % 3 | 14 | 3 | 100 | | ✔ | 10,00 |
| 11 3013 040 | ● 4 | 12 | 6 | 50 | | ✔ | 11,50 |
| 11 3013 045 | % 6 | 13 | 3 | 45 | ✔ | | 7,80 |
| 11 3013 050 | ● 6 | 18 | 6 | 50 | | ✔ | 11,50 |
| 11 3013 060 | % 6 | 18 | 6 | 100 | ✔ | | 12,05 |
| 11 3013 075 | ● 8 | 20 | 6 | 65 | ✔ | | 15,20 |
| 11 3013 080 | % 8 | 20 | 6 | 170 | ✔ | | 11,65 |
| 11 3013 085 | ● 10 | 20 | 6 | 65 | ✔ | | 16,35 |
| 11 3013 090 | % 10 | 20 | 6 | 172 | ✔ | | 17,95 |
| 11 3013 100 | ● 12 | 25 | 6 | 70 | ✔ | | 25,45 |
| 11 3013 105 | % 12 | 25 | 6 | 175 | ✔ | | 19,55 |
| 11 3013 110 | % 12 | 25 | 8 | 70 | ✔ | | 14,60 |
| 11 3013 115 | % 16 | 25 | 6 | 70 | ✔ | | 17,05 |
| 11 3013 120 | % 16 | 25 | 8 | 70 | ✔ | | 18,45 |

## 11 5023

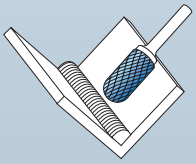
BLUETEC BESCHICHTET COATED




**C** FORM / SHAPE **WRC**

Walzenrundform

Ball nosed cylinder



## 11 3023




Schnittdaten Cutting data | Film Movie

827

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5023 020 | ● 2 | 11 | 3 | 38 | | ✔ | 9,45 |
| 11 5023 025 | ● 3 | 14 | 3 | 38 | | ✔ | 9,45 |
| 11 5023 030 | ● 3 | 14 | 3 | 50 | | ✔ | 12,25 |
| 11 5023 035 | ● 3 | 14 | 3 | 75 | | ✔ | 13,40 |
| 11 5023 040 | ● 3 | 14 | 3 | 100 | | ✔ | 16,05 |
| 11 5023 045 | ● 4 | 16 | 6 | 50 | | ✔ | 14,30 |
| 11 5023 050 | ● 6 | 12,7 | 3 | 44 | ✔ | | 14,25 |
| 11 5023 055 | ● 6 | 18 | 6 | 50 | | ✔ | 14,30 |
| 11 5023 060 | ● 6 | 18 | 6 | 100 | ✔ | | 26,00 |
| 11 5023 065 | ● 6 | 18 | 6 | 150 | ✔ | | 26,45 |
| 11 5023 070 | % 6 | 25 | 6 | 50 | | ✔ | 10,50 |
| 11 5023 075 | ● 8 | 20 | 6 | 65 | ✔ | | 17,10 |
| 11 5023 080 | ● 8 | 20 | 6 | 170 | ✔ | | 24,90 |
| 11 5023 085 | ● 10 | 20 | 6 | 65 | ✔ | | 19,90 |
| 11 5023 090 | % 10 | 20 | 6 | 170 | ✔ | | 15,85 |
| 11 5023 095 | % 10 | 25 | 6 | 70 | ✔ | | 12,05 |
| 11 5023 105 | ● 12 | 25 | 6 | 70 | ✔ | | 30,90 |
| 11 5023 110 | % 12 | 25 | 6 | 175 | ✔ | | 23,65 |
| 11 5023 115 | % 12 | 25 | 8 | 70 | ✔ | | 17,80 |
| 11 5023 120 | % 16 | 25 | 6 | 70 | ✔ | | 19,95 |
| 11 5023 125 | % 16 | 25 | 8 | 70 | ✔ | | 21,45 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3023 020 | % 2 | 11 | 3 | 38 | | ✔ | 3,95 |
| 11 3023 025 | ● 3 | 14 | 3 | 38 | | ✔ | 7,35 |
| 11 3023 030 | ● 3 | 14 | 3 | 50 | | ✔ | 10,15 |
| 11 3023 035 | ● 3 | 14 | 3 | 75 | | ✔ | 11,35 |
| 11 3023 040 | % 3 | 14 | 3 | 100 | | ✔ | 7,60 |
| 11 3023 045 | ● 4 | 16 | 6 | 50 | | ✔ | 12,25 |
| 11 3023 050 | ● 6 | 12,7 | 3 | 44 | ✔ | | 12,20 |
| 11 3023 055 | ● 6 | 18 | 6 | 50 | | ✔ | 12,25 |
| 11 3023 060 | % 6 | 18 | 6 | 100 | ✔ | | 12,75 |
| 11 3023 065 | % 6 | 18 | 6 | 150 | ✔ | | 17,95 |
| 11 3023 070 | % 6 | 25 | 6 | 50 | | ✔ | 9,40 |
| 11 3023 075 | ● 8 | 20 | 6 | 65 | ✔ | | 15,05 |
| 11 3023 080 | ● 8 | 20 | 6 | 170 | ✔ | | 21,65 |
| 11 3023 085 | ● 10 | 20 | 6 | 65 | ✔ | | 16,50 |
| 11 3023 090 | % 10 | 20 | 6 | 170 | ✔ | | 12,30 |
| 11 3023 095 | % 10 | 25 | 6 | 70 | ✔ | | 10,30 |
| 11 3023 100 | % 12 | 20 | 6 | 65 | ✔ | | 14,30 |
| 11 3023 105 | ● 12 | 25 | 6 | 70 | ✔ | | 26,00 |
| 11 3023 110 | % 12 | 25 | 6 | 175 | ✔ | | 19,35 |
| 11 3023 115 | % 12 | 25 | 8 | 70 | ✔ | | 14,90 |
| 11 3023 120 | ● 16 | 25 | 6 | 70 | ✔ | | 32,60 |
| 11 3023 125 | % 16 | 25 | 8 | 70 | ✔ | | 18,90 |

## 11 5033

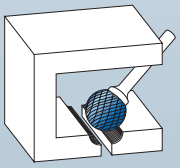
BLUETEC BESCHICHTET COATED




**D** FORM / SHAPE **KUD**

Kugel

Ball



## 11 3033




Schnittdaten Cutting data | Film Movie

827

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5033 020 | ● 2 | 1,8 | 3 | 38 | | ✔ | 9,45 |
| 11 5033 025 | ● 3 | 2,5 | 3 | 38 | | ✔ | 9,45 |
| 11 5033 030 | ● 3 | 2,5 | 3 | 50 | | ✔ | 11,45 |
| 11 5033 035 | ● 3 | 2,5 | 3 | 75 | | ✔ | 12,70 |
| 11 5033 040 | % 3 | 2,5 | 6 | 50 | | ✔ | 7,10 |
| 11 5033 045 | ● 4 | 3,0 | 3 | 38 | | ✔ | 19,90 |
| 11 5033 050 | ● 6 | 5,0 | 3 | 38 | ✔ | | 12,95 |
| 11 5033 055 | ● 6 | 4,7 | 6 | 50 | | ✔ | 13,35 |
| 11 5033 060 | ● 8 | 6,0 | 6 | 52 | ✔ | | 14,20 |
| 11 5033 065 | ● 8 | 6,0 | 6 | 180 | ✔ | | 20,70 |
| 11 5033 070 | ● 10 | 8,0 | 6 | 54 | ✔ | | 17,35 |
| 11 5033 075 | ● 10 | 8,0 | 6 | 185 | ✔ | | 25,75 |
| 11 5033 080 | ● 12 | 11,0 | 6 | 56 | ✔ | | 23,80 |
| 11 5033 085 | % 12 | 11,0 | 8 | 56 | ✔ | | 12,65 |
| 11 5033 090 | ● 12 | 11,0 | 6 | 162 | ✔ | | 33,90 |
| 11 5033 095 | ● 16 | 14,0 | 6 | 60 | ✔ | | 27,60 |
| 11 5033 100 | ● 16 | 14,0 | 8 | 60 | ✔ | | 30,15 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3033 020 | ● 2 | 1,8 | 3 | 38 | | ✔ | 7,35 |
| 11 3033 025 | ● 3 | 2,5 | 3 | 38 | | ✔ | 7,35 |
| 11 3033 030 | ● 3 | 2,5 | 3 | 50 | | ✔ | 9,40 |
| 11 3033 035 | % 3 | 2,5 | 3 | 75 | | ✔ | 5,70 |
| 11 3033 040 | % 3 | 2,5 | 6 | 50 | | ✔ | 6,00 |
| 11 3033 045 | ● 4 | 3,0 | 3 | 38 | | ✔ | 17,80 |
| 11 3033 050 | ● 6 | 5,0 | 3 | 38 | ✔ | | 10,90 |
| 11 3033 055 | ● 6 | 4,7 | 6 | 50 | | ✔ | 11,30 |
| 11 3033 060 | ● 8 | 6,0 | 6 | 52 | ✔ | | 12,15 |
| 11 3033 065 | ● 8 | 6,0 | 6 | 180 | ✔ | | 17,40 |
| 11 3033 070 | ● 10 | 8,0 | 6 | 54 | ✔ | | 14,00 |
| 11 3033 075 | % 10 | 8,0 | 6 | 185 | ✔ | | 10,15 |
| 11 3033 080 | ● 12 | 11,0 | 6 | 56 | ✔ | | 18,90 |
| 11 3033 085 | % 12 | 11,0 | 8 | 56 | ✔ | | 10,05 |
| 11 3033 090 | ● 12 | 11,0 | 6 | 162 | ✔ | | 25,70 |
| 11 3033 095 | % 16 | 14,0 | 6 | 60 | ✔ | | 12,05 |
| 11 3033 100 | % 16 | 14,0 | 8 | 60 | ✔ | | 13,45 |

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

## 11 5043

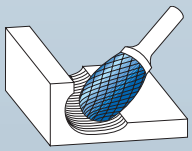
BLUETEC BESCHICHTET COATED




**E** FORM / SHAPE **TRE**

Tropfen

Oval



## 11 3043




Schnittdaten Cutting data 827

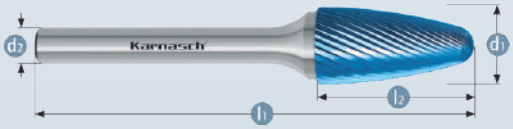
Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5043 010 | ● 3 | 6 | 3 | 38 | | ✔ | 9,45 |
| 11 5043 015 | ● 6 | 10 | 3 | 42 | ✔ | | 14,25 |
| 11 5043 020 | ● 6 | 10 | 6 | 50 | | ✔ | 15,85 |
| 11 5043 025 | ● 8 | 15 | 6 | 60 | ✔ | | 18,30 |
| 11 5043 030 | ● 10 | 16 | 6 | 60 | ✔ | | 19,90 |
| 11 5043 035 | ● 12 | 22 | 6 | 67 | ✔ | | 29,10 |
| 11 5043 040 | % 12 | 22 | 8 | 67 | ✔ | | 16,45 |
| | | | | | | | |
| 11 5043 050 | % 16 | 25 | 8 | 70 | ✔ | | 21,95 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3043 010 | ● 3 | 6 | 3 | 38 | | ✔ | 7,35 |
| 11 3043 015 | ● 6 | 10 | 3 | 42 | ✔ | | 12,20 |
| 11 3043 020 | ● 6 | 10 | 6 | 50 | | ✔ | 13,80 |
| 11 3043 025 | ● 8 | 15 | 6 | 60 | ✔ | | 16,25 |
| 11 3043 030 | ● 10 | 16 | 6 | 60 | ✔ | | 16,50 |
| 11 3043 035 | ● 12 | 22 | 6 | 67 | ✔ | | 24,20 |
| 11 3043 040 | % 12 | 22 | 8 | 67 | ✔ | | 13,85 |
| 11 3043 045 | % 16 | 25 | 6 | 70 | ✔ | | 17,90 |

## 11 5053

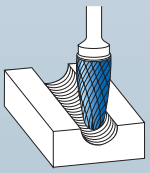
BLUETEC BESCHICHTET COATED




**F** FORM / SHAPE **RBF**

Rundbogen

Ball nosed tree



## 11 3053




Schnittdaten Cutting data 827

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5053 010 | ● 3 | 8 | 3 | 38 | | ✔ | 9,45 |
| 11 5053 015 | ● 3 | 14 | 3 | 38 | | ✔ | 9,45 |
| 11 5053 020 | ● 3 | 14 | 3 | 50 | | ✔ | 12,25 |
| 11 5053 025 | ● 6 | 12 | 3 | 44 | ✔ | | 14,25 |
| 11 5053 030 | ● 6 | 18 | 6 | 50 | | ✔ | 14,90 |
| 11 5053 035 | ● 8 | 20 | 6 | 65 | ✔ | | 19,45 |
| 11 5053 040 | ● 10 | 20 | 6 | 65 | ✔ | | 19,50 |
| 11 5053 045 | ● 10 | 20 | 6 | 170 | ✔ | | 29,45 |
| 11 5053 050 | ● 12 | 25 | 6 | 70 | ✔ | | 28,80 |
| 11 5053 055 | % 12 | 25 | 8 | 70 | ✔ | | 16,40 |
| 11 5053 060 | % 12 | 25 | 6 | 175 | ✔ | | 22,00 |
| | | | | | | | |
| 11 5053 070 | % 16 | 25 | 8 | 80 | ✔ | | 21,25 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3053 010 | % 3 | 8 | 3 | 38 | | ✔ | 3,95 |
| 11 3053 015 | ● 3 | 14 | 3 | 38 | | ✔ | 7,35 |
| 11 3053 020 | % 3 | 14 | 3 | 50 | | ✔ | 5,40 |
| 11 3053 025 | ● 6 | 12 | 3 | 44 | ✔ | | 12,20 |
| 11 3053 030 | ● 6 | 18 | 6 | 50 | | ✔ | 12,85 |
| 11 3053 035 | ● 8 | 20 | 6 | 65 | ✔ | | 17,40 |
| 11 3053 040 | ● 10 | 20 | 6 | 65 | ✔ | | 16,15 |
| | | | | | | | |
| 11 3053 050 | ● 12 | 25 | 6 | 70 | ✔ | | 23,90 |
| 11 3053 055 | % 12 | 25 | 8 | 70 | ✔ | | 13,45 |
| 11 3053 060 | % 12 | 25 | 6 | 175 | ✔ | | 17,75 |
| 11 3053 065 | % 16 | 25 | 6 | 70 | ✔ | | 17,55 |
| 11 3053 070 | % 16 | 25 | 8 | 80 | ✔ | | 18,70 |

## 11 5063

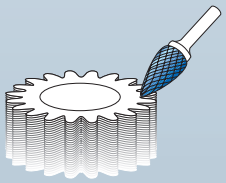
BLUETEC BESCHICHTET COATED




**G** FORM / SHAPE **SPG**

Spitzbogen

Tree



## 11 3063




Schnittdaten Cutting data 827

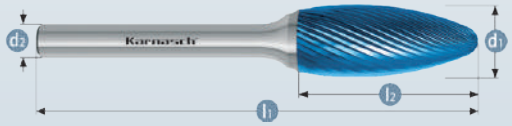
Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5063 010 | ● 3 | 6 | 3 | 38 | | ✔ | 9,45 |
| 11 5063 015 | ● 3 | 14 | 3 | 38 | | ✔ | 9,45 |
| 11 5063 020 | ● 3 | 14 | 3 | 50 | | ✔ | 11,15 |
| 11 5063 025 | ● 3 | 14 | 3 | 75 | | ✔ | 13,25 |
| 11 5063 030 | ● 6 | 12 | 3 | 44 | ✔ | | 14,25 |
| 11 5063 035 | ● 6 | 18 | 6 | 50 | | ✔ | 14,90 |
| 11 5063 040 | ● 8 | 20 | 6 | 65 | ✔ | | 17,65 |
| 11 5063 045 | ● 10 | 20 | 6 | 65 | ✔ | | 20,60 |
| 11 5063 050 | % 10 | 20 | 6 | 170 | ✔ | | 16,35 |
| 11 5063 055 | % 12 | 20 | 6 | 65 | ✔ | | 15,40 |
| 11 5063 060 | ● 12 | 25 | 6 | 70 | ✔ | | 28,40 |
| 11 5063 065 | ● 12 | 25 | 8 | 70 | ✔ | | 29,75 |
| 11 5063 070 | ● 12 | 25 | 6 | 175 | ✔ | | 41,15 |
| 11 5063 075 | ● 12 | 30 | 6 | 75 | ✔ | | 29,15 |
| 11 5063 080 | % 12 | 30 | 8 | 75 | ✔ | | 16,80 |
| 11 5063 085 | % 16 | 25 | 6 | 70 | ✔ | | 19,90 |
| 11 5063 090 | % 16 | 25 | 8 | 70 | ✔ | | 21,25 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3063 010 | ● 3 | 6 | 3 | 38 | | ✔ | 7,35 |
| 11 3063 015 | ● 3 | 14 | 3 | 38 | | ✔ | 7,35 |
| 11 3063 020 | ● 3 | 14 | 3 | 50 | | ✔ | 9,05 |
| | | | | | | | |
| 11 3063 030 | ● 6 | 12 | 3 | 44 | ✔ | | 12,20 |
| 11 3063 035 | ● 6 | 18 | 6 | 50 | | ✔ | 12,85 |
| 11 3063 040 | ● 8 | 20 | 6 | 65 | ✔ | | 15,55 |
| 11 3063 045 | ● 10 | 20 | 6 | 65 | ✔ | | 17,25 |
| 11 3063 050 | % 10 | 20 | 6 | 170 | ✔ | | 12,80 |
| 11 3063 055 | % 12 | 20 | 6 | 65 | ✔ | | 12,50 |
| 11 3063 060 | ● 12 | 25 | 6 | 70 | ✔ | | 23,50 |
| 11 3063 065 | % 12 | 25 | 8 | 70 | ✔ | | 13,25 |
| 11 3063 070 | % 12 | 25 | 6 | 175 | ✔ | | 17,55 |
| 11 3063 075 | ● 12 | 30 | 6 | 75 | ✔ | | 24,20 |
| 11 3063 080 | % 12 | 30 | 8 | 75 | ✔ | | 14,20 |
| 11 3063 085 | ● 16 | 25 | 6 | 70 | ✔ | | 32,55 |
| 11 3063 090 | % 16 | 25 | 8 | 70 | ✔ | | 18,70 |

## 11 5073

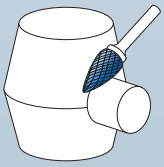
BLUETEC BESCHICHTET COATED



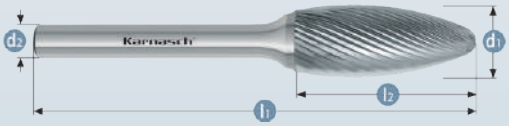

**H** FORM / SHAPE

Flamme

Flame



## 11 3073




Schnittdaten Cutting data 827

Film Movie

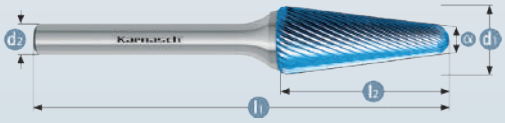
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 5073 005 | ● 3 | 6 | 3 | 38 | | ✔ | 9,45 |
| 11 5073 010 | ● 6 | 14 | 6 | 60 | | ✔ | 18,60 |
| 11 5073 015 | ● 8 | 20 | 6 | 65 | ✔ | | 19,05 |
| 11 5073 020 | ● 10 | 20 | 6 | 65 | ✔ | | 34,05 |
| 11 5073 025 | ● 12 | 32 | 6 | 77 | ✔ | | 40,00 |
| 11 5073 030 | % 12 | 32 | 8 | 77 | ✔ | | 21,25 |
| 11 5073 035 | % 16 | 36 | 6 | 82 | ✔ | | 28,00 |
| 11 5073 040 | % 16 | 36 | 8 | 82 | ✔ | | 29,95 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 3073 005 | ● 3 | 6 | 3 | 38 | | ✔ | 7,35 |
| 11 3073 010 | ● 6 | 14 | 6 | 60 | | ✔ | 16,55 |
| 11 3073 015 | ● 8 | 20 | 6 | 65 | ✔ | | 17,00 |
| 11 3073 020 | ● 10 | 20 | 6 | 65 | ✔ | | 30,70 |
| 11 3073 025 | ● 12 | 32 | 6 | 77 | ✔ | | 35,10 |
| 11 3073 030 | ● 12 | 32 | 8 | 77 | ✔ | | 35,10 |
| 11 3073 035 | ● 16 | 36 | 6 | 82 | ✔ | | 47,75 |
| 11 3073 040 | ● 16 | 36 | 8 | 82 | ✔ | | 50,30 |

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

## 11 5083

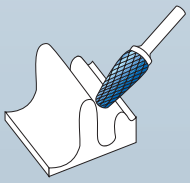
BLUETEC BESCHICHTET COATED



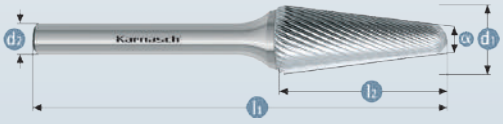
**L** FORM / SHAPE **KEL**

Rundkegel

Ball nosed cone



## 11 3083



Schnittdaten Cutting data

827

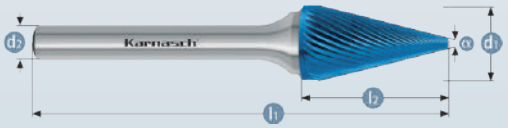
Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5083 005 | ● 3 | 10 | 3 | 38 | | ✔ | 10° | 9,45 |
| 11 5083 010 | ● 3 | 14 | 3 | 38 | | ✔ | 8° | 9,45 |
| 11 5083 015 | ● 6 | 16 | 3 | 48 | ✔ | | 22° | 15,10 |
| 11 5083 020 | ● 6 | 18 | 6 | 50 | | ✔ | 14° | 15,15 |
| 11 5083 025 | ● 8 | 25 | 6 | 70 | ✔ | | 14° | 19,30 |
| 11 5083 030 | ● 10 | 20 | 6 | 65 | ✔ | | 14° | 25,55 |
| 11 5083 035 | ● 10 | 30 | 6 | 75 | ✔ | | 14° | 24,00 |
| | | | | | | | | |
| 11 5083 045 | ● 12 | 32 | 6 | 77 | ✔ | | 14° | 30,65 |
| 11 5083 050 | % 12 | 32 | 8 | 77 | ✔ | | 14° | 16,25 |
| 11 5083 055 | % 12 | 32 | 6 | 182 | ✔ | | 14° | 24,70 |
| 11 5083 060 | ● 16 | 33 | 6 | 78 | ✔ | | 14° | 44,55 |
| 11 5083 065 | ● 16 | 33 | 8 | 78 | ✔ | | 14° | 44,55 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3083 005 | % 3 | 10 | 3 | 38 | | ✔ | 10° | 3,95 |
| 11 3083 010 | ● 3 | 14 | 3 | 38 | | ✔ | 8° | 7,35 |
| 11 3083 015 | ● 6 | 16 | 3 | 48 | ✔ | | 22° | 13,00 |
| 11 3083 020 | ● 6 | 18 | 6 | 50 | | ✔ | 14° | 13,10 |
| 11 3083 025 | ● 8 | 25 | 6 | 70 | ✔ | | 14° | 17,20 |
| 11 3083 030 | ● 10 | 20 | 6 | 65 | ✔ | | 14° | 22,20 |
| 11 3083 035 | ● 10 | 30 | 6 | 75 | ✔ | | 14° | 20,65 |
| 11 3083 040 | % 10 | 30 | 6 | 176 | ✔ | | 14° | 15,45 |
| 11 3083 045 | ● 12 | 32 | 6 | 77 | ✔ | | 14° | 25,75 |
| 11 3083 050 | % 12 | 32 | 8 | 77 | ✔ | | 14° | 13,70 |
| 11 3083 055 | ● 12 | 32 | 6 | 182 | ✔ | | 14° | 38,30 |
| 11 3083 060 | % 16 | 33 | 6 | 78 | ✔ | | 14° | 21,10 |
| 11 3083 065 | % 16 | 33 | 8 | 78 | ✔ | | 14° | 21,10 |

## 11 5093

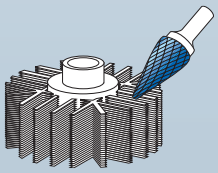
BLUETEC BESCHICHTET COATED



**M** FORM / SHAPE **SKM**

Spitzkegel

Cone



## 11 3093



Schnittdaten Cutting data

827

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 5093 010 | ● 3 | 8 | 3 | 38 | | ✔ | 18° | 9,45 |
| 11 5093 015 | ● 3 | 11 | 3 | 38 | | ✔ | 14° | 9,45 |
| 11 5093 020 | ● 3 | 15 | 3 | 38 | | ✔ | 10° | 9,45 |
| 11 5093 025 | ● 6 | 12 | 3 | 48 | ✔ | | 22° | 14,25 |
| 11 5093 030 | ● 6 | 20 | 6 | 50 | | ✔ | 14° | 15,15 |
| 11 5093 035 | ● 8 | 18 | 6 | 63 | ✔ | | 13° | 18,75 |
| 11 5093 040 | ● 10 | 20 | 6 | 65 | ✔ | | 28° | 24,00 |
| 11 5093 045 | ● 12 | 25 | 6 | 70 | ✔ | | 28° | 29,75 |
| 11 5093 050 | % 12 | 25 | 8 | 70 | ✔ | | 28° | 15,80 |
| 11 5093 055 | ● 16 | 26 | 6 | 74 | ✔ | | 33° | 39,50 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|---|---|---|---|---|---|---|---|---|
| 11 3093 010 | ● 3 | 8 | 3 | 38 | | ✔ | 18° | 7,35 |
| 11 3093 015 | ● 3 | 11 | 3 | 38 | | ✔ | 14° | 7,35 |
| 11 3093 020 | ● 3 | 15 | 3 | 38 | | ✔ | 10° | 7,35 |
| 11 3093 025 | ● 6 | 12 | 3 | 48 | ✔ | | 22° | 12,20 |
| 11 3093 030 | ● 6 | 20 | 6 | 50 | | ✔ | 14° | 13,10 |
| 11 3093 035 | ● 8 | 18 | 6 | 63 | ✔ | | 13° | 16,65 |
| 11 3093 040 | ● 10 | 20 | 6 | 65 | ✔ | | 28° | 20,65 |
| 11 3093 045 | ● 12 | 25 | 6 | 70 | ✔ | | 28° | 24,85 |
| 11 3093 050 | % 12 | 25 | 8 | 70 | ✔ | | 28° | 13,25 |
| 11 3093 055 | % 16 | 26 | 6 | 74 | ✔ | | 33° | 18,40 |

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

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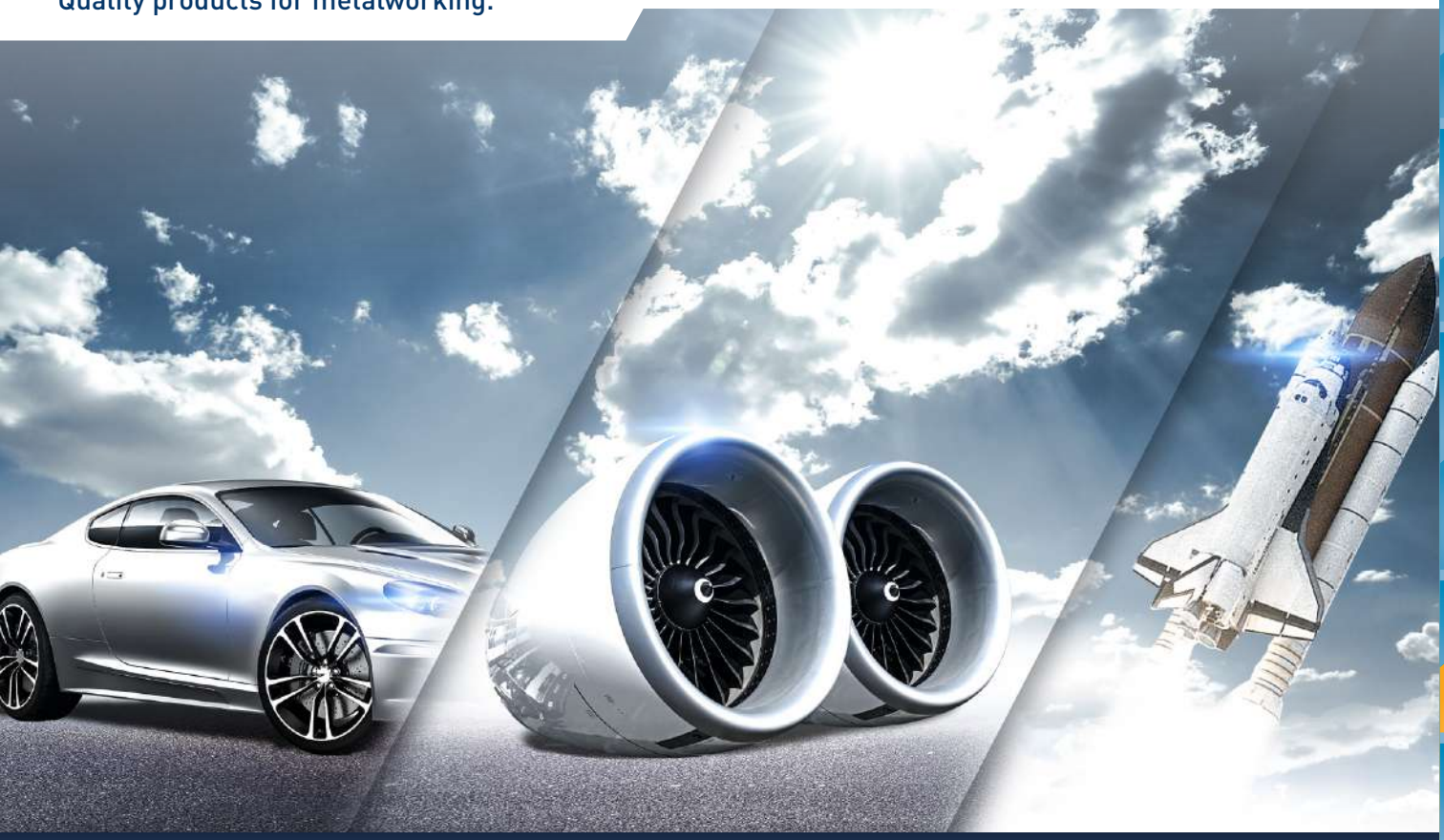
PROFESSIONAL TOOLS

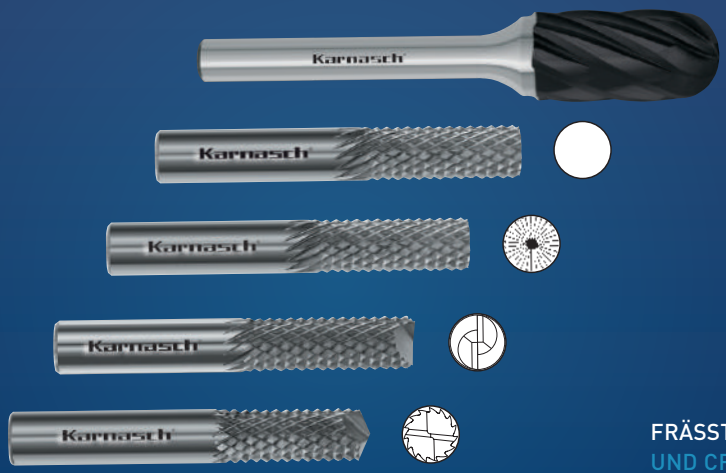
Qualitätsprodukte für die Metallbearbeitung.
Quality products for metalworking.



→ AUTOMOBILINDUSTRIE
→ AUTOMOTIVE

→ LUFTFAHRTINDUSTRIE
→ AEROSPACE INDUSTRY

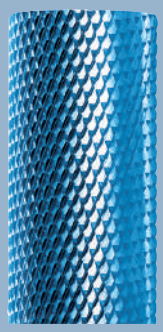
→ RAUMFAHRTINDUSTRIE
→ OUTER SPACE INDUSTRY




FRÄSSTIFTE SPEZIELL FÜR ABRASIVE WERKSTOFFE WIE GFK UND CFK, AL > 30% SI/ MAGNESIUM SIEHE HP-7 VERZAHNUNG SEITE 786-793 SOWIE UNSERE ART. 11 6001, 11 6002, 11 6003, 11 6004 SIEHE SEITE 845

ROTARY BURRS SPECIALLY DESIGNED FOR ABRASIVE MATERIALS SUCH AS GRP AND CFRP AND AL > 30% SI/MAGNESIUM SEE HP-7 CUT ON PAGE 786-793 AND OUR ART. 11 6001, 11 6002, 11 6003, 11 6004 SEE PAGE 845

# HP-11



## Extrem feine Kreuzverzahnung

## Extremely fine cross cutting style

### ANWENDUNG · APPLICATION

| Stahl / Steel | Gehärteter Stahl / Hardened steel | Edelstahl / Stainless | Gusseisen / Cast iron | Titan / Titanium | Cermet / Cermet | Nickel / Nickel | Kupfer, Kupferlegierungen / Copper, copper alloys | Alu / Alu | Kunststoffe GFK/CFK / Plastics GRP/CRP |
|---|---|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |

✓ OPTIMAL OPTIMAL

✓ GUT GOOD

- Exzellent für die: Feinbearbeitung · Extrem feine Putzarbeiten · Korrekturen im Werkzeug- und Formenbau · Schleifen/Schärfen von Schnittwerkzeugen
- Eigenschaften: Gutes Abtragverhalten · Vibrationsarm · Exzellente Kontrolle/Führung im Handeinsatz · Hohe Oberflächengüte
- Vorteile: Es können nahezu alle Werkstoffe bis zu einer Härte von 70 HRC bearbeitet werden.
  **In diesem Bereich werden üblicherweise Keramik-Schleifstifte verwendet.**

Die neue Micro-Verzahnung garantiert:
– Keine Geometrieveränderung durch Abnutzung/Verschleiß gegenüber Schleifstiften
– Wesentlich höheren Materialabtrag sowie Standzeit gegenüber Schleifstiften

- Excellent for: Finishing · Extremely fine cleaning work · Corrections in tool and mould construction · Grinding/sharpening of cutting tools
- Characteristics: Good stock removal · Low vibrations · Excellent control and guidance under handheld conditions · High surface quality
- Advantages: Micro-cut can be used for work on almost all materials up to a hardness of 70 HRC.
  **In this area usually mounted points are used.**

The new micro-cutting style guarantees:
– Unlike with mounted points, there is no change in geometry due to wear and tear
– Unlike with mounted points, there is much higher performance, surface quality and lifetime

**Lagerprogramm + Katalogseiten • Stockrange + catalogue pages**

| ZYA | ZYB | WRC | KUD | RBF | SPG |
|---|---|---|---|---|---|
| A | B | C | D | F | G |
| Art. 11 6080<br>Art. 11 4080 | Art. 11 6081<br>Art. 11 4081 | Art. 11 6082<br>Art. 11 4082 | Art. 11 6083<br>Art. 11 4083 | Art. 11 6084<br>Art. 11 4084 | Art. 11 6085<br>Art. 11 4085 |
|  |  |  |  |  |  |
| 836 | 836 | 837 | 837 | 838 | 838 |
| Zylinder<br>Cylinder | Zylinder + Stirnverzahnung<br>Cylinder + end cut | Walzenrundform<br>Ball nosed cylinder | Kugel<br>Ball | Rundbogen<br>Ball nosed tree | Spitzbogen<br>Tree |




Die für Frässtifte optimierte und patentierte BLUE-TEC-Beschichtung ergibt einzigartige Standzeiten und Performance in allen Stahlsorten.

Patented BLUE-TEC coating, specifically designed for burrs, gives outstanding tool life and excellent performance on all metals.

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---|---|---|---|---|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Feines Zerspanen = mittlerer Materialabtrag | 650–750 |
| | Gehärtete, vergütete Stähle über 1200 N/mm² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 450–600 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Feines Zerspanen = mittlerer Materialabtrag | 450–600 |
| NE-Metalle | Harte NE-Metalle | Bronze, Titan/Titanlegierungen, harte Alulegierungen (hoher Si-Anteil) | Feines Zerspanen = mittlerer Materialabtrag | 450–600 |
| | Hochwarmfeste Werkstoffe | Nickelbasis- und Kobaltbasislegierungen (Triebwerk- und Turbinenbau) | | |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/Späroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | Feines Zerspanen = mittlerer Materialabtrag | 600–750 |

| Material groups | | | Application | Cutting speed m/min |
|---|---|---|---|---|
| Steel, cast steel | Non-hardened, non-heat treated-steels up to 1200 N/mm² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Fine machining = medium stock removal | 650–750 |
| | Hardened, heat-treated steels exceeding 1200 N/mm² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 450–600 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Fine machining = medium stock removal | 450–600 |
| Non-ferrous metals | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard alu-alloys (high Si content) | Fine machining = medium stock removal | 450–600 |
| | High-temperature resistant materials | Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction) | | |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Fine machining = medium stock removal | 600–750 |

**Schnittgeschwindigkeit • Cutting speed (m/min)**

| | 450 | 600 | 650 | 750 |
|---|---|---|---|---|
| ∅ (mm) | Drehzahlen (min⁻¹) • Rotational speed (rpm) | | | |
| 2 | 72.000 | 95.000 | 104.000 | 120.000 |
| 3 | 48.000 | 64.000 | 68.000 | 80.000 |
| 4 | 36.000 | 48.000 | 52.000 | 60.000 |
| 6 | 24.000 | 32.000 | 34.000 | 40.000 |
| 8 | 18.000 | 24.000 | 26.000 | 30.000 |
| 10 | 14.000 | 19.000 | 21.000 | 24.000 |
| 12 | 12.000 | 16.000 | 18.000 | 21.000 |

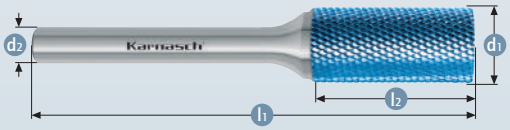
## 11 6080

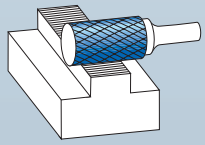
BLUETEC BESCHICHTET COATED

**A** FORM / SHAPE **ZYA**

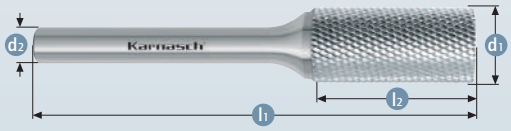
Zylinder ohne Stirnverzahnung

Cylinder without end cut



## 11 4080




Schnittdaten Cutting data 835

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6080 010 | 2 | 11 | 3 | 38 | | ✔ | 20,10 |
| 11 6080 020 | 3 | 14 | 3 | 38 | | ✔ | 20,10 |
| 11 6080 030 | 4 | 7 | 3 | 38 | | ✔ | 19,95 |
| 11 6080 040 | 6 | 5 | 3 | 37 | ✔ | | 21,00 |
| 11 6080 050 | 6 | 18 | 6 | 50 | | ✔ | 20,70 |
| 11 6080 060 | 8 | 20 | 6 | 65 | ✔ | | 24,85 |
| 11 6080 070 | 10 | 20 | 6 | 65 | ✔ | | 28,35 |
| 11 6080 080 | 12 | 25 | 6 | 70 | ✔ | | 36,15 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4080 010 | 2 | 11 | 3 | 38 | | ✔ | 18,05 |
| 11 4080 020 | 3 | 14 | 3 | 38 | | ✔ | 18,05 |
| 11 4080 030 | 4 | 7 | 3 | 38 | | ✔ | 17,90 |
| 11 4080 040 | 6 | 5 | 3 | 37 | ✔ | | 18,95 |
| 11 4080 050 | 6 | 18 | 6 | 50 | | ✔ | 18,65 |
| 11 4080 060 | 8 | 20 | 6 | 65 | ✔ | | 22,80 |
| 11 4080 070 | 10 | 20 | 6 | 65 | ✔ | | 25,00 |
| 11 4080 080 | 12 | 25 | 6 | 70 | ✔ | | 31,20 |

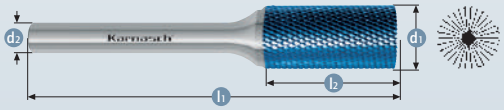
## 11 6081

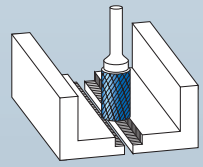
BLUETEC BESCHICHTET COATED

**B** FORM / SHAPE **ZYB**

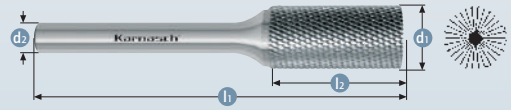
Zylinder mit Stirnverzahnung

Cylinder with end cut



## 11 4081




Schnittdaten Cutting data 835

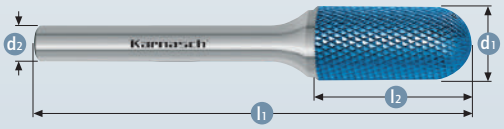
Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6081 010 | 6 | 18 | 6 | 50 | | ✔ | 22,55 |
| 11 6081 020 | 8 | 20 | 6 | 65 | ✔ | | 27,15 |
| 11 6081 030 | 10 | 20 | 6 | 65 | ✔ | | 31,90 |
| 11 6081 040 | 12 | 25 | 6 | 70 | ✔ | | 39,30 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4081 010 | 6 | 18 | 6 | 50 | | ✔ | 20,45 |
| 11 4081 020 | 8 | 20 | 6 | 65 | ✔ | | 25,10 |
| 11 4081 030 | 10 | 20 | 6 | 65 | ✔ | | 28,55 |
| 11 4081 040 | 12 | 25 | 6 | 70 | ✔ | | 34,40 |

## 11 6082

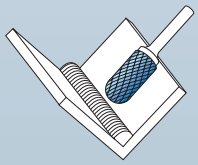
BLUETEC BESCHICHTET COATED



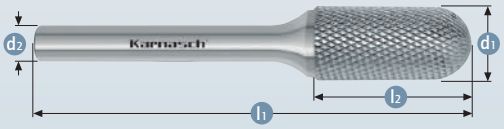

**C** FORM / SHAPE **WRC**

Walzenrundform

Ball nosed cylinder



## 11 4082




Schnittdaten Cutting data | Film Movie

835

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6082 010 | • 2 | 11 | 3 | 38 | | ✔ | 22,10 |
| 11 6082 020 | • 3 | 14 | 3 | 38 | | ✔ | 22,10 |
| 11 6082 030 | • 6 | 12,7 | 3 | 44 | ✔ | | 23,10 |
| 11 6082 040 | • 6 | 18 | 6 | 50 | | ✔ | 22,75 |
| 11 6082 050 | • 8 | 20 | 6 | 65 | ✔ | | 27,30 |
| 11 6082 060 | • 10 | 20 | 6 | 65 | ✔ | | 30,40 |
| 11 6082 070 | • 12 | 25 | 6 | 70 | ✔ | | 41,15 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4082 010 | • 2 | 11 | 3 | 38 | | ✔ | 20,05 |
| 11 4082 020 | • 3 | 14 | 3 | 38 | | ✔ | 20,05 |
| 11 4082 030 | • 6 | 12,7 | 3 | 44 | ✔ | | 21,05 |
| 11 4082 040 | • 6 | 18 | 6 | 50 | | ✔ | 20,65 |
| 11 4082 050 | • 8 | 20 | 6 | 65 | ✔ | | 25,25 |
| 11 4082 060 | • 10 | 20 | 6 | 65 | ✔ | | 27,00 |
| 11 4082 070 | • 12 | 25 | 6 | 70 | ✔ | | 36,25 |

## 11 6083

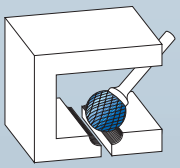
BLUETEC BESCHICHTET COATED




**D** FORM / SHAPE **KUD**

Kugel

Ball



## 11 4083




Schnittdaten Cutting data | Film Movie

835

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6083 010 | • 2 | 1,8 | 3 | 38 | | ✔ | 18,30 |
| 11 6083 020 | • 3 | 2,5 | 3 | 38 | | ✔ | 18,30 |
| 11 6083 030 | • 4 | 3,4 | 3 | 38 | | ✔ | 19,05 |
| 11 6083 040 | • 6 | 5 | 3 | 38 | ✔ | | 19,15 |
| 11 6083 050 | • 6 | 4,7 | 6 | 50 | | ✔ | 18,85 |
| 11 6083 060 | • 8 | 6 | 6 | 52 | ✔ | | 20,00 |
| 11 6083 070 | • 10 | 8 | 6 | 54 | ✔ | | 22,30 |
| 11 6083 080 | • 12 | 11 | 6 | 56 | ✔ | | 30,85 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4083 010 | • 2 | 1,8 | 3 | 38 | | ✔ | 16,25 |
| 11 4083 020 | • 3 | 2,5 | 3 | 38 | | ✔ | 16,25 |
| 11 4083 030 | • 4 | 3,4 | 3 | 38 | | ✔ | 16,95 |
| 11 4083 040 | • 6 | 5 | 3 | 38 | ✔ | | 17,10 |
| 11 4083 050 | • 6 | 4,7 | 6 | 50 | | ✔ | 16,75 |
| 11 4083 060 | • 8 | 6 | 6 | 52 | ✔ | | 18,30 |
| 11 4083 070 | • 10 | 8 | 6 | 54 | ✔ | | 18,95 |
| 11 4083 080 | • 12 | 11 | 6 | 56 | ✔ | | 25,95 |

## 11 6084

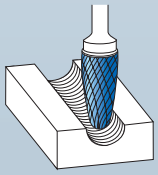
BLUETEC BESCHICHTET COATED



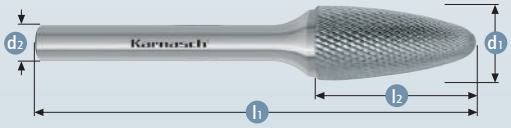

**F** FORM / SHAPE **RBF**

Rundbogen

Ball nosed tree



## 11 4084




Schnittdaten Cutting data 835

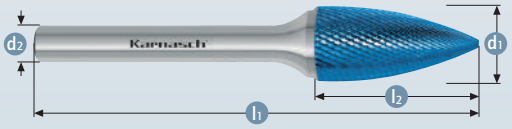
Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6084 010 | • 3 | 8 | 3 | 38 | | ✔ | 22,30 |
| 11 6084 020 | • 3 | 14 | 3 | 38 | | ✔ | 22,30 |
| 11 6084 030 | • 6 | 12 | 3 | 44 | ✔ | | 23,35 |
| 11 6084 040 | • 6 | 18 | 6 | 50 | | ✔ | 21,90 |
| 11 6084 050 | • 8 | 20 | 6 | 65 | ✔ | | 28,70 |
| 11 6084 060 | • 10 | 20 | 6 | 65 | ✔ | | 32,70 |
| 11 6084 070 | • 12 | 25 | 6 | 70 | ✔ | | 40,60 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4084 010 | • 3 | 8 | 3 | 38 | | ✔ | 20,20 |
| 11 4084 020 | • 3 | 14 | 3 | 38 | | ✔ | 20,20 |
| 11 4084 030 | • 6 | 12 | 3 | 44 | ✔ | | 21,30 |
| 11 4084 040 | • 6 | 18 | 6 | 50 | | ✔ | 19,85 |
| 11 4084 050 | • 8 | 20 | 6 | 65 | ✔ | | 26,65 |
| 11 4084 060 | • 10 | 20 | 6 | 65 | ✔ | | 29,35 |
| 11 4084 070 | • 12 | 25 | 6 | 70 | ✔ | | 35,70 |

## 11 6085

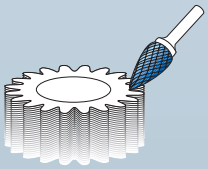
BLUETEC BESCHICHTET COATED



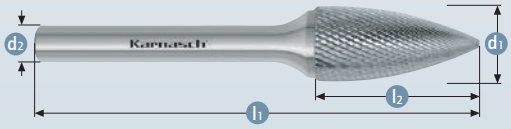

**G** FORM / SHAPE **SPG**

Spitzbogen

Tree



## 11 4085




Schnittdaten Cutting data 835

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6085 010 | • 3 | 6 | 3 | 38 | | ✔ | 22,30 |
| 11 6085 020 | • 3 | 14 | 3 | 38 | | ✔ | 22,30 |
| 11 6085 030 | • 6 | 12 | 3 | 44 | ✔ | | 23,35 |
| 11 6085 040 | • 6 | 18 | 6 | 50 | | ✔ | 24,10 |
| 11 6085 050 | • 8 | 20 | 6 | 65 | ✔ | | 25,20 |
| 11 6085 060 | • 10 | 20 | 6 | 65 | ✔ | | 28,90 |
| 11 6085 070 | • 12 | 25 | 6 | 70 | ✔ | | 36,75 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4085 010 | • 3 | 6 | 3 | 38 | | ✔ | 20,20 |
| 11 4085 020 | • 3 | 14 | 3 | 38 | | ✔ | 20,20 |
| 11 4085 030 | • 6 | 12 | 3 | 44 | ✔ | | 21,30 |
| 11 4085 040 | • 6 | 18 | 6 | 50 | | ✔ | 22,00 |
| 11 4085 050 | • 8 | 20 | 6 | 65 | ✔ | | 23,15 |
| 11 4085 060 | • 10 | 20 | 6 | 65 | ✔ | | 25,55 |
| 11 4085 070 | • 12 | 25 | 6 | 70 | ✔ | | 31,85 |

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PROFESSIONAL TOOLS

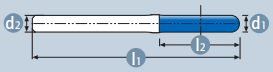
# 11 5021 | 11 5022 | 11 5025



**C** FORM / SHAPE **WRC**

Walzenrundform

Ball nosed cylinder




Film
Movie

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | Zahnung · Cut | € |
|---|---|---|---|---|---|---|
| 11 5021 030 | • 3,0 | 14 | 3 | 50 | | 9,90 |
| 11 5021 032 | • 3,0 | 14 | 3 | 60 | | 10,40 |
| 11 5021 035 | • 3,0 | 14 | 3 | 75 | | 10,90 |
| 11 5021 040 | • 3,0 | 14 | 3 | 100 | | 13,70 |
| 11 5021 043 | • 3,0 | 30* | 6 | 60 | | 21,70 |
| 11 5021 046 | • 4,0 | 30* | 6 | 60 | | 22,25 |
| 11 5021 055 | • 6,0 | 18 | 6 | 50 | | 11,35 |
| 11 5021 056 | • 6,0 | 18 | 6 | 60 | | 15,20 |
| 11 5021 058 | • 6,0 | 18 | 6 | 80 | | 18,05 |
| 11 5021 060 | • 6,0 | 18 | 6 | 100 | | 20,40 |
| 11 5021 065 | • 6,0 | 18 | 6 | 150 | | 29,00 |
| 11 5022 030 | • 3,0 | 14 | 3 | 50 | | 12,25 |
| 11 5022 032 | • 3,0 | 14 | 3 | 60 | | 12,80 |
| 11 5022 035 | • 3,0 | 14 | 3 | 75 | | 13,40 |
| 11 5022 040 | • 3,0 | 14 | 3 | 100 | | 16,90 |
| 11 5022 043 | • 3,0 | 30* | 6 | 60 | | 27,85 |
| 11 5022 046 | • 4,0 | 30* | 6 | 60 | | 28,45 |
| 11 5022 055 | • 6,0 | 18 | 6 | 50 | | 15,40 |
| 11 5022 056 | • 6,0 | 18 | 6 | 60 | | 19,30 |
| 11 5022 058 | • 6,0 | 18 | 6 | 80 | | 23,00 |
| 11 5022 060 | • 6,0 | 18 | 6 | 100 | | 28,15 |
| 11 5022 065 | • 6,0 | 18 | 6 | 150 | | 40,00 |
| 11 5025 055 | • 6,0 | 18 | 6 | 50 | | 19,40 |



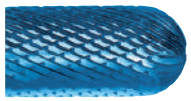
BEST SELLER

Schnittdaten
Cutting data

i 755

**HP-3**
Die am meisten verwendete Universalverzahnung Stahl bis < 60 HRC

The most widely used universal cutting style < 60 HRC



Schnittdaten
Cutting data

i 819

**HP-4**
Extra feine Kreuzverzahnung für Stähle bis ca. 70 HRC

Extra fine cross cutting style up to extra hard steel 70 HRC



Schnittdaten
Cutting data

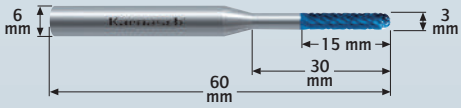
i 787

**HP-7**
Grobe Zerspanung und höchster Materialabtrag bei Alulegierungen

For coarse cutting and highest material removal of aluminum alloys

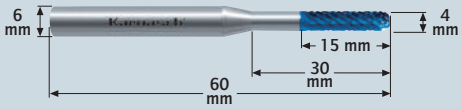
* Davon 15 mm verzahnt | Of which 15 mm teethed

***11 5021 043 / 11 5022 043**




BLUETEC BESCHICHTET COATED

***11 5021 046 / 11 5022 046**




* Durch Verjüngung eines ∅ 6 mm Frässtiftes auf ∅ 3 mm oder ∅ 4 mm wird die Arbeitszeit um ca. die Hälfte reduziert, da weniger Material zerspant werden muss.
- Durch ∅ 6 mm Schaft wesentlich bruchunempfindlicher als durchgehend ∅ 3 mm oder ∅ 4 mm Schaft
- Bei ∅ 3 mm, 4 mm, 6 mm kann mit der gleichen ∅ 6 mm Spannzange gearbeitet werden.
- Die Kernziehschutzblende muss in der Regel wegen des geringen Fräskopf-Durchmessers nicht zerstört werden.

* By tapering of a 6 mm burr to ∅ 3 mm or ∅ 4 mm working time is reduced by about half, because less material needs to be machined.
- Because of its 6 mm shank, significantly less susceptible to breakage than continuous ∅ 3 mm or ∅ 4 mm shank
- At ∅ 3 mm, ∅ 4 mm the same collet can be used for ∅ 6 mm
- Because of the limited diameter of the burr head, the core drawing tray may not be disturbed

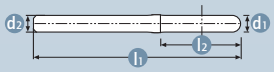
**11 3021** | **11 3022** | **11 3025**



**C** FORM / SHAPE **WRC**

Walzenrundform

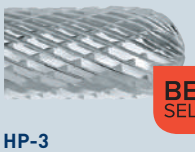
Ball nosed cylinder




Film
Movie

Bestseller – preisreduziert · Bestseller – price reduced

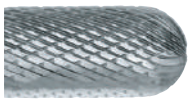
| Art. | d1 | l2 | d2 | l1 | Zahnung · Cut | € |
|---|---|---|---|---|---|---|
| 11 3021 030 | • 3,0 | 14 | 3 | 50 | | 8,10 |
| 11 3021 032 | • 3,0 | 14 | 3 | 60 | | 8,60 |
| 11 3021 035 | • 3,0 | 14 | 3 | 75 | | 9,15 |
| 11 3021 040 | • 3,0 | 14 | 3 | 100 | | 11,90 |
| 11 3021 043 | • 3,0 | 30* | 6 | 60 | | 19,95 |
| 11 3021 046 | • 4,0 | 30* | 6 | 60 | | 20,50 |
| 11 3021 055 | • 6,0 | 18 | 6 | 50 | | 9,60 |
| 11 3021 056 | • 6,0 | 18 | 6 | 60 | | 13,40 |
| 11 3021 058 | • 6,0 | 18 | 6 | 80 | | 16,30 |
| 11 3021 060 | • 6,0 | 18 | 6 | 100 | | 18,65 |
| 11 3021 065 | • 6,0 | 18 | 6 | 150 | | 26,20 |
| | | | | | | |
| 11 3022 032 | • 3,0 | 14 | 3 | 60 | | 10,75 |
| | | | | | | |
| 11 3022 040 | • 3,0 | 14 | 3 | 100 | | 14,85 |
| 11 3022 043 | • 3,0 | 30* | 6 | 60 | | 25,75 |
| 11 3022 046 | • 4,0 | 30* | 6 | 60 | | 26,40 |
| 11 3022 055 | • 6,0 | 18 | 6 | 50 | | 13,35 |
| 11 3022 056 | • 6,0 | 18 | 6 | 60 | | 17,20 |
| 11 3022 058 | • 6,0 | 18 | 6 | 80 | | 20,95 |
| 11 3022 060 | • 6,0 | 18 | 6 | 100 | | 26,05 |
| | | | | | | |
| 11 3025 055 | • 6,0 | 18 | 6 | 50 | | 14,55 |




Schnittdaten
Cutting data
755

**HP-3**
Die am meisten verwendete Universalverzahnung Stahl bis < 60 HRC

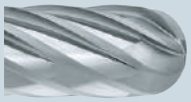
The most widely used universal cutting style < 60 HRC



Schnittdaten
Cutting data
819

**HP-4**
Extra feine Kreuzverzahnung für Stähle bis ca. 70 HRC

Extra fine cross cutting style up to extra hard steel 70 HRC



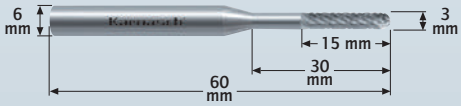
Schnittdaten
Cutting data
787

**HP-7**
Grobe Zerspanung und höchster Materialabtrag bei Alulegierungen

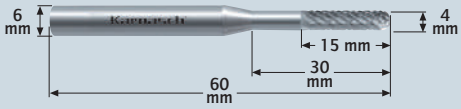
For coarse cutting and highest material removal of aluminum alloys

* Davon 15 mm verzahnt | Of which 15 mm teethed

***11 3021 043 / 11 3022 043**




***11 3021 046 / 11 3022 046**




* Durch Verjüngung eines ∅ 6 mm Frässtiftes auf ∅ 3 mm oder ∅ 4 mm wird die Arbeitszeit um ca. die Hälfte reduziert, da weniger Material zerspant werden muss.
- Durch ∅ 6 mm Schaft wesentlich bruchunempfindlicher als durchgehend ∅ 3 mm oder ∅ 4 mm Schaft
- Bei ∅ 3 mm, 4 mm, 6 mm kann mit der gleichen ∅ 6 mm Spannzange gearbeitet werden.
- Die Kernziehschutzblende muss in der Regel wegen des geringen Fräskopf-Durchmessers nicht zerstört werden.

* By tapering of a 6 mm burr to ∅ 3 mm or ∅ 4 mm working time is reduced by about half, because less material needs to be machined.
- Because of its 6 mm shank, significantly less susceptible to breakage than continuous ∅ 3 mm or ∅ 4 mm shank
- At ∅ 3 mm, ∅ 4 mm, the same collet can be used for ∅ 6 mm
- Because of the limited diameter of the burr head, the core drawing tray may usually not be disturbed

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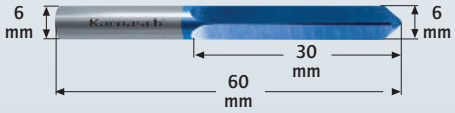
Special price / sale article. While stocks last.

## 11 4701 € 32,40






Schnittdaten Cutting data 1465 | Film Movie

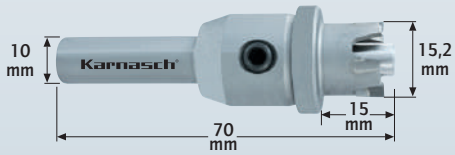
**Vollhartmetall-Bohrfräser der neuesten Generation.** Öffnet Schließzylinder in Rekordzeit. Beste Ergebnisse werden mit Geradschleifer erzielt (siehe Seite 1208/1209). Aufbohrungen sind mit Bohrmaschinen/Akku-Bohrmaschinen möglich.
In Verbindung mit Frässtiften (Seite 840) ergibt sich die ideale Werkzeugkombination.
Mit dem Bohrfräser wird der Zylinder in kürzester Zeit geradlinig aufgebohrt. In der Regel sollte der Schließzylinder nun bereits zu schließen sein. Falls nicht, z.B. bei besonderen Bohrschutzsicherungen, wird die Bohrung mit einem Frässtift (siehe Seite 841) seitlich erweitert.

**Solid carbide drill of the newest generation.** Opens locking cylinders in record time. Best results are achieved with straight grinders (see page 1208/1209). Also drilling with drilling/battery drills. Together with burrs (page 840), the ideal tool combination is achieved. With the drill, the cylinder is drilled in a straight line in the shortest possible time. Usually, the locking cylinder can already be closed now. If not, e.g., in case of special drill prevention, the borehole is sideways expanded with a burr (see page 841).

## 11 4702 € 17,15

### HM-LOCHSÄGE FÜR ABLOY PROTEC-SCHLIESSZYLINDER
### T.C.T. HOLESAWS FOR ABLOY PROTEC LOCKING CYLINDERS






Schnittdaten Cutting data 1465 | Film Movie

Zu verwenden mit einer Bohrmaschine/starke Akku-Bohrmaschine. Mit dieser Lochsäge ist es möglich, die vor dem Kern liegende, gehärtete Stirnplatte dieses speziellen Hochsicherheitszylinders zu durchdringen um anschließend den Kern herausziehen zu können.
Werkzeugmerkmale:
- 4 × HM-Zähne ∅ 15,2
- Gefederte Stiftführung (6,8 mm) zur Zentrierung im Schließkanal
- Tiefenanschlag

To be used with a drilling machine/strong battery drill. With this holesaw it is possible to penetrate the hardened front plate of this special high security locking cylinder that sits in front of the core and then to retrieve the core.
Properties of the tool:
- 4 × T.C.T. teeth ∅ 15.2
- Sprung pin guide (6.8 mm) for centring in the locking channel
- Depth stop

Grampelhuber GmbH
Koaserbauerstrasse 18
4810 Gmunden / Austria
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Telefax: +43 (0)7612 - 64902-8
office@grampelhuber.at
www.grampelhuber.at

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Frässtifte für GFK/CFK

Fiberglass routers

845



Mini-Frässtifte ∅ 1 + 1,5 mm

Mini-burrs ∅ 1 + 1,5 mm

846



Frässtifte + Bohrer für Schlüsseldienste

Burrs + drills for locksmiths

840-842

## 11 6011

BLUETEC BESCHICHTET COATED

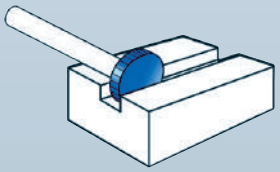
## HP-2 VERZAHNUNG · CUT

## 11 4011

Scheibenform

RIM shape






Schnittdaten Cutting data

1465

Film Movie

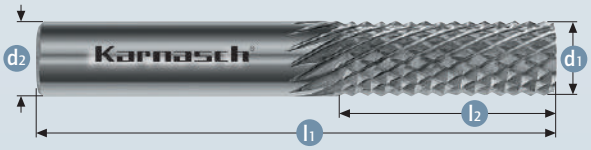
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | Form Shape | € |
|---|---|---|---|---|---|---|---|
| 11 6011 005 | • 10 | 1,6 | 3 | 34 | ✔ | | 17,30 |
| 11 6011 010 | • 12 | 2,6 | 6 | 48 | ✔ | | 42,30 |
| 11 6011 015 | • 25 | 5,2 | 8 | 50 | ✔ | 90° | 100,15 |
| 11 6011 020 | • 25 | 6,3 | 8 | 51 | ✔ | Radius | 103,95 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | Form Shape | € |
|---|---|---|---|---|---|---|---|
| 11 4011 005 | • 10 | 1,6 | 3 | 34 | ✔ | | 13,95 |
| 11 4011 010 | • 12 | 2,6 | 6 | 48 | ✔ | | 37,40 |
| 11 4011 015 | • 25 | 5,2 | 8 | 50 | ✔ | 90° | 93,75 |
| 11 4011 020 | • 25 | 6,3 | 8 | 51 | ✔ | Radius | 97,55 |

## GFK, CFK

Für Kunststoffe, GFK, CFK, MMC

Routers for fiberglass, GFK, CFK




Schnittdaten / Cutting data 1394

Film / Movie

Toleranzen
Tolerances

d1

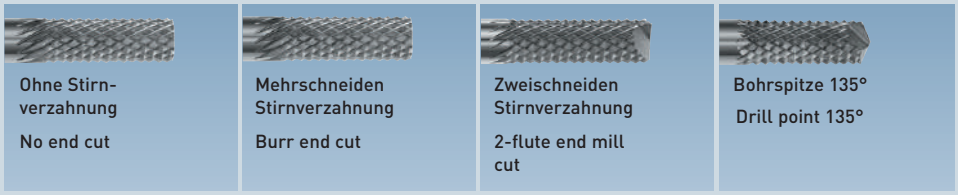
∅ 1.6 mm, 2.4 mm = +0,00/–0,10
∅ 3–12 mm = +0,00/–0,13

Diese Frässtifte sind geeignet zum Umrissfräsen, Besäumen, Nuten und Bohren der großen Bandbreite von Faserverstärkten Kunststoffen (Fiberglas, GFK CFK). Weiterhin für MMC, Metal Matrix Composites = schwer zerspanbare abrasive Verbundstoffe wie z.B. Leiterplatten, Verbindungen wie Keramik mit Glasfaser, Graphit, Carbon.

Sollten höchste Standzeiten erwünscht sein, empfehlen wir eine Diamantbeschichtung. Auf Anfrage.

These routers are for contouring, grooving, drilling of a wide range of GFK, CFK, fiberglass reinforced plastics, as well as MMC (Metal Matrix Composites). MMC material such as printed circuit boards, composites such as ceramic with glass fiber, graphite, carbon etc.

If highest lifetime is required do we recommend a diamond coating. On request.



| | Ohne Stirnverzahnung<br>No end cut | Mehrschneiden Stirnverzahnung<br>Burr end cut | Zweischneiden Stirnverzahnung<br>2-flute end mill cut | Bohrspitze 135°<br>Drill point 135° |
|---|---|---|---|---|

| d1 | l2 | d2 | l1 | VHM solid | 11 6001 | | 11 6002 | | 11 6003 | | 11 6004 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Art. | € | Art. | € | Art. | € | Art. | € |
| ● 1,6 | 5 | 3 | 38 | ✔ | - | - | 11 6002 001 | 11,50 | 11 6003 001 | 11,55 | 11 6004 001 | 12,30 |
| ● 2,4 | 9,5 | 3 | 38 | ✔ | - | - | 11 6002 003 | 11,50 | 11 6003 003 | 12,50 | - | - |
| ● 3 | 12 | 3 | 38 | ✔ | 11 6001 005 | 11,00 | 11 6002 005 | 11,60 | 11 6003 005 | 13,65 | 11 6004 005 | 13,65 |
| ● 4 | 16 | 4 | 50 | ✔ | - | - | 11 6002 010 | 16,40 | 11 6003 010 | 18,35 | 11 6004 010 | 18,35 |
| ● 4 | 16 | 6 | 50 | ✔ | - | - | 11 6002 012 | 19,65 | 11 6003 012 | 20,95 | 11 6004 012 | 21,80 |
| ● 6 | 19 | 6 | 50 | ✔ | 11 6001 013 | 17,55 | 11 6002 013 | 19,65 | 11 6003 013 | 20,95 | 11 6004 013 | 21,80 |
| ● 6 | 19 | 6 | 63 | ✔ | 11 6001 015 | 26,05 | 11 6002 015 | 27,45 | 11 6003 015 | 29,20 | 11 6004 015 | 29,20 |
| ● 6 | 25 | 6 | 75 | ✔ | 11 6001 017 | 21,80 | 11 6002 017 | 23,70 | 11 6003 017 | 24,85 | 11 6004 017 | 25,65 |
| ● 8 | 25 | 8 | 63 | ✔ | 11 6001 020 | 36,15 | 11 6002 020 | 38,15 | 11 6003 020 | 39,80 | 11 6004 020 | 39,80 |
| ○ 10 | 25 | 10 | 63 | ✔ | % 11 6001 025 | 25,05 | - | - | - | - | - | - |
| ● 10 | 25 | 10 | 75 | ✔ | 11 6001 027 | 45,45 | 11 6002 027 | 49,40 | 11 6003 027 | 51,30 | 11 6004 027 | 53,30 |
| ● 12 | 25 | 12 | 75 | ✔ | 11 6001 029 | 62,40 | 11 6002 029 | 68,65 | 11 6003 029 | 72,00 | 11 6004 029 | 75,30 |
| ○ 12 | 30 | 12 | 75 | ✔ | % 11 6001 030 | 35,80 | - | - | - | - | - | - |

### Schnittgeschwindigkeit • Cutting speed (m/min)

| | 450 | 900 |
|---|---|---|
| ∅ (mm) | Drehzahlen (min$^{-1}$) • Rotational speed (rpm) | |
| 2 | 72.000 | 143.000 |
| 3 | 48.000 | 95.000 |
| 4 | 36.000 | 72.000 |
| 6 | 24.000 | 48.000 |
| 8 | 17.000 | 36.000 |
| 10 | 14.000 | 29.000 |
| 12 | 12.000 | 24.000 |

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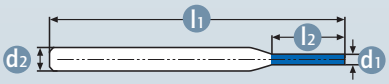
Special price / sale article. While stocks last.

# MINI-UNI

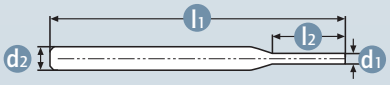
**Einsatzgebiete:** Feinmechanik, Schmuckindustrie, Turbinenbau, Werkzeugbau
**Zu bearbeitende Werkstoffe:** Edelstähle, Buntmetalle, Zinkdruckguss, weiche Keramiken, Titanlegierungen
**Drehzahlempfehlung:** ca. 70.000 U/min

**Applications:** Precision engineering, jewellery industry, turbine manufacture, tool manufacture
**For use on:** stainless steel, copper and copper alloys, zinc pressure die castings soft ceramics, titanium alloys
**Recommended operating speed:** +/- 70,000 RPM



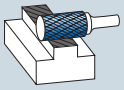
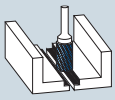
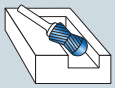
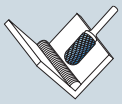
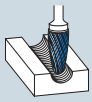
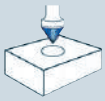
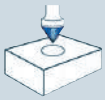


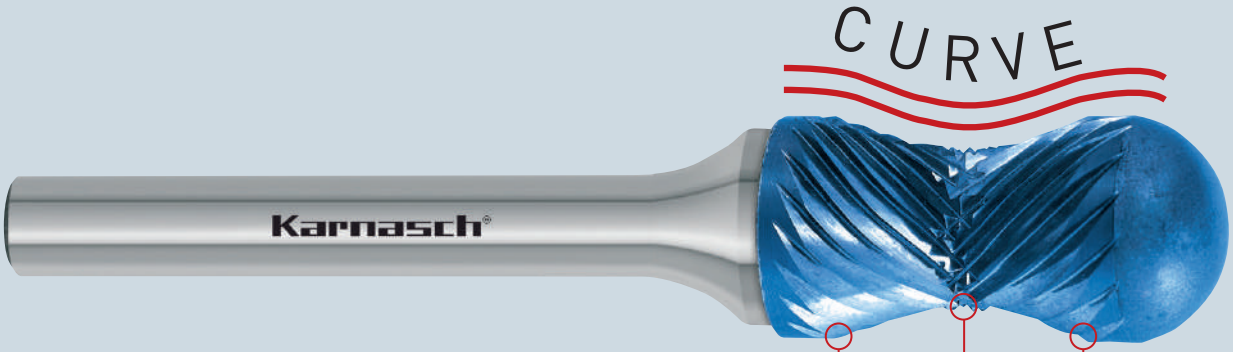





| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | | € |
|---|---|---|---|---|---|---|---|---|
| 11 5006 005 | ● 1 | 4 | 3 | 38 | A | ZYA | | 13,00 |
| 11 5006 010 | ● 1,5 | 4 | 3 | 38 | A | ZYA | | 13,00 |
| 11 5006 020 | ● 2 | 4 | 3 | 38 | A | ZYA | | 13,00 |
| 11 5026 005 | ● 1 | 4 | 3 | 38 | C | WRC | | 13,00 |
| 11 5026 010 | ● 1,5 | 4 | 3 | 38 | C | WRC | | 13,00 |
| 11 5026 015 | ● 2 | 4 | 3 | 38 | C | WRC | | 13,00 |
| 11 5036 005 | ● 1 | 1 | 3 | 38 | D | KUD | | 13,00 |
| 11 5036 010 | ● 1,5 | 1 | 3 | 38 | D | KUD | | 13,00 |
| 11 5036 015 | ● 2 | 2 | 3 | 38 | D | KUD | | 13,00 |
| 11 5046 005 | ● 1,5 | 4 | 3 | 38 | E | TRE | | 13,00 |
| 11 5056 005 | ● 1,5 | 4 | 3 | 38 | F | RBF | | 13,00 |
| 11 5066 005 | ● 1,5 | 4 | 3 | 38 | G | SPG | | 13,00 |
| 11 5196 005 | ● 1,5 | 4 | 3 | 38 | M | SKM | | 13,00 |

| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | | € |
|---|---|---|---|---|---|---|---|---|
| 11 3006 005 | ● 1 | 4 | 3 | 38 | A | ZYA | | 10,90 |
| 11 3006 010 | ● 1,5 | 4 | 3 | 38 | A | ZYA | | 10,90 |
| 11 3006 020 | ● 2 | 4 | 3 | 38 | A | ZYA | | 10,90 |
| 11 3026 005 | ● 1 | 4 | 3 | 38 | C | WRC | | 10,90 |
| 11 3026 010 | ● 1,5 | 4 | 3 | 38 | C | WRC | | 10,90 |
| 11 3026 015 | ● 2 | 4 | 3 | 38 | C | WRC | | 10,90 |
| 11 3036 005 | ● 1 | 1 | 3 | 38 | D | KUD | | 10,90 |
| 11 3036 010 | ● 1,5 | 1 | 3 | 38 | D | KUD | | 10,90 |
| 11 3036 015 | ● 2 | 2 | 3 | 38 | D | KUD | | 10,90 |
| 11 3046 005 | ● 1,5 | 4 | 3 | 38 | E | TRE | | 10,90 |
| 11 3056 005 | ● 1,5 | 4 | 3 | 38 | F | RBF | | 10,90 |
| 11 3066 005 | ● 1,5 | 4 | 3 | 38 | G | SPG | | 10,90 |
| 11 3196 005 | ● 1,5 | 4 | 3 | 38 | M | SKM | | 10,90 |

| | COMBI | CURVE | |
|---|---|---|---|
| ZYA |  |  | 850 |
| ZYB |  |  | 851 |
| WRC |  |  | 852 |
| WRC |  |  | 853 |
| RBF |  |  | 854 |
| SKM |  |  | 855 |
| KEL |  |  | 856 |
| KSJ |  |  | 857 |
| KSK |  |  | 858 |




Kegel SKM Form

Cone SKM shape

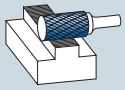
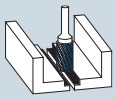
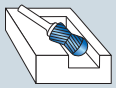
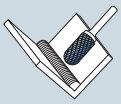
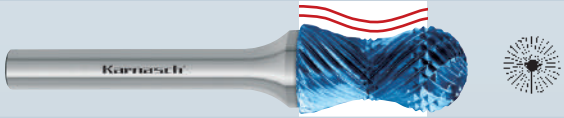
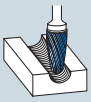
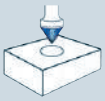
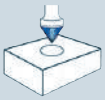
Die Schnittpunkte zwischen Winkelform (WKN) und Kegelform (SKM) ergeben das einzigartige **COMBI+CURVE Führungs-Rundungs-Entgratungssystem**

The intersecting points of the countersink (WKN) and cone shapes (SKM) form the unique **COMBI+CURVE guiding-rounding-deburring system**

Winkel WKN Form

Countersink WKN shape

# COMBI+CURVE

| | COMBI | CURVE | |
|---|---|---|---|
| ZYA |  |  | 850 |
| ZYB |  |  | 851 |
| WRC |  |  | 852 |
| WRC |  |  | 853 |
| RBF |  |  | 854 |
| SKM |  |  | 855 |
| KEL |  |  | 856 |
| KSJ |  |  | 857 |
| KSK |  |  | 858 |

Die Kombination aus den gängigsten Kopfformen wie Zylinder ZYA + ZYB, Walzenrund WRC, Rundbogen RBF, Spitzbogen SPG, Rundkegel KEL, Winkel KSJ + KSK mit dem einzigartigen **COMBI+CURVE Führungs-Rundungs-Entgratungssystem** ergeben folgende Vorteile:

- Ideal zum schnellen Kantenverrunden.
- Die Kanten werden nicht einfach flach abgeschrägt, sondern erhalten durch das einzigartige **Führungs-Rundungs-Entgratungssystem** eine saubere Rundung.
- Der **COMBI+CURVE** zentriert sich selbst, immer mittig zur Kante.
- Durch die einzigartige Selbstzentrierung ist ein Abgleiten oder Verrutschen an scharfen Kanten nahezu unmöglich.
- Somit besteht eine deutlich bessere Kontrolle und garantiert einen einfachen und schnellen Materialabtrag.

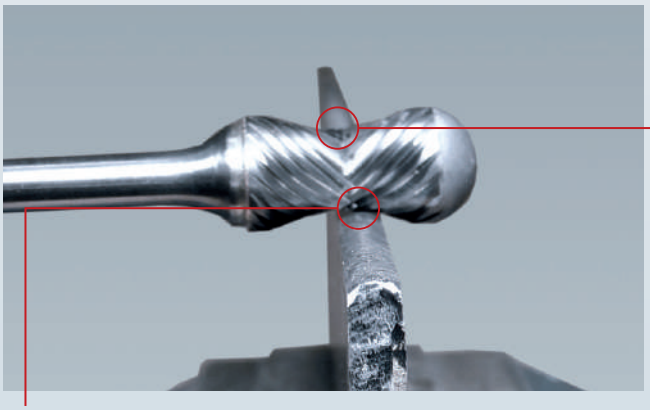
Anwendbar in den verschiedensten Materialen wie: Gusseisen, Stahl < 60 HRC, Edelstahl (INOX), Nickelbasis- und Titanlegierungen, sowie Kupfer, Messing und Bronze

The combination of the most used head shapes as cylinder ZYA + ZYB, ball nosed cylinder WRC, ball nosed tree RBF, tree SPG, ball nosed cone KEL, countersink KSJ + KSK with the unique **COMBI+CURVE guiding-rounding-deburring system** result in the following advantages:

- The ideal tool for extremly fast chamfering. The edges are not simply bevelled, but by the unique guiding-rounding-deburring system smoothly rounded.
- **COMBI+CURVE guiding-rounding-deburring system** always centres itself on the centre of the edge.
- Slipping off the edge is almost impossible. This gives best control and guarantees faster and easier removal of material.

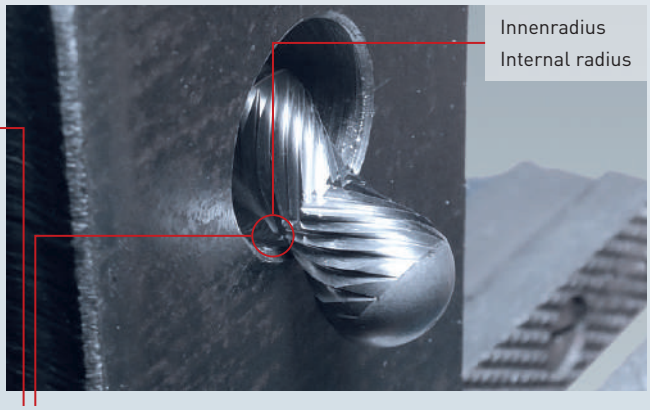
Can be used on a wide variety of material e.g. cast iron, steel < 60 HRC, stainless steel (INOX), nickel-based and titanium alloys, copper, brass and bronze.

# CURVE IN ACTION



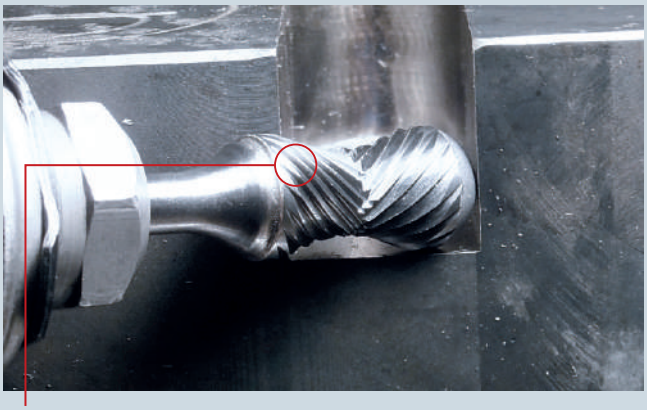
Außenradius

External radius



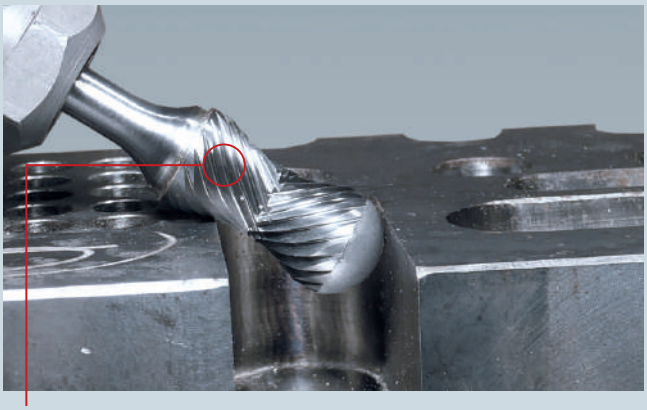

Die Schnittpunkte zwischen Winkelform (WKN) und Kegelform (SKM) ergeben das einzigartige **COMBI+CURVE Führungs-Rundungs-Entgratungssystem**

The intersecting points of the countersink (WKN) and cone shapes (SKM) form the unique **COMBI+CURVE guiding-rounding-deburring system**



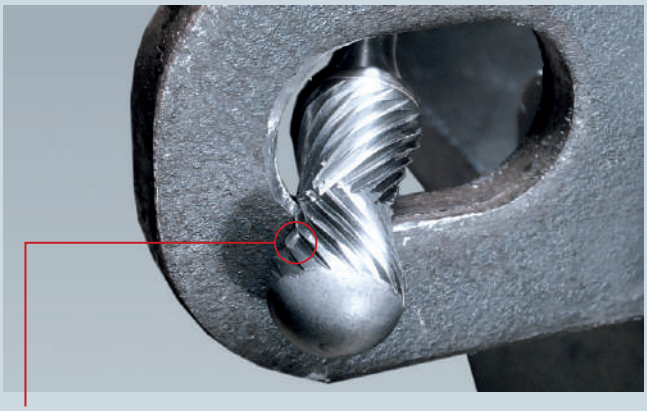
Interne Fase in SKM Form

Internal chamfer with SKM shape



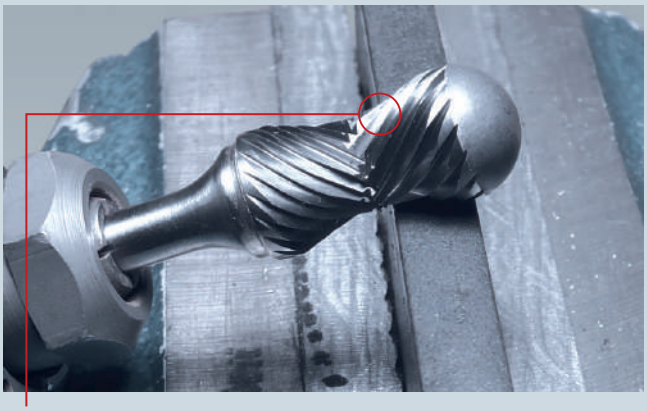
Außenfase in SKM Form

External chamfer with SKM shape



Interne Fase in WKN Form

Internal chamfer with WKN shape



Außenfase in WKN Form

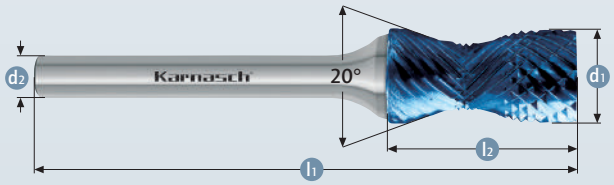
External chamfer with WKN shape

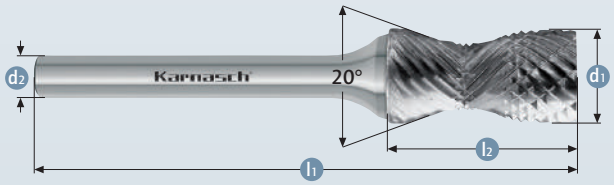
# COMBI+CURVE

**11 6019**

**11 4019**

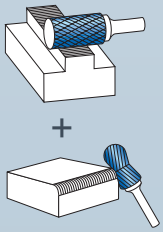
BLUETEC BESCHICHTET COATED




Curve + Zylinder

Curve + Cylinder



Schnittdaten / Cutting data — 755

Film / Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6019 100 | • 12 | 25 | 6 | 70 | ✔ | – | 45,95 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4019 100 | • 12 | 25 | 6 | 70 | ✔ | – | 41,05 |

## Anwendungsbeispiele / Application examples

COMBI →

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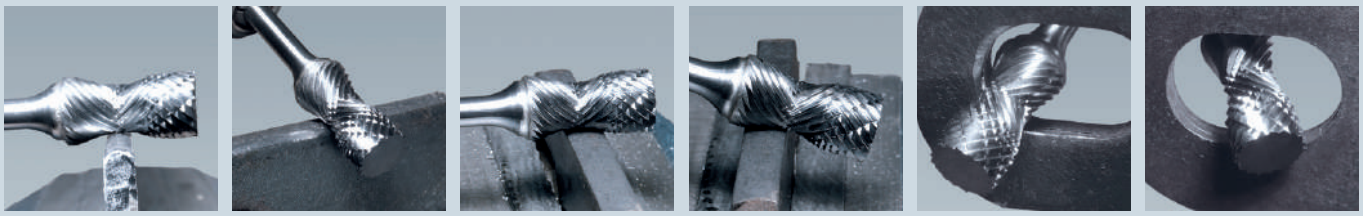
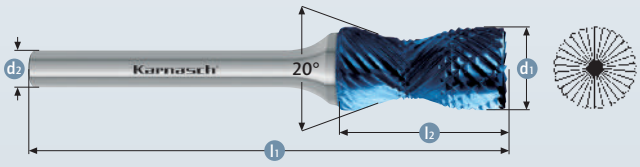
CURVE ↓

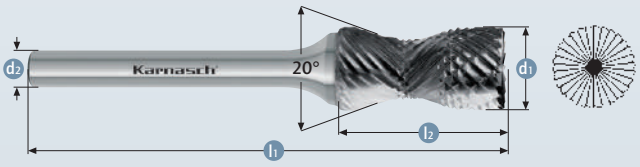


11 6020

BLUETEC BESCHICHTET COATED

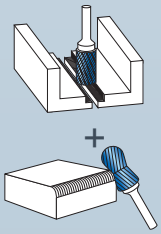
11 4020




Curve + Zylinder mit Stirnverzahnung

Curve + Cylinder with end cut



Schnittdaten Cutting data

Film Movie

755

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6020 100 | • 12 | 25 | 6 | 70 | ✔ | – | 58,05 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4020 100 | • 12 | 25 | 6 | 70 | ✔ | – | 53,10 |

## Anwendungsbeispiele / Application examples

COMBI →

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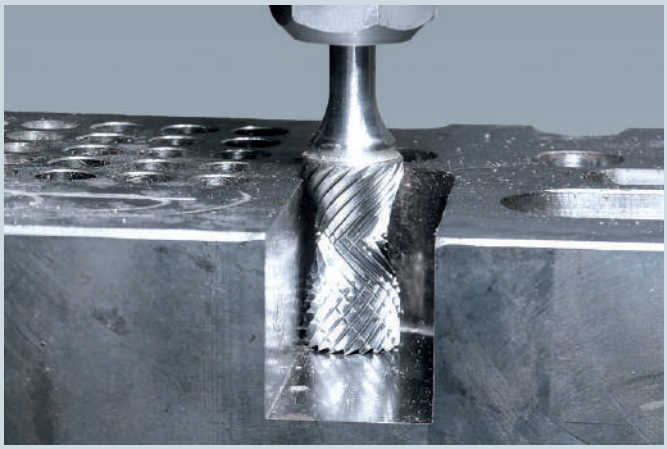
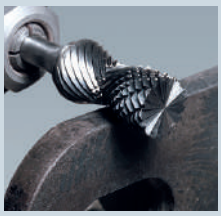


CURVE ↓











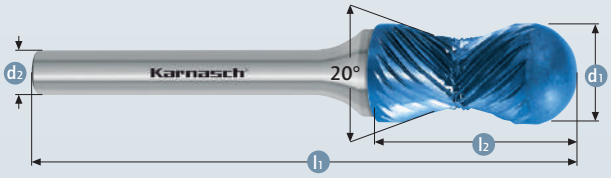


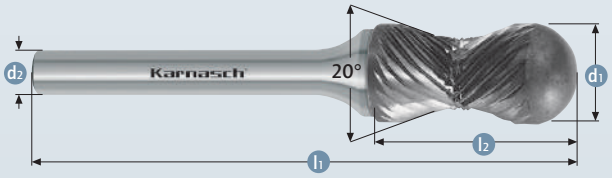
# COMBI+CURVE

**11 6021**

BLUETEC BESCHICHTET COATED

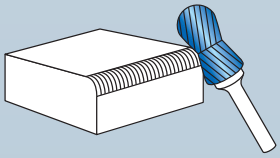
**11 4021**




Curve + Walzenrundform

Curve + Ball nosed cylinder



Schnittdaten Cutting data 755

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6021 100 | • 12 | 25 | 6 | 70 | ✔ | – | 50,95 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4021 100 | • 12 | 25 | 6 | 70 | ✔ | – | 46,05 |

## Anwendungsbeispiele / Application examples

COMBI →

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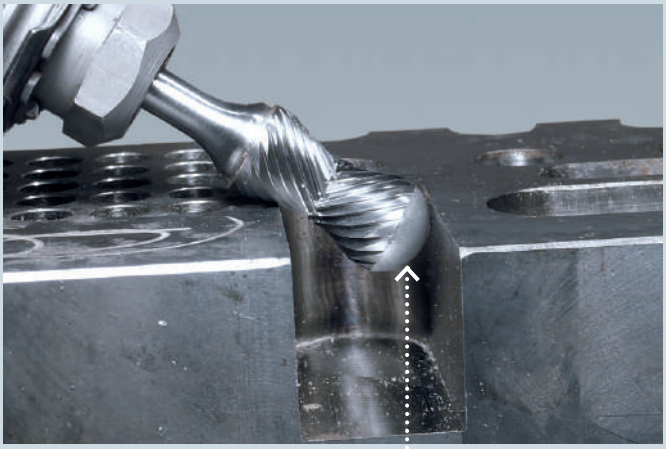
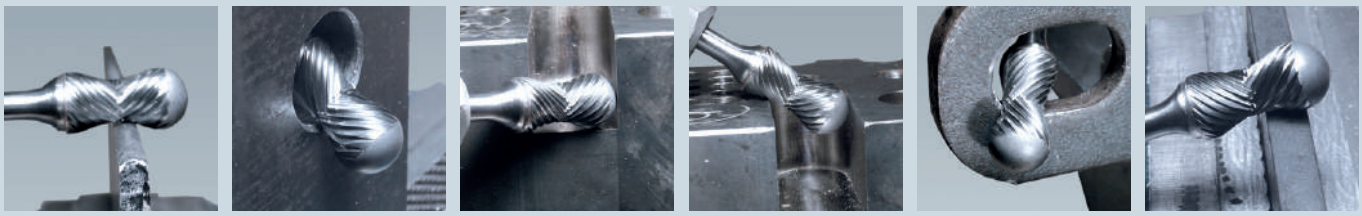
CURVE ↓



Der Radius an der Spitze des Frässtifts dient als Führung und Abstützung. Beschädigungen am Werkstück werden vermieden.

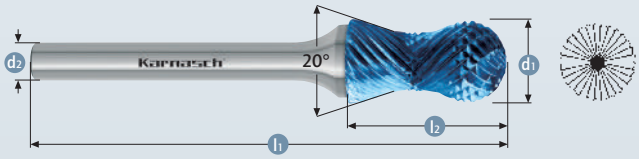
The radius at the front of the burr serves as a guide and a support. Damage to the workpiece can thus be avoided.

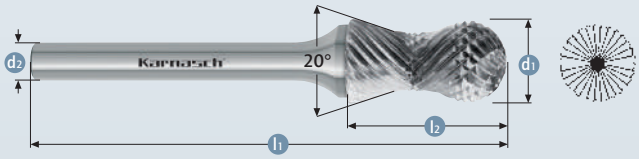


# COMBI+CURVE

**11 6022** | **11 4022**

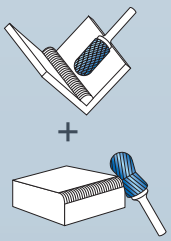
BLUETEC BESCHICHTET COATED




Curve + Walzenrundform

Curve + Ball nosed cylinder



Schnittdaten Cutting data | Film Movie

755

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6022 100 | • 12 | 25 | 6 | 70 | ✔ | – | 50,95 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4022 100 | • 12 | 25 | 6 | 70 | ✔ | – | 46,05 |

## Anwendungsbeispiele / Application examples

COMBI →

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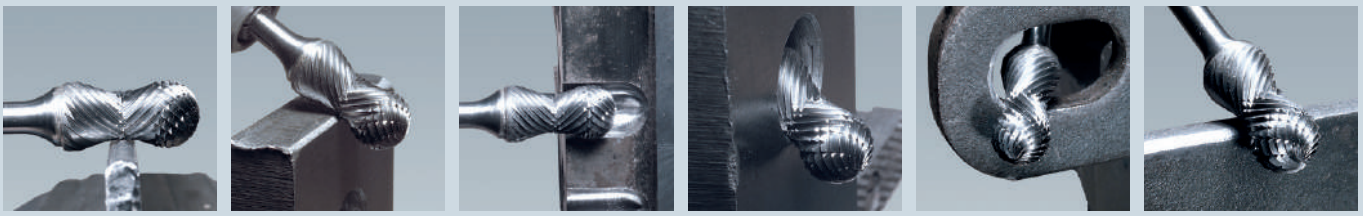
CURVE ↓

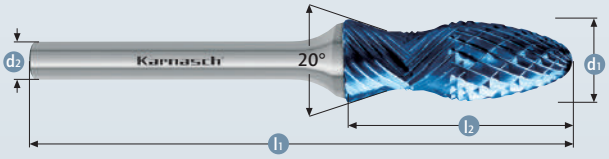


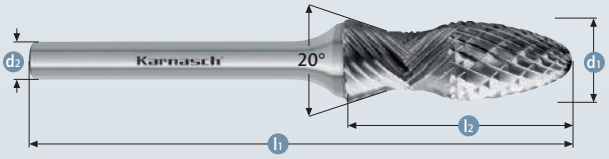
# COMBI+CURVE

**11 6023**

BLUETEC BESCHICHTET COATED

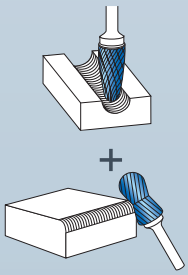
**11 4023**




Curve + Rundbogen

Curve + Ball nosed tree



Schnittdaten Cutting data 755

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6023 100 | • 12 | 35 | 6 | 80 | ✔ | – | 59,75 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4023 100 | • 12 | 35 | 6 | 80 | ✔ | – | 54,85 |

## Anwendungsbeispiele / Application examples

COMBI →

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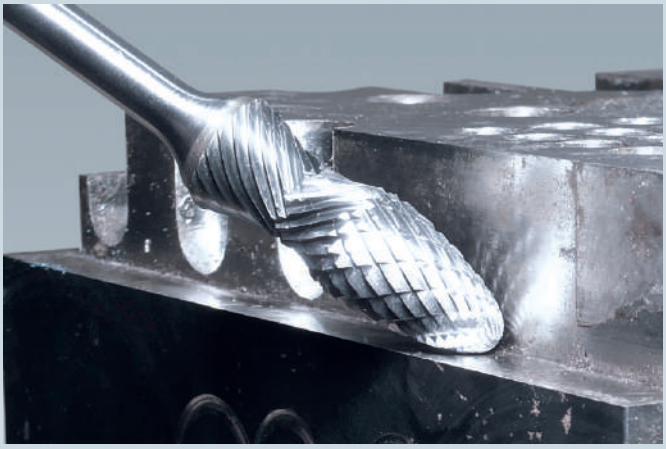


CURVE ↓



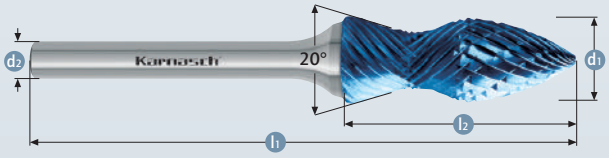


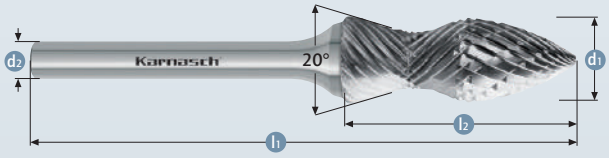


11 6024

BLUETEC BESCHICHTET COATED

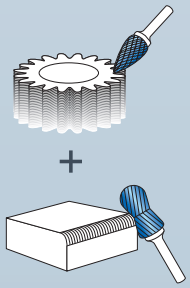
11 4024




Curve + Spitzbogen

Curve + Tree



Schnittdaten Cutting data

755

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6024 100 | • 12 | 35 | 6 | 80 | ✔ | – | 46,60 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4024 100 | • 12 | 35 | 6 | 80 | ✔ | – | 41,60 |

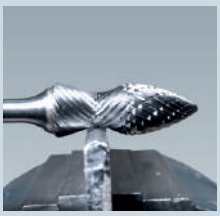
## Anwendungsbeispiele / Application examples

COMBI →



\+

CURVE ↓







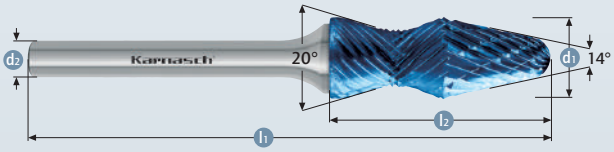


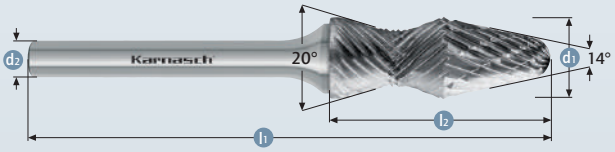
# COMBI+CURVE

**11 6025**

BLUETEC BESCHICHTET COATED

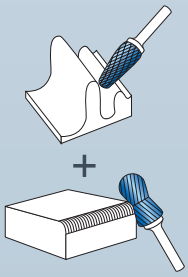
**11 4025**




Curve + Rundkegel

Curve + Ball nosed cone



Schnittdaten Cutting data 755

Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6025 100 | • 12 | 35 | 6 | 80 | ✔ | – | 49,70 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4025 100 | • 12 | 35 | 6 | 80 | ✔ | – | 44,75 |

## Anwendungsbeispiele / Application examples

COMBI →

+



CURVE ↓



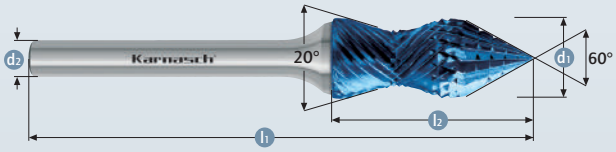


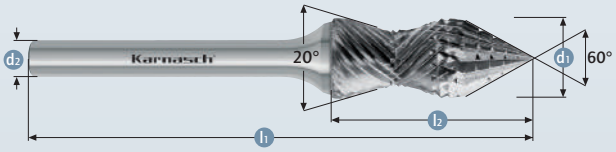


11 6026

BLUETEC BESCHICHTET COATED

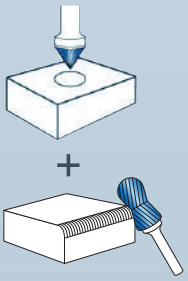
11 4026




Curve + Kegel 60°

Curve + Countersink 60°



Schnittdaten Cutting data

755

Film Movie

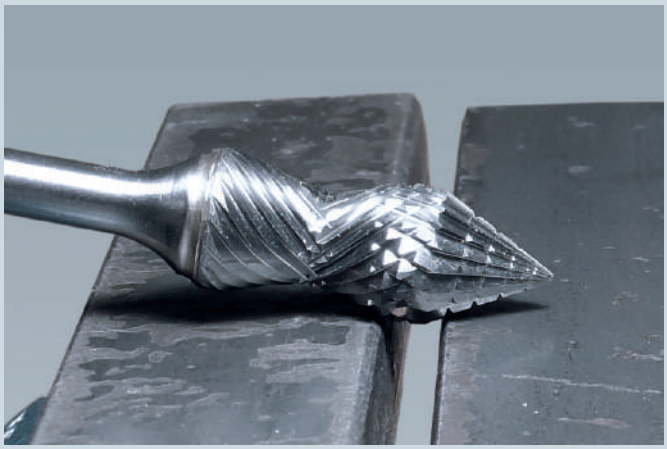
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6026 100 | • 12 | 28 | 6 | 73 | ✔ | – | 46,05 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4026 100 | • 12 | 28 | 6 | 73 | ✔ | – | 41,15 |

## Anwendungsbeispiele / Application examples

COMBI →

+



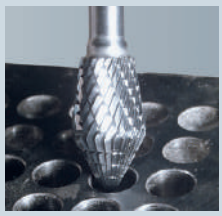
CURVE ↓







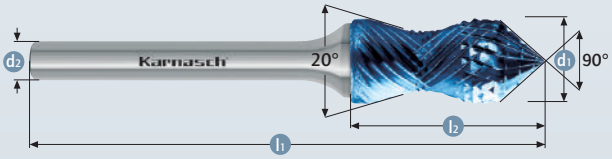




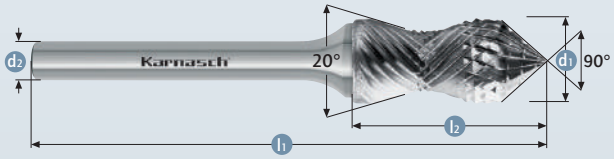
# COMBI+CURVE

**11 6027**

BLUETEC BESCHICHTET COATED

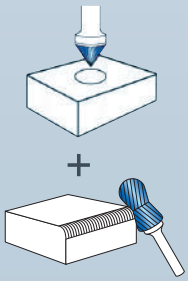



**11 4027**




Curve + Kegel 90°

Curve + Countersink 90°



Schnittdaten Cutting data

Film Movie

755

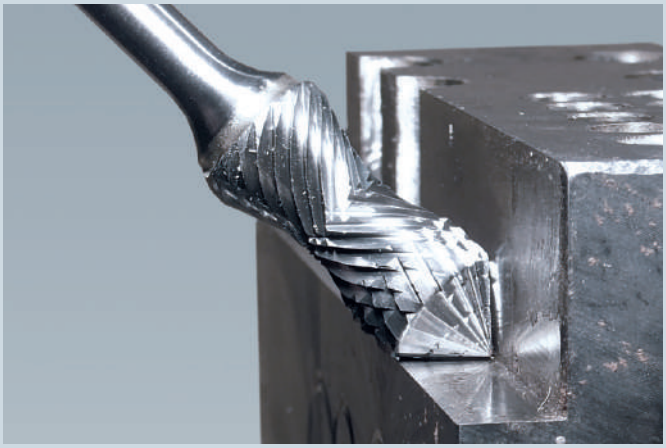
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6027 100 | • 12 | 31 | 6 | 76 | ✔ | – | 46,05 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4027 100 | • 12 | 31 | 6 | 76 | ✔ | – | 41,15 |

## Anwendungsbeispiele / Application examples

COMBI →

+



CURVE ↓









# KARNASCH PROFESSIONAL TOOLS WORLDWIDE

The rapid progress of technology always poses new challenges to companies from the metal-processing industry. It is more important for these companies to have future-orientated and reliable partner by their side who will not settle for targets achieved but provides impulses for new developments.

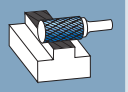
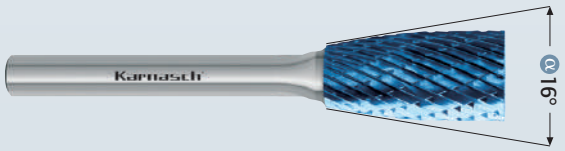
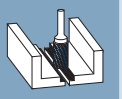
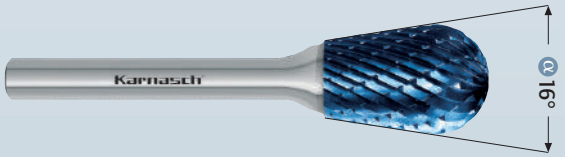
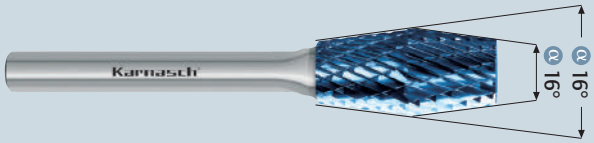
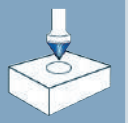
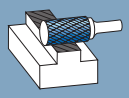
KARNASCH Professional Tools has offered an innovative and diverse product range and professional service towards its customers for more than 50 countries. The amount of know-how in our products becomes evident in daily use. Equipped with an extraordinary performance capacity, our products convince customers from all industries and around the world. Our past distinction will continue into the future with ever-new product innovations as well. You may continue to count on our excellent service.

## KARNASCH – Made for Professionals



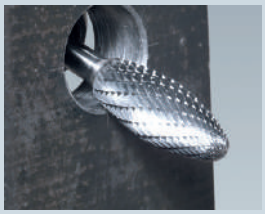

EUROPE AUSTRIA · BELGIUM · BOSNIA HERZEGOVINA · BRITISH VIRGIN ISLANDS · BULGARIA · CROATIA · CYPRUS · CZECH REPUBLIC · DENMARK · ESTONIA FAROE ISLANDS · FINLAND · FRANCE · GEORGIA · GERMANY · GREECE · HUNGARY · ICELAND · IRELAND · ITALY · KOSOVO · LATVIA · LITHUANIA · LUXEMBOURG MALTA · MOLDOVA · MONACO · MONTENEGRO · NETHERLANDS · NORWAY · POLAND · PORTUGAL · REPUBLIC OF MOLDOVA · REPUBLIC OF MACEDONIA ROMANIA · RUSSIA · SAN MARINO · SLOVAKIA · SLOVENIA · SPAIN · SWEDEN · SWITZERLAND · TURKEY · UKRAINE · UNITED KINGDOM · BELARUS · AFRICA ANGOLA · EGYPT · EQUATORIAL GUINEA · LYBIA · MOROCCO · NIGERIA · REPUBLIC OF MAURITIUS · SAUDI ARABIA · SOUTH AFRICA · UAE/UNITED ARAB EMIRATES · ASIA ARMENIA · AZERBAIJAN · CHINA · SOUTH KOREA · GEORGIA · HONG KONG · INDIA · INDONESIA · ISRAEL · JAPAN · JORDAN · KAZAKHSTAN KUWAIT · LEBANON · MALAYSIA · PHILIPPINES · QATAR · SINGAPORE · TAIWAN · THAILAND · TUNESIEN REPUBLIC · VIETNAM · SOUTH AMERICA ARGENTINIA BRAZIL · CHILE · COLOMBIA · EQUADOR · PERU · NORTH AMERICA CANADA · MEXICO · USA · CENTRAL AMERICA COSTA RICA · EL SALVADOR · OCEANIA AMERICAN SAMOA · AUSTRALIA · NEW CALEDONIA · NEW ZEALAND

# COMBI+FORM

| COMBI | | | FORM | | | |
|---|---|---|---|---|---|---|
| ZYA  | + | WKN  |   | Zylinder ohne Stirnverzahnung + Winkel | Cylinder without end cut + inverted cone | 862 |
| ZYB  | + | WKN  |   | Zylinder mit Stirnverzahnung + Winkel | Cylinder with end cut + inverted cone | 862 |
| WRC  | + | WKN  |   | Walzenrundform + Winkel | Ball nosed cylinder + inverted cone | 863 |
| WKN  | + | WKN  |   | Winkel + Winkel | Inverted cone + inverted cone | 863 |
| KSJ  | + | ZYA  |   | Kegel 60° + Zylinder | Countersink 60° + cylinder | 864 |

## Anwendungsbeispiele / Application examples







## PRODUKTBESCHREIBUNG:

Die neuen **COMBI+FORM** Frässtifte bieten ein Maß an noch nie zuvor gesehener Vielseitigkeit.

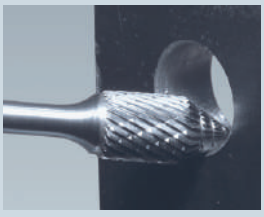
**COMBI+FORM** Frässtifte sind hervorragend geeignet zum Nachbearbeiten vom komplexen Werkstücken.
Durch die Zusammenführung von verschiedenen Formen, werden Rüstkosten minimiert. Zeitaufwendige Werkzeugwechsel, Kauf weiterer Formen wird vermieden.
Entgraten, Kanten-, sowie verschiedenartigste Multifunktionsarbeiten sind mit nur einem Werkzeug möglich.

Die **COMBI+FORM** Frässtifte sind geeignet für eine Vielzahl von Metallen und Stahlsorten wie: Gusseisen, Stahl <60 HRC, Edelstahl (INOX), Nickelbasis- und Titanlegierungen, Kupfer, Messing und Bronze

| COMBI | | | | FORM | | | |
|---|---|---|---|---|---|---|---|
| KSK | + | ZYA | | Karnasch 90° | Kegel 90° + Zylinder | Countersink 90° + cylinder | 864 |
| KSJ | + | WKN | | Karnasch 60° 16° | Kegel 60° + Winkel | Countersink 60° + inverted cone | 865 |
| – | | – | | Karnasch 90° | Kegel + Kegel | Countersink + Countersink | 866 |

## Anwendungsbeispiele / Application examples







### PRODUCT DESCRIPTION:

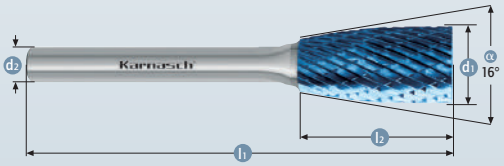
**COMBI+FORM** versatility to suit almost any application
Just like any multi-tool in the DIY sector, there is now high performance multipurpose burrs for the industry. The **COMBI+FORM** line has been developed to reduce downtime and cover multi-application processes for metal removal. These exclusive new shapes will cover your deburring, edging and blending work in one simple burr solution. This range is ideal for complex parts where different shapes are required. The **COMBI+FORM** will maximise your productivity.

**Features and benefits**
- Reduced downtime for end user
- Special tooth geometry manufactured using the latest CNC machines
- The highest quality sintered tungsten carbide is used to ensure consistent performance
- A versatile burr to be used on a wide range of materials and processes

Can be used on a wide variety of material e.g. cast iron, steel <60 HRC, stainless steel (INOX), nickel-based and titanium alloys, copper, brass and bronze

## 11 6051

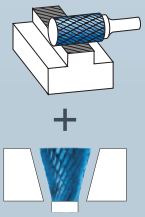
BLUETEC BESCHICHTET COATED




FORM / SHAPE **ZYA / WKN**

Zylinder ohne Stirnverzahnung + Winkel

Cylinder without end cut + inverted cone

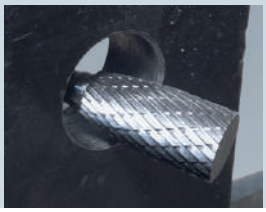


Schnittdaten Cutting data 755

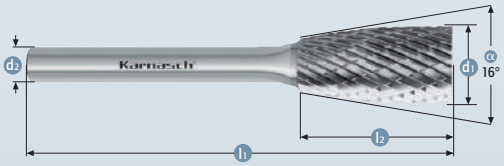
Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6051 100 | % 12 | 25 | 6 | 70 | | | 24,45 |

Anwendungsbeispiele Application examples

## 11 4051

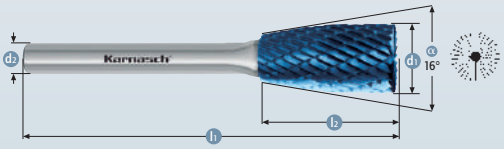



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4051 100 | % 12 | 25 | 6 | 70 | | | 21,85 |




## 11 6052

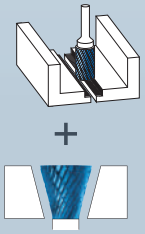
BLUETEC BESCHICHTET COATED




FORM / SHAPE **ZYB / WKN**

Zylinder mit Stirnverzahnung + Winkel

Cylinder with end cut + inverted cone

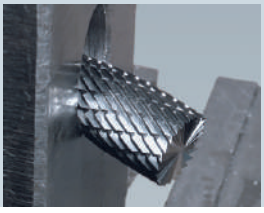


Schnittdaten Cutting data 755

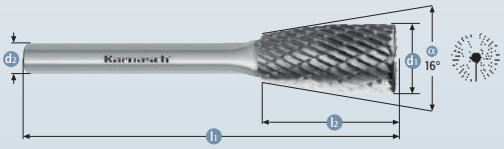
Film Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6052 100 | % 12 | 25 | 6 | 70 | | | 26,65 |

Anwendungsbeispiele Application examples




## 11 4052

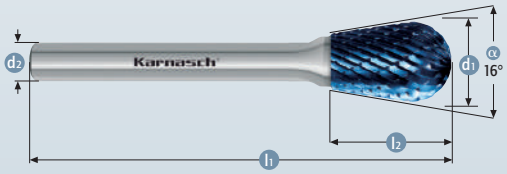



| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4052 100 | % 12 | 25 | 6 | 70 | | | 24,05 |




## 11 6053

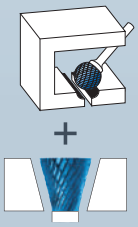
BLUETEC BESCHICHTET COATED



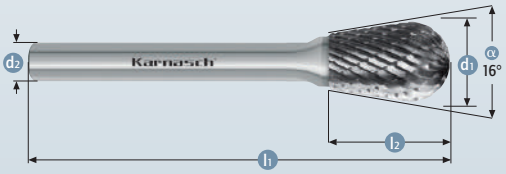

FORM / SHAPE **WRC / WKN**

Walzenrundform + Winkel

Ball nosed cylinder + inverted cone



## 11 4053




Schnittdaten Cutting data | Film Movie

755

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6053 100 | % 12 | 20 | 6 | 65 | | | 19,85 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4053 100 | % 12 | 20 | 6 | 65 | | | 17,30 |

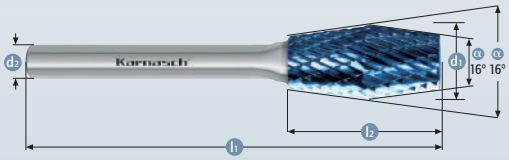
**Anwendungsbeispiele**
**Application examples**






## 11 6058

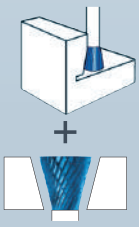
BLUETEC BESCHICHTET COATED



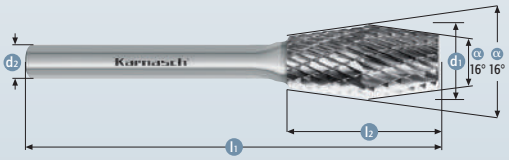

FORM / SHAPE **WKN / WKN**

Winkel + Winkel

Inverted cone + inverted cone



## 11 4058




Schnittdaten Cutting data | Film Movie

755

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6058 100 | % 12 | 25 | 6 | 70 | | | 31,30 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4058 100 | % 12 | 25 | 6 | 70 | | | 28,70 |

**Anwendungsbeispiele**
**Application examples**

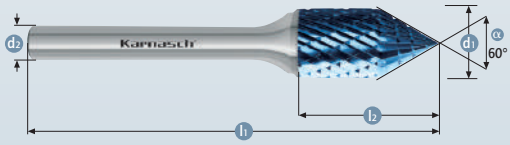





% Sonderpreis / Sale Artikel. Lieferbar solange Vorrat.
Special price / sale article. While stocks last.

## 11 6059

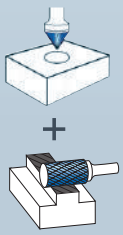
BLUETEC BESCHICHTET COATED




FORM / SHAPE **KSJ / ZYA**

Kegel 60° + Zylinder

Countersink 60° + cylinder

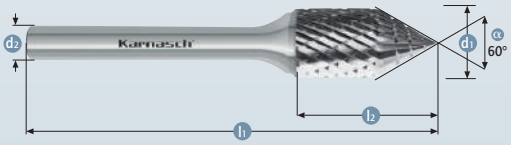


Schnittdaten Cutting data | Film Movie

755

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6059 100 | % 12 | 25 | 6 | 70 | | | 21,50 |

## 11 4059




| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4059 100 | % 12 | 25 | 6 | 70 | | | 18,95 |

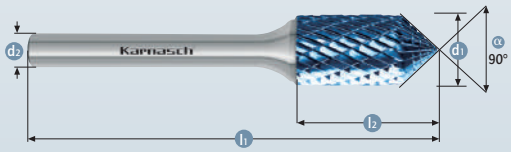
Anwendungsbeispiele Application examples






## 11 6060

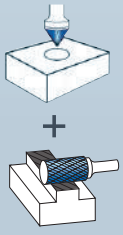
BLUETEC BESCHICHTET COATED




FORM / SHAPE **KSK / ZYA**

Kegel 90° + Zylinder

Countersink 90° + cylinder

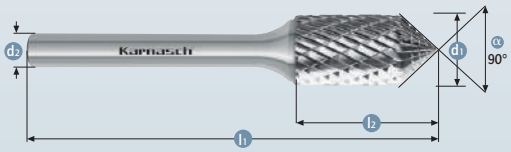


Schnittdaten Cutting data | Film Movie

755

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6060 100 | % 12 | 25 | 6 | 70 | | | 19,55 |

## 11 4060




| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4060 100 | % 12 | 25 | 6 | 70 | | | 16,95 |

Anwendungsbeispiele Application examples

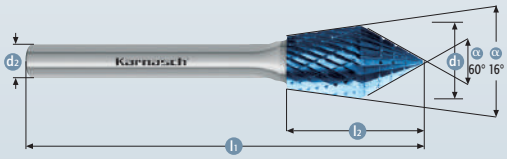




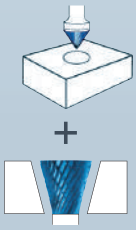

11 6061

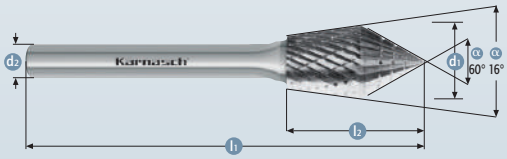
11 4061

BLUETEC BESCHICHTET COATED




| FORM / SHAPE | KSJ / WKN |
|---|---|
| Kegel 60° + Winkel | |
| Countersink 60° + inverted cone | |






Schnittdaten Cutting data 755

Film Movie

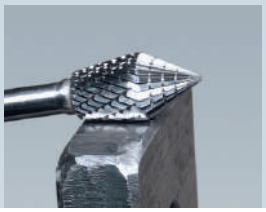
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6061 100 | % 12 | 23 | 6 | 68 | | | 19,55 |

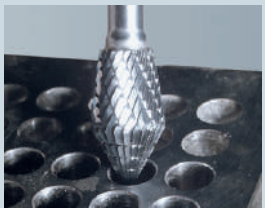
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4061 100 | % 12 | 23 | 6 | 68 | | | 16,95 |

Anwendungsbeispiele
Application examples









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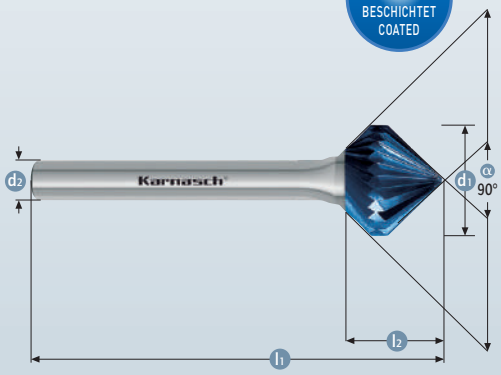
Special price / sale article. While stocks last.

## 11 6063

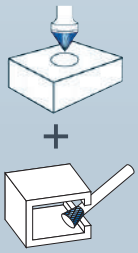
BLUETEC BESCHICHTET COATED



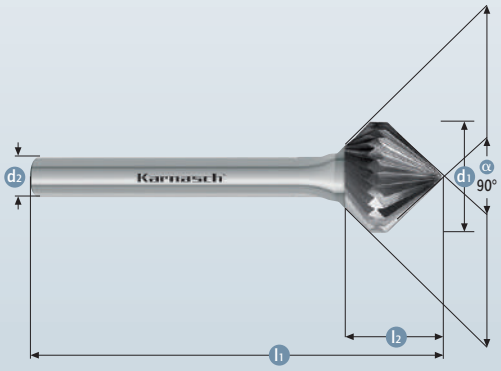

FORM / SHAPE **KSK / KSK**

Kegel 90° + Kegel 90°

Countersink 90° + countersink 90°



## 11 4063




Schnittdaten / Cutting data — 755

Film / Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 6063 100 | • 16 | 15 | 6 | 60 | | | 52,30 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|
| 11 4063 100 | • 16 | 15 | 6 | 60 | | | 47,40 |

**Anwendungsbeispiele**
**Application examples**



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## Anwendungsbeispiele / Application examples







## Reifenreparatur

Frässtifte für exakte Schadensbearbeitung an Radial und Diagonalreifen.

Geeignet für Reparaturen an Autoreifen, LKW Reifen, Reifen für Fahrzeuge in der Landwirtschaft sowie Baufahrzeugreifen.

Die speziell angepasste Schneidgeometrie ermöglicht eine saubere und Professionelle Bearbeitung des Lochkanals.

## Vorgehensweise – Bearbeiten des Lochkanals

Mit einem Vorstecher ist der Verlauf des Lochkanals von innen nach außen festzustellen. Somit wird die Schadensgröße innen und außen am Reifen gemessen (max. 6 mm).

Der Lochkanal wird mit einem **passenden Frässtift** zuerst von innen nach außen und dann von außen nach innen bearbeitet und gesäubert.

Hierbei ist besonders darauf zu achten, dass der Schadenskanal genau durchdrungen wird, ohne den Schaden zu vergrößern, intakte Cordseile nicht verletzt werden und eine Aufweitung/Lösung des umliegenden Gewerbes vermieden wird.

Werden hierbei weiterreichende Schäden wie Rostbildung oder Lösung festgestellt, muss der Reifen einer nochmaligen Prüfung auf die Reparaturfähigkeit mit vorgefertigten Reparaturkörpern unterzogen werden.

## Tyre repair

Rotating mills for precise damage processing at radial and diagonal tyres.

Suitable for repairs to car tyres, truck tyres, tyres for agricultural vehicles and construction vehicle tyres.

The specifically adjusted cutting geometry permits clean and professional processing of the hole channel.

## Procedure – Processing the hole channel

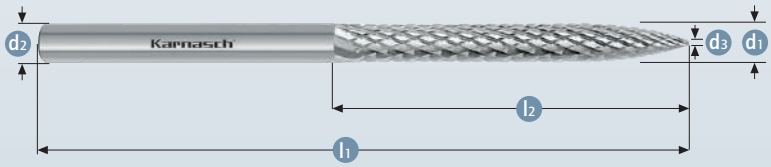
The course of the hole channel from the inside out is to be determined with a pricking awl. This measures the damage size on the inside and the outside of the tyre (max. 6 mm).

The hole channel is first processed and cleaned with a **matching rotating mill** from the inside outwards and then from the outside inwards.

For this, it must be particularly observed that the damage channel is penetrated precisely without enlarging the damage, that intact cord ropes are not damaged and that expansion/loosening of the surrounding tissue is avoided.

If further damage such as rust formation or loosening is found, the tyre must be inspected again for the possibility of repair with prefabricated repair elements.

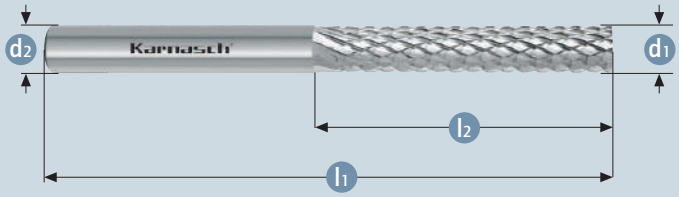
## 11 4070




| | |
|---|---|
| Geeignet für:<br>Suitable for: |  |
| Drehzahl:<br>Rotational speed: | 2500 U/min |

| Art. | d1 | d3 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 4070 100 | % 3 | 0,4 | 25 | 3 | 50 | | ✔ | 9,05 |

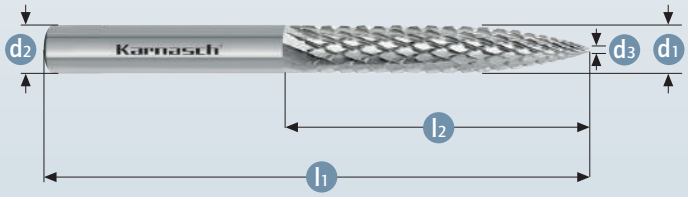
## 11 4071




| | |
|---|---|
| Geeignet für:<br>Suitable for: |  |
| Drehzahl:<br>Rotational speed: | 2500 U/min |

| Art. | d1 | d3 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 4071 100 | % 6 | – | 35 | 6 | 65 | | ✔ | 17,20 |

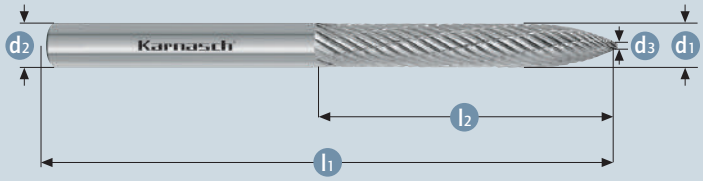
## 11 4072




| | |
|---|---|
| Geeignet für:<br>Suitable for: |  |
| Drehzahl:<br>Rotational speed: | max. 2500 U/min |

| Art. | d1 | d3 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|

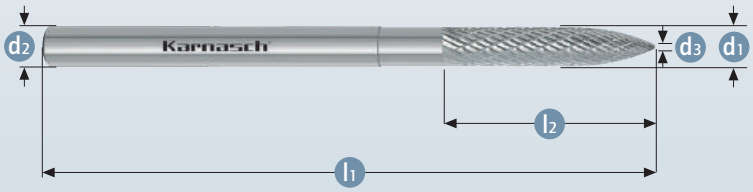
## 11 4073




| | |
|---|---|
| Geeignet für:<br>Suitable for: |  |
| Drehzahl:<br>Rotational speed: | max. 2500 U/min |

| Art. | d1 | d3 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|

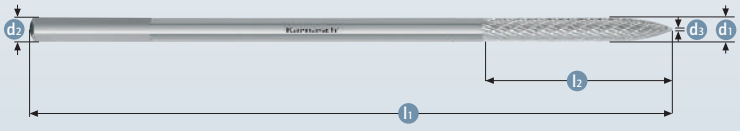
## 11 4074




| | |
|---|---|
| Geeignet für:<br>Suitable for: |  |
| Drehzahl:<br>Rotational speed: | 2500 U/min |

| Art. | | d1 | d3 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|---|
| 11 4074 100 | % | 10 | 0,75 | 50 | 10 | 110 | ✔ | | 32,10 |

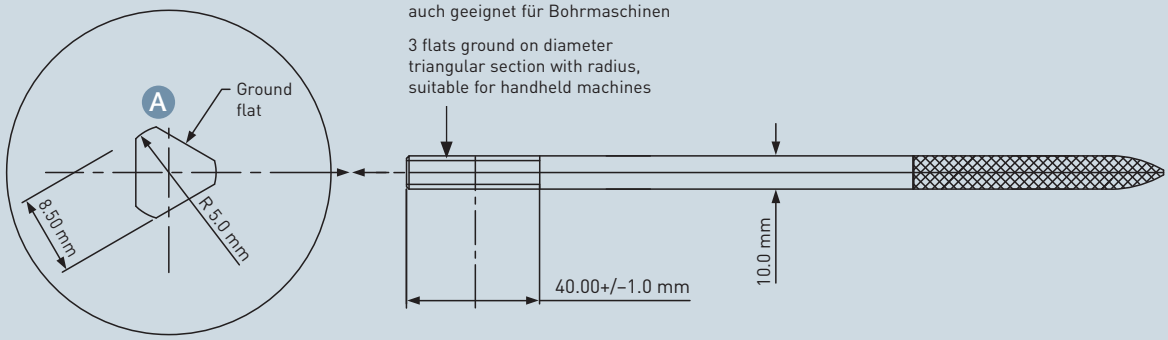
## 11 4075




| | |
|---|---|
| Geeignet für:<br>Suitable for: |  |
| Drehzahl:<br>Rotational speed: | 2500 U/min |

3 Flächen am Schaftende, dreieckiger Querschnitt mit Radius, auch geeignet für Bohrmaschinen

3 flats ground on diameter triangular section with radius, suitable for handheld machines




| Art. | | d1 | d3 | l2 | d2 + A | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|---|
| 11 4075 100 | % | 10 | 0,75 | 75 | 10<br>+ 3 Flächen<br>+ 3 flats | 250 | ✔ | | 94,35 |

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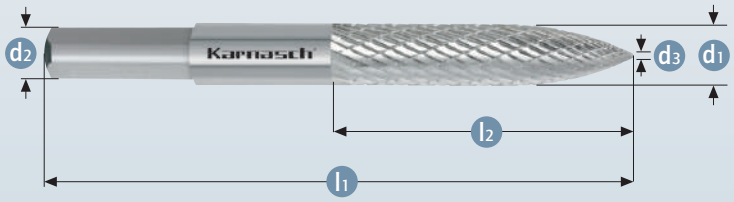
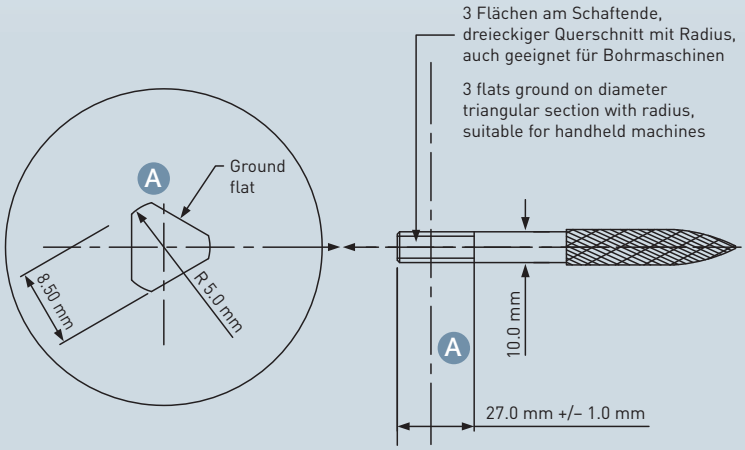
## 11 4076

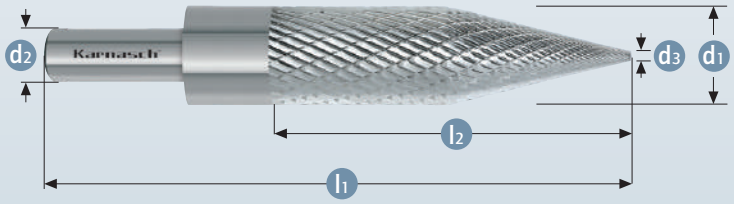



| | |
|---|---|
| Geeignet für:<br>Suitable for: |  |
| Drehzahl:<br>Rotational speed: | max. 2500 U/min |

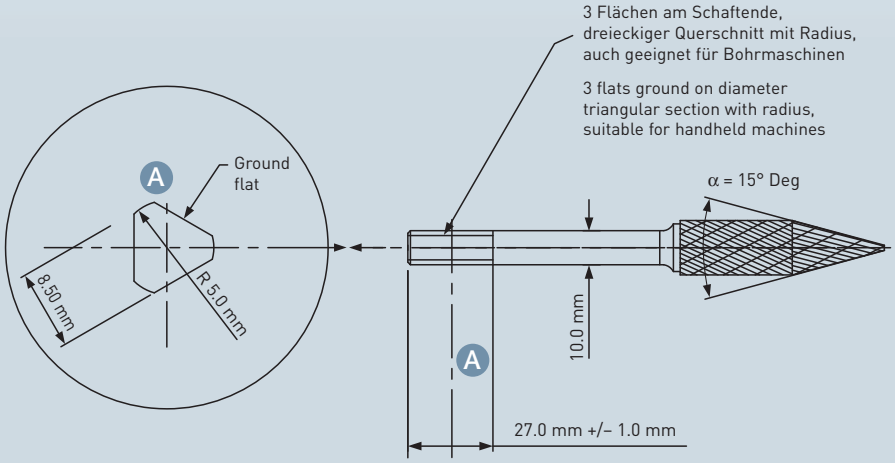



| Art. | d1 | d3 | l2 | d2 + A | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 4076 100 | % 12 | 0,8 | 55 | 10<br>+ 3 Flächen<br>+ 3 flats | 110 | ✔ | | 57,25 |

## 11 4077

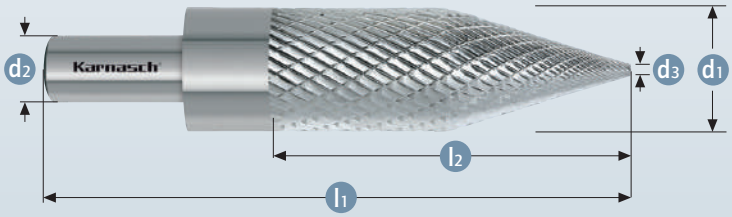



| | |
|---|---|
| Geeignet für:<br>Suitable for: |  |
| Drehzahl:<br>Rotational speed: | max. 2500 U/min |

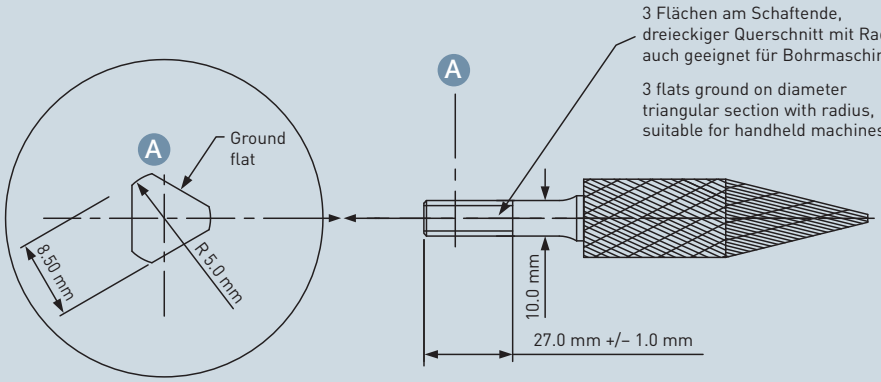



| Art. | d1 | d3 | l2 | d2 + A | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 4077 100 | % 16 | 1,5 | 60 | 10<br>+ 3 Flächen<br>+ 3 flats | 140 | ✔ | | 134,05 |

## 11 4078



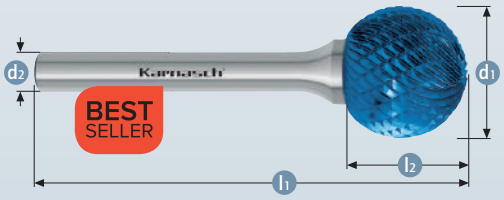

| | |
|---|---|
| Geeignet für:<br>Suitable for: |  |
| Drehzahl:<br>Rotational speed: | max. 2500 U/min |




| Art. | | d1 | d3 | l2 | d2 + A | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|---|
| 11 4078 100 | % | 22 | 2,2 | 80 | 10<br>+ 3 Flächen<br>+ 3 flats | 125 | ✔ | | 203,55 |

## 11 5031

BLUETEC BESCHICHTET COATED



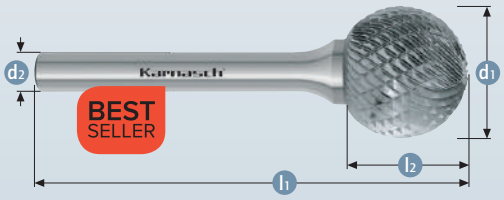

**D** FORM / SHAPE **KUD**

Kugel

Ball

| | |
|---|---|
| Geeignet für:<br>Suitable for: |  |
| Drehzahl:<br>Rotational speed: | max. 2500 U/min |

## 11 3031




Schnittdaten Cutting data 755

Film Movie

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 5031 105 | • | 20 | 16,5 | 6 | 62 | ✔ | | 29,85 |

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|---|---|---|---|---|---|---|---|---|
| 11 3031 105 | • | 20 | 16,5 | 6 | 62 | ✔ | | 24,35 |

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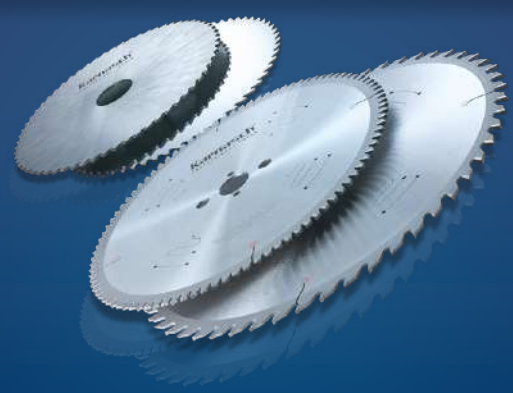

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www.grampelhuber.at

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# SETS · DISPLAYS

SETS · DISPLAYS

GERMAN QUALITY PRODUCT

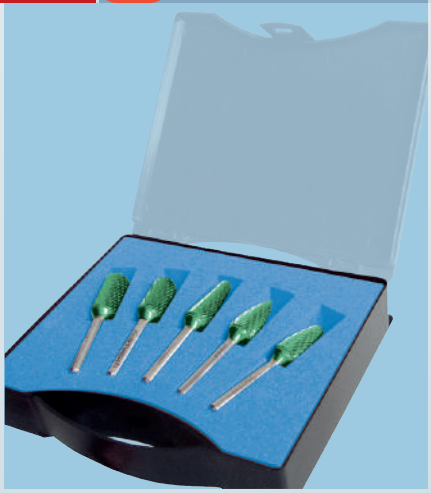


5.4

## 11 4964

BEST SELLER

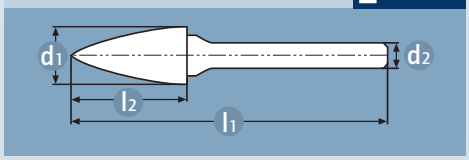
€ 108,10



5 Stück

5 pieces

Film
Movie



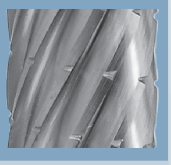

BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

GREENTEC BESCHICHTET COATED

### HP-3 Pro Performance 82



Zahnung
Cut



| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | Inhalt \| Contents |
|---|---|---|---|---|---|---|---|
| 11 6091 030 | • 10 | 20 | 6 | 65 | B | ZYB | 1× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| 11 6092 030 | • 10 | 20 | 6 | 65 | C | WRC | 1× Walzenrundform<br>Ball nosed cylinder |
| 11 6095 030 | • 10 | 20 | 6 | 65 | F | RBF | 1× Rundbogen<br>Ball nosed tree |
| 11 6096 030 | • 10 | 20 | 6 | 65 | G | SPG | 1× Spitzbogen<br>Tree |
| 11 6098 030 | • 10 | 20 | 6 | 65 | L | KEL | 1× Rundkegel<br>Ball nosed cone |

## 11 4964 U

BEST SELLER

€ 88,95



BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 |
|---|---|---|---|---|
| 11 4091 030 | • 10 | 20 | 6 | 65 |
| 11 4092 030 | • 10 | 20 | 6 | 65 |
| 11 4095 030 | • 10 | 20 | 6 | 65 |
| 11 4096 030 | • 10 | 20 | 6 | 65 |
| 11 4098 030 | • 10 | 20 | 6 | 65 |

## 11 4947

Leeres Set / Empty set

€ 9,50



**Sie wollen einen anderen Inhalt? Kein Problem!** Wählen Sie aus unserem Gesamtsortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

**Would you like a display of mini-burrs? No problem!** Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

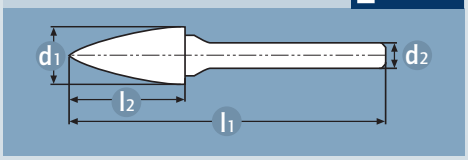
**11 4966** BEST SELLER € 148,40



5 Stück

5 pieces

Film
Movie




BEST SELLER € 128,65 **11 4966 U**



BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

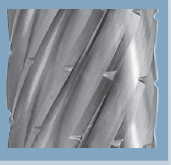
GREENTEC BESCHICHTET COATED

BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

## HP-3 Pro Performance 82



Zahnung
Cut



| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | Inhalt \| Contents |
|---|---|---|---|---|---|---|---|
| 11 6091 040 | • 12 | 25 | 6 | 70 | B | ZYB | 1× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| 11 6092 040 | • 12 | 25 | 6 | 70 | C | WRC | 1× Walzenrundform<br>Ball nosed cylinder |
| 11 6095 040 | • 12 | 25 | 6 | 70 | F | RBF | 1× Rundbogen<br>Ball nosed tree |
| 11 6096 040 | • 12 | 25 | 6 | 70 | G | SPG | 1× Spitzbogen<br>Tree |
| 11 6098 040 | • 12 | 25 | 6 | 70 | L | KEL | 1× Rundkegel<br>Ball nosed cone |

| Art. | d1 | l2 | d2 | l1 |
|---|---|---|---|---|
| 11 4091 040 | • 12 | 25 | 6 | 70 |
| 11 4092 040 | • 12 | 25 | 6 | 70 |
| 11 4095 040 | • 12 | 25 | 6 | 70 |
| 11 4096 040 | • 12 | 25 | 6 | 70 |
| 11 4098 040 | • 12 | 25 | 6 | 70 |

**Sie wollen einen anderen Inhalt? Kein Problem!** Wählen Sie aus unserem Gesamtsortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

**Would you like a display of mini-burrs? No problem!** Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.



**11 4947**
Leeres Set / Empty set
€ 9,50

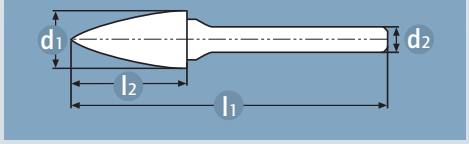
**11 4918** BEST SELLER € 98,65



5 Stück

5 pieces

Film
Movie




BEST SELLER € 75,30 **11 4918 U**

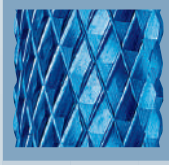
VALUETOOL € 59,65 **11 4919 U**



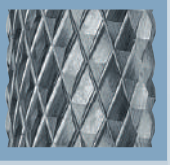
BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

BLUETEC BESCHICHTET COATED

## Universal HP-3



Zahnung
Cut



| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | Inhalt \| Contents |
|---|---|---|---|---|---|---|---|
| 11 5011 085 | • 10 | 20 | 6 | 65 | B | ZYB | 1× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| 11 5021 085 | • 10 | 20 | 6 | 65 | C | WRC | 1× Walzenrundform<br>Ball nosed cylinder |
| 11 5051 040 | • 10 | 20 | 6 | 65 | F | RBF | 1× Rundbogen<br>Ball nosed tree |
| 11 5061 045 | • 10 | 20 | 6 | 65 | G | SPG | 1× Spitzbogen<br>Tree |
| 11 5081 035 | • 10 | 30 | 6 | 75 | L | KEL | 1× Rundkegel<br>Ball nosed cone |

BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

VALUETOOL

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|---|---|---|---|---|---|
| 11 3011 085 | 11 3011 086 | • 10 | 20 | 6 | 65 |
| 11 3021 085 | 11 3021 086 | • 10 | 20 | 6 | 65 |
| 11 3051 040 | 11 3051 041 | • 10 | 20 | 6 | 65 |
| 11 3061 045 | 11 3061 046 | • 10 | 20 | 6 | 65 |
| 11 3081 035 | 11 3081 031 | • 10 | 30<br>20 | 6 | 75<br>65 |

**11 4947**

Leeres Set / Empty set

€ 9,50



**Sie wollen einen anderen Inhalt? Kein Problem!** Wählen Sie aus unserem Gesamtsortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

**Would you like a display of mini-burrs? No problem!** Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

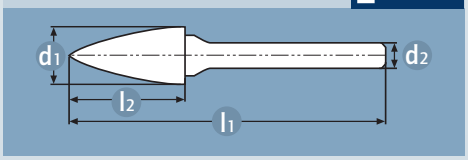
**11 4926** BEST SELLER € 124,80



5 Stück

5 pieces

Film
Movie




BEST SELLER € 103,80 **11 4926 U**

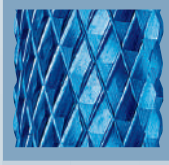
VALUETOOL € 73,95 **11 4927 U**



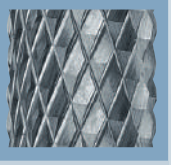
BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

BLUETEC BESCHICHTET COATED

## Universal HP-3



Zahnung
Cut



BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

VALUETOOL

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | Inhalt \| Contents |
|---|---|---|---|---|---|---|---|
| 11 5011 100 | • 12 | 25 | 6 | 70 | B | ZYB | 1× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| 11 5021 105 | • 12 | 25 | 6 | 70 | C | WRC | 1× Walzenrundform<br>Ball nosed cylinder |
| 11 5051 050 | • 12 | 25 | 6 | 70 | F | RBF | 1× Rundbogen<br>Ball nosed tree |
| 11 5061 060 | • 12 | 25 | 6 | 70 | G | SPG | 1× Spitzbogen<br>Tree |
| 11 5081 045 | • 12 | 25 | 6 | 77 | L | KEL | 1× Rundkegel<br>Ball nosed cone |

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|---|---|---|---|---|---|
| 11 3011 100 | 11 3011 104 | • 12 | 25 | 6 | 70 |
| 11 3021 105 | 11 3021 108 | • 12 | 25 | 6 | 70 |
| 11 3051 050 | 11 3051 054 | • 12 | 25 | 6 | 70 |
| 11 3061 060 | 11 3061 064 | • 12 | 25 | 6 | 70 |
| 11 3081 045 | 11 3081 048 | • 12 | 32<br>25 | 6 | 77<br>70 |

**Sie wollen einen anderen Inhalt? Kein Problem!** Wählen Sie aus unserem Gesamtsortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

**Would you like a display of mini-burrs? No problem!** Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.



**11 4947**
Leeres Set / Empty set
€ 9,50

# DIN NORM FRÄSSTIFT-SETS Ø 12 MM, SCHAFT 6 MM, ZU SONDERPREISEN!
# DIN STANDARD BURR SETS Ø 12 MM, SHANK 6 MM AT SPECIAL PRICES!

**11 4907** BEST SELLER **€ 115,45**

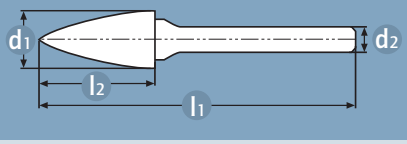
DIN



5 Stück

5 pieces

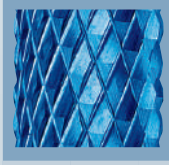
Film
Movie



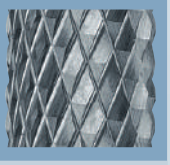

BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

BLUETEC BESCHICHTET COATED

## Universal HP-3



Zahnung
Cut



| Art. | | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | Inhalt \| Contents |
|---|---|---|---|---|---|---|---|---|
| 11 5011 103 | • | 12,0 DIN | 25 | 6 | 70 | B | ZYB | 1× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| 11 5021 107 | • | 12,0 DIN | 25 | 6 | 70 | C | WRC | 1× Walzenrundform<br>Ball nosed cylinder |
| 11 5051 053 | • | 12,0 DIN | 25 | 6 | 70 | F | RBF | 1× Rundbogen<br>Ball nosed tree |
| 11 5061 063 | • | 12,0 DIN | 25 | 6 | 70 | G | SPG | 1× Spitzbogen<br>Tree |
| 11 5081 047 | • | 12,0 DIN | 25 | 6 | 70 | L | KEL | 1× Rundkegel<br>Ball nosed cone |

BEST SELLER **€ 94,40** **11 4907 U**

DIN



BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

| Art. | | d1 | l2 | d2 | l1 |
|---|---|---|---|---|---|
| 11 3011 103 | • | 12,0 DIN | 25 | 6 | 70 |
| 11 3021 107 | • | 12,0 DIN | 25 | 6 | 70 |
| 11 3051 053 | • | 12,0 DIN | 25 | 6 | 70 |
| 11 3061 063 | • | 12,0 DIN | 25 | 6 | 70 |
| 11 3081 047 | • | 12,0 DIN | 25 | 6 | 70 |

**11 4947**

Leeres Set / Empty set

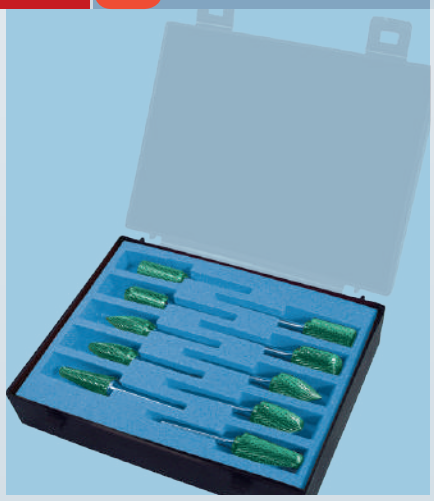
€ 9,50



**Sie wollen einen anderen Inhalt? Kein Problem!** Wählen Sie aus unserem Gesamtsortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

**Would you like a display of mini-burrs? No problem!** Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

**11 4968** BEST SELLER € 248,15

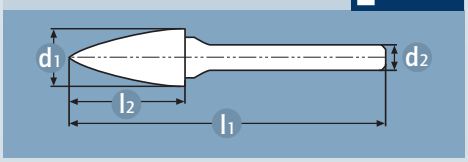


BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

GREENTEC BESCHICHTET COATED

10 Stück
10 pieces

Film
Movie




BEST SELLER € 209,25 **11 4968 U**

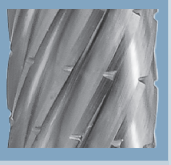


BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

## HP-3 Pro Performance 82



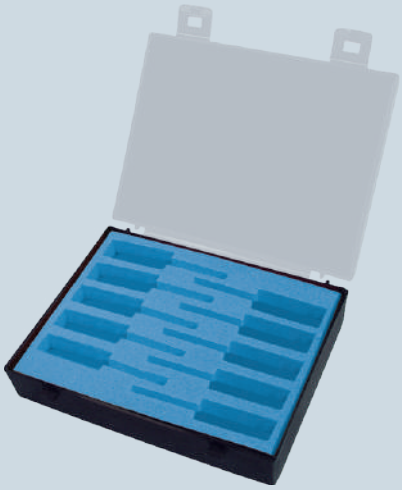
Zahnung
Cut



| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | Inhalt \| Contents |
|---|---|---|---|---|---|---|---|
| 11 6091 030 | • 10 | 20 | 6 | 65 | B | ZYB | 1× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| 11 6092 030 | • 10 | 20 | 6 | 65 | C | WRC | 1× Walzenrundform<br>Ball nosed cylinder |
| 11 6095 030 | • 10 | 20 | 6 | 65 | F | RBF | 1× Rundbogen<br>Ball nosed tree |
| 11 6096 030 | • 10 | 20 | 6 | 65 | G | SPG | 1× Spitzbogen<br>Tree |
| 11 6098 030 | • 10 | 20 | 6 | 65 | L | KEL | 1× Rundkegel<br>Ball nosed cone |
| 11 6091 040 | • 12 | 25 | 6 | 70 | B | ZYB | 1× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| 11 6092 040 | • 12 | 25 | 6 | 70 | C | WRC | 1× Walzenrundform<br>Ball nosed cylinder |
| 11 6095 040 | • 12 | 25 | 6 | 70 | F | RBF | 1× Rundbogen<br>Ball nosed tree |
| 11 6096 040 | • 12 | 25 | 6 | 70 | G | SPG | 1× Spitzbogen<br>Tree |
| 11 6098 040 | • 12 | 25 | 6 | 77 | L | KEL | 1× Rundkegel<br>Ball nosed cone |

| Art. | d1 | l2 | d2 | l1 |
|---|---|---|---|---|
| 11 4091 030 | • 10 | 20 | 6 | 65 |
| 11 4092 030 | • 10 | 20 | 6 | 65 |
| 11 4095 030 | • 10 | 20 | 6 | 65 |
| 11 4096 030 | • 10 | 20 | 6 | 65 |
| 11 4098 030 | • 10 | 20 | 6 | 65 |
| 11 4091 040 | • 12 | 25 | 6 | 70 |
| 11 4092 040 | • 12 | 25 | 6 | 70 |
| 11 4095 040 | • 12 | 25 | 6 | 70 |
| 11 4096 040 | • 12 | 25 | 6 | 70 |
| 11 4098 040 | • 12 | 25 | 6 | 77 |

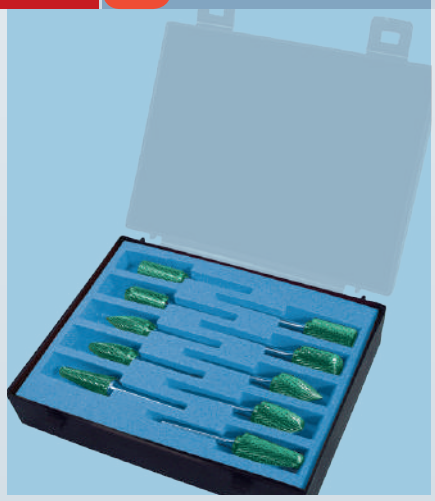
**11 4950**
Leeres Set / Empty set
€ 9,50



**Sie wollen einen anderen Inhalt? Kein Problem!** Wählen Sie aus unserem Gesamtsortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

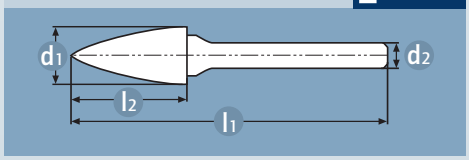
**Would you like a display of mini-burrs? No problem!** Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

**11 4970** BEST SELLER € 290,55



10 Stück
10 pieces

Film
Movie




BEST SELLER € 251,10 **11 4970 U**



BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

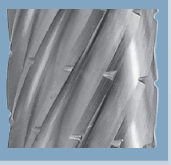
GREENTEC BESCHICHTET COATED

BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

## HP-3 Pro Performance 82



Zahnung
Cut



| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | Inhalt \| Contents |
|---|---|---|---|---|---|---|---|
| 11 6090 040 | • 12 | 25 | 6 | 70 | A | ZYA | 1× Zylinder ohne Stirnverzahnung<br>Cylinder without end cut |
| 11 6091 040 | • 12 | 25 | 6 | 70 | B | ZYB | 1× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| 11 6092 040 | • 12 | 25 | 6 | 70 | C | WRC | 1× Walzenrundform<br>Ball nosed cylinder |
| 11 6093 040 | • 12 | 11 | 6 | 56 | D | KUD | 1× Kugel<br>Ball |
| 11 6094 040 | • 12 | 21 | 6 | 66 | E | TRE | 1× Tropfen<br>Oval |
| 11 6095 040 | • 12 | 25 | 6 | 70 | F | RBF | 1× Rundbogen<br>Ball nosed tree |
| 11 6096 040 | • 12 | 25 | 6 | 70 | G | SPG | 1× Spitzbogen<br>Tree |
| 11 6097 040 | • 12 | 30 | 6 | 75 | H | – | 1× Flamme<br>Flame |
| 11 6098 040 | • 12 | 25 | 6 | 70 | L | KEL | 1× Rundkegel<br>Ball nosed cone |
| 11 6099 040 | • 12 | 25 | 6 | 70 | M | SKM | 1× Spitzkegel<br>Cone |

| Art. | d1 | l2 | d2 | l1 |
|---|---|---|---|---|
| 11 4090 040 | • 12 | 25 | 6 | 70 |
| 11 4091 040 | • 12 | 25 | 6 | 70 |
| 11 4092 040 | • 12 | 25 | 6 | 70 |
| 11 4093 040 | • 12 | 11 | 6 | 56 |
| 11 4094 040 | • 12 | 21 | 6 | 66 |
| 11 4095 040 | • 12 | 25 | 6 | 70 |
| 11 4096 040 | • 12 | 25 | 6 | 70 |
| 11 4097 040 | • 12 | 30 | 6 | 75 |
| 11 4098 040 | • 12 | 25 | 6 | 70 |
| 11 4099 040 | • 12 | 25 | 6 | 70 |

**11 4950**
Leeres Set / Empty set
€ 9,50



**Sie wollen einen anderen Inhalt? Kein Problem!** Wählen Sie aus unserem Gesamtsortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

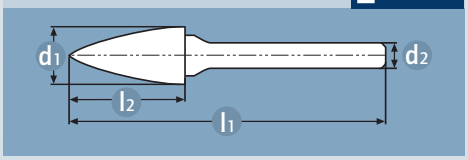
**Would you like a display of mini-burrs? No problem!** Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

**11 4934** BEST SELLER € 216,30



10 Stück
10 pieces

Film
Movie




BEST SELLER € 171,95 **11 4934 U**

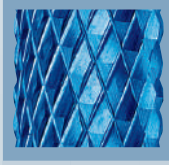
VALUETOOL € 126,45 **11 4935 U**



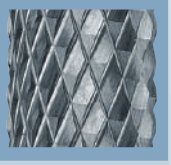
BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

BLUETEC BESCHICHTET COATED

## Universal HP-3



Zahnung
Cut



BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

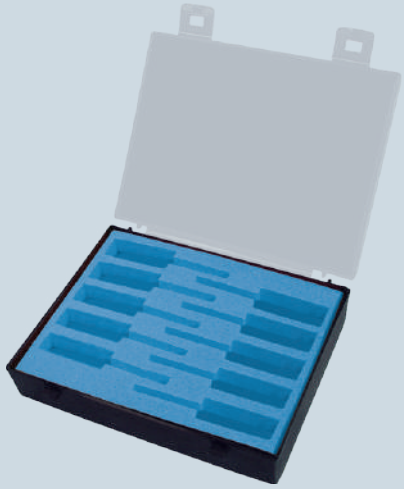
VALUETOOL

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | Inhalt \| Contents |
|---|---|---|---|---|---|---|---|
| 11 5011 085 | • 10 | 20 | 6 | 65 | B | ZYB | 1× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| 11 5021 085 | • 10 | 20 | 6 | 65 | C | WRC | 1× Walzenrundform<br>Ball nosed cylinder |
| 11 5051 040 | • 10 | 20 | 6 | 65 | F | RBF | 1× Rundbogen<br>Ball nosed tree |
| 11 5061 045 | • 10 | 20 | 6 | 65 | G | SPG | 1× Spitzbogen<br>Tree |
| 11 5081 035 | • 10 | 30 | 6 | 75 | L | KEL | 1× Rundkegel<br>Ball nosed cone |
| 11 5011 100 | • 12 | 25 | 6 | 70 | B | ZYB | 1× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| 11 5021 105 | • 12 | 25 | 6 | 70 | C | WRC | 1× Walzenrundform<br>Ball nosed cylinder |
| 11 5051 050 | • 12 | 25 | 6 | 70 | F | RBF | 1× Rundbogen<br>Ball nosed tree |
| 11 5061 060 | • 12 | 25 | 6 | 70 | G | SPG | 1× Spitzbogen<br>Tree |
| 11 5081 045 | • 12 | 32 | 6 | 77 | L | KEL | 1× Rundkegel<br>Ball nosed cone |

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|---|---|---|---|---|---|
| 11 3011 085 | 11 3011 086 | • 10 | 20 | 6 | 65 |
| 11 3021 085 | 11 3021 086 | • 10 | 20 | 6 | 65 |
| 11 3051 040 | 11 3051 041 | • 10 | 20 | 6 | 65 |
| 11 3061 045 | 11 3061 046 | • 10 | 20 | 6 | 65 |
| 11 3081 035 | 11 3081 031 | • 10 | 30<br>20 | 6 | 75<br>65 |
| 11 3011 100 | 11 3011 104 | • 12 | 25 | 6 | 70 |
| 11 3021 105 | 11 3021 108 | • 12 | 25 | 6 | 70 |
| 11 3051 050 | 11 3051 054 | • 12 | 25 | 6 | 70 |
| 11 3061 060 | 11 3061 064 | • 12 | 25 | 6 | 70 |
| 11 3081 045 | 11 3081 048 | • 12 | 32<br>25 | 6 | 77<br>70 |

**11 4950**
Leeres Set / Empty set
€ 9,50



**Sie wollen einen anderen Inhalt? Kein Problem!** Wählen Sie aus unserem Gesamtsortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

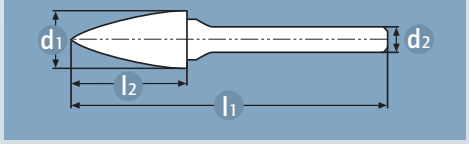
**Would you like a display of mini-burrs? No problem!** Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

**11 4942** BEST SELLER € 245,40



10 Stück
10 pieces

Film
Movie




BEST SELLER € 203,35 **11 4942 U**

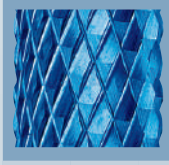
VALUETOOL € 141,85 **11 4943 U**



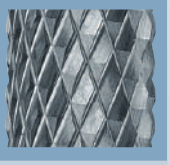
BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

BLUETEC BESCHICHTET COATED

## Universal HP-3



Zahnung
Cut



| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | Inhalt \| Contents |
|---|---|---|---|---|---|---|---|
| 11 5001 105 | • 12 | 25 | 6 | 70 | A | ZYA | 1× Zylinder ohne Stirnverzahnung<br>Cylinder without end cut |
| 11 5011 100 | • 12 | 25 | 6 | 70 | B | ZYB | 1× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| 11 5021 105 | • 12 | 25 | 6 | 70 | C | WRC | 1× Walzenrundform<br>Ball nosed cylinder |
| 11 5031 080 | • 12 | 11,4 | 6 | 65 | D | KUD | 1× Kugel<br>Ball |
| 11 5041 035 | • 12 | 22 | 6 | 67 | E | TRE | 1× Tropfen<br>Oval |
| 11 5051 050 | • 12 | 25 | 6 | 70 | F | RBF | 1× Rundbogen<br>Ball nosed tree |
| 11 5061 060 | • 12 | 25 | 6 | 70 | G | SPG | 1× Spitzbogen<br>Tree |
| 11 5071 025 | • 12 | 32 | 6 | 77 | H | – | 1× Flamme<br>Flame |
| 11 5081 045 | • 12 | 32 | 6 | 77 | L | KEL | 1× Rundkegel<br>Ball nosed cone |
| 11 5091 045 | • 12 | 25 | 6 | 70 | M | SKM | 1× Spitzkegel<br>Cone |

BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

VALUETOOL
Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|---|---|---|---|---|---|
| 11 3001 105 | 11 3001 108 | • 12 | 25 | 6 | 70 |
| 11 3011 100 | 11 3011 104 | • 12 | 25 | 6 | 70 |
| 11 3021 105 | 11 3021 108 | • 12 | 25 | 6 | 70 |
| 11 3031 080 | 11 3031 084 | • 12 | 11,4<br>11 | 6 | 65<br>56 |
| 11 3041 035 | 11 3041 036 | • 12 | 22<br>21 | 6 | 67<br>66 |
| 11 3051 050 | 11 3051 054 | • 12 | 25 | 6 | 70 |
| 11 3061 060 | 11 3061 064 | • 12 | 25 | 6 | 70 |
| 11 3071 025 | 11 3071 026 | • 12 | 32<br>30 | 6 | 77<br>75 |
| 11 3081 045 | 11 3081 048 | • 12 | 32<br>25 | 6 | 77<br>70 |
| 11 3091 045 | 11 3091 048 | • 12 | 25 | 6 | 70 |

**11 4950**
Leeres Set / Empty set
€ 9,50



**Sie wollen einen anderen Inhalt? Kein Problem!** Wählen Sie aus unserem Gesamtsortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

**Would you like a display of mini-burrs? No problem!** Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

**11 4911** BEST SELLER € 227,80

DIN



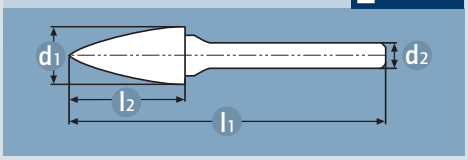
BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

BLUETEC BESCHICHTET COATED

10 Stück

10 pieces

Film
Movie



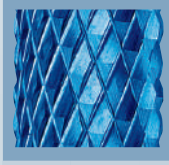

BEST SELLER € 184,35 **11 4911 U**

DIN

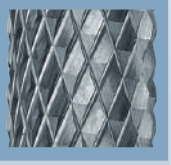


BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

## Universal HP-3



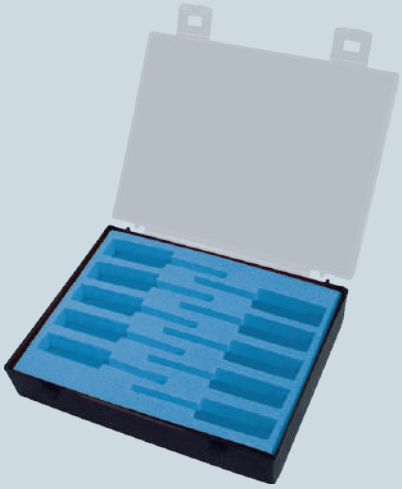
Zahnung
Cut



| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | Inhalt \| Contents |
|---|---|---|---|---|---|---|---|
| 11 5001 107 | • 12,0 DIN | 25 | 6 | 70 | A | ZYA | 1× Zylinder ohne Stirnverzahnung<br>Cylinder without end cut |
| 11 5011 103 | • 12,0 DIN | 25 | 6 | 70 | B | ZYB | 1× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| 11 5021 107 | • 12,0 DIN | 25 | 6 | 70 | C | WRC | 1× Walzenrundform<br>Ball nosed cylinder |
| 11 5031083 | • 12,0 DIN | 11,4 | 6 | 65 | D | KUD | 1× Kugel<br>Ball |
| 11 5041 037 | • 12,0 DIN | 22 | 6 | 66 | E | TRE | 1× Tropfen<br>Oval |
| 11 5051 053 | • 12,0 DIN | 25 | 6 | 70 | F | RBF | 1× Rundbogen<br>Ball nosed tree |
| 11 5061 063 | • 12,0 DIN | 25 | 6 | 70 | G | SPG | 1× Spitzbogen<br>Tree |
| 11 5071 027 | • 12,0 DIN | 32 | 6 | 70 | H | – | 1× Flamme<br>Flame |
| 11 5081 047 | • 12,0 DIN | 32 | 6 | 70 | L | KEL | 1× Rundkegel<br>Ball nosed cone |
| 11 5091 047 | • 12,0 DIN | 25 | 6 | 70 | M | SKM | 1× Spitzkegel<br>Cone |

| Art. | d1 | l2 | d2 | l1 |
|---|---|---|---|---|
| 11 3001 107 | • 12,0 DIN | 25 | 6 | 70 |
| 11 3011 103 | • 12,0 DIN | 25 | 6 | 70 |
| 11 3021 107 | • 12,0 DIN | 25 | 6 | 70 |
| 11 3031 083 | • 12,0 DIN | 11,4 | 6 | 65 |
| 11 3041 037 | • 12,0 DIN | 22 | 6 | 66 |
| 11 3051 053 | • 12,0 DIN | 25 | 6 | 70 |
| 11 3061 063 | • 12,0 DIN | 25 | 6 | 70 |
| 11 3071 027 | • 12,0 DIN | 32 | 6 | 70 |
| 11 3081 047 | • 12,0 DIN | 32 | 6 | 70 |
| 11 3091 047 | • 12,0 DIN | 25 | 6 | 70 |

**11 4950**
Leeres Set / Empty set
€ 9,50



**Sie wollen einen anderen Inhalt? Kein Problem!** Wählen Sie aus unserem Gesamtsortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

**Would you like a display of mini-burrs? No problem!** Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

**11 4960** BEST SELLER € 863,50



Abschließbares Display Ø 6, 8, 10, 12 mm, Schaft 6 mm (40 Stück)

Lockable display Ø 6, 8, 10, 12 mm, shank 6 mm (40 pieces)

Film
Movie

BEST SELLER € 738,80 **11 4960 U**



BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

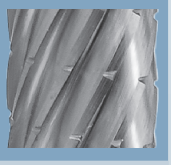
GREENTEC BESCHICHTET COATED

BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

## HP-3 Pro Performance 82



Zahnung
Cut



| Art. | | d1 | l2 | d2 | l1 |
|---|---|---|---|---|---|
| 11 6091 051 | • | 6 | 18 | 6 | 50 |
| 11 6091 076 | • | 8 | 20 | 6 | 65 |
| 11 6091 086 | • | 10 | 20 | 6 | 65 |
| 11 6091 104 | • | 12 | 25 | 6 | 70 |
| 11 6092 054 | • | 6 | 18 | 6 | 50 |
| 11 6092 076 | • | 8 | 20 | 6 | 65 |
| 11 6092 086 | • | 10 | 20 | 6 | 65 |
| 11 6092 108 | • | 12 | 25 | 6 | 70 |
| 11 6095 031 | • | 6 | 18 | 6 | 50 |
| 11 6095 036 | • | 8 | 20 | 6 | 65 |
| 11 6095 041 | • | 10 | 20 | 6 | 65 |
| 11 6095 054 | • | 12 | 25 | 6 | 70 |
| 11 6096 036 | • | 6 | 18 | 6 | 50 |
| 11 6096 041 | • | 8 | 20 | 6 | 65 |
| 11 6096 046 | • | 10 | 20 | 6 | 65 |
| 11 6096 064 | • | 12 | 25 | 6 | 70 |
| 11 6098 021 | • | 6 | 18 | 6 | 50 |
| 11 6098 026 | • | 8 | 25 | 6 | 50 |
| 11 6098 031 | • | 10 | 20 | 6 | 65 |
| 11 6098 048 | • | 12 | 32 | 6 | 77 |

| Form Shape | DIN 8033 | Inhalt \| Contents | |
|---|---|---|---|
| B | ZYB | 2× | Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| C | WRC | 2× | Walzenrundform<br>Ball nosed cylinder |
| F | RBF | 2× | Rundbogen<br>Ball nosed tree |
| G | SPG | 2× | Spitzbogen<br>Tree |
| L | KEL | 2× | Rundkegel<br>Ball nosed cone |

| Art. | | d1 | l2 | d2 | l1 |
|---|---|---|---|---|---|
| 11 4091 051 | • | 6 | 18 | 6 | 50 |
| 11 4091 076 | • | 8 | 20 | 6 | 65 |
| 11 4091 086 | • | 10 | 20 | 6 | 65 |
| 11 4091 104 | • | 12 | 25 | 6 | 70 |
| 11 4092 054 | • | 6 | 18 | 6 | 50 |
| 11 4092 076 | • | 8 | 20 | 6 | 65 |
| 11 4092 086 | • | 10 | 20 | 6 | 65 |
| 11 4092 108 | • | 12 | 25 | 6 | 70 |
| 11 4095 031 | • | 6 | 18 | 6 | 50 |
| 11 4095 036 | • | 8 | 20 | 6 | 65 |
| 11 4095 041 | • | 10 | 20 | 6 | 65 |
| 11 4095 054 | • | 12 | 25 | 6 | 70 |
| 11 4096 036 | • | 6 | 18 | 6 | 50 |
| 11 4096 041 | • | 8 | 20 | 6 | 65 |
| 11 4096 046 | • | 10 | 20 | 6 | 65 |
| 11 4096 064 | • | 12 | 25 | 6 | 70 |
| 11 4098 021 | • | 6 | 18 | 6 | 50 |
| 11 4098 026 | • | 8 | 25 | 6 | 50 |
| 11 4098 031 | • | 10 | 20 | 6 | 65 |
| 11 4098 048 | • | 12 | 32 | 6 | 77 |

**11 4945**

**Leeres Display / Empty display**

€ 71,45



**Sie wollen einen anderen Inhalt? Kein Problem!** Wählen Sie aus unserem Gesamtsortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

**Would you like a display of mini-burrs? No problem!** Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

**11 4853** BEST SELLER € 714,48



Abschließbares Display Ø 6, 8, 10, 12 mm, Schaft 6 mm (40 Stück)

Lockable display Ø 6, 8, 10, 12 mm, shank 6 mm (40 pieces)

Film
Movie

BEST SELLER € 608,38 **11 4853 U**

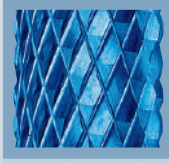
VALUETOOL € 468,18 **11 4854 U**



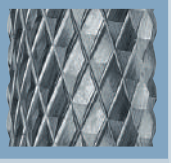
BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

BLUETEC BESCHICHTET COATED

## Universal HP-3



Zahnung
Cut



| Art. | d1 | l2 | d2 | l1 |
|---|---|---|---|---|
| 11 5011 050 | • 6 | 18 | 6 | 50 |
| 11 5011 075 | • 8 | 20 | 6 | 65 |
| 11 5011 085 | • 10 | 20 | 6 | 65 |
| 11 5011 100 | • 12 | 25 | 6 | 70 |
| 11 5021 055 | • 6 | 18 | 6 | 50 |
| 11 5021 075 | • 8 | 20 | 6 | 65 |
| 11 5021 085 | • 10 | 20 | 6 | 65 |
| 11 5021 105 | • 12 | 25 | 6 | 70 |
| 11 5051 030 | • 6 | 18 | 6 | 50 |
| 11 5051 035 | • 8 | 20 | 6 | 65 |
| 11 5051 040 | • 10 | 20 | 6 | 65 |
| 11 5051 050 | • 12 | 25 | 6 | 70 |
| 11 5061 035 | • 6 | 18 | 6 | 50 |
| 11 5061 040 | • 8 | 20 | 6 | 65 |
| 11 5061 045 | • 10 | 20 | 6 | 65 |
| 11 5061 060 | • 12 | 25 | 6 | 70 |
| 11 5081 020 | • 6 | 18 | 6 | 50 |
| 11 5081 025 | • 8 | 25 | 6 | 50 |
| 11 5081 035 | • 10 | 30 | 6 | 75 |
| 11 5081 045 | • 12 | 32 | 6 | 77 |

| Form Shape | DIN 8033 | Inhalt \| Contents |
|---|---|---|
| B | ZYB | 2× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| C | WRC | 2× Walzenrundform<br>Ball nosed cylinder |
| F | RBF | 2× Rundbogen<br>Ball nosed tree |
| G | SPG | 2× Spitzbogen<br>Tree |
| L | KEL | 2× Rundkegel<br>Ball nosed cone |

BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

VALUETOOL

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|---|---|---|---|---|---|
| 11 3011 050 | 11 3011 051 | • 6 | 18 | 6 | 50 |
| 11 3011 075 | 11 3011 076 | • 8 | 20 | 6 | 65 |
| 11 3011 085 | 11 3011 086 | • 10 | 20 | 6 | 65 |
| 11 3011 100 | 113011 104 | • 12 | 25 | 6 | 70 |
| 11 3021 055 | 11 3021 054 | • 6 | 18 | 6 | 50 |
| 11 3021 075 | 11 3021 076 | • 8 | 20 | 6 | 65 |
| 11 3021 085 | 11 3021 086 | • 10 | 20 | 6 | 65 |
| 11 3021 105 | 11 3021 108 | • 12 | 25 | 6 | 70 |
| 11 3051 030 | 11 3051 031 | • 6 | 18 | 6 | 50 |
| 11 3051 035 | 11 3051 036 | • 8 | 20 | 6 | 65 |
| 11 3051 040 | 11 3051 041 | • 10 | 20 | 6 | 65 |
| 11 3051 050 | 11 3051 054 | • 12 | 25 | 6 | 70 |
| 11 3061 035 | 11 3061 036 | • 6 | 18 | 6 | 50 |
| 11 3061 040 | 11 3061 041 | • 8 | 20 | 6 | 65 |
| 11 3061 045 | 11 3061 046 | • 10 | 20 | 6 | 65 |
| 11 3061 060 | 11 3061 064 | • 12 | 25 | 6 | 70 |
| 11 3081 020 | 11 3081 021 | • 6 | 18 | 6 | 50 |
| 11 3081 025 | 11 3081 026 | • 8 | 25 | 6 | 50 |
| 11 3081 035 | 11 3081 031 | • 10 | 30<br>20 | 6 | 75<br>65 |
| 11 3081 045 | 11 3081 048 | • 12 | 32<br>25 | 6 | 77<br>70 |

**Sie wollen einen anderen Inhalt? Kein Problem!** Wählen Sie aus unserem Gesamtsortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

**Would you like a display of mini-burrs? No problem!** Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.



**11 4945**
Leeres Display / Empty display
€ 71,45

## 11 4962

BEST SELLER

€ 1385,20



Abschließbares Display Ø 6, 8, 10, 12 mm, Schaft 6 mm (64 Stück)

Lockable display Ø 6, 8, 10, 12 mm, shank 6 mm (64 pieces)

Film
Movie

BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

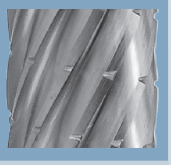
GREENTEC BESCHICHTET COATED

| Art. | | d1 | l2 | d2 | l1 |
|---|---|---|---|---|---|
| 11 6090 066 | • | 6 | 18 | 6 | 50 |
| 11 6090 081 | • | 8 | 20 | 6 | 65 |
| 11 6090 091 | • | 10 | 20 | 6 | 65 |
| 11 6090 108 | • | 12 | 25 | 6 | 70 |
| 11 6091 051 | • | 6 | 18 | 6 | 50 |
| 11 6091 076 | • | 8 | 20 | 6 | 65 |
| 11 6091 086 | • | 10 | 20 | 6 | 65 |
| 11 6091 104 | • | 12 | 25 | 6 | 70 |
| 11 6092 054 | • | 6 | 18 | 6 | 50 |
| 11 6092 076 | • | 8 | 20 | 6 | 65 |
| 11 6092 086 | • | 10 | 20 | 6 | 65 |
| 11 6092 108 | • | 12 | 25 | 6 | 70 |
| 11 6094 021 | • | 6 | 10 | 6 | 50 |
| 11 6094 026 | • | 8 | 15 | 6 | 60 |
| 11 6094 031 | • | 10 | 16 | 6 | 60 |
| 11 6094 036 | • | 12 | 22 | 6 | 67 |
| 11 6095 031 | • | 6 | 18 | 6 | 50 |
| 11 6095 036 | • | 8 | 20 | 6 | 65 |
| 11 6095 041 | • | 10 | 20 | 6 | 65 |
| 11 6095 054 | • | 12 | 25 | 6 | 70 |
| 11 6096 036 | • | 6 | 18 | 6 | 50 |
| 11 6096 041 | • | 8 | 20 | 6 | 65 |
| 11 6096 046 | • | 10 | 20 | 6 | 65 |
| 11 6096 064 | • | 12 | 25 | 6 | 70 |
| 11 6097 011 | • | 6 | 14 | 6 | 50 |
| 11 6097 016 | • | 8 | 20 | 6 | 65 |
| 11 6097 021 | • | 10 | 20 | 6 | 65 |
| 11 6097 026 | • | 12 | 32 | 6 | 77 |
| 11 6098 021 | • | 6 | 18 | 6 | 50 |
| 11 6098 026 | • | 8 | 25 | 6 | 70 |
| 11 6098 031 | • | 10 | 20 | 6 | 65 |
| 11 6098 048 | • | 12 | 32 | 6 | 77 |

### HP-3 Pro Performance 82



Zahnung
Cut



| Form Shape | DIN 8033 | | Inhalt \| Contents |
|---|---|---|---|
| A | ZYA | 2× | Zylinder ohne Stirnverzahnung<br>Cylinder without end cut |
| B | ZYB | 2× | Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| C | WRC | 2× | Walzenrundform<br>Ball nosed cylinder |
| E | TRE | 2× | Tropfen<br>Oval |
| F | RBF | 2× | Rundbogen<br>Ball nosed tree |
| G | SPG | 2× | Spitzbogen<br>Tree |
| H | – | 2× | Flamme<br>Flame |
| L | KEL | 2× | Rundkegel<br>Ball nosed cone |

## 11 4962 U

BEST SELLER

€ 1185,30



BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

| Art. | | d1 | l2 | d2 | l1 |
|---|---|---|---|---|---|
| 11 4090 066 | • | 6 | 18 | 6 | 50 |
| 11 4090 081 | • | 8 | 20 | 6 | 65 |
| 11 4090 091 | • | 10 | 20 | 6 | 65 |
| 11 4090 108 | • | 12 | 25 | 6 | 70 |
| 11 4091 051 | • | 6 | 18 | 6 | 50 |
| 11 4091 076 | • | 8 | 20 | 6 | 65 |
| 11 4091 086 | • | 10 | 20 | 6 | 65 |
| 11 4091 104 | • | 12 | 25 | 6 | 70 |
| 11 4092 054 | • | 6 | 18 | 6 | 50 |
| 11 4092 076 | • | 8 | 20 | 6 | 65 |
| 11 4092 086 | • | 10 | 20 | 6 | 65 |
| 11 4092 108 | • | 12 | 25 | 6 | 70 |
| 11 4094 021 | • | 6 | 10 | 6 | 50 |
| 11 4094 026 | • | 8 | 15 | 6 | 60 |
| 11 4094 031 | • | 10 | 16 | 6 | 60 |
| 11 4094 036 | • | 12 | 22 | 6 | 67 |
| 11 4095 031 | • | 6 | 18 | 6 | 50 |
| 11 4095 036 | • | 8 | 20 | 6 | 65 |
| 11 4095 041 | • | 10 | 20 | 6 | 65 |
| 11 4095 054 | • | 12 | 25 | 6 | 70 |
| 11 4096 036 | • | 6 | 18 | 6 | 50 |
| 11 4096 041 | • | 8 | 20 | 6 | 65 |
| 11 4096 046 | • | 10 | 20 | 6 | 65 |
| 11 4096 064 | • | 12 | 25 | 6 | 70 |
| 11 4097 011 | • | 6 | 14 | 6 | 50 |
| 11 4097 016 | • | 8 | 20 | 6 | 65 |
| 11 4097 021 | • | 10 | 20 | 6 | 65 |
| 11 4097 026 | • | 12 | 32 | 6 | 77 |
| 11 4098 021 | • | 6 | 18 | 6 | 50 |
| 11 4098 026 | • | 8 | 25 | 6 | 70 |
| 11 4098 031 | • | 10 | 20 | 6 | 65 |
| 11 4098 048 | • | 12 | 32 | 6 | 77 |

## 11 4955

Leeres Display / Empty display

% € 38,92



## 11 4948

Leeres Display / Empty display

€ 81,65



**Sie wollen einen anderen Inhalt? Kein Problem!**
Wählen Sie aus unserem Gesamtsortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

**Would you like a display of mini-burrs? No problem!**
Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.

**11 4855** BEST SELLER € 1153,88



Abschließbares Display Ø 6, 8, 10, 12 mm, Schaft 6 mm (64 Stück)

Lockable display Ø 6, 8, 10, 12 mm, shank 6 mm (64 pieces)

Film
Movie

BEST SELLER € 983,88 **11 4855 U**

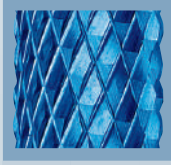
VALUETOOL € 726,68 **11 4856 U**



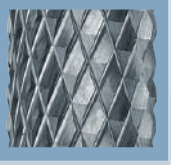
BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

BLUETEC BESCHICHTET COATED

## Universal HP-3



Zahnung
Cut



| Form Shape | DIN 8033 | Inhalt \| Contents |
|---|---|---|
| A | ZYA | 2× Zylinder ohne Stirnverzahnung<br>Cylinder without end cut |
| B | ZYB | 2× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| C | WRC | 2× Walzenrundform<br>Ball nosed cylinder |
| E | TRE | 2× Tropfen<br>Oval |
| F | RBF | 2× Rundbogen<br>Ball nosed tree |
| G | SPG | 2× Spitzbogen<br>Tree |
| H | – | 2× Flamme<br>Flame |
| L | KEL | 2× Rundkegel<br>Ball nosed cone |

BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

VALUETOOL

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 |
|---|---|---|---|---|
| 11 5001 065 | • 6 | 18 | 6 | 50 |
| 11 5001 080 | • 8 | 20 | 6 | 65 |
| 11 5001 090 | • 10 | 20 | 6 | 65 |
| 11 5001 105 | • 12 | 25 | 6 | 70 |
| 11 5011 050 | • 6 | 18 | 6 | 50 |
| 11 5011 075 | • 8 | 20 | 6 | 65 |
| 11 5011 085 | • 10 | 20 | 6 | 65 |
| 11 5011 100 | • 12 | 25 | 6 | 70 |
| 11 5021 055 | • 6 | 18 | 6 | 50 |
| 11 5021 075 | • 8 | 20 | 6 | 65 |
| 11 5021 085 | • 10 | 20 | 6 | 65 |
| 11 5021 105 | • 12 | 25 | 6 | 70 |
| 11 5041 020 | • 6 | 10 | 6 | 50 |
| 11 5041 025 | • 8 | 15 | 6 | 60 |
| 11 5041 030 | • 10 | 16 | 6 | 60 |
| 11 5041 035 | • 12 | 22 | 6 | 67 |
| 11 5051 030 | • 6 | 18 | 6 | 50 |
| 11 5051 035 | • 8 | 20 | 6 | 65 |
| 11 5051 040 | • 10 | 20 | 6 | 65 |
| 11 5051 050 | • 12 | 25 | 6 | 70 |
| 11 5061 035 | • 6 | 18 | 6 | 50 |
| 11 5061 040 | • 8 | 20 | 6 | 65 |
| 11 5061 045 | • 10 | 20 | 6 | 65 |
| 11 5061 060 | • 12 | 25 | 6 | 70 |
| 11 5071 010 | • 6 | 14 | 6 | 50 |
| 11 5071 015 | • 8 | 20 | 6 | 65 |
| 11 5071 020 | • 10 | 20 | 6 | 65 |
| 11 5071 025 | • 12 | 32 | 6 | 77 |
| 11 5081 020 | • 6 | 18 | 6 | 50 |
| 11 5081 025 | • 8 | 25 | 6 | 70 |
| 11 5081 035 | • 10 | 30 | 6 | 75 |
| 11 5081 045 | • 12 | 32 | 6 | 77 |

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|---|---|---|---|---|---|
| 11 3001 065 | 11 3001 066 | • 6 | 18 | 6 | 50 |
| 11 3001 080 | 11 3001 081 | • 8 | 20 | 6 | 65 |
| 11 3001 090 | 11 3001 091 | • 10 | 20 | 6 | 65 |
| 11 3001 105 | 11 3001 108 | • 12 | 25 | 6 | 70 |
| 11 3011 050 | 11 3011 051 | • 6 | 18 | 6 | 50 |
| 11 3011 075 | 11 3011 076 | • 8 | 20 | 6 | 65 |
| 11 3011 085 | 11 3011 086 | • 10 | 20 | 6 | 65 |
| 11 3011 100 | 11 3011 104 | • 12 | 25 | 6 | 70 |
| 11 3021 055 | 11 3021 054 | • 6 | 18 | 6 | 50 |
| 11 3021 075 | 11 3021 076 | • 8 | 20 | 6 | 65 |
| 11 3021 085 | 11 3021 086 | • 10 | 20 | 6 | 65 |
| 11 3021 105 | 11 3021 108 | • 12 | 25 | 6 | 70 |
| 11 3041 020 | 11 3041 021 | • 6 | 10 | 6 | 50 |
| 11 3041 025 | 11 3041 026 | • 8 | 15 | 6 | 60 |
| 11 3041 030 | 11 3041 031 | • 10 | 16 | 6 | 60 |
| 11 3041 035 | 11 3041 036 | • 12 | 22<br>21 | 6 | 67<br>66 |
| 11 3051 030 | 11 3051 031 | • 6 | 18 | 6 | 50 |
| 11 3051 035 | 11 3051 036 | • 8 | 20 | 6 | 65 |
| 11 3051 040 | 11 3051 041 | • 10 | 20 | 6 | 65 |
| 11 3051 050 | 11 3051 054 | • 12 | 25 | 6 | 70 |
| 11 3061 035 | 11 3061 036 | • 6 | 18 | 6 | 50 |
| 11 3061 040 | 11 3061 041 | • 8 | 20 | 6 | 65 |
| 11 3061 045 | 11 3061 046 | • 10 | 20 | 6 | 65 |
| 11 3061 060 | 11 3061 064 | • 12 | 25 | 6 | 70 |
| 11 3071 010 | 11 3071 011 | • 6 | 14 | 6 | 50 |
| 11 3071 015 | 11 3071 016 | • 8 | 20 | 6 | 65 |
| 11 3071 020 | 11 3071 021 | • 10 | 20 | 6 | 65 |
| 11 3071 025 | 11 3071 026 | • 12 | 32<br>30 | 6 | 77<br>75 |
| 11 3081 020 | 11 3081 021 | • 6 | 18 | 6 | 50 |
| 11 3081 025 | 11 3081 026 | • 8 | 25 | 6 | 70 |
| 11 3081 035 | 11 3081 031 | • 10 | 30<br>20 | 6 | 75<br>65 |
| 11 3081 045 | 11 3081 048 | • 12 | 32<br>25 | 6 | 77<br>70 |

**Sie wollen einen anderen Inhalt? Kein Problem!**
Wählen Sie aus unserem Gesamtsortiment 6 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 86 mm.

**Would you like a display of mini-burrs? No problem!**
Select 6.0 mm shafts from the complete list of products. Note that the maximum length is 86 mm.



**11 4948**
Leeres Display / Empty display
€ 81,65



**11 4955**
Leeres Display / Empty display
% € 38,92

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

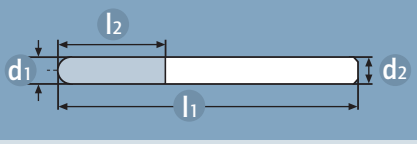
# FRÄSSTIFT-SETS Ø 3 MM, SCHAFT 3 MM
# BURR SETS Ø 3 MM, SHANK 3 MM

**11 4904** BEST SELLER € 76,40



10 Stück
10 pieces

Film
Movie




BEST SELLER € 58,45 **11 4904 U**

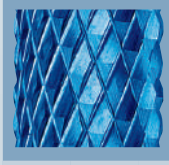
VALUETOOL € 40,45 **11 4903 U**



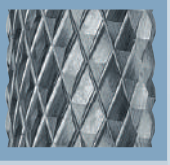
BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

BLUETEC BESCHICHTET COATED

## Universal HP-3



Zahnung
Cut



BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

VALUETOOL

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | Inhalt \| Contents |
|---|---|---|---|---|---|---|---|
| 11 5001 030 | • 3 | 14 | 3 | 38 | A | ZYA | 1× Zylinder ohne Stirnverzahnung<br>Cylinder without end cut |
| 11 5011 015 | • 3 | 14 | 3 | 38 | B | ZYB | 1× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| 11 5021 025 | • 3 | 14 | 3 | 38 | C | WRC | 1× Walzenrundform<br>Ball nosed cylinder |
| 11 5031 025 | • 3 | 2,7 | 3 | 38 | D | KUD | 1× Kugel<br>Ball |
| 11 5041 010 | • 3 | 6 | 3 | 38 | E | TRE | 1× Tropfen<br>Oval |
| 11 5051 015 | • 3 | 14 | 3 | 38 | F | RBF | 1× Rundbogen<br>Ball nosed tree |
| 11 5061 015 | • 3 | 14 | 3 | 38 | G | SPG | 1× Spitzbogen<br>Tree |
| 11 5071 005 | • 3 | 6 | 3 | 38 | H | – | 1× Flamme<br>Flame |
| 11 5081 010 | • 3 | 14 | 3 | 38 | L | KEL | 1× Rundkegel<br>Ball nosed cone |
| 11 5091 015 | • 3 | 11 | 3 | 38 | M | SKM | 1× Spitzkegel<br>Cone |

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|---|---|---|---|---|---|
| 11 3001 030 | 11 3001 031 | • 3 | 14 | 3 | 38 |
| 11 3011 015 | 11 3011 016 | • 3 | 14 | 3 | 38 |
| 11 3021 025 | 11 3021 026 | • 3 | 14 | 3 | 38 |
| 11 3031 025 | 11 3031 026 | • 3 | 2,7<br>2,5 | 3 | 38 |
| 11 3041 010 | 11 3041 009 | • 3 | 6 | 3 | 38 |
| 11 3051 015 | 11 3051 016 | • 3 | 14 | 3 | 38 |
| 11 3061 015 | 11 3061 016 | • 3 | 14 | 3 | 38 |
| 11 3071 005 | 11 3071 004 | • 3 | 6 | 3 | 38 |
| 11 3081 010 | 11 3081 008 | • 3 | 14 | 3 | 38 |
| 11 3091 015 | 11 3091 016 | • 3 | 11 | 3 | 38 |

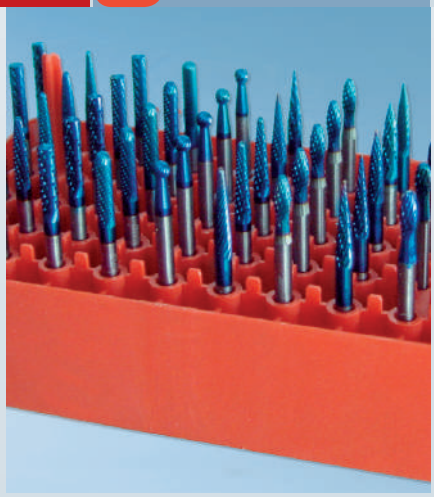
**11 4952**
Leeres Set / Empty set
€ 0,65



**Sie wollen einen anderen Inhalt? Kein Problem!** Wählen Sie aus unserem Gesamtsortiment 3 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 38 mm.

**Would you like a display of mini-burrs? No problem!** Select 3.0 mm shafts from the complete list of products. Note that the maximum length is 38 mm.

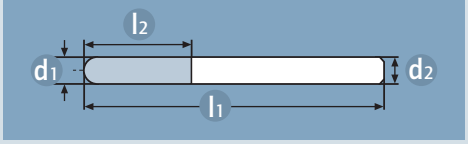
**11 4837** BEST SELLER € 381,05



50 Stück

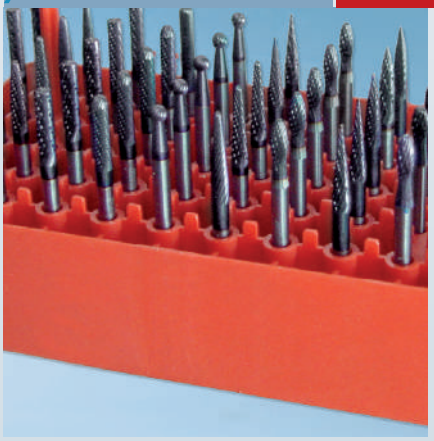
50 pieces

Film
Movie




BEST SELLER € 291,30 **11 4837 U**

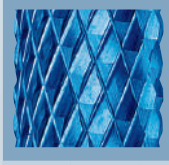
VALUETOOL € 201,30 **11 4838 U**



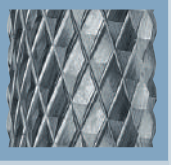
BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

BLUETEC BESCHICHTET COATED

## Universal HP-3



Zahnung
Cut



BEST SELLER Bestseller – preisreduziert
Bestseller – price reduced

VALUETOOL

Valuetool – hervorragendes Preis-Leistungs-Verhältnis
Valuetool – excellent price-performance ratio

| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | Inhalt \| Contents |
|---|---|---|---|---|---|---|---|
| 11 5001 030 | • 3 | 14 | 3 | 38 | A | ZYA | 5× Zylinder ohne Stirnverzahnung<br>Cylinder without end cut |
| 11 5011 015 | • 3 | 14 | 3 | 38 | B | ZYB | 5× Zylinder mit Stirnverzahnung<br>Cylinder with end cut |
| 11 5021 025 | • 3 | 14 | 3 | 38 | C | WRC | 5× Walzenrundform<br>Ball nosed cylinder |
| 11 5031 025 | • 3 | 2,7 | 3 | 38 | D | KUD | 5× Kugel<br>Ball |
| 11 5041 010 | • 3 | 6 | 3 | 38 | E | TRE | 5× Tropfen<br>Oval |
| 11 5051 015 | • 3 | 14 | 3 | 38 | F | RBF | 5× Rundbogen<br>Ball nosed tree |
| 11 5061 015 | • 3 | 14 | 3 | 38 | G | SPG | 5× Spitzbogen<br>Tree |
| 11 5071 005 | • 3 | 6 | 3 | 38 | H | – | 5× Flamme<br>Flame |
| 11 5081 010 | • 3 | 14 | 3 | 38 | L | KEL | 5× Rundkegel<br>Ball nosed cone |
| 11 5091 015 | • 3 | 11 | 3 | 38 | M | SKM | 5× Spitzkegel<br>Cone |

| Art. BESTSELLER | Art. VALUETOOL | d1 | l2 | d2 | l1 |
|---|---|---|---|---|---|
| 11 3001 030 | 11 3001 031 | • 3 | 14 | 3 | 38 |
| 11 3011 015 | 11 3011 016 | • 3 | 14 | 3 | 38 |
| 11 3021 025 | 11 3021 026 | • 3 | 14 | 3 | 38 |
| 11 3031 025 | 11 3031 026 | • 3 | 2,7<br>2,5 | 3 | 38 |
| 11 3041 010 | 11 3041 009 | • 3 | 6 | 3 | 38 |
| 11 3051 015 | 11 3051 016 | • 3 | 14 | 3 | 38 |
| 11 3061 015 | 11 3061 016 | • 3 | 14 | 3 | 38 |
| 11 3071 005 | 11 3071 004 | • 3 | 6 | 3 | 38 |
| 11 3081 010 | 11 3081 008 | • 3 | 14 | 3 | 38 |
| 11 3091 015 | 11 3091 016 | • 3 | 11 | 3 | 38 |

**Sie wollen einen anderen Inhalt? Kein Problem!** Wählen Sie aus unserem Gesamtsortiment 3 mm Schäfte aus. Beachten Sie dabei die maximale Länge von 38 mm.

**Would you like a display of mini-burrs? No problem!** Select 3.0 mm shafts from the complete list of products. Note that the maximum length is 38 mm.



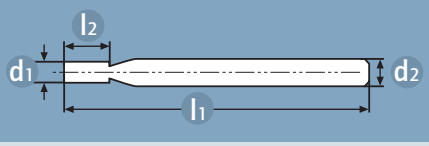
**11 4953**
Leeres Set / Empty set
€ 2,05

**11 4805** € 130,65




10 Stück
10 pieces

Film
Movie




€ 109,65 **11 4805 U**




BLUETEC BESCHICHTET COATED

**Universal Fein**




| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | Inhalt \| Contents | Art. | d1 | l2 | d2 | l1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 5006 005 | • 1 | 4 | 3 | 38 | A | ZYA | 1× Zylinder ohne Stirnverzahnung<br>Cylinder without end cut | 11 3006 005 | • 1 | 4 | 3 | 38 |
| 11 5006 010 | • 1,5 | 4 | 3 | 38 | A | ZYA | 1× Zylinder ohne Stirnverzahnung<br>Cylinder without end cut | 11 3006 010 | • 1,5 | 4 | 3 | 38 |
| 11 5026 005 | • 1 | 4 | 3 | 38 | C | WRC | 1× Walzenrundform<br>Ball nosed cylinder | 11 3026 005 | • 1 | 4 | 3 | 38 |
| 11 5026 010 | • 1,5 | 4 | 3 | 38 | C | WRC | 1× Walzenrundform<br>Ball nosed cylinder | 11 3026 010 | • 1,5 | 4 | 3 | 38 |
| 11 5036 005 | • 1 | 1 | 3 | 38 | D | KUD | 1× Kugel<br>Ball | 11 3036 005 | • 1 | 1 | 3 | 38 |
| 11 5036 010 | • 1,5 | 1 | 3 | 38 | D | KUD | 1× Kugel<br>Ball | 11 3036 010 | • 1,5 | 1 | 3 | 38 |
| 11 5046 005 | • 1,5 | 4 | 3 | 38 | E | TRE | 1× Tropfen<br>Oval | 11 3046 005 | • 1,5 | 4 | 3 | 38 |
| 11 5056 005 | • 1,5 | 4 | 3 | 38 | F | RBF | 1× Rundbogen<br>Ball nosed tree | 11 3056 005 | • 1,5 | 4 | 3 | 38 |
| 11 5066 005 | • 1,5 | 4 | 3 | 38 | G | SPG | 1× Spitzbogen<br>Tree | 11 3066 005 | • 1,5 | 4 | 3 | 38 |
| 11 5196 005 | • 1,5 | 4 | 3 | 38 | M | SKM | 1× Spitzkegel<br>Cone | 11 3196 005 | • 1,5 | 4 | 3 | 38 |

**11 4952**
Leeres Set / Empty set
€ 0,65



**Sie wollen einen anderen Inhalt an Mini-Frässtiften? Kein Problem!** Wählen Sie aus dem Gesamtprogramm Mini-Frässtifte auf Seite 846 Ihren gewünschten Inhalt.

**Would you like a display of mini-burrs? No problem!** Select the content you want from the complete list of mini-burr products on page 846.

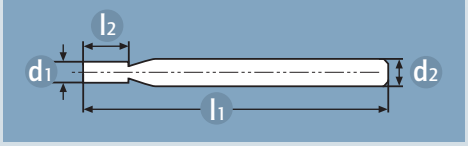
**11 4820** € 652,05




50 Stück

50 pieces

Film
Movie

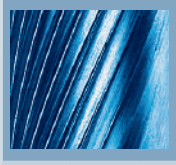



€ 547,05 **11 4820 U**

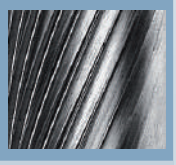



BLUETEC BESCHICHTET COATED

**Universal Fein**



Zahnung
Cut



| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | Inhalt \| Contents |
|---|---|---|---|---|---|---|---|
| 11 5006 005 | • 1 | 4 | 3 | 38 | A | ZYA | 5× Zylinder ohne Stirnverzahnung<br>Cylinder without end cut |
| 11 5006 010 | • 1,5 | 4 | 3 | 38 | A | ZYA | 5× Zylinder ohne Stirnverzahnung<br>Cylinder without end cut |
| 11 5006 020 | • 2 | 4 | 3 | 38 | A | ZYA | 3× Zylinder ohne Stirnverzahnung<br>Cylinder without end cut |
| 11 5026 005 | • 1 | 4 | 3 | 38 | C | WRC | 5× Walzenrundform<br>Ball nosed cylinder |
| 11 5026 010 | • 1,5 | 1 | 3 | 38 | C | WRC | 5× Walzenrundform<br>Ball nosed cylinder |
| 11 5026 015 | • 2 | 1 | 3 | 38 | C | WRC | 3× Walzenrundform<br>Ball nosed cylinder |
| 11 5036 005 | • 1 | 4 | 3 | 38 | D | KUD | 5× Kugel<br>Ball |
| 11 5036 010 | • 1,5 | 4 | 3 | 38 | D | KUD | 5× Kugel<br>Ball |
| 11 5036 015 | • 2 | 4 | 3 | 38 | D | KUD | 2× Kugel<br>Ball |
| 11 5046 005 | • 1,5 | 4 | 3 | 38 | E | TRE | 3× Tropfen<br>Oval |
| 11 5056 005 | • 1,5 | 4 | 3 | 38 | F | RBF | 3× Rundbogen<br>Ball nosed tree |
| 11 5066 005 | • 1,5 | 4 | 3 | 38 | G | SPG | 3× Spitzbogen<br>Tree |
| 11 5196 005 | • 1,5 | 4 | 3 | 38 | M | SKM | 3× Spitzkegel<br>Cone |

| Art. | d1 | l2 | d2 | l1 |
|---|---|---|---|---|
| 11 3006 005 | • 1 | 4 | 3 | 38 |
| 11 3006 010 | • 1,5 | 4 | 3 | 38 |
| 11 3006 020 | • 1 | 4 | 3 | 38 |
| 11 3026 005 | • 1,5 | 4 | 3 | 38 |
| 11 3026 010 | • 1,5 | 4 | 3 | 38 |
| 11 3026 015 | • 1,5 | 4 | 3 | 38 |
| 11 3036 005 | • 1,5 | 4 | 3 | 38 |
| 11 3036 010 | • 1 | 1 | 3 | 38 |
| 11 3036 015 | • 1,5 | 1 | 3 | 38 |
| 11 3046 005 | • 1,5 | 4 | 3 | 38 |
| 11 3056 005 | • 1,5 | 4 | 3 | 38 |
| 11 3066 005 | • 1,5 | 4 | 3 | 38 |
| 11 3196 005 | • 1,5 | 4 | 3 | 38 |

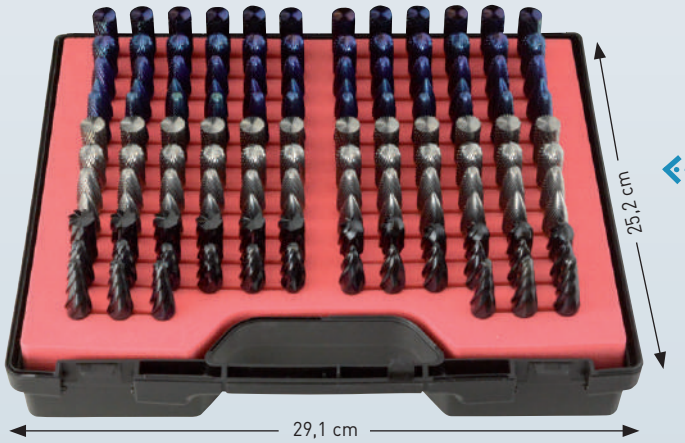
**Sie wollen einen anderen Inhalt an Mini-Frässtiften? Kein Problem!** Wählen Sie aus dem Gesamtprogramm Mini-Frässtifte auf Seite 846 Ihren gewünschten Inhalt.

**Would you like a display of mini-burrs? No problem!** Select the content you want from the complete list of mini-burr products on page 846.



**11 4953**
**Leeres Set / Empty set**
€ 2,05

Leer · Empty € 28,50 **11 4954**




Deckel abnehmbar.
Wird dadurch auch zu einem Tisch-Display.

Removable cover.
Becomes a Display.



Kunststoffkoffer und Display leer. Zum selbst bestücken bis 138 Stück.

Plastic case and display. Can be equipped with 138 pieces.

**Robuster Kunststoffkoffer mit Tragegriff und Display in einem.**
Ideal für den harten Einsatz auf der Baustelle.
Alle Frässtifte gesichert von außen durch schlagfesten Kunststoff.
Alle Frässtifte gesichert von innen durch festen Sitz in einer passgenauen Bohrung. Die Köpfe können **nicht** aufeinanderschlagen.

Mit bis zu 138 Stück Frässtifte zu bestücken.
Daher ebenfalls hervorragend geeignet als **Tisch-Display (Deckel abnehmbar)** oder Lagerung Ihrer gängigsten Frässtifte.

Wählen Sie aus unserem Gesamtsortiment Frässtifte mit Schaft 6 oder 8 mm. Die Gesamtlänge (L1) des Frässtifts sollte 86 mm nicht überschreiten. **Wir beraten Sie gerne über die gängigsten Frässtifte.**

Bei Bestellung eines voll bestückten Koffers (138 Stück) ist der **Koffer gratis**. Sie bezahlen nur den Inhalt.

**Robust plastic case with carry handle and display in one.**
Ideal for hard use on the construction site.
All rotary burrs secured from the outside by impact-resilient plastic.
All rotary burrs secured from the inside by tight fit in a precisely fitting bore. The heads **cannot** touch.

Can be equipped with 138 rotary mills. It is also suitable as **table display (lid removable)** with our most popular rotary mills.

Choose rotary burrs with a 6 or 8 mm shaft from our overall rotary burrs range. The overall length (L1) of the rotary burr should not exceed 86 mm. **We will gladly advise you about the most common rotary burrs.**

When ordering a fully equipped case (138 pieces), the **case** is enclosed **for free**. You only need to pay for the contents.

Karnasch®
PROFESSIONAL TOOLS



## FÄCHERSCHLEIFSCHEIBEN
## FLAP DISCS

neu new



5.5

897-906

## SCHNELLWECHSEL-SCHLEIFSCHEIBEN
## QUICK-CHANGE DISCS

neu new



5.6

907-912

## FÄCHERSCHLEIFER
## FLAP WHEELS

neu new

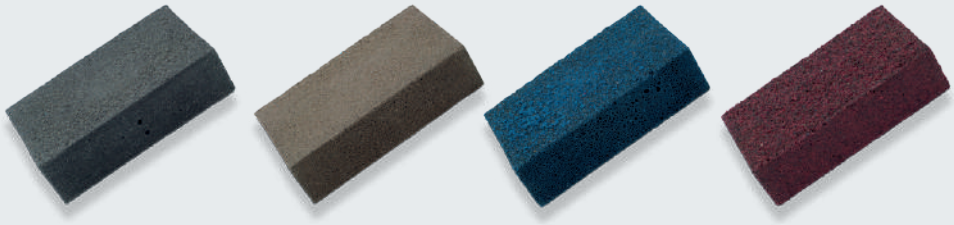


5.7

917-918

## SCHLEIFBLÖCKE
## ABRASIVE BLOCKS

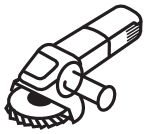
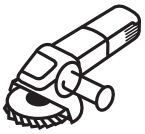
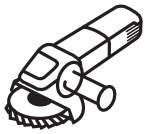
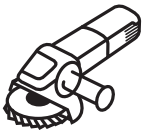
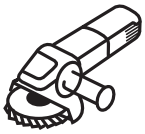
neu new



5.8

919-920

# Anwendungsgebiete / Technical reference chart

| Produktgruppe<br>Product group | <br>CERAMIC STANDARD PRO | <br>ZIRCONIUM STANDARD PRO | <br>ZIRCONIUM XXL-COLOSSUS | <br>CERAMIC FLEX-ELAST | <br>ZIRCONIUM FLEX-ELAST | <br>CERAMIC QUICK-CHANGE MINI |
|---|---|---|---|---|---|---|
| Maschinentyp<br>Machine type |  |  |  |  |  |  |
| Artikelgruppe<br>Artcile group | **12 1000** | **12 1010** | **12 1020** | **12 1030** | **12 1040** | **12 1050** |
| | 898 | 899 | 900 | 901 | 902 | 903 |
| Stahl<br>Steel | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Gusseisen<br>Cast iron | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Edelstahl<br>Stainless steel | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Hochlegierter Stahl<br>High alloy steel | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Aluminium<br>Aluminum | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Nicheisenmetalle<br>Non ferrous metals | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Holz<br>Wood | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Kunststoffe<br>Plastics | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Weitere mögliche Materialien<br>Other suitable materials | Farbe/lack<br>Paint | Farbe/lack<br>Paint | Farbe/lack<br>Paint | Farbe/lack, Rost<br>Paint, rust | Farbe/lack, Rost<br>Paint, rust | Farbe/lack, Rost<br>Paint, rust |

✓ OPTIMAL
OPTIMAL

✓ GUT
GOOD

✓ MÖGLICH
POSSIBLE



INDUSTRIAL TOOLS DIVISION
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For more informations please call **+49 33675-7265-0** send a mail to **mail@karnasch.tools**.

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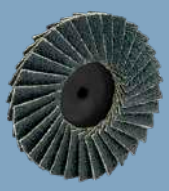
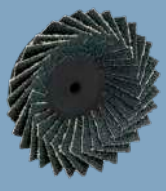
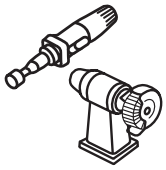
# Anwendungsgebiete / Technical reference chart

|  CERAMIC FLEX-ELAST MINI |  ZIRCONIUM MINI |  ZIRCONIUM FLEX-ELAST MINI |  SCHNELLWECHSEL-SCHLEIFSCHEIBEN / QUICK-CHANGE DISCS KERAMIK / CERAMIC |  ALUMINIUMOXID / ALUMINUM OXIDE |  OBERFLÄCHEN-BEARBEITUNG / SURFACE CONDITIONING |  FÄCHER-SCHLEIFER / FLAP WHEELS |  SCHLEIFBLÖCKE / ABRASIVE BLOCKS |
|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |
| **12 1060** | **12 1070** | **12 1080** | **12 2010<br>12 2020<br>12 2025** | **12 2030<br>12 2040<br>12 2045** | **12 2050<br>12 2060<br>12 2065** | **12 3010<br>12 3020** | **12 4000** |
| 904 | 905 | 906 | 908, 909 | 910, 911 | 912, 913 | 918 | 920 |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Farbe/lack, Rost<br>Paint, rust | Farbe/lack, Rost<br>Paint, rust | Farbe/lack, Rost<br>Paint, rust | Farbe/lack, Rost<br>Paint, rust | Farbe/lack, Rost<br>Paint, rust | Keramik<br>Ceramic | Farbe/lack, Rost<br>Paint, rust | Rost, Keramik<br>Rust, ceramic |





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## Ihre Notizen & Zeichnungen
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Karnasch® PROFESSIONAL TOOLS

# FÄCHERSCHLEIFSCHEIBEN neu new

# FLAP DISCS neu new




5.5

# 12 1000 CERAMIC STANDARD PRO

Fächerschleifscheiben
Flap discs






Konisch / Angled

**Karnasch CERAMIC STANDARD PRO Fächerschleifscheiben:**

**Aggressive Schleif-und Oberflächenbearbeitung auch bei schwer zerspanbaren Werkstoffen.** Somit hervorragend neben Baustählen auch für hochlegierte und rostbeständige Stähle, Nickelbasislegierungen, Titanlegierungen und harte Aluminiumlegierungen.

**Karnasch CERAMIC STANDARD PRO flap discs:**

**Aggressive grinding and surface processing also for difficult to grind materials.** Excellent in addition to structural steels also for high-alloy and stainless steel, carbon steel, nickel based alloys, titanium alloys, hard aluminum alloys.

## ANWENDUNG · APPLICATION

| Edelstahl<br>Stainless | Stahl<br>Steel | Hochlegierter Stahl<br>High Nickel alloys | Nichteisen-metall<br>Non ferrous metals | Gusseisen<br>Cast iron | Farbe/Lack<br>Paint |
|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL
OPTIMAL

✓ GUT
GOOD

✓ MÖGLICH
POSSIBLE

## BEARBEITUNG · PROCESSING

Flächenschliff, Schweißnahtbearbeitung, Anfasen, Entgraten

Surface grinding, weld dressing, chamfering, deburring

## EMPFEHLUNG · RECOMMENDATION

Das selbstschärfende Keramikkorn erzielt optimale Schleifergebnisse ohne Anlauffarben.
Beste Schleifergebnisse ergeben sich bei leistungsstarken Winkelschleifern.

The self-sharpening ceramic grain achieves optimal grinding results without tarnishing.
Best grinding results are obtained with powerful angle grinders.



| Art. | Korngröße<br>Grit size | Ø Außen<br>Ø Outer<br>mm | Bohrung<br>Bore<br>mm | Drehzahl<br>(min⁻¹)<br>RPM | Packmenge<br>Unit | € |
|---|---|---|---|---|---|---|
| 12 1000 115 036 | • 36 | 115 | 22 | 13.300 | 10 | 35,50 |
| 12 1000 115 040 | • 40 | 115 | 22 | 13.300 | 10 | 35,50 |
| 12 1000 115 060 | • 60 | 115 | 22 | 13.300 | 10 | 35,50 |
| 12 1000 115 080 | • 80 | 115 | 22 | 13.300 | 10 | 35,50 |
| 12 1000 125 036 | • 36 | 125 | 22 | 12.000 | 10 | 42,50 |
| 12 1000 125 040 | • 40 | 125 | 22 | 12.000 | 10 | 42,50 |
| 12 1000 125 060 | • 60 | 125 | 22 | 12.000 | 10 | 42,50 |
| 12 1000 115 080 | • 80 | 125 | 22 | 12.000 | 10 | 42,50 |

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Movie




Konisch / Angled

**Karnasch ZIRCONIUM STANDARD PRO Fächerschleifscheiben:**

Aggressive Zerspanleistung bei **hoher** Standzeit.
Für alle anspruchsvollen Schleifarbeiten in Stahl/Edelstahl bei wirtschaftlichem Einsatz.

**Karnasch ZIRCONIUM STANDARD PRO flap discs:**

Aggressive cutting performance with **long** disc life.
For all demanding grinding work in steel / stainless steel with economical performance.

## ANWENDUNG · APPLICATION

| Edelstahl / Stainless | Stahl / Steel | Hochlegierter Stahl / High Nickel alloys | Nichteisenmetall / Non ferrous metals | Gusseisen / Cast iron | Farbe/Lack / Paint |
|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL
OPTIMAL

✓ GUT
GOOD

✓ MÖGLICH
POSSIBLE

## BEARBEITUNG · PROCESSING

Schweißnahtbearbeitung, Anfasen, Entgraten, Flächenschliff auf Stahl

Weld dressing, chamfering, deburring, surface grinding on steel

## EMPFEHLUNG · RECOMMENDATION

Zirkonium erzielt die beste Zerspanleistung auf leistungsstarken Winkelschleifern mit erhöhtem Anpressdruck.

Zirconium achieves the best cutting performance on powerful angle grinders with increased contact pressure.



| Art. | Korngröße Grit size | ∅ Außen ∅ Outer mm | Bohrung Bore mm | max Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|---|
| 12 1010 115 036 | • 36 | 115 | 22 | 13.300 | 10 | 23,50 |
| 12 1010 115 040 | • 40 | 115 | 22 | 13.300 | 10 | 23,50 |
| 12 1010 115 060 | • 60 | 115 | 22 | 13.300 | 10 | 23,50 |
| 12 1010 115 080 | • 80 | 115 | 22 | 13.300 | 10 | 23,50 |
| 12 1010 115 120 | • 120 | 115 | 22 | 13.300 | 10 | 23,50 |
| 12 1010 125 036 | • 36 | 125 | 22 | 12.000 | 10 | 29,00 |
| 12 1010 125 040 | • 40 | 125 | 22 | 12.000 | 10 | 29,00 |
| 12 1010 125 060 | • 60 | 125 | 22 | 12.000 | 10 | 29,00 |
| 12 1010 125 080 | • 80 | 125 | 22 | 12.000 | 10 | 29,00 |
| 12 1010 125 120 | • 120 | 125 | 22 | 12.000 | 10 | 29,00 |

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Movie

# 12 1020 ZIRCONIUM XXL-COLOSSUS

Fächerschleifscheiben
Flap discs






Konisch / Angled

**Karnasch ZIRCONIUM XXL-COLOSSUS Fächerschleifscheiben:**

Aggressive Zerspanleistung bei **hervorragender** Standzeit (wesentlich höhere Standzeit als Standard-Zirkonium Fächerschleifscheiben). Für alle anspruchsvollen Schleifarbeiten in Stahl / Edelstahl bei wirtschaftlichstem Einsatz.

Durch XXL-COLOSSUS-Technologie mit bis zu 50–60 % mehr Korund Schleifkörpern ergibt sich eine bis zu 50 % höhere Nutzungsdauer als Standard Zirkonium Fächerschleifscheiben.

Durch die erheblich vergrößerte Materialdicke der XXL-COLOSSUS-Technologie entsteht ein positiver Dämpfungseffekt für ein Mehr an Kontrolle und weniger Vibrationen.

Durch eine vollflächige Nutzung der Scheibe entsteht eine gleichmäßige Abnutzung und weniger Schleifmaterialabfall. Das sorgt für eine erhebliche Einsparungen von Ressourcen und somit Abfallvermeidung.

**Karnasch ZIRCONIUM XXL-COLOSSUS flap discs:**

Aggressive cutting performance with **excellent** tool life (much longer service life than standard zirconium flap discs). For all demanding grinding work in steel / stainless steel with the most economical performance.

XXL-COLOSSUS technology with up to 50–60 % more corundum abrasives increases service life up to 50 % against standard zirconium flap discs.

The significantly increased material thickness of XXL-COLOSSUS technology creates a positive damping effect for more control and less vibration.

## ANWENDUNG · APPLICATION

| Edelstahl<br>Stainless | Stahl<br>Steel | Hochlegierter Stahl<br>High Nickel alloys | Nichteisenmetall<br>Non ferrous metals | Gusseisen<br>Cast iron | Farbe/Lack<br>Paint |
|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL
OPTIMAL

✓ GUT
GOOD

✓ MÖGLICH
POSSIBLE

## BEARBEITUNG · PROCESSING

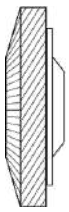
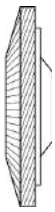
Schweißnahtbearbeitung, Anfasen, Entgraten, Flächenschliff auf Stahl

Weld dressing, chamfering, deburring, surface grinding on steel

## EMPFEHLUNG · RECOMMENDATION

Zirkonium erzielt die beste Zerspanleistung auf leistungsstarken Winkelschleifern mit erhöhtem Anpressdruck.

Zirconium achieves the best cutting performance on powerful angle grinders with increased contact pressure.

| XXL-Colossus | Standard |
|---|---|
|  |  |



| Art. | Korngröße<br>Grit size | Ø Außen<br>Ø Outer<br>mm | Bohrung<br>Bore<br>mm | Drehzahl<br>(min⁻¹)<br>RPM | Packmenge<br>Unit | € |
|---|---|---|---|---|---|---|
| 12 1020 115 040 | • 40 | 115 | 22 | 13.300 | 10 | 32,50 |
| 12 1020 115 060 | • 60 | 115 | 22 | 13.300 | 10 | 32,50 |
| 12 1020 115 080 | • 80 | 115 | 22 | 13.300 | 10 | 32,50 |
| 12 1020 125 040 | • 40 | 125 | 22 | 12.000 | 10 | 37,00 |
| 12 1020 125 060 | • 60 | 125 | 22 | 12.000 | 10 | 37,00 |
| 12 1020 125 080 | • 80 | 125 | 22 | 12.000 | 10 | 37,00 |

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CERAMIC FLEX-ELAST

Fächerschleifscheiben
Flap discs

**12 1030**




Flexibel / Flexible

**Karnasch CERAMIC FlexElast Fächerschleifscheiben:**

Ideal für Übergänge und Oberflächenbearbeitung bei gekrümmten und konturierten Oberflächen.

CERAMIC FlexElast Schleifscheiben wurden für ein aggressives Schleifen mit maximaler Materialabnahme entwickelt.
Sie bieten eine hohe Leistung bei Übergängen und bei der Bearbeitung von konkaven und konvexen Oberflächen, Konturen und Profilen. Die flexible Konstruktion verringert das Risiko von Schleifvertiefungen und Ausfugungen.

Die Oberflächenzusammensetzung verbessert die Materialabnahme, verhindert ein Verkleben und erlaubt ein kühleres Schleifen.
Sie sorgen für eine erheblich längere Nutzungsdauer als Kunstharzfaserscheiben.

**Karnasch CERAMIC FlexElast flap discs:**

Ideal for blending and finishing on curved and contoured surfaces.

CERAMIC FlexElast is designed for aggressive grinding with maximum stock removal.
It offers flexibility for blending and finishing on concave and convex surfaces, contours and profiles. Its flexible cloth construction reduces the risk of undercutting and gouging.

Top coat additives improve stock removal, prevent clogging and allow cooler grinding. It gives significantly longer life than resin fibre discs.

## ANWENDUNG · APPLICATION

| Edelstahl<br>Stainless | Stahl<br>Steel | Hochlegierter Stahl<br>High Nickel alloys | Nichteisen-metall<br>Non ferrous metals | Gusseisen<br>Cast iron | Farbe/Lack<br>Paint |
|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL
OPTIMAL

✓ GUT
GOOD

✓ MÖGLICH
POSSIBLE

## BEARBEITUNG · PROCESSING

**Einsatzgebiete Beispiele:**
Rohleitung- und Behälterbau, Endbearbeitung von Eckschweissungen, generelle Entrostungs- und Entgratungsarbeiten, Vorbereitungen zum Schweißen.

**Application examples:**
Pipe fabrications, vessels, tanks, enclosures or finishing of corner welds, rust removal and stock removal, preparation for welding.



| Art. | Korngröße<br>Grit size | Ø Außen<br>Ø Outer<br>mm | Bohrung<br>Bore<br>mm | max<br>Drehzahl<br>(min⁻¹)<br>RPM | Packmenge<br>Unit | € |
|---|---|---|---|---|---|---|
| 12 1030 115 040 | • 40 | 115 | 22 | 13.300 | 10 | 47,50 |
| 12 1030 115 060 | • 60 | 115 | 22 | 13.300 | 10 | 47,50 |
| 12 1030 115 080 | • 80 | 115 | 22 | 13.300 | 10 | 47,50 |

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# 12 1040 ZIRCONIUM FLEX-ELAST

Fächerschleifscheiben
Flap discs




Flexibel / Flexible

## ANWENDUNG · APPLICATION

| Edelstahl / Stainless | Stahl / Steel | Hochlegierter Stahl / High Nickel alloys | Nichteisenmetall / Non ferrous metals | Gusseisen / Cast iron | Farbe/Lack / Paint |
|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL OPTIMAL
✓ GUT GOOD
✓ MÖGLICH POSSIBLE

## BEARBEITUNG · PROCESSING

**Einsatzgebiete Beispiele:**
Rohleitung- und Behälterbau, Endbearbeitung von Eckschweissungen, generelle Entrostungs- und Entgratungsarbeiten, Vorbereitungen zum Schweißen.

**Application examples:**
Pipe fabrications, vessels, tanks, enclosures or finishing of corner welds, rust removal and stock removal, preparation for welding.

## EMPFEHLUNG · RECOMMENDATION

Zirkonkorund erzielt die beste Zerspanleistung auf leistungsstarken Winkelschleifern mit erhöhtem Anpressdruck.

Zirconium corundum achieves the best cutting performance on powerful angle grinders with increased contact pressure.



**Karnasch ZIRCONIUM FlexElast Fächerschleifscheiben:**

Ideal zum Veredeln und Endbearbeitung großer konkaver und konvexer Flächen, Konturen und Profile. Für schwer zugängliche Stellen sowie schwierig zu bearbeitende Stellen z.B. enge Radien.

Die flexible Konstruktion verringert das Risiko von Schleifvertiefungen und Ausfugungen sowie das „Einschneiden" und die Rillenbildung auf dem Werkstück.

Ein weiterer Vorteil ist die hohe Reißfestigkeit beim Schleifen von Ecken und Kanten.

**Karnasch ZIRCONIUM FlexElast flap discs:**

Ideal for blending and finishing large concave and convex surfaces, contours and profiles. For hard-to-reach places as well as places that are difficult to process e.g. tight radii.

Its flexible cloth construction reduces the risk of undercutting and gouging.

Another advantage is the higher resistance to tearing when grinding corners and edges.

| Art. | Korngröße Grit size | Ø Außen Ø Outer mm | Bohrung Bore mm | max Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|---|
| 12 1040 115 040 | • 40 | 115 | 22 | 13.300 | 10 | 37,00 |
| 12 1040 115 060 | • 60 | 115 | 22 | 13.300 | 10 | 37,00 |
| 12 1040 115 080 | • 80 | 115 | 22 | 13.300 | 10 | 37,00 |
| 12 1040 125 040 | • 40 | 125 | 22 | 12.000 | 10 | 44,00 |
| 12 1040 125 060 | • 60 | 125 | 22 | 12.000 | 10 | 44,00 |
| 12 1040 125 080 | • 80 | 125 | 22 | 12.000 | 10 | 44,00 |

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CERAMIC QUICK-CHANGE MINI

Fächerschleifscheiben
Flap discs

**12 1050**






Konisch / Angled

## ANWENDUNG · APPLICATION

| Edelstahl<br>Stainless | Stahl<br>Steel | Hochlegierter Stahl<br>High Nickel alloys | Nichteisenmetall<br>Non ferrous metals | Gusseisen<br>Cast iron | Farbe/Lack<br>Paint |
|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL
OPTIMAL

✓ GUT
GOOD

✓ MÖGLICH
POSSIBLE

## BEARBEITUNG · PROCESSING

**Einsatzgebiete Beispiele:**
Rohleitung- und Behälterbau, Endbearbeitung von Eckschweissungen, generelle Entrostungs- und Entgratungsarbeiten, Vorbereitungen zum Schweißen.

**Application examples:**
Pipe fabrications, vessels, tanks, enclosures or finishing of corner welds, rust removal and stock removal, preparation for welding.



**Karnasch CERAMIC QUICK-CHANGE MINI Fächerschleifscheiben:**
FÜR MAXIMALE MATERIALABNAHME

Eine Scheibe mit kleinem Durchmesser für aggressives Schleifen und ideal geeignet für den Einsatz an schwer zugänglichen Stellen.

Unsere CERAMIC QUICK-CHANGE MINI Schleifscheiben bieten eine außergewöhnlich hohe Produktivität und eine längere Nutzungsdauer im Vergleich zu traditionell beschichteten Schleifscheiben des gleichen Durchmessers.

Vorteile:
- Verbesserte Materialabnahme
- Verhindert das Verkleben
- Erlaubt kühlere Schleifvorgänge
- Schnellwechsel-Spannsystem für einen effizienteren Scheibenwechsel

**Karnasch CERAMIC QUICK-CHANGE MINI flap discs:**
FOR MAXIMUM MATERIAL REMOVAL AND BLENDING WHERE ACCESSIBILITY IS A PROBLEM

A small diameter disc designed for aggressive grinding and is ideal for use in hard to access and awkward areas.

The CERAMIC QUICK-CHANGE MINI disc offers exceptional productivity and lasts significantly longer compared to traditional coated abrasive discs of the same diameter.

Advantages:
- Improves stock removal
- Prevents clogging
- Allows cooler grinding
- Quick-Change locking system provides efficient changeover of discs

### CERAMIC QUICK-CHANGE MINI „R Typ“
### CERAMIC QUICK-CHANGE MINI „R Type“

| Art. | Korngröße Grit size | Ø Außen Ø Outer mm / inches | Bohrung Bore mm | Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|---|
| 12 1050 050 036 | • 36 | 50 / 2 | Quick-Change | 30.000 | 10 | 26,00 |
| 12 1050 050 040 | • 40 | 50 / 2 | Quick-Change | 30.000 | 10 | 26,00 |
| 12 1050 050 060 | • 60 | 50 / 2 | Quick-Change | 30.000 | 10 | 26,00 |
| 12 1050 050 080 | • 80 | 50 / 2 | Quick-Change | 30.000 | 10 | 26,00 |
| 12 1050 075 036 | • 36 | 75 / 3 | Quick-Change | 20.000 | 10 | 35,00 |
| 12 1050 075 040 | • 40 | 75 / 3 | Quick-Change | 20.000 | 10 | 35,00 |
| 12 1050 075 060 | • 60 | 75 / 3 | Quick-Change | 20.000 | 10 | 35,00 |
| 12 1050 075 080 | • 80 | 75 / 3 | Quick-Change | 20.000 | 10 | 35,00 |

### SCHNELLWECHSEL-AUFNAHMEHALTER „R Typ“
### QUICK-CHANGE HOLDER „R Type“

| Ø Außen Ø Outer mm / inches | Drehzahl (min⁻¹) RPM | Packmenge Unit | 6 mm / ¼" Art. | € | M14 Art. | € | ½" 20UNF Art. | € |
|---|---|---|---|---|---|---|---|---|
| 50 / 2 | 30.000 | 1 | 12 5000 | 9,30 | 12 5020 | 26,80 | 12 5140 | 26,45 |
| 75 / 3 | 20.000 | 1 | - | - | 12 5030 | 28,40 | 12 5150 | 22,75 |

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# 12 1060 CERAMIC FLEX-ELAST MINI

Fächerschleifscheiben
Flap discs






Flexibel / Flexible

**Karnasch CERAMIC FLEX-ELAST MINI Fächerschleifscheiben:**
**Zum Verfeinern und Fertigstellen von welligen oder profilierten Oberflächen.**

Eine Scheibe mit kleinem Durchmesser für aggressives Schleifen und ideal geeignet für den Einsatz an schwer zugänglichen Stellen.

Durch die hohe Flexibilität lassen sich Übergänge, konkave und konvexe Oberflächen, Konturen und Profile besser bearbeiten.

Die flexible Konstruktion verringert das Risiko von Schleifvertiefungen und Ausfugungen.

Vorteile:
- Verbesserte Materialabnahme
- Verhindert das Verkleben
- Erlaubt kühlere Schleifvorgänge
- Schnellwechsel-Spannsystem für einen effizienteren Scheibenwechsel

**Karnasch CERAMIC FLEX-ELAST MINI flap discs:**
**For blending and finishing on awkward curved and contoured surfaces.**

A small diameter disc designed for aggressive grinding and is ideal for use in hard to access and awkward areas.

It offers flexibility for blending and finishing on concave and convex surfaces, contours and profiles.

Its flexible construction reduces the risk of undercutting and gouging.

Advantages:
- Improves stock removal
- Prevents clogging
- Allows cooler grinding
- Quick-Change locking system provides efficient changeover of discs

## ANWENDUNG · APPLICATION

| Edelstahl / Stainless | Stahl / Steel | Hochlegierter Stahl / High Nickel alloys | Nichteisenmetall / Non ferrous metals | Gusseisen / Cast iron | Farbe/Lack / Paint |
|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL OPTIMAL
✓ GUT GOOD
✓ MÖGLICH POSSIBLE

## BEARBEITUNG · PROCESSING

**Einsatzgebiete Beispiele:**
Rohleitung- und Behälterbau, Endbearbeitung von Eckschweissungen, generelle Entrostungs- und Entgratungsarbeiten, Vorbereitungen zum Schweißen.

**Application examples:**
Pipe fabrications, vessels, tanks, enclosures or finishing of corner welds, rust removal and stock removal, preparation for welding.



## CERAMIC FLEX-ELAST MINI „R Typ“
## CERAMIC FLEX-ELAST MINI „R Type“



| Art. | Korngröße Grit size | Ø Außen Ø Outer mm / inches | Bohrung Bore mm | Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|---|
| 12 1060 050 040 | • 40 | 50 / 2 | Quick-Change | 25.000 | 10 | 26,00 |
| 12 1060 050 060 | • 60 | 50 / 2 | Quick-Change | 25.000 | 10 | 26,00 |
| 12 1060 050 080 | • 80 | 50 / 2 | Quick-Change | 25.000 | 10 | 26,00 |
| 12 1060 075 040 | • 40 | 75 / 3 | Quick-Change | 20.000 | 10 | 34,00 |
| 12 1060 075 060 | • 60 | 75 / 3 | Quick-Change | 20.000 | 10 | 34,00 |
| 12 1060 075 080 | • 80 | 75 / 3 | Quick-Change | 20.000 | 10 | 34,00 |

## SCHNELLWECHSEL-AUFNAHMEHALTER „R Typ“
## QUICK-CHANGE HOLDER „R Type“

| Ø Außen Ø Outer mm / inches | Drehzahl (min⁻¹) RPM | Packmenge Unit | 6 mm / ¼" Art. | € | M14 Art. | € | ½" 20UNF Art. | € |
|---|---|---|---|---|---|---|---|---|
| 50 / 2 | 30.000 | 1 | 12 5000 | 9,30 | 12 5020 | 26,80 | 12 5140 | 26,45 |
| 75 / 3 | 20.000 | 1 | - | - | 12 5030 | 28,40 | 12 5150 | 22,75 |

Sicherheitshinweise
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ZIRCONIUM MINI

Fächerschleifscheiben
Flap discs

**12 1070**




Konisch / Angled

**Karnasch ZIRCONIUM MINI Fächerschleifscheiben:**

Quick-Change-Minidiscs sind Schleifscheiben mit kleinem Durchmesser für Eisenwerkstoffe.

Ideal geeignet für den Einsatz an schwer zugänglichen Stellen.

ZIRCONIUM MINI Schleifscheiben bieten eine außergewöhnlich hohe Lebensdauer im Vergleich zu herkömmlichen Schleifscheiben mit dem selben Durchmesser.

Das Schnellwechsel-Spannsystem bietet einen bequemen und effizienteren Scheibenwechsel.

**Karnasch ZIRCONIUM MINI flap discs:**

Quick-Change minidiscs are small diameter flap discs for Ferrous materials.

Ideal for material removal and blending where accessibility is a problem or the work area needs to be kept to a minimum.

The minidisc offers exceptional life compared to traditional Quick-Change discs of the same diameter.

The easy locking system is suitable for fast, convenient changeover of discs.

## ANWENDUNG · APPLICATION

| Edelstahl / Stainless | Stahl / Steel | Hochlegierter Stahl / High Nickel alloys | Nichteisenmetall / Non ferrous metals | Gusseisen / Cast iron | Farbe/Lack / Paint |
|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL
OPTIMAL

✓ GUT
GOOD

✓ MÖGLICH
POSSIBLE

## BEARBEITUNG · PROCESSING

**Einsatzgebiete Beispiele:**
Rohleitung- und Behälterbau, Endbearbeitung von Eckschweissungen, generelle Entrostungs- und Entgratungsarbeiten, Vorbereitungen zum Schweißen.

**Application examples:**
Pipe fabrications, vessels, tanks, enclosures or finishing of corner welds, rust removal and stock removal, preparation for welding.



### ZIRCONIUM MINI „R Typ“
### ZIRCONIUM MINI „R Type“

| Art. | Korngröße Grit size | Ø Außen Ø Outer mm / inches | Bohrung Bore mm | Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|---|
| 12 1070 050 040 | • 40 | 50 / 2 | Quick-Change | 30.000 | 10 | 27,50 |
| 12 1070 050 060 | • 60 | 50 / 2 | Quick-Change | 30.000 | 10 | 27,50 |
| 12 1070 050 080 | • 80 | 50 / 2 | Quick-Change | 30.000 | 10 | 27,50 |
| 12 1070 075 040 | • 40 | 75 / 3 | Quick-Change | 20.000 | 10 | 35,50 |
| 12 1070 075 060 | • 60 | 75 / 3 | Quick-Change | 20.000 | 10 | 35,50 |
| 12 1070 075 080 | • 80 | 75 / 3 | Quick-Change | 20.000 | 10 | 35,50 |

### SCHNELLWECHSEL-AUFNAHMEHALTER „R Typ“
### QUICK-CHANGE HOLDER „R Type“

| Ø Außen Ø Outer mm / inches | Drehzahl (min⁻¹) RPM | Packmenge Unit | 6 mm / ¼" Art. | € | M14 Art. | € | ½" 20UNF Art. | € |
|---|---|---|---|---|---|---|---|---|
| 50 / 2 | 30.000 | 1 | 12 5000 | 9,30 | 12 5020 | 26,80 | 12 5140 | 26,45 |
| 75 / 3 | 20.000 | 1 | - | - | 12 5030 | 28,40 | 12 5150 | 22,75 |

Sicherheitshinweise
Safety instructions
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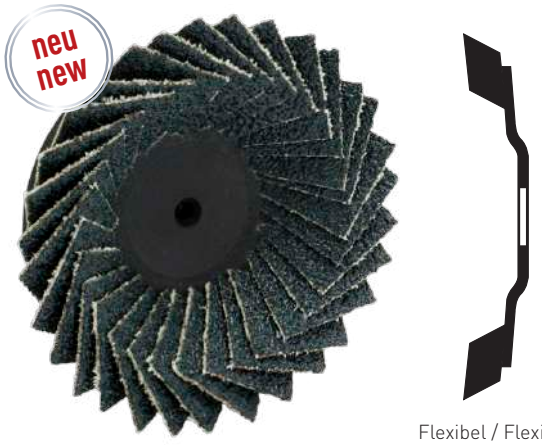
Film
Movie

# 12 1080 ZIRCONIUM FLEX-ELAST MINI

Fächerschleifscheiben
Flap discs






Flexibel / Flexible

**Karnasch ZIRCONIUM FLEX-ELAST MINI Fächerschleifscheiben:**

Für aggressives Schleifen und ideal geeignet für den Einsatz an schwer zugänglichen Stellen.

Durch die hohe Flexibilität lassen sich Übergänge, konkave und konvexe Oberflächen, Konturen und Profile besser bearbeiten.

Die flexible Konstruktion verringert das Risiko von Schleifvertiefungen und Ausfugungen.

Das Schnellwechsel-Spannsystem bietet einen bequemen und effizienteren Scheibenwechsel.

**Karnasch ZIRCONIUM FLEX-ELAST MINI flap discs:**

Ideal for blending and finishing on ferrous materials where accessibility is a problem and the work area is curved or profiled.

Flex-Elast Mini discs offer improved access to awkward areas and the flexibility for blending and finishing on curved surfaces, profiles and contours.

Its flexible construction reduces the risk of undercutting and gouging.

The easy locking system is suitable for fast, convenient changeover of discs.

## ANWENDUNG · APPLICATION

| Edelstahl<br>Stainless | Stahl<br>Steel | Hochlegierter Stahl<br>High Nickel alloys | Nichteisen-metall<br>Non ferrous metals | Gusseisen<br>Cast iron | Farbe/Lack<br>Paint |
|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL
OPTIMAL

✓ GUT
GOOD

✓ MÖGLICH
POSSIBLE

## BEARBEITUNG · PROCESSING

**Einsatzgebiete Beispiele:**
Rohleitung- und Behälterbau, Endbearbeitung von Eckschweissungen, generelle Entrostungs- und Entgratungsarbeiten, Vorbereitungen zum Schweißen.

**Application examples:**
Pipe fabrications, vessels, tanks, enclosures or finishing of corner welds, rust removal and stock removal, preparation for welding.




## ZIRCONIUM FLEX-ELAST MINI „R Typ“
## ZIRCONIUM FLEX-ELAST MINI „R Type“



| Art. | Korngröße Grit size | Ø Außen Ø Outer mm / inches | Bohrung Bore mm | Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|---|
| 12 1080 050 040 | • 40 | 50 / 2 | Quick-Change | 25.000 | 10 | 23,50 |
| 12 1080 050 060 | • 60 | 50 / 2 | Quick-Change | 25.000 | 10 | 23,50 |
| 12 1080 050 080 | • 80 | 50 / 2 | Quick-Change | 25.000 | 10 | 23,50 |
| 12 1080 050 120 | • 120 | 50 / 2 | Quick-Change | 25.000 | 10 | 23,50 |
| 12 1080 075 040 | • 40 | 75 / 3 | Quick-Change | 20.000 | 10 | 30,50 |
| 12 1080 075 060 | • 60 | 75 / 3 | Quick-Change | 20.000 | 10 | 30,50 |
| 12 1080 075 080 | • 80 | 75 / 3 | Quick-Change | 20.000 | 10 | 30,50 |
| 12 1080 075 120 | • 120 | 75 / 3 | Quick-Change | 20.000 | 10 | 30,50 |

## SCHNELLWECHSEL-AUFNAHMEHALTER „R Typ“
## QUICK-CHANGE HOLDER „R Type“

| Ø Außen Ø Outer mm / inches | Drehzahl (min⁻¹) RPM | Pack-menge Unit | 6 mm / ¼" Art. | € | M14 Art. | € | ½" 20UNF Art. | € |
|---|---|---|---|---|---|---|---|---|
| 50 / 2 | 30.000 | 1 | 12 5000 | 9,30 | 12 5020 | 26,80 | 12 5140 | 26,45 |
| 75 / 3 | 20.000 | 1 | - | - | 12 5030 | 28,40 | 12 5150 | 22,75 |

Sicherheits-hinweise
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Movie

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www.grampelhuber.at

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# SCHNELLWECHSEL-SCHLEIFSCHEIBEN neu new

# QUICK-CHANGE DISCS neu new




5.6

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www.grampelhuber.at

PROFESSIONAL TOOLS

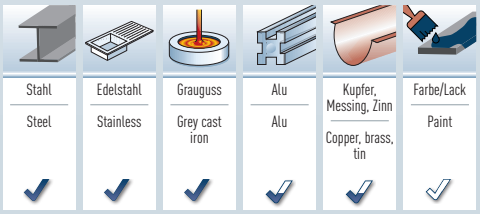
Netto-Preise · Net sales prices

# 12 2010
# 12 2020

## KERAMIK SCHNELLWECHSEL-SCHLEIFSCHEIBEN
## CERAMIC QUICK-CHANGE DISCS




### ANWENDUNG · APPLICATION



| Stahl / Steel | Edelstahl / Stainless | Grauguss / Grey cast iron | Alu / Alu | Kupfer, Messing, Zinn / Copper, brass, tin | Farbe/Lack / Paint |
|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL
OPTIMAL

✓ GUT
GOOD

✓ MÖGLICH
POSSIBLE

### BEARBEITUNG · PROCESSING

Flächenschliff, Schweißnahtbearbeitung, Anfasen, Entgraten

Surface grinding, weld dressing, chamfering, deburring

### EMPFEHLUNG · RECOMMENDATION

- Selbst bei geringem Anpressdruck erzielt das selbstschärfende Keramikkorn optimale Schleifergebnisse ohne Anlauffarben
- Den größten Materialabtrag erzielen Sie mit leistungsstarken Winkelschleifern

- The self-sharpening ceramic grain achieves even with low contact pressure optimal grinding results without tarnishing
- Higher stock removal is obtained with powerful angle grinders



### Karnsch KERAMIK SCHNELLWECHSEL-SCHLEIFSCHEIBEN

Karnasch KERAMIK Schnellwechsel-Schleifscheiben sind ideal für das Schleifen von Edelstahl, hochnickelhaltigen Legierungen und anderen wärmeempfindlichen Materialien. Es findet eine schnelle Materialabtragung von Metall unter hohem Druck statt. Selbst bei geringem Anpressdruck erzielt das selbstschärfende Keramikkorn optimale Schleifergebnisse ohne Anlauffarben. Höchster Materialabtrag ergibt sich bei leistungsstarken Winkelschleifern. Das Schnellwechsel-Spannsystem bietet einen bequemen und effizienteren Scheibenwechsel.

### Karnasch CERAMIC QUICK-CHANGE DISCS

Karnasch CERAMIC Quick-Change Discs are ideal for use on stainless steel, high-nickel alloys and other heat sensitive materials. There is a rapid material removal on high pressure applications. Even with low contact pressure, the self-sharpening ceramic grain achieves optimum grinding results without tarnishing. The best grinding results are achieved with powerful angle grinders. The easy locking system is suitable for a fast convenience change of discs.

## 12 2010 KERAMIK SCHNELLWECHSEL-SCHLEIFSCHEIBEN „AD Typ“
## CERAMIC QUICK-CHANGE DISCS „AD Type“



| Art. | Korngröße Grit size | Durchmesser Diameter mm | max Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|
| 12 2010 050 036 | ● 36 | 50 | 25.000 | 50 | 35,00 |
| 12 2010 050 060 | ● 60 | 50 | 25.000 | 50 | 35,00 |
| 12 2010 050 080 | ● 80 | 50 | 25.000 | 50 | 35,00 |
| 12 2010 075 036 | ● 36 | 75 | 20.000 | 50 | 60,00 |
| 12 2010 075 060 | ● 60 | 75 | 20.000 | 50 | 60,00 |
| 12 2010 075 080 | ● 80 | 75 | 20.000 | 50 | 60,00 |

### SCHNELLWECHSEL-AUFNAHMEHALTER „AD Typ“
### QUICK-CHANGE HOLDER „AD Type“

| Ø Außen Ø Outer mm / inches | max Drehzahl (min⁻¹) RPM | Packmenge Unit | 6 mm / ¼" Art. | € | ½" 20UNF Art. | € |
|---|---|---|---|---|---|---|
| 50 / 2 | 30.000 | 1 | 12 5040 | 17,65 | 12 5120 | 18,65 |
| 75 / 3 | 20.000 | 1 | 12 5050 | 19,25 | 12 5130 | 20,60 |

## 12 2020 KERAMIK SCHNELLWECHSEL-SCHLEIFSCHEIBEN „R Typ“
## CERAMIC QUICK-CHANGE DISCS „R Type“



| Art. | Korngröße Grit size | Durchmesser Diameter mm | max Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|
| 12 2020 050 036 | ● 36 | 50 | 25.000 | 50 | 35,00 |
| 12 2020 050 040 | ● 40 | 50 | 25.000 | 50 | 35,00 |
| 12 2020 050 050 | ● 50 | 50 | 25.000 | 50 | 35,00 |
| 12 2020 050 060 | ● 60 | 50 | 25.000 | 50 | 35,00 |
| 12 2020 075 036 | ● 36 | 75 | 20.000 | 50 | 47,50 |
| 12 2020 075 040 | ● 40 | 75 | 20.000 | 50 | 47,50 |
| 12 2020 075 050 | ● 50 | 75 | 20.000 | 50 | 47,50 |
| 12 2020 075 060 | ● 60 | 75 | 20.000 | 50 | 47,50 |

### SCHNELLWECHSEL-AUFNAHMEHALTER „R Typ“
### QUICK-CHANGE HOLDER „R Type“

| Ø Außen Ø Outer mm / inches | max Drehzahl (min⁻¹) RPM | Packmenge Unit | 6 mm / ¼" Art. | € | M14 Art. | € | ½" 20UNF Art. | € |
|---|---|---|---|---|---|---|---|---|
| 50 / 2 | 30.000 | 1 | 12 5000 | 9,30 | 12 5020 | 26,80 | 12 5140 | 26,45 |
| 75 / 3 | 20.000 | 1 | 12 5010 | 11,40 | 12 5030 | 28,40 | 12 5150 | 22,75 |




## ANWENDUNG · APPLICATION

| Stahl / Steel | Edelstahl / Stainless | Grauguss / Grey cast iron | Alu / Alu | Kupfer, Messing, Zinn / Copper, brass, tin | Farbe/Lack / Paint |
|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL
OPTIMAL

✓ GUT
GOOD

✓ MÖGLICH
POSSIBLE

## BEARBEITUNG · PROCESSING

Flächenschliff, Schweißnahtbearbeitung, Anfasen, Entgraten

Surface grinding, weld dressing, chamfering, deburring

## EMPFEHLUNG · RECOMMENDATION

- Selbst bei geringem Anpressdruck erzielt das selbstschärfende Keramikkorn optimale Schleifergebnisse ohne Anlauffarben
- Den größten Materialabtrag erzielen Sie mit leistungsstarken Winkelschleifern

- The self-sharpening ceramic grain achieves even with low contact pressure optimal grinding results without tarnishing
- Higher stock removal is obtained with powerful angle grinders



## Karnsch KERAMIK SCHNELLWECHSEL-SCHLEIFSCHEIBEN

Karnasch Keramik Schnellwechsel-Schleifscheiben sind ideal für das Schleifen von Edelstahl, hochnickelhaltigen Legierungen und anderen wärmeempfindlichen Materialien. Es findet eine schnelle Materialabtragung von Metall unter hohem Druck statt. Selbst bei geringem Anpressdruck erzielt das selbstschärfende Keramikkorn optimale Schleifergebnisse ohne Anlauffarben. Höchster Materialabtrag ergibt sich bei leistungsstarken Winkelschleifern. Das Schnellwechsel-Spannsystem bietet einen bequemen und effizienteren Scheibenwechsel.

## Karnasch CERAMIC QUICK-CHANGE DISCS

Karnasch CERAMIC Quick-Change Discs are ideal for use on stainless steel, high-nickel alloys and other heat sensitive materials. There is a rapid material removal on high pressure applications. Even with low contact pressure, the self-sharpening ceramic grain achieves optimum grinding results without tarnishing. The best grinding results are achieved with powerful angle grinders. The easy locking system is suitable for a fast convenience change of discs.

## KERAMIK SCHNELLWECHSEL-SCHLEIFSCHEIBEN „S Typ“
## CERAMIC QUICK-CHANGE DISCS „S Type“



| Art. | Korngröße Grit size | Durchmesser Diameter mm | max Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|
| 12 2025 050 036 | • 36 | 50 | 25.000 | 50 | 35,00 |
| 12 2025 050 040 | • 40 | 50 | 25.000 | 50 | 35,00 |
| 12 2025 050 050 | • 50 | 50 | 25.000 | 50 | 35,00 |
| 12 2025 050 060 | • 60 | 50 | 25.000 | 50 | 35,00 |
| 12 2025 075 036 | • 36 | 75 | 20.000 | 50 | 47,50 |
| 12 2025 075 040 | • 40 | 75 | 20.000 | 50 | 47,50 |
| 12 2025 075 050 | • 50 | 75 | 20.000 | 50 | 47,50 |
| 12 2025 075 060 | • 60 | 75 | 20.000 | 50 | 47,50 |

## SCHNELLWECHSEL-AUFNAHMEHALTER „S Typ“
## QUICK-CHANGE HOLDER „S Type“

| Ø Außen Ø Outer mm / inches | max Drehzahl (min⁻¹) RPM | Packmenge Unit | 6 mm / ¼" Art. | € | M14 Art. | € |
|---|---|---|---|---|---|---|
| 50 / 2 | 30.000 | 1 | 12 5080 | 9,30 | 12 5100 | 26,80 |
| 75 / 3 | 20.000 | 1 | 12 5090 | 11,40 | 12 5110 | 28,40 |

Sicherheitshinweise
Safety instructions
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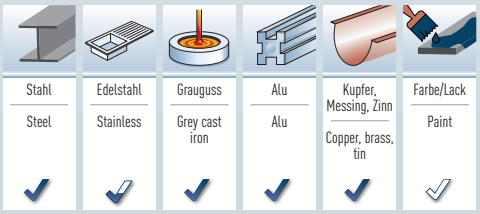
Film
Movie

# 12 2030 / 12 2040 ALUMINIUMOXID SCHNELLWECHSEL-SCHLEIFSCHEIBEN / ALUMINUM OXIDE QUICK-CHANGE DISCS




## ANWENDUNG · APPLICATION




✓ OPTIMAL
OPTIMAL

✓ GUT
GOOD

✓ MÖGLICH
POSSIBLE

## BEARBEITUNG · PROCESSING

Schweißnahtbearbeitung, Anfasen, Entgraten, Flächenschliff auf Stahl

Weld dressing, chamfering, deburring, surface grinding on steel

### Karnasch ALUMINIUMOXID SCHNELLWECHSEL-SCHLEIFSCHEIBEN

Karnasch Aluminiumoxid Schnellwechsel-Schleifscheiben sind ideal zum Schleifen und Entgraten von Metallen, Aufbereiten und Glätten von Schweißnähten, sowie Anfasen und Entgraten.
Im Allgemeinen werden sie auf Winkelschleifern zum Entfernen von Oberflächenfehlern, leichten Kantengraten auf Eisen und Nichteisenmaterialien genutzt. Beste Ergebnisse erzielt man beim Kantenschleifen.

### Karnasch ALUMINUM OXIDE QUICK-CHANGE DISCS

Karnasch Aluminum Oxide Quick-Change grinding discs are ideal for grinding and deburring metals, preparation and smoothing of weld seams, as well as chamfering, deburring and surface grinding on steel. They are generally used on angle grinders to remove surface imperfections, light burrs on iron and non-ferrous materials. The best results are achieved with edge sanding.



Karnasch ALUMINIUMOXID SCHNELLWECHSEL-SCHLEIFSCHEIBEN

Karnasch ALUMINUM OXIDE QUICK-CHANGE DISCS

## 12 2030 SCHNELLWECHSEL-SCHLEIFSCHEIBEN „AD Typ“ / QUICK-CHANGE DISCS „AD Type“

| Art. | Korngröße Grit size | Durchmesser Diameter mm | max Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|
| 12 2030 050 036 | • 36 | 50 | 25.000 | 50 | 20,00 |
| 12 2030 050 040 | • 40 | 50 | 25.000 | 50 | 20,00 |
| 12 2030 050 060 | • 60 | 50 | 25.000 | 50 | 20,00 |
| 12 2030 050 080 | • 80 | 50 | 25.000 | 50 | 20,00 |
| 12 2030 050 120 | • 120 | 50 | 25.000 | 50 | 20,00 |
| 12 2030 075 036 | • 36 | 75 | 20.000 | 50 | 32,50 |
| 12 2030 075 040 | • 40 | 75 | 20.000 | 50 | 32,50 |
| 12 2030 075 060 | • 60 | 75 | 20.000 | 50 | 32,50 |
| 12 2030 075 080 | • 80 | 75 | 20.000 | 50 | 32,50 |
| 12 2030 075 120 | • 120 | 75 | 20.000 | 50 | 32,50 |

### SCHNELLWECHSEL-AUFNAHMEHALTER „AD Typ“ / QUICK-CHANGE HOLDER „AD Type“

| ∅ Außen ∅ Outer mm / inches | max Drehzahl (min⁻¹) RPM | Packmenge Unit | 6 mm / ¼" Art. | € | ½" 20UNF Art. | € |
|---|---|---|---|---|---|---|
| 50 / 2 | 30.000 | 1 | 12 5040 | 17,65 | 12 5120 | 18,65 |
| 75 / 3 | 20.000 | 1 | 12 5050 | 19,25 | 12 5130 | 20,60 |

## 12 2040 SCHNELLWECHSEL-SCHLEIFSCHEIBEN „R Typ“ / QUICK-CHANGE DISCS „R Type“

| Art. | Korngröße Grit size | Durchmesser Diameter mm | max Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|
| 12 2040 050 036 | • 36 | 50 | 25.000 | 50 | 22,50 |
| 12 2040 050 040 | • 40 | 50 | 25.000 | 50 | 22,50 |
| 12 2040 050 060 | • 60 | 50 | 25.000 | 50 | 22,50 |
| 12 2040 050 080 | • 80 | 50 | 25.000 | 50 | 22,50 |
| 12 2040 050 120 | • 120 | 50 | 25.000 | 50 | 22,50 |
| 12 2040 075 036 | • 36 | 75 | 20.000 | 50 | 35,00 |
| 12 2040 075 040 | • 40 | 75 | 20.000 | 50 | 35,00 |
| 12 2040 075 060 | • 60 | 75 | 20.000 | 50 | 35,00 |
| 12 2040 075 080 | • 80 | 75 | 20.000 | 50 | 35,00 |
| 12 2040 075 120 | • 120 | 75 | 20.000 | 50 | 35,00 |

### SCHNELLWECHSEL-AUFNAHMEHALTER „R Typ“ / QUICK-CHANGE HOLDER „R Type“

| ∅ Außen ∅ Outer mm / inches | max Drehzahl (min⁻¹) RPM | Packmenge Unit | 6 mm / ¼" Art. | € | M14 Art. | € | ½" 20UNF Art. | € |
|---|---|---|---|---|---|---|---|---|
| 50 / 2 | 30.000 | 1 | 12 5000 | 9,30 | 12 5020 | 26,80 | 12 5140 | 26,45 |
| 75 / 3 | 20.000 | 1 | 12 5010 | 11,40 | 12 5030 | 28,40 | 12 5150 | 22,75 |

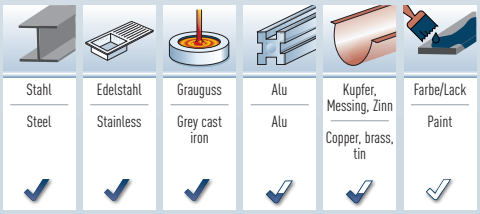
Sicherheitshinweise / Safety instructions 1466-1467
Film / Movie

# ALUMINIUMOXID SCHNELLWECHSEL-SCHLEIFSCHEIBEN
# ALUMINUM OXIDE QUICK-CHANGE DISCS

**12 2045**




## ANWENDUNG · APPLICATION




✓ OPTIMAL
OPTIMAL

✓ GUT
GOOD

✓ MÖGLICH
POSSIBLE

## BEARBEITUNG · PROCESSING

Schweißnahtbearbeitung, Anfasen, Entgraten, Flächenschliff auf Stahl

Weld dressing, chamfering, deburring, surface grinding on steel

### Karnasch ALUMINIUMOXID SCHNELLWECHSEL-SCHLEIFSCHEIBEN

Karnasch Aluminiumoxid Schnellwechsel-Schleifscheiben sind ideal zum Schleifen und Entgraten von Metallen, Aufbereiten und Glätten von Schweißnähten, sowie Anfasen und Entgraten.
Im Allgemeinen werden sie auf Winkelschleifern zum Entfernen von Oberflächenfehlern, leichten Kantengraten auf Eisen und Nichteisenmaterialien genutzt. Beste Ergebnisse erzielt man beim Kantenschleifen.

### Karnasch ALUMINUM OXIDE QUICK-CHANGE DISCS

Karnasch Aluminum Oxide Quick-Change grinding discs are ideal for grinding and deburring metals, preparation and smoothing of weld seams, as well as chamfering, deburring and surface grinding on steel. They are generally used on angle grinders to remove surface imperfections, light burrs on iron and non-ferrous materials. The best results are achieved with edge sanding.



Karnasch ALUMINIUMOXID SCHNELLWECHSEL-SCHLEIFSCHEIBEN

Karnasch ALUMINUM OXIDE QUICK-CHANGE DISCS

### SCHNELLWECHSEL-SCHLEIFSCHEIBEN „S Typ“
### QUICK-CHANGE DISCS „S Type“



| Art. | Korngröße Grit size | Durchmesser Diameter mm | max Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|
| 12 2045 050 036 | • 36 | 50 | 25.000 | 50 | 22,50 |
| 12 2045 050 040 | • 40 | 50 | 25.000 | 50 | 22,50 |
| 12 2045 050 060 | • 60 | 50 | 25.000 | 50 | 22,50 |
| 12 2045 050 080 | • 80 | 50 | 25.000 | 50 | 22,50 |
| 12 2045 050 120 | • 120 | 50 | 25.000 | 50 | 22,50 |
| 12 2045 075 036 | • 36 | 75 | 20.000 | 50 | 35,00 |
| 12 2045 075 040 | • 40 | 75 | 20.000 | 50 | 35,00 |
| 12 2045 075 060 | • 60 | 75 | 20.000 | 50 | 35,00 |
| 12 2045 075 080 | • 80 | 75 | 20.000 | 50 | 35,00 |
| 12 2045 075 120 | • 120 | 75 | 20.000 | 50 | 35,00 |

### SCHNELLWECHSEL-AUFNAHMEHALTER „S Typ“
### QUICK-CHANGE HOLDER „S Type“

| ∅ Außen ∅ Outer mm / inches | max Drehzahl (min⁻¹) RPM | Packmenge Unit | 6 mm / ¼" Art. | € | M14 Art. | € |
|---|---|---|---|---|---|---|
| 50 / 2 | 30.000 | 1 | 12 5080 | 9,30 | 12 5100 | 26,80 |
| 75 / 3 | 20.000 | 1 | 12 5090 | 11,40 | 12 5110 | 28,40 |

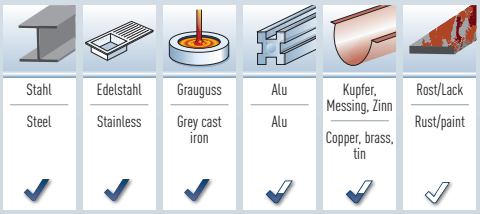
Sicherheitshinweise
Safety instructions
1466-1467

Film
Movie

# 12 2050 / 12 2060
## OBERFLÄCHENBEARBEITUNG SCHNELLWECHSEL-SCHLEIFSCHEIBEN
## SURFACE CONDITIONING QUICK-CHANGE DISCS




### ANWENDUNG · APPLICATION




OPTIMAL
OPTIMAL

GUT
GOOD

MÖGLICH
POSSIBLE

### BEARBEITUNG · PROCESSING

**Karnasch Schnellwechsel-Schleifscheiben** sind ideal zum Entfernen von Oberflächenfehlern, Bearbeitungsspuren, starker Oxidation, Schweißspritzern und zum Reinigen aller Metalle.

Bietet sehr hohe Haltbarkeit bei Kantenbearbeitung.

Gleichmäßige Schnittrate während der gesamten Arbeitsdauer.

**Karnasch Quick-Change Discs** are ideal for removing surface defects, machining marks, heavy oxidation, weld splatter and cleaning all metals.

Offers durability for edge work.

Consistent cut rate throughout life.




## 12 2050 SCHNELLWECHSEL-SCHLEIFSCHEIBEN „AD Typ“
## QUICK-CHANGE DISCS „AD Type“

| Art. | Korngröße Grit size | Durchmesser Diameter mm | Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|
| 12 2050 050 100 | • grob / coarse | 50 | 20.000 | 50 | 55,00 |
| 12 2050 050 120 | • mittel / medium | 50 | 20.000 | 50 | 55,00 |
| 12 2050 050 140 | • fein / fine | 50 | 20.000 | 50 | 55,00 |
| 12 2050 075 100 | • grob / coarse | 75 | 17.000 | 25 | 40,00 |
| 12 2050 075 120 | • mittel / medium | 75 | 17.000 | 25 | 40,00 |
| 12 2050 075 140 | • fein / fine | 75 | 17.000 | 25 | 40,00 |

### SCHNELLWECHSEL-AUFNAHMEHALTER „AD Typ“
### QUICK-CHANGE HOLDER „AD Type“

| ∅ Außen ∅ Outer mm / inches | Drehzahl (min⁻¹) RPM | Packmenge Unit | 6 mm / ¼" Art. | € | ½" 20UNF Art. | € |
|---|---|---|---|---|---|---|
| 50 / 2 | 30.000 | 1 | 12 5040 | 17,65 | 12 5120 | 18,65 |
| 75 / 3 | 20.000 | 1 | 12 5050 | 19,25 | 12 5130 | 20,60 |

## 12 2060 SCHNELLWECHSEL-SCHLEIFSCHEIBEN „R Typ“
## QUICK-CHANGE DISCS „R Type“

| Art. | Korngröße Grit size | Durchmesser Diameter mm | Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|
| 12 2060 050 100 | • grob / coarse | 50 | 20.000 | 50 | 47,50 |
| 12 2060 050 120 | • mittel / medium | 50 | 20.000 | 50 | 47,50 |
| 12 2060 050 140 | • fein / fine | 50 | 20.000 | 50 | 47,50 |
| 12 2060 075 100 | • grob / coarse | 75 | 17.000 | 25 | 35,00 |
| 12 2060 075 120 | • mittel / medium | 75 | 17.000 | 25 | 35,00 |
| 12 2060 075 140 | • fein / fine | 75 | 17.000 | 25 | 35,00 |

### SCHNELLWECHSEL-AUFNAHMEHALTER „R Typ“
### QUICK-CHANGE HOLDER „R Type“

| ∅ Außen ∅ Outer mm / inches | Drehzahl (min⁻¹) RPM | Packmenge Unit | 6 mm / ¼" Art. | € | M14 Art. | € | ½" 20UNF Art. | € |
|---|---|---|---|---|---|---|---|---|
| 50 / 2 | 30.000 | 1 | 12 5000 | 9,30 | 12 5020 | 26,80 | 12 5140 | 26,45 |
| 75 / 3 | 20.000 | 1 | 12 5010 | 11,40 | 12 5030 | 28,40 | 12 5150 | 22,75 |

Sicherheitshinweise
Safety instructions
1466-1467

Film
Movie




## SCHNELLWECHSEL-SCHLEIFSCHEIBEN „S Typ“
## QUICK-CHANGE DISCS „S Type“

| Art. | Korngröße Grit size | Durchmesser Diameter mm | max Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|
| 12 2065 050 100 | • grob / coarse | 50 | 20.000 | 50 | 47,50 |
| 12 2065 050 120 | • mittel / medium | 50 | 20.000 | 50 | 47,50 |
| 12 2065 050 140 | • fein / fine | 50 | 20.000 | 50 | 47,50 |
| 12 2065 075 100 | • grob / coarse | 75 | 17.000 | 25 | 35,00 |
| 12 2065 075 120 | • mittel / medium | 75 | 17.000 | 25 | 35,00 |
| 12 2065 075 140 | • fein / fine | 75 | 17.000 | 25 | 35,00 |

## SCHNELLWECHSEL-AUFNAHMEHALTER „S Typ“
## QUICK-CHANGE HOLDER „S Type“

| ∅ Außen ∅ Outer mm / inches | max Drehzahl (min⁻¹) RPM | Packmenge Unit | 6 mm / ¼" Art. | € | M14 Art. | € |
|---|---|---|---|---|---|---|
| 50 / 2 | 30.000 | 1 | 12 5080 | 9,30 | 12 5100 | 26,80 |
| 75 / 3 | 20.000 | 1 | 12 5090 | 11,40 | 12 5110 | 28,40 |

## ANWENDUNG · APPLICATION

| Stahl / Steel | Edelstahl / Stainless | Grauguss / Grey cast iron | Alu / Alu | Kupfer, Messing, Zinn / Copper, brass, tin | Rost/Lack / Rust/paint |
|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL OPTIMAL

✓ GUT GOOD

✓ MÖGLICH POSSIBLE

## BEARBEITUNG · PROCESSING

**Karnasch Schnellwechsel-Schleifscheiben** sind ideal zum Entfernen von Oberflächenfehlern, Bearbeitungsspuren, starker Oxidation, Schweißspritzern und zum Reinigen aller Metalle.

Bietet sehr hohe Haltbarkeit bei Kantenbearbeitung.

Gleichmäßige Schnittrate während der gesamten Arbeitsdauer.

**Karnasch Quick-Change Discs** are ideal for removing surface defects, machining marks, heavy oxidation, weld splatter and cleaning all metals.

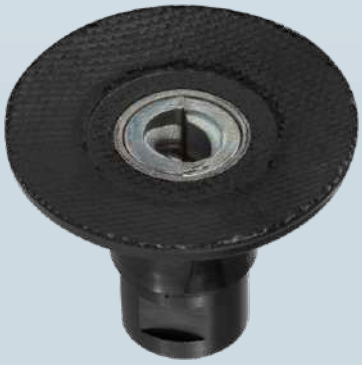
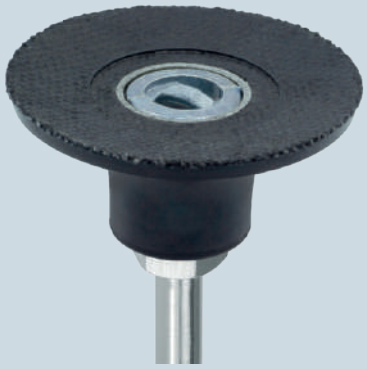
Offers durability for edge work.

Consistent cut rate throughout life.

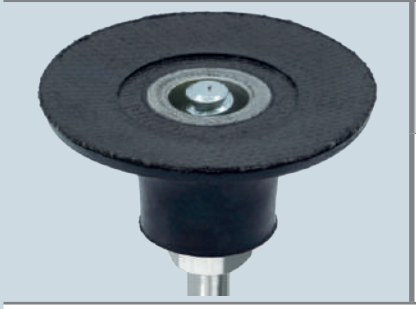



Sicherheitshinweise
Safety instructions
1466-1467

Film
Movie

| | Art. | TYP / TYPE | Für Fächerschleifscheiben und Schnellwechselschleifscheiben For flap discs and quick change-discs | | € |
|---|---|---|---|---|---|
| **R-TYP R-TYPE** | **Aufnahmehalter für Fächerschleifscheiben und Schnellwechselschleifscheiben mit Außengewinde Tools holder for flap discs and quick-change discs with external thread** | | | | |
|  | **12 5020** | Schnellwechsel-Aufnahmehalter „R" Typ, 50 mm mit M14 Direktaufnahme Quick-Change Disc Holder "R" Type 50 mm with M14 direct attachment | 12 1050 050.../ 12 1060 050... 12 1070 050... / 12 1080 050... 12 2020 050... / 12 2040 050... 12 2060 050... | 903-906, 908, 910, 912 | **26,80** |
| | **12 5030** | Schnellwechsel-Aufnahmehalter „R" Typ, 75 mm mit M14 Direktaufnahme Quick-Change Disc Holder "R" Type 75 mm with M14 direct attachment | 12 2020 075... / 12 2040 075... 12 2060 075... | 903-906, 908, 910, 912 | **28,40** |
|  | **12 5140** | Schnellwechsel-Aufnahmehalter „R" Typ, 50 mm mit 1/2" 20 UNF Direktaufnahme Quick-Change Disc Holder "R" Type 50 mm with 1/2" 20 UNF direct attachment | 12 1050 050.../ 12 1060 050... 12 1070 050... / 12 1080 050... 12 2020 050... / 12 2040 050... 12 2060 050... | 903-906, 908, 910, 912 | **26,45** |
| | **12 5150** | Schnellwechsel-Aufnahmehalter „R" Typ, 75 mm mit 1/2" 20 UNF Direktaufnahme Quick-Change Disc Holder "R" Type 75 mm with 1/2" 20 UNF direct attachment | 12 1050 075.../ 12 1060 075... 12 1070 075... / 12 1080 075... 12 2020 075... / 12 2040 075... 12 2060 075... | 903-906, 908, 910, 912 | **22,75** |
|  | **12 5000** | Schnellwechsel-Aufnahmehalter „R" Typ, 50 mm mit festem 6 mm Schaft Quick-Change Disc Holder "R" Type, 50 mm with 6 mm shank | 12 1050 050.../ 12 1060 050... 12 1070 050... / 12 1080 050... 12 2020 050... / 12 2040 050... 12 2060 050... | 903-906, 908, 910, 912 | **9,30** |
| | **12 5010** | Schnellwechsel-Aufnahmehalter „R" Typ, 75 mm mit festem 6 mm Schaft Quick-Change Disc Holder "R" Type, 75 mm with 6 mm shank | 12 1050 075.../ 12 1060 075... 12 1070 075... / 12 1080 075... 12 2020 075... / 12 2040 075... 12 2060 075... | 908, 910, 912 | **11,40** |

Kompatibel mit ROLOC, Combidisc, Roll-on, Holex / Compatible with ROLOC, Combidisc, Roll-on, Holex

| | Art. | TYP / TYPE | Für Fächerschleifscheiben und Schnellwechselschleifscheiben<br>For flap discs and quick change-discs | | € |
|---|---|---|---|---|---|
| **AD-TYP**<br>**AD-TYPE** | **Aufnahmehalter für Fächerschleifscheiben und Schnellwechselschleifscheiben**<br>**Tools holder for flap discs and quick-change discs** | | | | |
|  | **12 5120** | Schnellwechsel-Aufnahmehalter „AD" Typ, 50 mm mit 1/2" 20 UNF Direktaufnahme<br>Quick-Change Disc Holder "AD" Type 50 mm with 1/2" 20 UNF direct attachment | 12 2010 050... / 12 2030 050...<br>12 2050 050... | 908, 910, 912 | 18,65 |
| | **12 5130** | Schnellwechsel-Aufnahmehalter „AD" Typ, 75 mm mit 1/2" 20 UNF Direktaufnahme<br>Quick-Change Disc Holder "AD" Type 75 mm with 1/2" 20 UNF direct attachment | 12 2010 075... / 12 2030 075...<br>12 2050 075... | 908, 910, 912 | 20,60 |
|  | **12 5040** | Schnellwechsel-Aufnahmehalter „AD" Typ, 50 mm mit festem 6 mm Schaft<br>Quick-Change Disc Holder "AD" Type, 50 mm with 6 mm shank | 12 2010 050... / 12 2030 050...<br>12 2050 050... | 908, 910, 912 | 17,65 |
| | **12 5050** | Schnellwechsel-Aufnahmehalter „AD" Typ, 75 mm mit festem 6 mm Schaft<br>Quick-Change Disc Holder "AD" Type, 75 mm with 6 mm shank | 12 2010 075... / 12 2030 075...<br>12 2050 075... | 908, 910, 910 | 19,25 |
| Nur kompatibel mit ATA Karnasch und ATA Garryson AD Vorrichtungssystemen / Only compatible with ATA Karnasch and ATA Garryson AD fixture systems | | | | | |
| **S-TYP**<br>**S-TYPE** | **Aufnahmehalter für Fächerschleifscheiben und Schnellwechselschleifscheiben mit Innengewinde**<br>**Tools holder for flap discs and quick-change discs with internal thread** | | | | |
|  | **12 5100** | Schnellwechsel-Aufnahmehalter „S" Typ, 50 mm mit M14 Direktaufnahme<br>Quick-Change Disc Holder "S" Type 50 mm with M14 direct attachment | 12 2025 050... / 12 2045 050...<br>12 2065 050... | 909, 911, 913 | 26,80 |
| | **12 5110** | Schnellwechsel-Aufnahmehalter „S" Typ, 75 mm mit M14 Direktaufnahme<br>Quick-Change Disc Holder "S" Type 75 mm with M14 direct attachment | 12 22025 075... / 12 2045 075...<br>12 2065 075... | 909, 911, 913 | 28,40 |
|  | **12 5080** | Schnellwechsel-Aufnahmehalter „S" Typ, 50 mm mit festem 6 mm Schaft<br>Quick-Change Disc Holder "S" Type, 50 mm with 6 mm shank | 12 2025 050... / 12 2045 050...<br>12 2065 050... | 909, 911, 913 | 9,30 |
| | **12 5090** | Schnellwechsel-Aufnahmehalter „S" Typ, 75 mm mit festem 6 mm Schaft<br>Quick-Change Disc Holder "S" Type, 75 mm with 6 mm shank | 12 22025 075... / 12 2045 075...<br>12 2065 075... | 909, 911, 913 | 11,40 |
| Kompatibel mit Pferd System / Compatible with Pferd System | | | | | |

## Ihre Notizen & Zeichnungen
## Your notices & drafts

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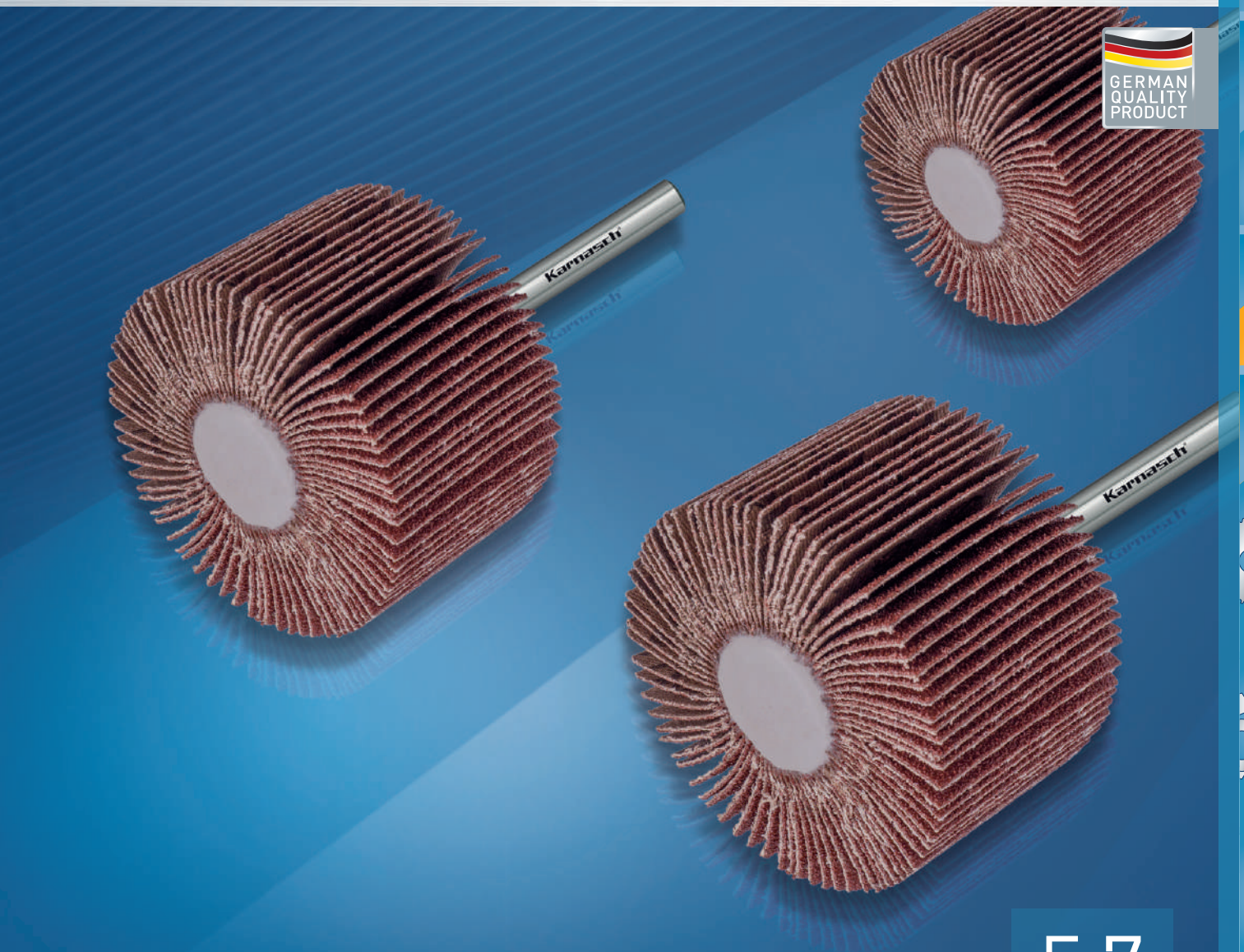
Karnasch® PROFESSIONAL TOOLS

# FÄCHERSCHLEIFER neu new

# FLAP WHEELS neu new




5.7

# 12 3010
# 12 3020

Aluminiumoxid Fächerschleifer
Aluminum oxide flap wheels








## ANWENDUNG · APPLICATION



| Stahl / Steel | Edelstahl / Stainless | Grauguss / Grey cast iron | Alu / Alu | Kupfer, Messing, Zinn / Copper, brass, tin | Holz / Wood | Kunststoffe / Plastics | Rost/Lack / Rust/paint |
|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL OPTIMAL ✓ GUT GOOD ✓ MÖGLICH POSSIBLE

## BEARBEITUNG · PROCESSING

**Karnasch Fächerschleifer** sind ideal für die Bearbeitung einer Vielzahl von Materialien zum Entfernen von Materialabtrag, Entgraten, Reinigen, Verfeinern und Endarbeiten.

Hochleistungs Aluminiumoxid Körnung garantiert einen schnellen Materialabtrag.

Typische Anwendungen sind das Reinigen von Schweißflächen, das Entfernen von Einkerbungen, Farbe, Rost und Schleifspuren.

Körnungen 150, 240 und 320 sind auf Anfrage erhältlich.

**Karnasch Flap Wheels** are ideal for use on a wide range of materials for stock removal, deburring, cleaning, blending and finishing.

High-performance aluminum oxide grain guarantees fast material removal.

Typical applications are cleaning weld surfaces and removing die lines, paint, rust and sanding.

Grits 150, 240 and 320 are available on request.

## KURZE KOPFLÄNGE · SHORT HEAD LENGTH

| Art. | Korngröße Grit size | Ø Kopf Ø Head mm | Kopflänge Head lenght mm | Ø Schaft Ø Shank mm | Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|---|---|
| 12 3010 030 040 3 | • 40 | 30 | 15 | 3 | 25.000 | 10 | 17,00 |
| 12 3010 030 060 3 | • 60 | 30 | 15 | 3 | 25.000 | 10 | 17,00 |
| 12 3010 030 080 3 | • 80 | 30 | 15 | 3 | 25.000 | 10 | 17,00 |
| 12 3010 030 120 3 | • 120 | 30 | 15 | 3 | 25.000 | 10 | 17,00 |
| 12 3010 030 040 | • 40 | 30 | 15 | 6 | 25.000 | 10 | 17,00 |
| 12 3010 030 060 | • 60 | 30 | 15 | 6 | 25.000 | 10 | 17,00 |
| 12 3010 030 080 | • 80 | 30 | 15 | 6 | 25.000 | 10 | 17,00 |
| 12 3010 030 120 | • 120 | 30 | 15 | 6 | 25.000 | 10 | 17,00 |
| 12 3010 040 040 | • 40 | 40 | 15 | 6 | 19.000 | 10 | 19,00 |
| 12 3010 040 060 | • 60 | 40 | 15 | 6 | 19.000 | 10 | 19,00 |
| 12 3010 040 080 | • 80 | 40 | 15 | 6 | 19.000 | 10 | 19,00 |
| 12 3010 040 120 | • 120 | 40 | 15 | 6 | 19.000 | 10 | 19,00 |
| 12 3010 050 040 | • 40 | 50 | 20 | 6 | 15.000 | 10 | 24,50 |
| 12 3010 050 060 | • 60 | 50 | 20 | 6 | 15.000 | 10 | 24,50 |
| 12 3010 050 080 | • 80 | 50 | 20 | 6 | 15.000 | 10 | 24,50 |
| 12 3010 050 120 | • 120 | 50 | 20 | 6 | 15.000 | 10 | 24,50 |
| 12 3010 060 040 | • 40 | 60 | 15 | 6 | 12.600 | 10 | 25,00 |
| 12 3010 060 060 | • 60 | 60 | 15 | 6 | 12.600 | 10 | 25,00 |
| 12 3010 060 080 | • 80 | 60 | 15 | 6 | 12.600 | 10 | 25,00 |
| 12 3010 060 120 | • 120 | 60 | 15 | 6 | 12.600 | 10 | 25,00 |
| 12 3010 080 040 | • 40 | 80 | 25 | 6 | 9.500 | 10 | 44,00 |
| 12 3010 080 060 | • 60 | 80 | 25 | 6 | 9.500 | 10 | 44,00 |
| 12 3010 080 080 | • 80 | 80 | 25 | 6 | 9.500 | 10 | 44,00 |
| 12 3010 080 120 | • 120 | 80 | 25 | 6 | 9.500 | 10 | 44,00 |

## LANGE KOPFLÄNGE · LONG HEAD LENGTH

| Art. | Korngröße Grit size | Ø Kopf Ø Head mm | Kopflänge Head lenght mm | Ø Schaft Ø Shank mm | Drehzahl (min⁻¹) RPM | Packmenge Unit | € |
|---|---|---|---|---|---|---|---|
| 12 3020 040 040 | • 40 | 40 | 30 | 6 | 19.000 | 10 | 24,00 |
| 12 3020 040 060 | • 60 | 40 | 30 | 6 | 19.000 | 10 | 24,00 |
| 12 3020 040 080 | • 80 | 40 | 30 | 6 | 19.000 | 10 | 24,00 |
| 12 3020 040 120 | • 120 | 40 | 30 | 6 | 19.000 | 10 | 24,00 |
| 12 3020 050 040 | • 40 | 50 | 40 | 6 | 15.000 | 10 | 34,50 |
| 12 3020 050 060 | • 60 | 50 | 40 | 6 | 15.000 | 10 | 34,50 |
| 12 3020 050 080 | • 80 | 50 | 40 | 6 | 15.000 | 10 | 34,50 |
| 12 3020 050 120 | • 120 | 50 | 40 | 6 | 15.000 | 10 | 34,50 |
| 12 3020 060 040 | • 40 | 60 | 40 | 6 | 12.600 | 10 | 41,00 |
| 12 3020 060 060 | • 60 | 60 | 40 | 6 | 12.600 | 10 | 41,00 |
| 12 3020 060 080 | • 80 | 60 | 40 | 6 | 12.600 | 10 | 41,00 |
| 12 3020 060 120 | • 120 | 60 | 40 | 6 | 12.600 | 10 | 41,00 |
| 12 3020 080 040 | • 40 | 80 | 50 | 6 | 9.500 | 6 | 46,50 |
| 12 3020 080 060 | • 60 | 80 | 50 | 6 | 9.500 | 6 | 46,50 |
| 12 3020 080 080 | • 80 | 80 | 50 | 6 | 9.500 | 6 | 46,50 |
| 12 3020 080 120 | • 120 | 80 | 50 | 6 | 9.500 | 6 | 46,50 |

Sicherheitshinweise Safety instructions 1466-1467
Film Movie

Grampelhuber Gesellschaft m.b.H.

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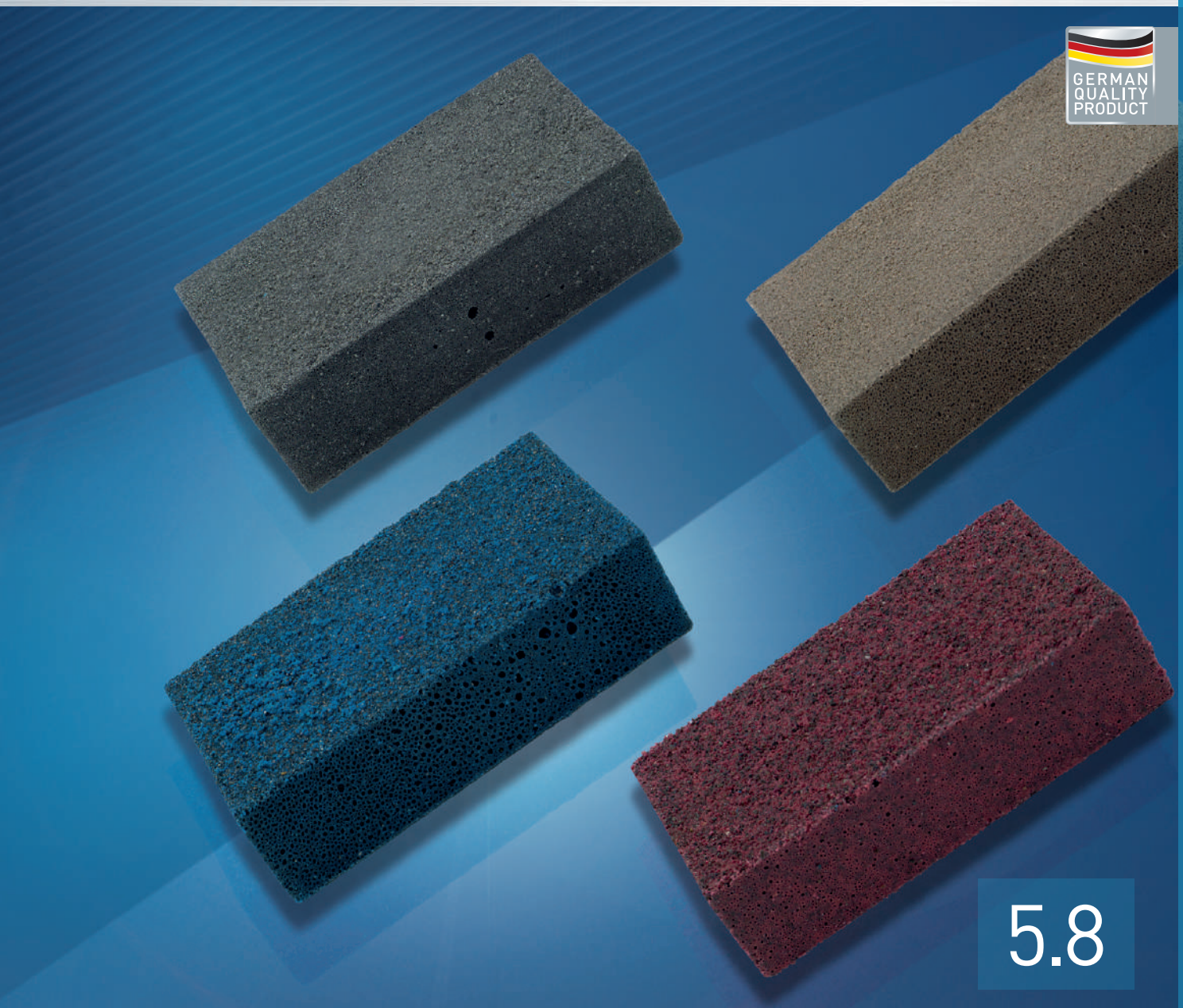
www.grampelhuber.at

# SCHLEIFBLÖCKE neu new

# ABRASIVE BLOCKS neu new




5.8



Netto-Preise · Net sales prices

## 12 4000 FLEXCLEAN BLOCKS
## FLEXCLEAN BLOCKS




**Karnasch FlexClean Blocks für:**

Mehrzweck Schleifblock durchgehend mit scharfen Aluminium-Oxid Schleifkörnern imprägniert.

Für die Anwendung auf Eisen, Stahl, Aluminium, Kunststoffen, Keramik, Lack usw.

Für noch feinere Ergebnisse können die Karnasch FlexClean Blocks mit Wasser, Spühlmittel, Waschbenzin, Paraffin usw. verwendet werden.

**Karnasch FlexClean Blocks for:**

Multi-purpose abrasive cleaner, impregnated throughout with sharp aluminum-oxide abrasive grit.

For use on iron, steel, aluminum, plastics, ceramics, paintwork etc.

For finer results the Karnasch FlexClean Blocks can be used with water, washing up liquid, white spirit, paraffin etc.

### ANWENDUNG · APPLICATION

| Stahl / Steel | Edelstahl / Stainless | Grauguss / Grey cast iron | Alu / Alu | Kupfer, Messing, Zinn / Copper, brass, tin | Kunststoffe / Plastics | Keramik / Ceramic | Rost/Lack / Rust/paint |
|---|---|---|---|---|---|---|---|
| ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ OPTIMAL OPTIMAL ✓ GUT GOOD ✓ MÖGLICH POSSIBLE

### BEARBEITUNG · PROCESSING

Ideal zum Entfernen von Verfärbungen, leichten Kratzern und Korrosion. Gleichbleibendes Schleifergebnis trotz Verschleiß.

Ideal for removing discolouration, light scratches and corrosion. Consistent finish throughout.

| Art. | Korngröße Grit size | Länge Length mm | Breite Width mm | Höhe Depth mm | Farbe Colour | Packmenge Unit | € |
|---|---|---|---|---|---|---|---|
| 12 4000 080 036 | • 36 (extra grob) (extra coarse) | 80 | 50 | 20 | Pink/ Pink | 18 | 109,00 |
| 12 4000 080 060 | • 60 (grob) (coarse) | 80 | 50 | 20 | Blau/ Blue | 18 | 109,00 |
| 12 4000 080 120 | • 120 (mittel) (medium) | 80 | 50 | 20 | Grau/ Grey | 18 | 109,00 |
| 12 4000 080 240 | • 240 (fein) (fine) | 80 | 50 | 20 | Braun/ Brown | 18 | 109,00 |

## 12 4010 FLEXCLEAN BLOCKS SET
## FLEXCLEAN BLOCKS SET

Karnasch **FlexClean Blocks Set**, enthält 6 grobe, 6 mittlere und 6 feine **FlexClean Blocks**

Karnasch **FlexClean Blocks Set**, includes 6 coarse, 6 medium and 6 fine **FlexClean Blocks**

| Art. | Länge Length mm | Breite Width mm | Höhe Depth mm | Farbe Colour | Packmenge Unit | € |
|---|---|---|---|---|---|---|
| 12 4010 | 80 | 50 | 20 | – | 18 | 109,00 |




Sicherheitshinweise Safety instructions 1466-1467

Film Movie

Grampelhuber
Gesellschaft m.b.H.

**Ihr Spezialist für Zerspanungswerkzeuge:**

Karnasch
PROFESSIONAL TOOLS
GERMANY

Grampelhuber
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