

HARTMETALL-FRÄSSTIFTE

Ähnlich DIN 8032

TUNGSTEN CARBIDE BURRS

Similar DIN 8032



5.1

KONTAKT | CONTACT

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PROFESSIONAL TOOLS

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Index

HP-3 PRO / PERFORMANCE 82

BEST SELLER

746-753



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



- 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 Standzeitsteigerung.
- 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.

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 for 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



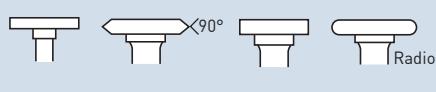
Speziell für NE-Metalle wie Alu, Kupfer, Messing sowie alle Kunststoffe

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

- Alulegierungen
- Leichtmetalle
- Weiche Buntmetalle (NE-Metalle)
- Kunststoffe
- Faser verstärkte Kunststoffe GFK/CFK
- Aluminum alloy
- Light metals
- Soft copper and copper alloys (non-ferrous metals)
- Plastics
- Fibre-reinforced plastic (GFK/CFK)

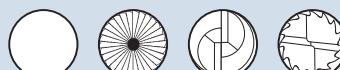
Spezial-Frässtifte · Special burrs

843-846



Scheibenform

844



Frässtifte für GFK/CFK

845



Mini-Frässtifte Ø 1 + 1,5 mm

846

Mini-burrs Ø 1 + 1,5 mm



Frässtifte + Bohrer für Schlüsseldienste

840-842

Burr and drills for locksmiths

Kombinations-Frässtifte · Combination-burrs

847-866



HP-1

894-801



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-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-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 Kreuzverzähnungen.
- Hohe Aggressivität erzeugt große Späne mit hervorragender Spanabfuhr.
- Keine Anlauffarben am Werkstück durch geringe Wärmeentwicklung
- Up to 60% higher machining output as compared to conventional cross cut.
- High aggressiveness produces large chips with outstanding chip removal.
- No annealing colours at the workpiece due to low heat development.

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-resistant 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

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/Schräfen 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

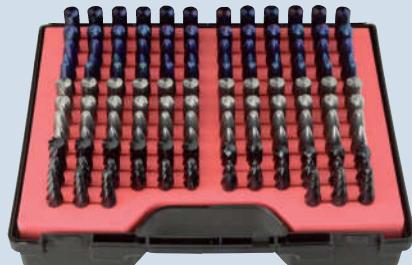
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BEST SELLER

Sets + Displays · Sets + Displays

873-892



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Technische Daten · Technical data

1465



HP-3
PROBEST
SELLER

746-753

Die revolutionäre neue Universal-**PRO** VerzahnungThe revolutionary new Universal-**PRO** cutting stylePATENT
PENDINGLagerartikel
Stockrange

ANWENDUNG · APPLICATION

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

- 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.

HP-3

BEST
SELLER

VALUETOOL

754-767

Die am meisten verwendete Universalverzahnung

The most widely used universal cutting style

ANWENDUNG · APPLICATION

| | | | | | | | | | |
|----------------|---------------------------------------|------------------------|------------------------|-------|--------|--------|--|------------|---|
| | | | | | | | | | |
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- 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

ANWENDUNG · APPLICATION

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

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

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



HP-3 PRO

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

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

HP-3

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA A | ZYB B | ZYA C | WRC D | KUD E | TRE F | RBF G | SPG H | - I | KEL J | SKM K | WKN L | KSJ M | KSK N |
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| 756 | 757 | 759 | 760 | 761 | 762 | 763 | 764 | 765 | 766 | 766 | 767 | 767 | 767 |
| Zylinder Cylinder | Zylinder + Stirn- verzahnung Cylinder + end cut | Zylinder- Radius Cylinder- Radius | Walzenrund- form Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Winkel Inverted cone | Kegel 60° Countersink 60° | Kegel 90° Countersink 90° |

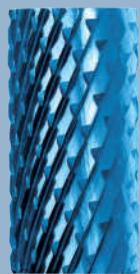
HP-2

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA A | ZYB B | WRC C | KUD D | TRE E | RBF F | SPG G | - H | KEL L | SKM M | WKN N | KSJ J | KSK K |
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| 770 | 770 | 771 | 771 | 772 | 772 | 773 | 773 | 774 | 774 | 775 | 775 | 776 |
| Zylinder Cylinder | Zylinder + Stirn- verzahnung Cylinder + end cut | Walzenrund- form Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Winkel Inverted cone | Kegel 60° Countersink 60° | Kegel 90° Countersink 90° |



HP-6



778-784



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 |

Lagerartikel Stockrange

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



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.

ANWENDUNG · APPLICATION

| | | | | | | | | | |
|----------------|------------------------------------|------------------------|------------------------|-------------------|------------------|------------------|--|------------|---|
| | | | | | | | | | |
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Lagerartikel Stockrange

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



794-801

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 |

Lagerartikel Stockrange

OPTIMAL
 GUT GOOD

- Schlagunempfindlichkeit (Zahnabschläge, 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-6

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA A | ZYB B | WRC C | KUD D | TRE E | RBF F | SPG G | - H | KEL L | SKM M |
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| □ 780 | □ 780 | □ 781 | □ 781 | □ 782 | □ 782 | □ 783 | □ 783 | □ 784 | □ 784 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone |

HP-7

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA A | ZYB B | WRC C | KUD D | TRE E | RBF F | SPG G | - H | KEL L | SKM M | MINI-ALU |
|---|---|---|---|---|---|---|--|---|---|---|
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| □ 788 | □ 788 | □ 789 | □ 789 | □ 790 | □ 790 | □ 791 | □ 791 | □ 792 | □ 792 | □ 793 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Minifrässtifte in feiner Aluverzahnung Mini-burrs in Alu cutting style |

HP-1

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

| ZYA A | ZYB B | WRC C | KUD D | TRE E | RBF F | SPG G | - H | KEL L | SKM M | Ø 3 mm |
|---|---|---|---|---|---|---|--|---|---|--|
| Art. 115007 Art. 113007 | Art. 115017 Art. 113017 | Art. 115027 Art. 113027 | Art. 115037 Art. 113037 | Art. 115047 Art. 113047 | Art. 115057 Art. 113057 | Art. 115067 Art. 113067 | Art. 115077 Art. 113077 | Art. 115087 Art. 113087 | Art. 115097 Art. 113097 |  |
|  |  |  |  |  |  |  |  |  |  |  |
| □ 796 | □ 796 | □ 797 | □ 797 | □ 798 | □ 798 | □ 799 | □ 799 | □ 800 | □ 800 | □ 801 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Ø 3 mm, Schaf 3 mm, für Superlegierungen! Ø 3 mm, shank 3 mm, for super alloys! |

1



2



3



4



5



6



7



8



9



10



Index

HP-8



802-808

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, Kupfer- legierungen Copper, copper alloys | Alu Alu | Kunststoffe GFK/CFK Plastics GRP/CRP |

Lagerartikel
StockrangeOPTIMAL
OPTIMALGUT
GOOD

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

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

HP-9



810-816

Speziell für Edelstahl. Extrem hohe Zerspanleistung

Especially for stainless steel. Extremely high machining output.

ANWENDUNG · APPLICATION

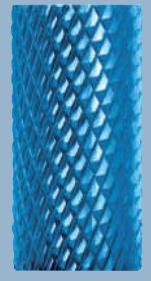
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|----------------|---------------------------------------|------------------------|------------------------|-------------------|------------------|------------------|---|------------|---|
| | | | | | | | | | |
| Stahl Steel | Gehärteter Stahl Hardened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

Lagerartikel
StockrangeOPTIMAL
OPTIMALGUT
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-resistant 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

ANWENDUNG · APPLICATION

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

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

HP-9

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

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

HP-4

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

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



HP-5



826-832

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 |

- 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

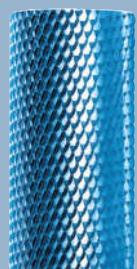
- Excellent surface finish
- Preferred for fine deburring all ferrous metals, such as:
 - Up to extra hard steel approx. 70 HRC
 - Cast iron
 - Stainless steel (INOX)
 - Heat resistant substances, such as, e.g. nickel based + cobalt based alloys

OPTIMAL
OPTIMAL

GUT
GOOD

Lagerartikel
Stockrange

HP-11



834-838

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 |

- **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

OPTIMAL
OPTIMAL

GUT
GOOD

Lagerartikel
Stockrange

HP-5

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

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

HP-11

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

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



HP-3 PRO



BEST
SELLER

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



ANWENDUNG · APPLICATION

| | | | | | | | | | |
|----------------|---------------------------------------|------------------------|------------------------|-------------------|--------|------------------|---|------------|---|
| | | | | | | | | | |
| Stahl Steel | Gehärteter Stahl Hardened steel | Edelstahl Stainless | Gusseisen Cast iron | Titan Titanium | Cermet | Nickel Nickel | Kupfer, Kupfer- legierungen 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 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 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

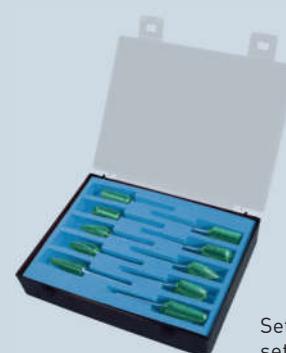
| ZYA A | ZYB B | WRC C | KUD D | TRE E | RBF F | SPG G | - H | KEL L | SKM M |
|------------------------------|---|---|------------------------------|------------------------------|---------------------------------|------------------------------|------------------------------|---------------------------------|------------------------------|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



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

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.



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



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.

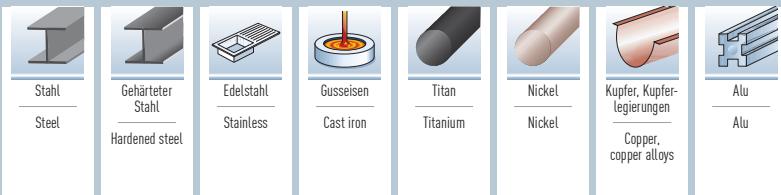


Almost vibration-free and controlled
work even under tough roughing conditions
possible.



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

ANWENDUNG · APPLICATION



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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Index



| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|------------------|--|---|----------------|--------------------------------|
| Stahl, Stahlguss | Stähle bis 1200 N/mm ² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss, Vergütungsstähle | Grobzerspanung | 450–600 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 250–350 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | 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/mm ² (< 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/mm ² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 250–350 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Coarse 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)

| Ø (mm) | 250 | 300 | 350 | 400 | 450 | 500 | 600 |
|--|--------|--------|--------|--------|--------|--------|--------|
| 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 |

HP-3 PRO VERZAHNUNG · CUT

Karnasch®

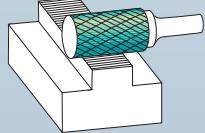
11 6090



A FORM / SHAPE ZYA

Zylinder ohne Stirnverzahnung

Cylinder without end cut



11 4090



Schnittdaten
Cutting data

Film
Movie



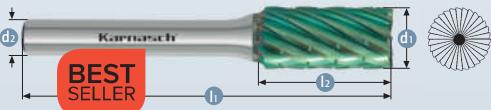
748



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 |

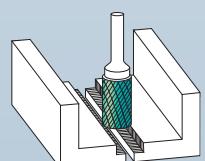
11 6091



B FORM / SHAPE ZYB

Zylinder mit Stirnverzahnung

Cylindrical with end cut



11 4091



Schnittdaten
Cutting data

Film
Movie



748



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 |

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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Index



11 6092



11 4092

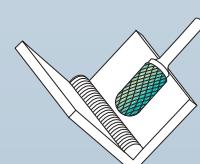


C FORM / SHAPE

WRC

Walzenrundform

Ball nosed cylinder

Schnittdaten
Cutting dataFilm
Movie

748

748

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



11 4093

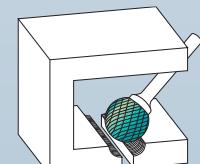


D FORM / SHAPE

KUD

Kugel

Ball

Schnittdaten
Cutting dataFilm
Movie

748

748

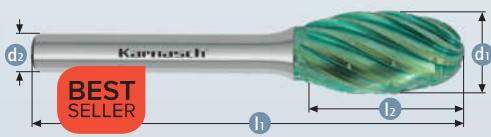
Bestseller – preisreduziert · Bestseller – price reduced

| 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

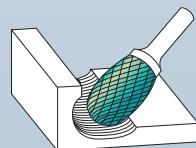
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|------|----|----|-------------------|--------------|-------|
| 11 4093 010 | • 6 | 4,8 | 6 | 50 | | ✓ | 10,95 |
| 11 4093 020 | • 8 | 7,0 | 6 | 52 | ✓ | | 11,75 |
| 11 4093 030 | • 10 | 9,0 | 6 | 54 | ✓ | | 13,10 |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

11 6094


E FORM / SHAPE TRE

Tropfen

Oval


BEST SELLER

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 |


 Schnittdaten
Cutting data


748

 Film
Movie


Bestseller – preisreduziert · Bestseller – price reduced

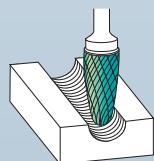
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|----|----|----|-------------------|--------------|-------|
| 11 4094 010 | • 6 | 10 | 6 | 50 | | ✓ | 13,35 |
| 11 4094 020 | • 8 | 15 | 6 | 60 | ✓ | | 14,60 |
| 11 4094 030 | • 10 | 15 | 6 | 60 | ✓ | | 16,00 |
| 11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

11 6095


F FORM / SHAPE RBF

Rundbogen

Ball nosed tree


BEST SELLER

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 |


 Schnittdaten
Cutting data


748

 Film
Movie


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 |

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Index

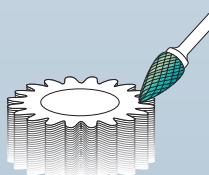
11 6096



G FORM / SHAPE

Spitzbogen

Tree



SPG



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 |

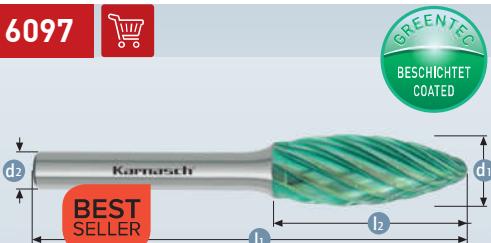
Bestseller – preisreduziert · Bestseller – price reduced

| 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



11 4097



H FORM / SHAPE

Flamme

Schnittdaten
Cutting data

748

Film
Movie

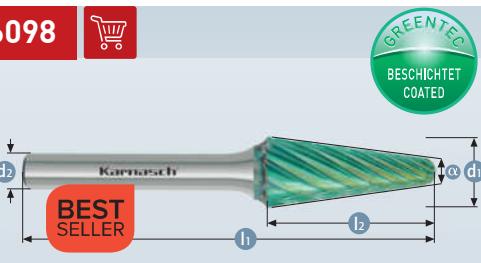
Bestseller – preisreduziert · Bestseller – price reduced

| 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 |

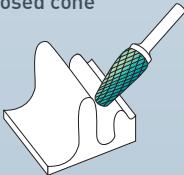
11 6098



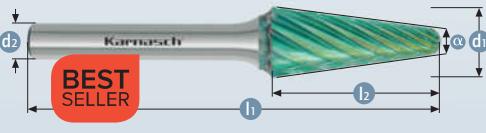
L FORM / SHAPE KEL

Rundkegel

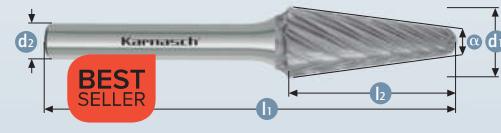
Ball nosed cone



BEST SELLER



11 4098

Schnittdaten
Cutting dataFilm
Movie

748



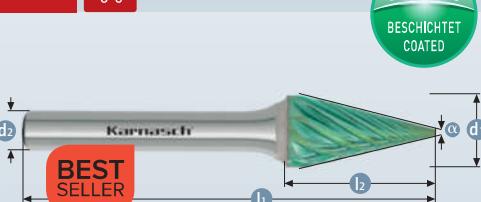
Bestseller – preisreduziert · Bestseller – price reduced

| 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

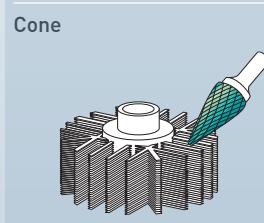
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|---------|----|----|----|-------------------|--------------|----------------|-------|
| 11 4098 010 | • 6 | 18 | 6 | 50 | | ✓ | 14° | 12,70 |
| 11 4098 020 | • 8 | 25 | 6 | 70 | ✓ | | 14° | 16,65 |
| 11 4098 030 | • 10 | 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



M FORM / SHAPE SKM

Spitzkegel



BEST SELLER



11 4099

Schnittdaten
Cutting dataFilm
Movie

748



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 |

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Index



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

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

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|------------------|---|---|---|--------------------------------|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm ² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Grobes Zerspanen mit hohen Materialabtrag | 450–600 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 250–350 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Grobes 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/mm ² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Coarse machining with high stock removal | 450–600 |
| | Hardened, heat-treated steels exceeding 1200 N/mm ² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 250–350 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Coarse machining with high stock removal | 250–350 |
| Non-ferrous metals | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard alu-alloys (high Si content) | Coarse machining with high stock removal | 250–350 |
| | High-temperature resistant materials | Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction) | | 300–450 |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Coarse machining with high stock removal | 450–600 |

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



11 5001

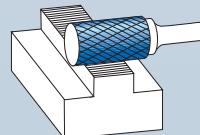


A FORM / SHAPE

ZYA

Zylinder ohne Stirnverzahnung

Cylinder without end cut

Schnittdaten
Cutting dataFilm
Movie

755



11 3001

Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|------|----|-----|-------------------|--------------|-------|
| 11 5001 015 | • 1,5 | 6 | 3 | 38 | | ✓ | 7,60 |
| 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 |

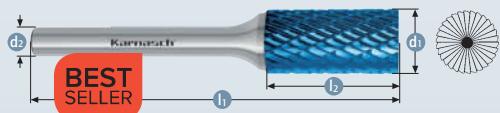
Bestseller – preisreduziert · Bestseller – price reduced

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

11 5011

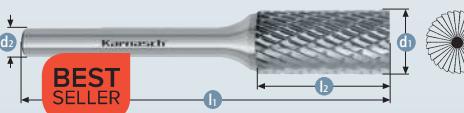
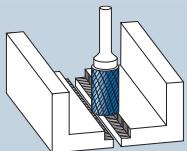


BEST SELLER

B FORM / SHAPE ZYB

Zylinder mit Stirnverzahnung

Cylinder with end cut



BEST SELLER



Schnittdaten
Cutting data

Film
Movie



755



Bestseller – preisreduziert · Bestseller – price reduced

| 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 |

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



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10



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 Fräzers 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 Fräzers.

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.

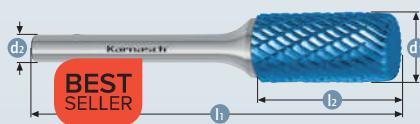
11 6010



HP-3



11 4010

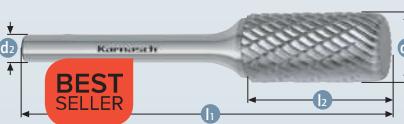


A FORM / SHAPE

ZYA

Zylinder-Radius

Cylinder-Radius



Schnittdaten
Cutting data

Film
Movie



755



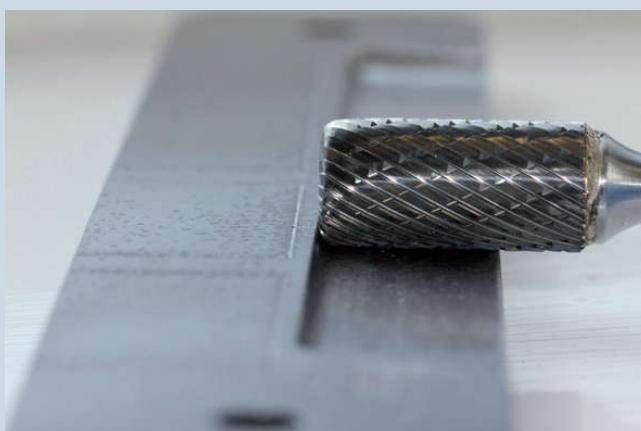
Bestseller – preisreduziert · Bestseller – price reduced

| 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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Index

11 5021



11 3021

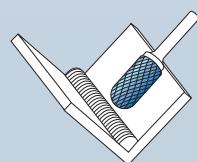


C FORM / SHAPE

WRC

Walzenrundform

Ball nosed cylinder

Schnittdaten
Cutting dataFilm
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

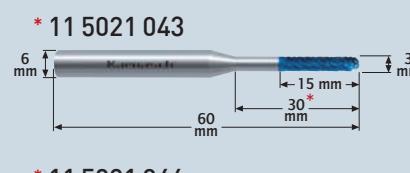
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|---------|----|-----|-------------------|--------------|-------|
| 11 3021 020 | • 2 | 11 | 3 | 38 | | ✓ | 5,80 |
| 11 3021 022 | • 2,5 | 11 | 3 | 38 | | ✓ | 5,70 |
| 11 3021 025 | • 3 | 14 | 3 | 38 | | ✓ | 5,80 |
| 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 | 60 | | ✓ | 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 | 8 | 70 | ✓ | | 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 Schlüsseldiensten 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

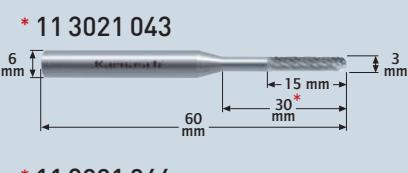
* 11 5021 043



* 11 5021 046



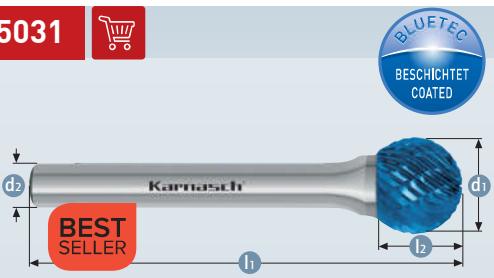
* 11 3021 043



* 11 3021 046



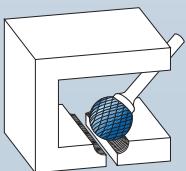
11 5031



D FORM / SHAPE KUD

Kugel

Ball



11 3031



Schnittdaten

Cutting data

Film

Movie



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 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 | |
| 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 | |

11 5041



11 3041

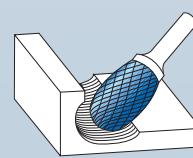


E FORM / SHAPE

TRE

Tropfen

Oval

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 |

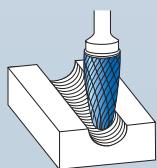
11 5051



F FORM / SHAPE RBF

Rundbogen

Ball nosed tree



Schnittdaten
Cutting data

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 |

11 5061



11 3061

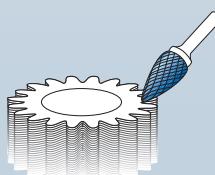


G FORM / SHAPE

SPG

Spitzbogen

Tree

Schnittdaten
Cutting dataFilm
Movie

755

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 |

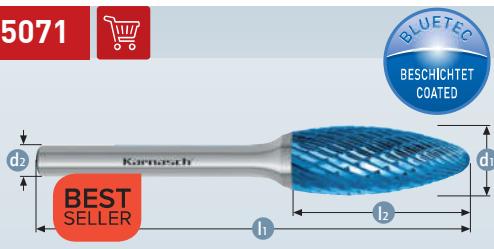
Bestseller – preisreduziert · Bestseller – price reduced

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 |

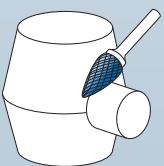
11 5071



BLUETEC
BESCHICHTET
COATED

H FORM / SHAPE

Flamme



BEST SELLER

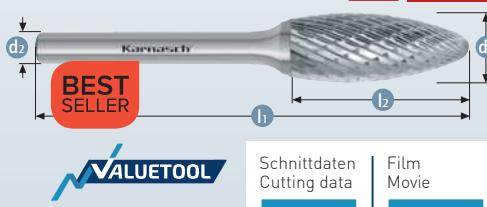
VALUETOOL

Schnittdaten
Cutting data

Film
Movie

755

11 3071



Bestseller – preisreduziert · Bestseller – price reduced

Bestseller – preisreduziert · Bestseller – price reduced

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

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|-----|----|-----|-------------------|--------------|-------|
| 11 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 |

| 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



BLUETEC
BESCHICHTET
COATED

L FORM / SHAPE

KEL

Rundkegel



BEST
SELLER

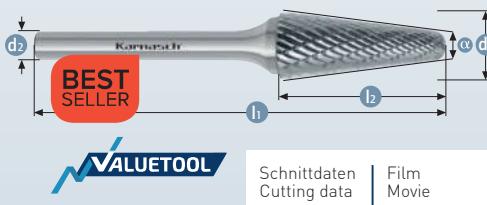
VALUETOOL

Schnittdaten
Cutting data

Film
Movie

755

11 3081



Bestseller – preisreduziert · Bestseller – price reduced

Bestseller – preisreduziert · Bestseller – price reduced

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

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|---------|------|----|-----|-------------------|--------------|-----|-------|
| 11 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 |

| 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 | | ✓ | 14° | 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 |

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

11 5091



11 3091

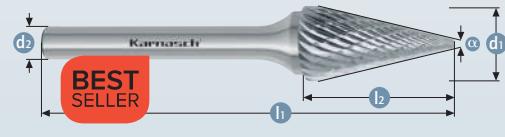
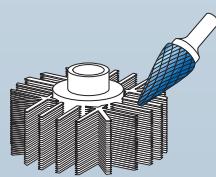


M FORM / SHAPE

SKM

Spitzkegel

Cone



BEST SELLER



VALUETOOL

Schnittdaten
Cutting dataFilm
Movie

755

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 |

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



11 3096

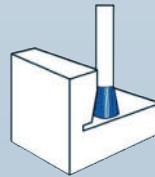


N FORM / SHAPE

WKN

Winkel

Inverted cone



BEST SELLER

Schnittdaten
Cutting dataFilm
Movie

755

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 |

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 |

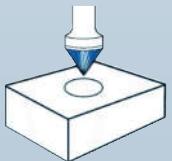
11 5101



J FORM / SHAPE KSJ

Kegel 60°

Countersink 60°



BEST SELLER



Schnittdaten
Cutting data

Film
Movie



11 3101

1

2

3

4

5

6

7

8

9

i

10

Index

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



K FORM / SHAPE KSK

Kegel 90°



BEST SELLER



Schnittdaten
Cutting data

Film
Movie

11 3111

6

7

8

9

i

10

Index

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 | |



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
✓ OUT 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 A | ZYB B | WRC C | KUD D | TRE E | RBF F | SPG G | - H | KEL L | SKM M | WKN N | KSJ J | KSK K |
|----------------------------|--|---------------------------------------|----------------------------|----------------------------|------------------------------|----------------------------|----------------------------|------------------------------|----------------------------|----------------------------|------------------------------|------------------------------|
| Art. 115000 Art. 113000 | Art. 115010 Art. 113010 | Art. 115020 Art. 113020 | Art. 115030 Art. 113030 | Art. 115040 Art. 113040 | Art. 115050 Art. 113050 | Art. 115060 Art. 113060 | Art. 115070 Art. 113070 | Art. 115080 Art. 113080 | Art. 115090 Art. 113090 | Art. 115099 Art. 113099 | Art. 115100 Art. 113100 | Art. 115110 Art. 113110 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 770 | 770 | 771 | 771 | 772 | 772 | 773 | 773 | 774 | 774 | 775 | 775 | 776 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Winkel Inverted cone | Kegel 60° Countersink 60° | Kegel 90° Countersink 90° |



BLUE-TEC-beschichtet
BLUE-TEC-coated

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

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

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|------------------|---|---|---|--------------------------------|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm ² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Grobes Zerspanen mit hohen Materialabtrag | 450–600 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 250–350 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Grobes 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/mm ² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Coarse machining with high stock removal | 450–600 |
| | Hardened, heat-treated steels exceeding 1200 N/mm ² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 250–350 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Coarse machining with high stock removal | 250–350 |
| Non-ferrous metals | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard alu-alloys (high Si content) | Coarse machining with high stock removal | 250–350 |
| | High-temperature resistant materials | Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction) | | 300–450 |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Coarse machining with high stock removal | 450–600 |

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



11 5000



11 3000

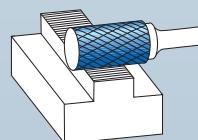


A FORM / SHAPE

ZYA

Zylinder ohne Stirnverzahnung

Cylindrical without end cut

Schnittdaten
Cutting data

769

Film
Movie

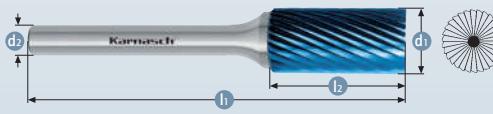
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|---|
| 11 5000 030 | • 3 | 14 | 3 | 38 | ✓ | 8,70 | |
| 11 5000 060 | • 6 | 13 | 3 | 45 | ✓ | 13,90 | |
| 11 5000 065 | • 6 | 18 | 6 | 50 | ✓ | 11,75 | |
| 11 5000 080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

| 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



11 3010

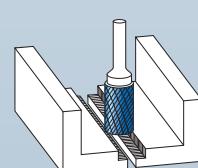


B FORM / SHAPE

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 | |

| 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 | |

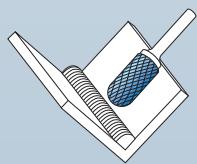
11 5020



C FORM / SHAPE WRC

Walzenrundform

Ball nosed cylinder



11 3020



Schnittdaten
Cutting data

Film
Movie



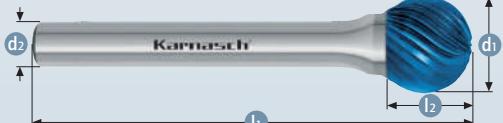
769



| 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 | |

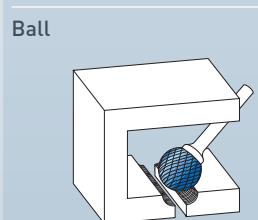
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|----|-------------------|--------------|---|
| 11 3020 022 | % 2,5 | 11 | 3 | 38 | ✓ | 3,55 | |
| 11 3020 025 | • 3 | 14 | 3 | 38 | ✓ | 6,65 | |
| 11 3020 050 | • 6 | 12,7 | 3 | 44 | ✓ | 11,10 | |
| 11 3020 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



D FORM / SHAPE KUD

Kugel



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 | |

11 5040



11 3040

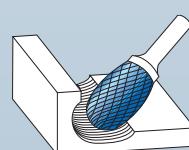


E FORM / SHAPE

TRE

Tropfen

Oval

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



11 3050

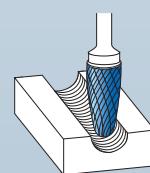


F FORM / SHAPE

RBF

Rundbogen

Ball nosed tree

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 | |

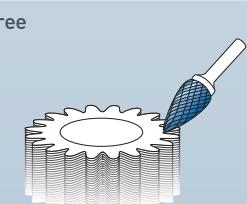
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|---|
| 11 3050 015 | • 3 | 14 | 3 | 38 | ✓ | 6,65 | |
| 11 3050 025 | • 6 | 12 | 3 | 44 | ✓ | 10,90 | |
| 11 3050 030 | • 6 | 18 | 6 | 50 | ✓ | 11,70 | |
| 11 3050 035 | • 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



G FORM / SHAPE SPG

Spitzbogen



Tree



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 | |

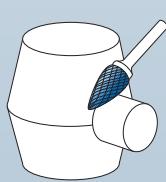
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|---|
| 11 3060 012 | • 3 | 10 | 3 | 38 | ✓ | 6,65 | |
| 11 3060 015 | • 3 | 14 | 3 | 38 | ✓ | 6,65 | |
| 11 3060 030 | • 6 | 12 | 3 | 44 | ✓ | 10,90 | |
| 11 3060 035 | • 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



H FORM / SHAPE

Flamme



Flame



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 | |

11 5080

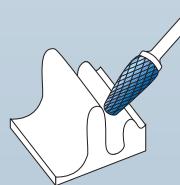


L FORM / SHAPE

KEL

Rundkegel

Ball nosed cone



11 3080

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 | |

| 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

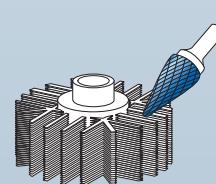


M FORM / SHAPE

SKM

Spitzkegel

Cone



11 3090

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 | |

| 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 | |

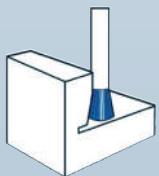
11 5099



N FORM / SHAPE WKN

Winkel

Inverted cone



11 3099



Schnittdaten
Cutting data

Film
Movie



769



| 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 | |

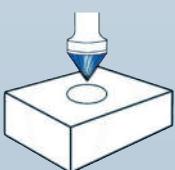
11 5100



J FORM / SHAPE KSJ

Kegel 60°

Countersink 60°



11 3100



Schnittdaten
Cutting data

Film
Movie



769



| 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 | |

1

2

3

4

5

6

7

8

9

i

10

Index

11 5110



11 3110

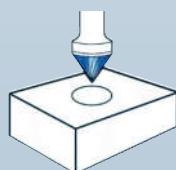


K FORM / SHAPE

KSK

Kegel 90°

Countersink 90°

Schnittdaten
Cutting dataFilm
Movie

769

| 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 | Nickel | Kupfer, Kupferlegierungen Copper, copper alloys | Alu Alu | Kunststoffe GFK/CFK Plastics GRP/CRP |

✓ OPTIMAL

✓ GUT

- 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 |
|----------------------------|--|---------------------------------------|----------------------------|----------------------------|------------------------------|----------------------------|----------------------------|------------------------------|----------------------------|
| Art. 115004 Art. 115004 | Art. 115014 Art. 113014 | Art. 115024 Art. 113024 | Art. 115034 Art. 113034 | Art. 115044 Art. 113044 | Art. 115054 Art. 113054 | Art. 115064 Art. 113064 | Art. 115074 Art. 113074 | Art. 115084 Art. 113084 | Art. 115094 Art. 113094 |
| | | | | | | | | | |
| 780 | 780 | 781 | 781 | 782 | 782 | 783 | 783 | 784 | 784 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone |



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

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

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---------------------|---|---|---|--------------------------------|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm ² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Grobes Zerspanen = hoher Materialabtrag mit Schlagbelastung | 250 - 600 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | Grobes Zerspanen = hoher Materialabtrag mit Schlagbelastung | 250 - 350 |
| NE-Metalle | Hochwarmfeste Werkstoffe | Nickelbasis- und Kobaltbasislegierungen, (Triebwerk- und Turbinenbau) | Grobes Zerspanen = hoher Materialabtrag mit Schlagbelastung | 250 - 450 |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/ Sphäroguss EN-GJS (GGG), weißer Temperiungsguss EN-GJMW (GTW), schwarzer Temperiungsguss EN-GJMB (GTS) | Grobes Zerspanen = hoher Materialabtrag mit Schlagbelastung | 250 - 600 |

| Material groups | | | Application | Cutting speed m/min |
|---------------------|---|--|--|---------------------|
| Steel cast steel | Non-hardened, non-heat treated steels up to 1200 N/mm ² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Coarse machining = high stock removal with impact load | 250 - 600 |
| | Hardened, heat treated steels exceeding 1200 N/mm ² (> 38 HRC) | tool steels, tempering steels, alloyed steels, cast steels | | 250 - 350 |
| Non-Ferrous metals | High-temperature resistant materials | Nickel based alloys cobalt based alloys (aircraft engine and turbine construction) | Coarse machining = high stock removal with impact load | 250 - 450 |
| Cast iron | Grey cast iron, white cast iron | Cast-iron with flake graphite EN-GJL (GG), with nodular graphite cast iron EN-GJS (GGG), white annealed cast iron EN-GJMW (GTW), black cast iron EN-GJMB (GTS) | Coarse machining = high stock removal with impact load | 250 - 600 |

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





11 5004



11 3004

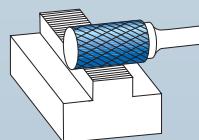


A FORM / SHAPE

ZYA

Zylinder ohne Stirnverzahnung

Cylinder without end cut

Schnittdaten
Cutting data

779

Film
Movie

| 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



11 3014

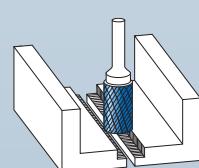


B FORM / SHAPE

ZYB

Zylinder mit Stirnverzahnung

Cylinder with end cut

Schnittdaten
Cutting data

779

Film
Movie

| 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 | |

11 5024

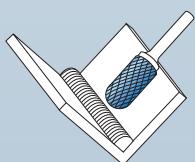


BLUETEC
BESCHICHTET
COATED

C FORM / SHAPE WRC

Walzenrundform

Ball nosed cylinder



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 | |

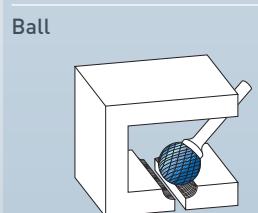
11 5034



BLUETEC
BESCHICHTET
COATED

D FORM / SHAPE KUD

Kugel



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 | |

11 5044



11 3044

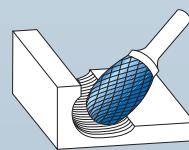


E FORM / SHAPE

TRE

Tropfen

Oval

Schnittdaten
Cutting dataFilm
Movie

779



| 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



11 3054

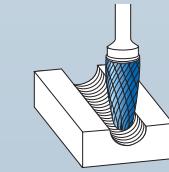


F FORM / SHAPE

RBF

Rundbogen

Ball nosed tree

Schnittdaten
Cutting dataFilm
Movie

779



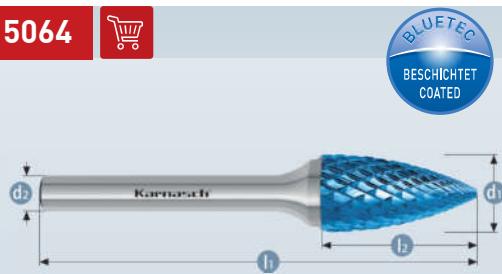
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|---|
| 11 5054 030 | • 6 | 18 | 6 | 50 | ✓ | 14,90 | |
| 11 5054 035 | • 8 | 20 | 6 | 65 | ✓ | 19,15 | |
| 11 5054 040 | • 10 | 20 | 6 | 65 | ✓ | 19,50 | |
| 11 5054 050 | • 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



11 3064



G FORM / SHAPE SPG

Spitzbogen

Tree



Schnittdaten
Cutting data

Film
Movie



779



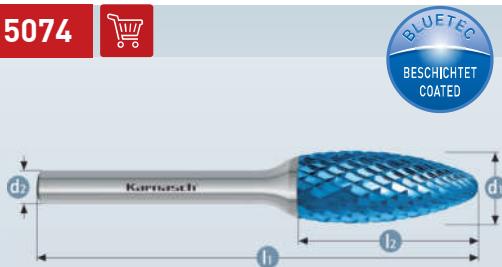
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|---|
| 11 5064 035 | • 6 | 18 | 6 | 50 | ✓ | 14,90 | |
| 11 5064 040 | • 8 | 20 | 6 | 65 | ✓ | 17,65 | |
| 11 5064 045 | • 10 | 20 | 6 | 65 | ✓ | 20,60 | |
| 11 5064 060 | • 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



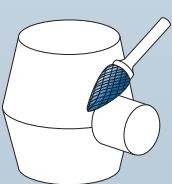
11 3074



H FORM / SHAPE

Flamme

Flame



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 | |



11 5084



11 3084

11 3084

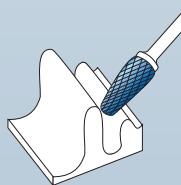


L FORM / SHAPE

KEL

Rundkegel

Ball nosed cone

Schnittdaten
Cutting dataFilm
Movie

779



| 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



11 3094

11 3094

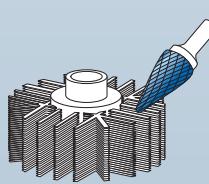


M FORM / SHAPE

SKM

Spitzkegel

Cone

Schnittdaten
Cutting dataFilm
Movie

779



| 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 | |

| 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 | |

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



POWER.
PRECISION.
PERFORMANCE.

Karnasch®
PROFESSIONAL TOOLS



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/CFR |

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. 115005 Art. 113005 | Art. 115015 Art. 113015 | Art. 115025 Art. 113025 | Art. 115035 Art. 113035 | Art. 115045 Art. 113045 | Art. 115055 Art. 113055 | Art. 115065 Art. 113065 | Art. 115075 Art. 113075 | Art. 115085 Art. 113085 | Art. 115095 Art. 113095 | |
| | | | | | | | | | | |
| 788 | 788 | 789 | 789 | 790 | 790 | 791 | 791 | 792 | 792 | 793 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Minifrässtifte in feiner Aluverzahnung Mini-burrs in Alu cutting style |



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

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

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

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

Schnittgeschwindigkeit • Cutting speed (m/min)

| Ø (mm) | 500 | 600 | 900 | 1100 |
|---|--------|--------|---------|---------|
| 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

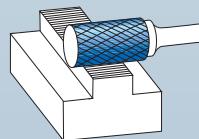
BLACKTEC
BESCHICHTET
COATED

A FORM / SHAPE

ZYA

Zylinder ohne Stirnverzahnung

Cylinder without end cut



11 3005

Schnittdaten
Cutting dataFilm
Movie

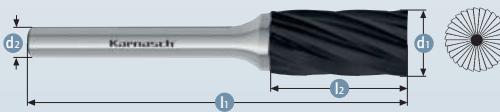
787



| 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 | |

| 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

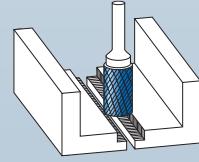
BLACKTEC
BESCHICHTET
COATED

B FORM / SHAPE

ZYB

Zylinder mit Stirnverzahnung

Cylinder with end cut



11 3015

| 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 | |

| 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 | |

Schnittdaten
Cutting dataFilm
Movie

787



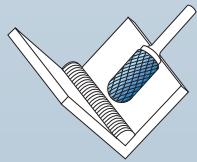
11 5025



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 |

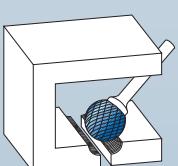
11 5035



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 |



11 5045

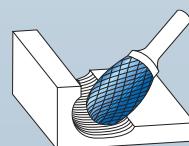


E FORM / SHAPE

TRE

Tropfen

Oval



11 3045

Schnittdaten
Cutting data

787

Film
Movie

| 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

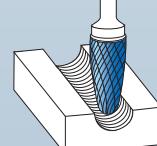


F FORM / SHAPE

RBF

Rundbogen

Ball nosed tree



11 3055

Schnittdaten
Cutting data

787

Film
Movie

| 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 | |

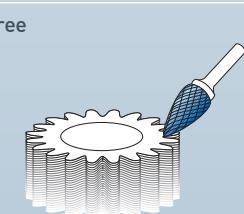
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|---|
| 11 3055 015 | • 3 | 14 | 3 | 38 | ✓ | 9,00 | |
| 11 3055 025 | • 6 | 12 | 3 | 44 | ✓ | 17,05 | |
| 11 3055 030 | • 6 | 18 | 6 | 50 | ✓ | 14,55 | |
| 11 3055 035 | • 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



G FORM / SHAPE SPG

Spitzbogen



Tree

11 3065



Schnittdaten
Cutting data

Film
Movie



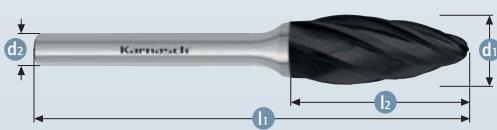
787



| 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 | |

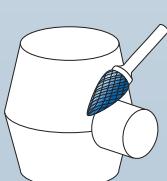
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|---|
| 11 3065 015 | • 3 | 14 | 3 | 38 | ✓ | 9,00 | |
| 11 3065 030 | • 6 | 12 | 3 | 44 | ✓ | 17,05 | |
| 11 3065 035 | • 6 | 18 | 6 | 50 | ✓ | 20,10 | |
| 11 3065 040 | • 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

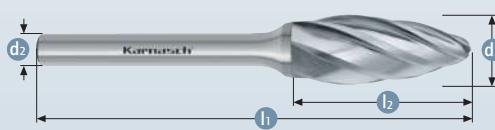


H FORM / SHAPE

Flamme



11 3075



Schnittdaten
Cutting data

Film
Movie



787



| 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 |

11 5085



11 3085

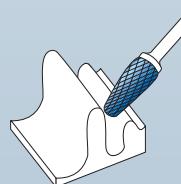


L FORM / SHAPE

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 |

| 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



11 3095

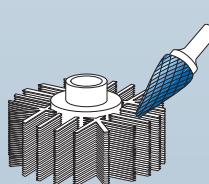


M FORM / SHAPE

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 |

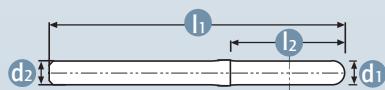
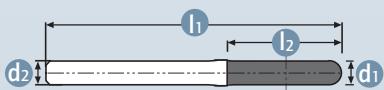
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|----------------|-------|
| 11 3095 015 | • 3 | 11 | 3 | 38 | ✓ | ✓ | 8° | 9,00 |
| 11 3095 025 | • 6 | 12 | 3 | 44 | ✓ | ✓ | 22° | 16,25 |
| 11 3095 030 | • 6 | 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 |

Einsatzgebiete:
Zu bearbeitende Werkstoffe:
Drehzahlempfehlung:

Feinmechanik, Werkzeugbau
Alulegierungen, Leichtmetalle, Buntmetalle, Kunststoffe
ca. 70.000 U/min

Applications:
For use on:
Recommended operating speed:

Precision engineering, tool manufacture
Aluminum alloys, light metals, copper and copper alloys, plastics
approx. 70,000 RPM



| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | € |
|-------------|-----|------|----|----|------------|----------|-------|
| 11 5005 030 | • 3 | 14 | 3 | 38 | A ZYA | | 12,55 |
| 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 |





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 | Nickel Nickel | Kupfer, Kupferlegierungen Copper, copper alloys | Alu Alu | Kunststoffe GFK/CFK Plastics GRP/CRP |

✓ OPTIMAL

✓ GOOD

- Schlagunempfindlichkeit (Zahnbrüche, 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 A | ZYB B | WRC C | KUD D | TRE E | RBF F | SPG G | - H | KEL L | SKM M | Ø 3 mm |
|----------------------------|--|---------------------------------------|----------------------------|----------------------------|------------------------------|----------------------------|----------------------------|------------------------------|----------------------------|---|
| Art. 115007 Art. 113007 | Art. 115017 Art. 113017 | Art. 115027 Art. 113027 | Art. 115037 Art. 113037 | Art. 115047 Art. 113047 | Art. 115057 Art. 113057 | Art. 115067 Art. 113067 | Art. 115077 Art. 113077 | Art. 115087 Art. 113087 | Art. 115097 Art. 113097 | |
| | | | | | | | | | | |
| 796 | 796 | 797 | 797 | 798 | 798 | 799 | 799 | 800 | 800 | 801 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Ø 3 mm, Schaft 3 mm, für Superlegierungen! Ø 3 mm, shank 3 mm, for super alloys! |



BLUE-TEC-beschichtet
BLUE-TEC-coated

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

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

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---|---|---|---|--------------------------------|
| Schwierigste Legierungen Superlegierungen | Titan, Inconel, Hastelloy, Waspaloy, Duplex, Amanox Udimet, Nicrofer, Conicro, René | Motoren-, Turbinen- und Triebwerksbau Energietechnik, Luft- und Raumfahrt Öl- und Gasindustrie, Gasturbinen | grobes Zerspanen = hoher bis mittlerer Materialabtrag | 250-350 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | grobes Zerspanen = hoher bis mittlerer Materialabtrag | 250-350 |
| Stahl, Stahlguss | Ungehärtet, nicht vergütete Stähle bis 1200 N/mm ² (<38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | grobes Zerspanen = hoher bis mittlerer Materialabtrag | 450-600 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (>38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 250-350 |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/ Sphäroguss EN-GJS (GGG), weißer Temperierte EN-GJMW (GTW), schwarzer Temperierte EN-GJMB (GTS) | grobes Zerspanen = hoher bis mittlerer Materialabtrag | 450-600 |

| Material groups | | | Application | Cutting speed m/min |
|------------------------------|---|--|---|---------------------|
| difficult alloys superalloys | Titan, Inconel, Hastelloy, Waspaloy, Duplex, Amanox Udimet, Nicrofer, Conicro, René | Engines, aircraft engine and turbine construction, energy technology, aerospace oil and gas industry, gas turbines | Coarse machining = high to medium stock removal | 250-350 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Coarse machining = high to medium stock removal | 250-350 |
| Steel cast steel | Non-hardened, non-heat treated steels up to 1200 N/mm ² (<38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Coarse machining = high to medium stock removal | 450-600 |
| | Hardened, heat treated steels exceeding 1200 N/mm ² (>38 HRC) | tool steels, tempering steels, alloyed steels, cast steels | | 250-350 |
| Cast iron | Grey cast iron, white cast iron | Cast-iron with flake graphite EN-GJL (GG), with nodular graphite cast iron EN-GJS (GGG), white annealed 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 |
| Ø (mm) | Drehzahlen (min ⁻¹) • Rotational speed (rpm) | | | | | | |
| 3 | 27.000 | 32.000 | 37.000 | 42.000 | 48.000 | 53.000 | 64.000 |
| 6 | 13.000 | 16.000 | 19.000 | 21.000 | 24.000 | 27.000 | 32.000 |
| 8 | 10.000 | 12.000 | 14.000 | 16.000 | 18.000 | 20.000 | 24.000 |
| 10 | 8.000 | 10.000 | 11.000 | 13.000 | 14.000 | 16.000 | 19.000 |
| 12 | 7.000 | 8.000 | 9.000 | 11.000 | 12.000 | 13.000 | 16.000 |
| 16 | 5.000 | 6.000 | 7.000 | 8.000 | 9.000 | 10.000 | 12.000 |

11 5007



11 3007

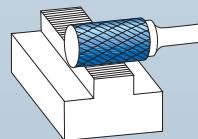


A FORM / SHAPE

ZYA

Zylinder ohne Stirnverzahnung

Cylinder without end cut

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



11 3017

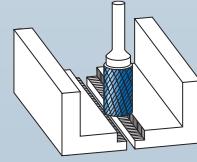


B FORM / SHAPE

ZYB

Zylinder mit Stirnverzahnung

Cylinder with end cut

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 | |

11 5027



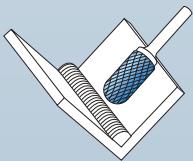
11 3027



C FORM / SHAPE WRC

Walzenrundform

Ball nosed cylinder



[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

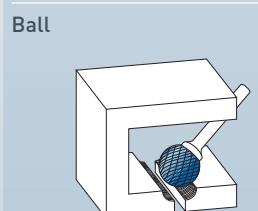


11 3037



D FORM / SHAPE KUD

Kugel



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 |



11 5047



11 3047

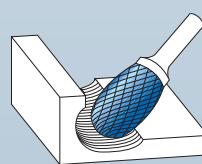


E FORM / SHAPE

TRE

Tropfen

Oval

Schnittdaten
Cutting dataFilm
Movie

795



795

| 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



11 3057

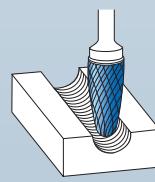


F FORM / SHAPE

RBF

Rundbogen

Ball nosed tree

Schnittdaten
Cutting dataFilm
Movie

795



795

| 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 | |

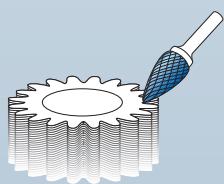
11 5067



G FORM / SHAPE SPG

Spitzbogen

Tree



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 | |

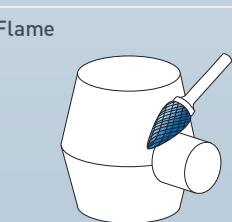
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|---------|----|----|----|-------------------|--------------|---|
| 11 3067 015 | • 3 | 14 | 3 | 38 | ✓ | 7,55 | |
| 11 3067 030 | • 6 | 12 | 3 | 44 | ✓ | 9,60 | |
| 11 3067 035 | • 6 | 18 | 6 | 50 | ✓ | 12,50 | |
| 11 3067 040 | • 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



H FORM / SHAPE

Flamme



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 | |



11 5087



11 3087

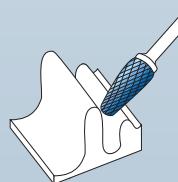
BLUETEC
BESCHICHTET
COATED

L FORM / SHAPE

KEL

Rundkegel

Ball nosed cone

Schnittdaten
Cutting dataFilm
Movie

795



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



11 3097

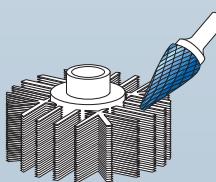
BLUETEC
BESCHICHTET
COATED

M FORM / SHAPE

SKM

Spitzkegel

Cone

Schnittdaten
Cutting dataFilm
Movie

795



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 |

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

Speziell optimierte HP-1 Verzahnung für Rotierfräser 3 mm

Specially optimized HP-1 cut for burrs 3 mm



| Art. | d1 | l2 | d2 | l1 | Form Shape | DIN 8033 | | € |
|-------------|-----|-----|----|----|------------|----------|--|-------|
| 11 5007 030 | • 3 | 14 | 3 | 38 | A | ZYA | | 9,65 |
| 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 |





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 GPK/CPK |

OPTIMAL

GUT

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

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

Lagerprogramm + Katalogseiten • Stockrange + catalogue pages

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



BLUE-TEC-beschichtet
BLUE-TEC-coated

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

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

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---------------------|--|--|---|--------------------------------|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm ² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Grobes Zerspanen = hoher Materialabtrag mit Schlagbelastung | 450 - 750 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | |

| Material groups | | | Application | Cutting speed m/min |
|---------------------|---|--|--|------------------------|
| Steel cast steel | Non-hardened, non-heat treated steels up to 1200 N/mm ² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Coarse machining = high stock removal with impact load | 450 - 750 |
| | Hardened, heat treated steels exceeding 1200 N/mm ² (> 38 HRC) | tool steels, tempering steels, alloyed steels, cast steels | | |

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



11 6041



11 4041

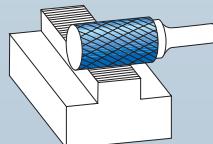


A FORM / SHAPE

ZYA

Zylinder ohne Stirnverzahnung

Cylinder without end cut

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



11 4042

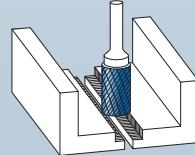


B FORM / SHAPE

ZYB

Zylinder mit Stirnverzahnung

Cylinder with end cut

Schnittdaten
Cutting data

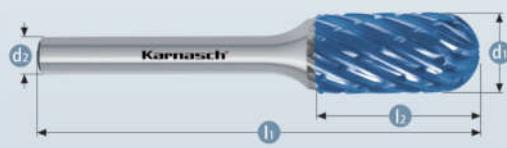
803

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 | ✓ | - | |

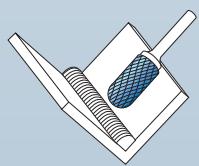
11 6043



C FORM / SHAPE WRC

Walzenrundform

Ball nosed cylinder



11 4043



Schnittdaten
Cutting data

Film
Movie



803

| 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 | ✓ | - | |

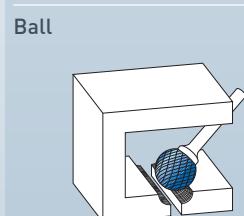
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|---|
| 11 4043 010 | • 6 | 18 | 6 | 50 | ✓ | 12,25 | |
| 11 4043 015 | • 8 | 20 | 6 | 65 | ✓ | 15,05 | |
| 11 4043 020 | • 10 | 20 | 6 | 65 | ✓ | 16,50 | |
| 11 4043 025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

11 6044



D FORM / SHAPE KUD

Kugel



11 4044



Schnittdaten
Cutting data

Film
Movie



803

| 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 | ✓ | - | |

1

2

3

4

5

6

7

8

9

10

Index

11 6045

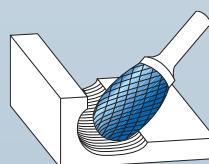


E FORM / SHAPE

TRE

Tropfen

Oval



11 4045

Schnittdaten
Cutting dataFilm
Movie

803



803

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

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

11 6046

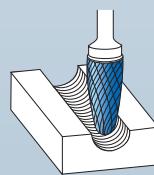


F FORM / SHAPE

RBF

Rundbogen

Ball nosed tree



11 4046

Schnittdaten
Cutting dataFilm
Movie

803



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 | o 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 | o 16 | 25 | 6 | 70 | ✓ | | - |

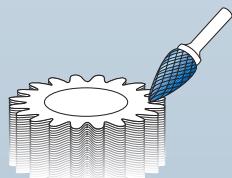
11 6047



G FORM / SHAPE SPG

Spitzbogen

Tree



11 4047



Schnittdaten
Cutting data

Film
Movie



803



| 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



H FORM / SHAPE

Flamme



11 4048

Schnittdaten
Cutting data

Film
Movie



803



| 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 | ✓ | - | |

11 6049

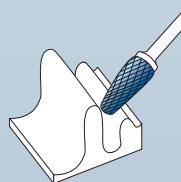


L FORM / SHAPE

KEL

Rundkegel

Ball nosed cone



11 4049

Schnittdaten
Cutting data

803

Film
Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|----------------|-------|
| 11 6049 015 | o 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 | o 16 | 33 | 6 | 78 | ✓ | | 14° | - |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|----|-------------------|--------------|----------------|-------|
| 11 4049 015 | o 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 | o 16 | 33 | 6 | 78 | ✓ | | 14° | - |

11 6050

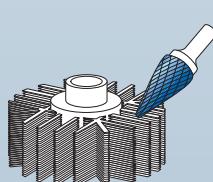


M FORM / SHAPE

SKM

Spitzkegel

Cone



11 4050

Schnittdaten
Cutting data

803

Film
Movie

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

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

Qualitätsprodukte für die Metallbearbeitung.
Quality products for metalworking.

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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, Kupfer- legierungen Copper, copper alloys | Alu Alu | Kunststoffe GFK/CFK Plastics GRP/CRP |

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



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

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

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

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

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



11 6031



11 4031

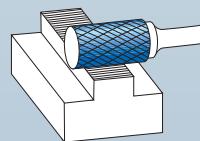


A FORM / SHAPE

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 | ✓ | | - |

| 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



11 4032

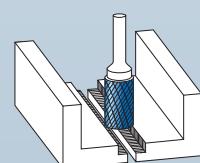


B FORM / SHAPE

ZYB

Zylinder mit Stirnverzahnung

Cylinder with end cut



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

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

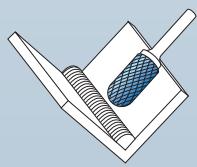
11 6033



C FORM / SHAPE WRC

Walzenrundform

Ball nosed cylinder



11 4033



Schnittdaten
Cutting data

Film
Movie



811



| 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 | ✓ | - | |

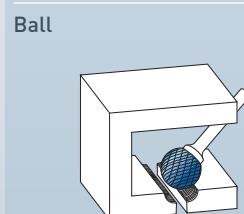
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|------|----|----|-------------------|--------------|---|
| 11 4033 005 | • 3 | 14 | 3 | 38 | ✓ | 9,15 | |
| 11 4033 007 | • 6,3 | 12,7 | 3 | 45 | ✓ | 14,90 | |
| 11 4033 010 | • 6 | 18 | 6 | 50 | ✓ | 13,40 | |
| 11 4033 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



D FORM / SHAPE KUD

Kugel



11 4034



Schnittdaten
Cutting data

Film
Movie



811



| 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 | ✓ | - | |

11 6035



11 4035

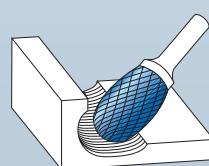


E FORM / SHAPE

TRE

Tropfen

Oval

Schnittdaten
Cutting dataFilm
Movie

811

| 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



11 4036

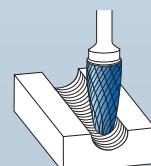


F FORM / SHAPE

RBF

Rundbogen

Ball nosed tree

Schnittdaten
Cutting dataFilm
Movie

811

| 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



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



H FORM / SHAPE

Flamme



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 | ✓ | | - |





11 6039

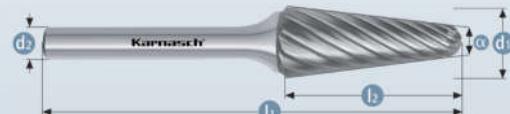
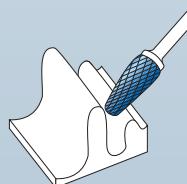


L FORM / SHAPE

KEL

Rundkegel

Ball nosed cone

Schnittdaten
Cutting data

811

Film
Movie

| 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

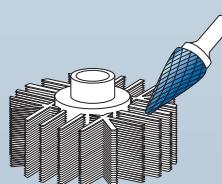


M FORM / SHAPE

SKM

Spitzkegel

Cone

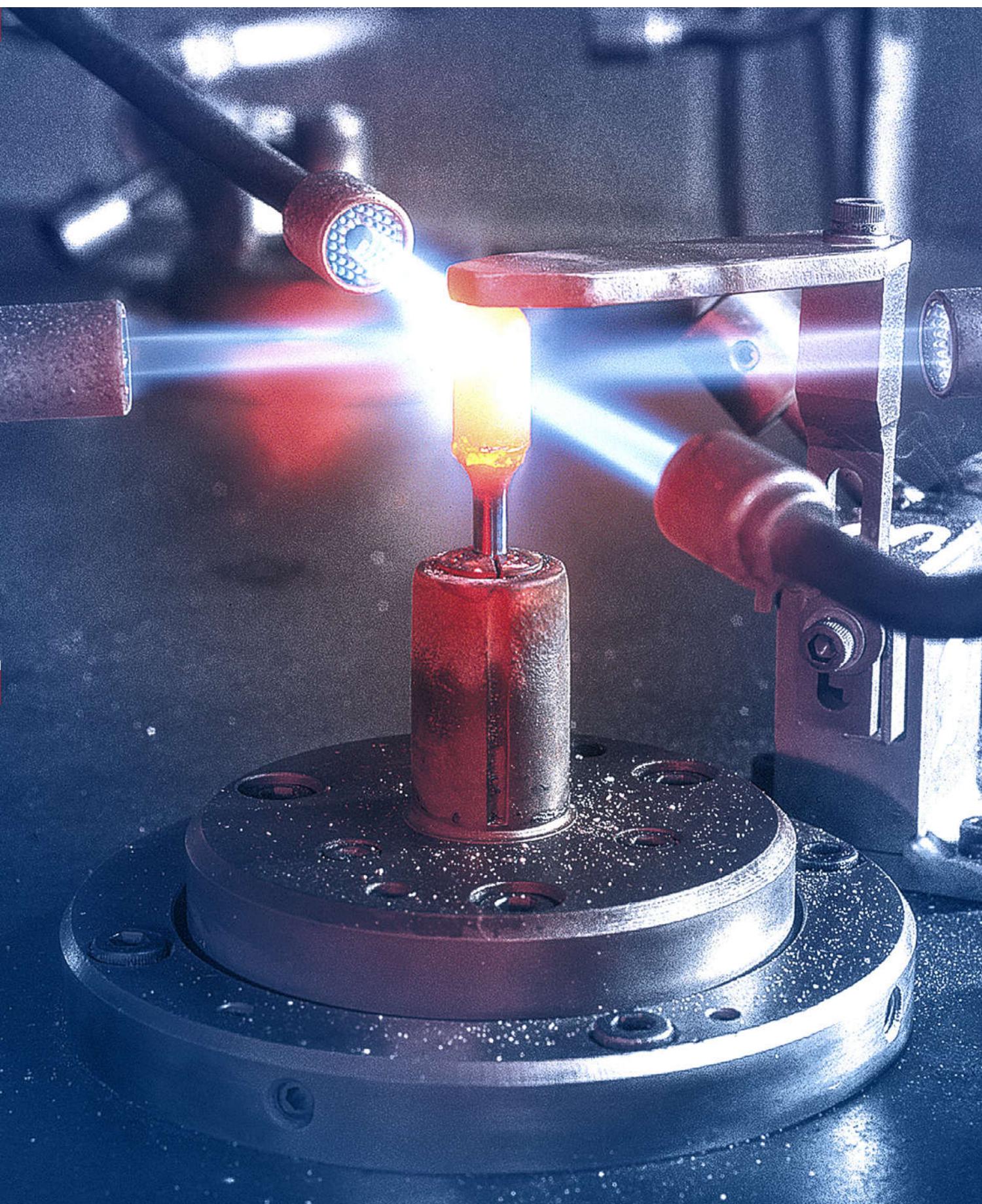
Schnittdaten
Cutting data

811

Film
Movie

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

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



POWER.
PRECISION.
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PROFESSIONAL TOOLS



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
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 A | ZYB B | WRC C | KUD D | TRE E | RBF F | SPG G | - H | KEL L | SKM M | WKN N |
|----------------------------|--|---|----------------------------|----------------------------|---------------------------------|----------------------------|----------------------------|---------------------------------|----------------------------|----------------------------|
| Art. 115002 Art. 113002 | Art. 115012 Art. 113012 | Art. 115022 Art. 113022 | Art. 115032 Art. 113032 | Art. 115042 Art. 113042 | Art. 115052 Art. 113052 | Art. 115062 Art. 113062 | Art. 115072 Art. 113072 | Art. 115082 Art. 113082 | Art. 115092 Art. 113092 | Art. 115098 Art. 113098 |
| | | | | | | | | | | |
| 820 | 820 | 821 | 822 | 822 | 823 | 823 | 824 | 824 | 825 | 825 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrund- form Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone | Winkel Inverted cone |



BLUE-TEC-beschichtet
BLUE-TEC-coated

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

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

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|------------------|---|---|---|--------------------------------|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm ² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Feines Zerspanen = mittlerer Materialabtrag | 650-750 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 450-600 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Feines Zerspanen = mittlerer Materialabtrag | 450-600 |
| NE-Metalle | Harte NE-Metalle | Bronze, Titan/Titanlegierungen, harte Alulegierungen (hoher Si-Anteil) | Feines Zerspanen = mittlerer Materialabtrag | 450-600 |
| | Hochwarmfeste Werkstoffe | Nickelbasis- und Kobaltbasislegierungen [Triebwerk- und Turbinenbau] | | |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/Späroguss EN-GJS (GGG), weißer Temperiungsguss EN-GJMW (GTW), schwarzer Temperiungsguss EN-GJMB (GTS) | Feines Zerspanen = mittlerer Materialabtrag | 650-750 |

| Material groups | | | Application | Cutting speed m/min |
|------------------------|---|---|---------------------------------------|---------------------|
| Steel, cast steel | Non-hardened, non-heat treated steels up to 1200 N/mm ² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Fine machining = medium stock removal | 650-750 |
| | Hardened, heat-treated steels exceeding 1200 N/mm ² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 450-600 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Fine machining = medium stock removal | 450-600 |
| Non-ferrous metals | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard alu-alloys [high Si content] | Fine machining = medium stock removal | 450-600 |
| | High-temperature resistant materials | Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction) | | |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Fine machining = medium stock removal | 650-750 |

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



11 5002



11 3002

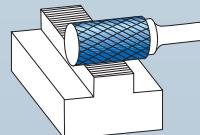


A FORM / SHAPE

ZYA

Zylinder ohne Stirnverzahnung

Cylinder without end cut

Schnittdaten
Cutting dataFilm
Movie

819



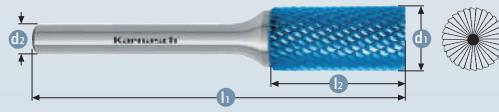
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|----|----|-----|-------------------|--------------|-------|
| 11 5002 015 | • 1,5 | 6 | 3 | 38 | | ✓ | 9,45 |
| 11 5002 025 | • 2 | 11 | 3 | 38 | | ✓ | 9,45 |
| 11 5002 030 | • 3 | 14 | 3 | 38 | | ✓ | 9,45 |
| 11 5002 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



11 3012

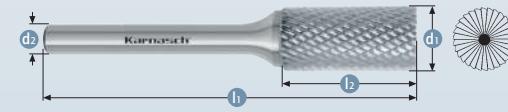
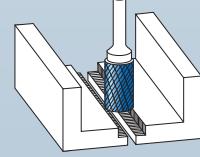


B FORM / SHAPE

ZYB

Zylinder mit Stirnverzahnung

Cylinder with end cut

Schnittdaten
Cutting dataFilm
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 | | ✓ | |
| 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 |

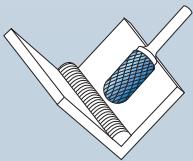
11 5022



C FORM / SHAPE WRC

Walzenrundform

Ball nosed cylinder



11 3022

Schnittdaten
Cutting dataFilm
Movie

819



| 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
Burr specifically for locksmiths see page 840/841

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



11 5032



11 3032

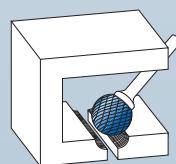


D FORM / SHAPE

KUD

Kugel

Ball



Karnasch®

Schnittdaten
Cutting dataFilm
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

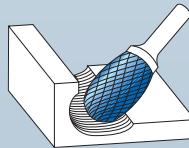


11 3042



E FORM / SHAPE

TRE

Tropfen
OvalSchnittdaten
Cutting dataFilm
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

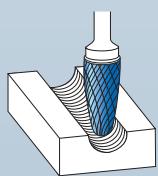


BLUETEC
BESCHICHTET
COATED

F FORM / SHAPE RBF

Rundbogen

Ball nosed tree



11 3052



Schnittdaten
Cutting data

Film
Movie



| 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



| 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.

823

1

2

4

7

9

10

Index

11 5072



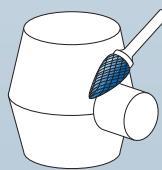
11 3072



H FORM / SHAPE

Flamme

Flame

Schnittdaten
Cutting data

819

Film
Movie

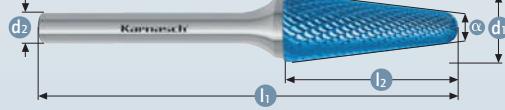
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 5072 005 | • 3 | 6 | 3 | 38 | | ✓ | 9,45 |
| 11 5072 010 | • 6 | 14 | 6 | 60 | | ✓ | 18,60 |
| 11 5072 015 | • 8 | 20 | 6 | 65 | ✓ | | 20,20 |
| 11 5072 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 |

| 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



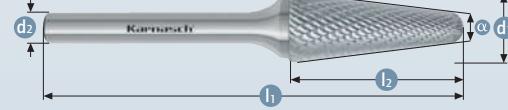
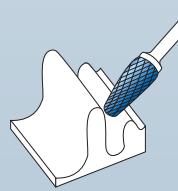
11 3082



L FORM / SHAPE

Rundkegel

Ball nosed cone

Schnittdaten
Cutting data

819

Film
Movie

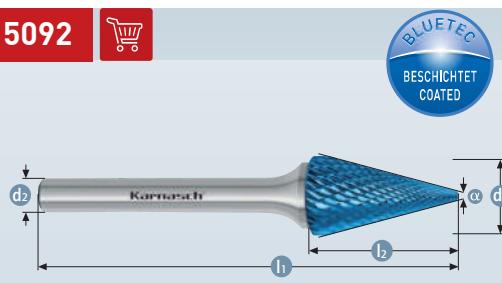
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | α° | € |
|-------------|------|----|----|-----|-------------------|--------------|----------------|-------|
| 11 5082 005 | • 3 | 10 | 3 | 38 | | ✓ | 10° | 9,45 |
| 11 5082 010 | • 3 | 14 | 3 | 38 | | ✓ | 8° | 9,45 |
| 11 5082 015 | • 6 | 16 | 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 |

| 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



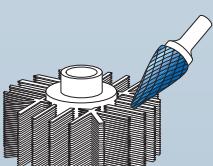
11 3092



BLUETEC
BESCHICHTET
COATED

M FORM / SHAPE SKM

Spitzkegel
Cone



Schnittdaten
Cutting data

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



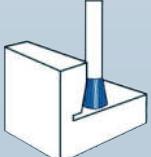
11 3098



BLUETEC
BESCHICHTET
COATED

N FORM / SHAPE WKN

Winkel
Inverted cone



Schnittdaten
Cutting data

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 |





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
 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 |
|----------------------------|--|---------------------------------------|----------------------------|----------------------------|------------------------------|----------------------------|----------------------------|------------------------------|----------------------------|
| Art. 115003 Art. 113003 | Art. 115013 Art. 113013 | Art. 115023 Art. 113023 | Art. 115033 Art. 113033 | Art. 115043 Art. 113043 | Art. 115053 Art. 113053 | Art. 115063 Art. 113063 | Art. 115073 Art. 113073 | Art. 115083 Art. 113083 | Art. 115093 Art. 113093 |
| | | | | | | | | | |
| | | | | | | | | | |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Tropfen Oval | Rundbogen Ball nosed tree | Spitzbogen Tree | Flamme Flame | Rundkegel Ball nosed cone | Spitzkegel Cone |



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

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

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|---------------------|---|---|---|--------------------------------|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm ² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Feines Zerspanen = mittlerer Materialabtrag | 650–750 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 450–600 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | Austenitische und ferritische Edelstähle | Feines Zerspanen = mittlerer Materialabtrag | 450–600 |
| NE-Metalle | Harte NE-Metalle | Bronze, Titan/Titanlegierungen, harte Alulegierungen (hoher Si-Anteil) | Feines Zerspanen = mittlerer Materialabtrag | 450–600 |
| | Hochwarmfeste Werkstoffe | Nickelbasis- und Kobaltbasislegierungen (Triebwerk- und Turbinenbau) | | |
| Gusseisen | Graues Gusseisen, weißes Gusseisen | Gusseisen mit Lamellengraphit EN-GJL (GG), mit Kugelgraphit/Späroguss EN-GJS (GGG), weißer Temperguss EN-GJMW (GTW), schwarzer Temperguss EN-GJMB (GTS) | Feines Zerspanen = mittlerer Materialabtrag | 650–750 |

| Material groups | | | Application | Cutting speed m/min |
|---------------------------|---|---|---------------------------------------|---------------------|
| Steel, cast steel | Non-hardened, non-heat treated steels up to 1200 N/mm ² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Fine machining = medium stock removal | 650–750 |
| | Hardened, heat-treated steels exceeding 1200 N/mm ² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 450–600 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Fine machining = medium stock removal | 450–600 |
| Non-ferrous metals | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard alu-alloys (high Si content) | Fine machining = medium stock removal | 450–600 |
| | High-temperature resistant materials | Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction) | | |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Fine machining = medium stock removal | 650–750 |

Schnittgeschwindigkeit • Cutting speed (m/min)

| Ø (mm) | 450 | 600 | 650 | 750 |
|--|--------|--------|---------|---------|
| 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



11 3003

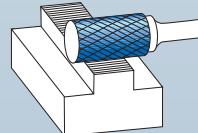


A FORM / SHAPE

ZYA

Zylinder ohne Stirnverzahnung

Cylinder without end cut

Schnittdaten
Cutting dataFilm
Movie

827

| 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 |

| 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



11 3013

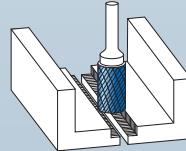


B FORM / SHAPE

ZYB

Zylinder mit Stirnverzahnung

Cylinder with end cut

Schnittdaten
Cutting dataFilm
Movie

827

| 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 | % 12 | 25 | 8 | 70 | ✓ | | 36,90 |
| 11 5013 120 | % 16 | 25 | 8 | 70 | ✓ | | 21,00 |

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|-------|----|----|-----|-------------------|--------------|-------|
| 11 3013 005 | % 1,5 | 6 | 3 | 38 | | ✓ | 3,60 |
| 11 3013 010 | % 2 | 11 | 3 | 38 | | ✓ | 4,25 |
| 11 3013 015 | • 3 | 14 | 3 | 38 | | ✓ | 7,50 |
| 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 |

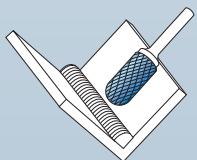
11 5023



C FORM / SHAPE WRC

Walzenrundform

Ball nosed cylinder



11 3023

Schnittdaten
Cutting dataFilm
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 | |

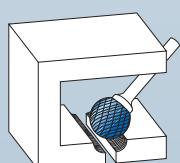
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|-----|-------------------|--------------|-------|
| 11 3023 020 | % 2 | 11 | 3 | 38 | ✓ | | 3,95 |
| 11 3023 025 | ● 3 | 14 | 3 | 38 | ✓ | | 7,35 |
| 11 3023 030 | ● 3 | 14 | 3 | 50 | ✓ | | 10,15 |
| 11 3023 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



D FORM / SHAPE KUD

Kugel



11 3033

Schnittdaten
Cutting dataFilm
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 |

11 5043



11 3043

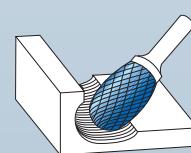


E FORM / SHAPE

TRE

Tropfen

Oval

Schnittdaten
Cutting dataFilm
Movie

827



Film

| 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 | ✓ | 9,45 | 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



11 3053

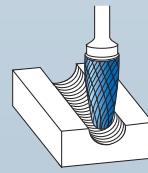


F FORM / SHAPE

RBF

Rundbogen

Ball nosed tree

Schnittdaten
Cutting dataFilm
Movie

827



Film

| 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 |

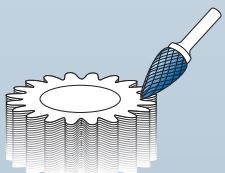
11 5063



G FORM / SHAPE SPG

Spitzbogen

Tree



11 3063



Schnittdaten
Cutting data

Film
Movie



827



| 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



H FORM / SHAPE

Flamme



11 3073



Schnittdaten
Cutting data

Film
Movie



827



| 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 | |

11 5083

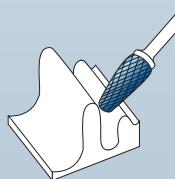
BLUETEC
BESCHICHTET
COATED

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

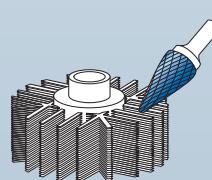
BLUETEC
BESCHICHTET
COATED

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 |

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Special price / sale article. While stocks last.

Qualitätsprodukte für die Metallbearbeitung.
Quality products for metalworking.



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→ 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

1

2

3

4

5

6

7

8

9

10

Index

HP-11



Extrem feine Kreuzverzahnung

Extremely fine cross cutting style

ANWENDUNG · APPLICATION

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

OPTIMAL

GUT

- 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 |
|------------------------------|--|---------------------------------------|------------------------------|------------------------------|------------------------------|
| Art. 11 6080 Art. 11 4080 | Art. 11 6081 Art. 11 4081 | Art. 11 6082 Art. 11 4082 | Art. 11 6083 Art. 11 4083 | Art. 11 6084 Art. 11 4084 | Art. 11 6085 Art. 11 4085 |
| | | | | | |
| 836 | 836 | 837 | 837 | 838 | 838 |
| Zylinder Cylinder | Zylinder + Stirnverzahnung Cylinder + end cut | Walzenrundform Ball nosed cylinder | Kugel Ball | Rundbogen Ball nosed tree | Spitzbogen Tree |



BLUE-TEC-beschichtet
BLUE-TEC-coated

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

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

| Werkstoffgruppen | | | Bearbeitung | Schnittgeschwindigkeit (m/min) |
|------------------|---|---|---|--------------------------------|
| Stahl, Stahlguss | Ungehärtete, nicht vergütete Stähle bis 1200 N/mm ² (< 38 HRC) | Baustähle, Kohlenstoffstähle, Werkzeugstähle, unlegierte Stähle, Einsatzstähle, Stahlguss | Feines Zerspanen = mittlerer Materialabtrag | 650-750 |
| | Gehärtete, vergütete Stähle über 1200 N/mm ² (> 38 HRC) | Werkzeugstähle, Vergütungsstähle, legierte Stähle, Stahlguss | | 450-600 |
| Edelstahl (INOX) | Rost- und säurebeständige Stähle | | 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 Temperiungsguss EN-GJMW (GTW), schwarzer Temperiungsguss EN-GJMB (GTS) | Feines Zerspanen = mittlerer Materialabtrag | 600-750 |

| Material groups | | | Application | Cutting speed m/min |
|------------------------|---|---|---------------------------------------|---------------------|
| Steel, cast steel | Non-hardened, non-heat treated steels up to 1200 N/mm ² (< 38 HRC) | Construction steels, carbon steels, tool steels, non-alloyed steels, case-hardened steels, cast steels | Fine machining = medium stock removal | 650-750 |
| | Hardened, heat-treated steels exceeding 1200 N/mm ² (> 38 HRC) | Tool steels, tempering steels, alloyed steel, cast steels | | 450-600 |
| Stainless steel (INOX) | Rust and acid-resistant steels | Austenitic and ferritic stainless steels | Fine machining = medium stock removal | 450-600 |
| Non-ferrous metals | Hard-non-ferrous metals | Bronze, titanium/titanium alloys, hard alu-alloys [high Si content] | Fine machining = medium stock removal | 450-600 |
| | High-temperature resistant materials | Nickel based alloys, cobalt based alloys (aircraft engine and turbine construction) | | |
| Cast iron | Grey cast iron, white cast iron | Cast iron with flake graphite EN-GJL, with nodular graphite cast iron EN-GJS, white annealed cast iron EN-GJMW, black cast iron EN-GJMB | Fine machining = medium stock removal | 600-750 |

Schnittgeschwindigkeit • Cutting speed (m/min)

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

11 6080

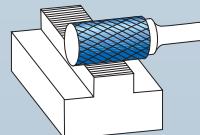


A FORM / SHAPE

ZYA

Zylinder ohne Stirnverzahnung

Cylinder without end cut

Schnittdaten
Cutting dataFilm
Movie

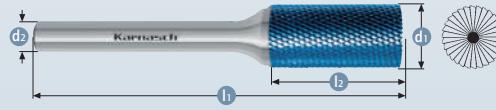
835



| 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

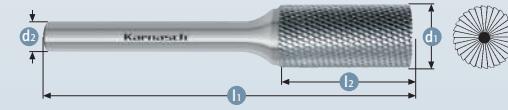
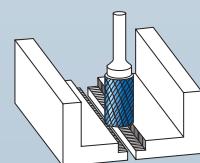


B FORM / SHAPE

ZYB

Zylinder mit Stirnverzahnung

Cylinder with end cut

Schnittdaten
Cutting dataFilm
Movie

835



| 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 |

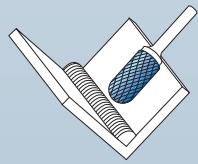
11 6082



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 | |

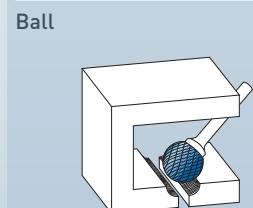
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|------|----|----|-------------------|--------------|---|
| 11 4082 010 | • 2 | 11 | 3 | 38 | ✓ | 20,05 | |
| 11 4082 020 | • 3 | 14 | 3 | 38 | ✓ | 20,05 | |
| 11 4082 030 | • 6 | 12,7 | 3 | 44 | ✓ | 21,05 | |
| 11 4082 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

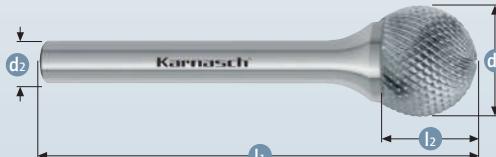


D FORM / SHAPE KUD

Kugel



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 | |

1

2

3

4

5

6

7

8

9

10

Index

11 6084

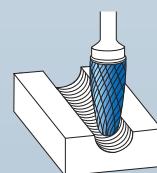
BLUETEC
BESCHICHTET
COATED

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 |

FRÄSSTIFTE / LOCHSÄGEN FÜR SCHLÜSSELDIENSTE

ROTARY BURRS / HOLE SAWS FOR LOCKSMITHS



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5.2

PROFESSIONAL TOOLS

11 5021 | 11 5022 | 11 5025



C FORM / SHAPE **WRC**

Walzenrundform

Ball nosed cylinder



Film
Movie



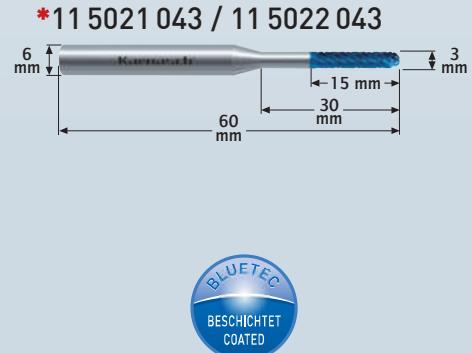
| Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | Zahnung · Cut | | | € |
|-------------|-------|-----|----|-----|---------------|------------------------------|-----|-------|
| 11 5021 030 | • 3,0 | 14 | 3 | 50 | HP-3 | Schnittdaten Cutting data | 755 | 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 | HP-4 | Schnittdaten Cutting data | 819 | 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 | HP-7 | Schnittdaten Cutting data | 787 | 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 |

* Davon 15 mm verzahnt | Of which 15 mm toothed

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

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





C FORM / SHAPE WRC

Walzenrundform

Ball nosed cylinder



Film
Movie



| Bestseller – preisreduziert · Bestseller – price reduced

| Art. | d1 | l2 | d2 | l1 | Zahnung · Cut | Schnittdaten Cutting data | € |
|-------------|-------|-----|----|-----|---------------|---|-------|
| 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 | HP-3 | Schnittdaten Cutting data | 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 | HP-4 | Extra feine Kreuzverzahnung für Stähle bis ca. 70 HRC | 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 | HP-7 | Große Zerspanung und höchster Materialabtrag bei Alulegierungen | 14,55 |
| | | | | | | For coarse cutting and highest material removal of aluminum alloys | 787 |

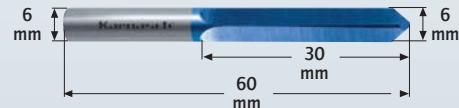
* Davon 15 mm verzahnt | Of which 15 mm toothed

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

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

11 4701

€ 32,40



Schnittdaten
Cutting data



Film
Movie



1465

Vollhartmetall-Bohrfräser der neuesten Generation. Öffnet Schließzyliner 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 Schließzyliner 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-SCHLIESZYLINDER T.C.T. HOLESAWS FOR ABLOY PROTEC LOCKING CYLINDERS



Schnittdaten
Cutting data



Film
Movie



1465

Zu verwenden mit einer Bohrmaschine/starke Akku-Bohrmaschine. Mit dieser Lochsäge ist es möglich, die vor dem Kern liegende, gehärtete Stirnplatte dieses speziellen Hochsicherheitszylinders zu durchdringen um anschließend den Kern herausziehen zu können.

Werkzeugmerkmale:

- 4 x HM-Zähne Ø 15,2
- Gefederte Stiftführung (6,8 mm) zur Zentrierung im Schließkanal
- Tiefenanschlag

To be used with a drilling machine/strong battery drill. With this holesaw it is possible to penetrate the hardened front plate of this special high security locking cylinder that sits in front of the core and then to retrieve the core.

Properties of the tool:

- 4 x T.C.T. teeth Ø 15.2
- Sprung pin guide (6.8 mm) for centring in the locking channel
- Depth stop

SPEZIAL FRÄSSTIFTE

SPECIAL BURRS



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5.3

PROFESSIONAL TOOLS

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Index



Frässtifte für GFK/CFK
Fiberglass routers

845



Mini-Frässtifte Ø 1 + 1,5 mm
Mini-burrs Ø 1 + 1,5 mm

846



Frässtifte + Bohrer für Schlüsseldienste
Burrs + drills for locksmiths

840-
842

11 6011

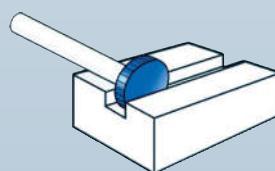


HP-2 VERZAHNUNG · CUT

11 4011



Scheibenform
RIM shape



Schnittdaten
Cutting data

Film
Movie



1465

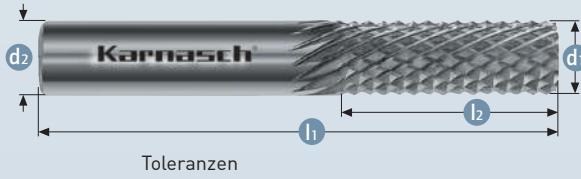
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | Form Shape | € |
|-------------|------|-----|----|----|-------------------|---------------|--------|
| 11 6011 005 | • 10 | 1,6 | 3 | 34 | ✓ | | 17,30 |
| 11 6011 010 | • 12 | 2,6 | 6 | 48 | ✓ | | 42,30 |
| 11 6011 015 | • 25 | 5,2 | 8 | 50 | ✓ | | 100,15 |
| 11 6011 020 | • 25 | 6,3 | 8 | 51 | ✓ | | 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 | ✓ | | 93,75 |
| 11 4011 020 | • 25 | 6,3 | 8 | 51 | ✓ | | 97,55 |

GFK, CFK

Für Kunststoffe, GFK, CFK, MMC

Routers for fiberglass, GFK, CFK



$\varnothing 1.6 \text{ mm}, 2.4 \text{ mm} = +0,00/-0,10$
 $\varnothing 3-12 \text{ mm} = +0,00/-0,13$

Schnittdaten
Cutting data

Film
Movie

1394

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.



| 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)

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



1



MINI-UNI

Einsatzgebiete:

Zu bearbeitende Werkstoffe:
Drehzahlempfehlung:

Feinmechanik, Schmuckindustrie, Turbinenbau, Werkzeugbau

Edelstähle, Buntmetalle, Zinkdruckguss, weiche Keramiken, Titanlegierungen
ca. 70.000 U/min

2



Applications:

For use on:

Recommended operating speed:

Precision engineering, jewellery industry, turbine manufacture
stainless steel, copper and copper alloys, zinc pressure die castings soft ceramics, titanium alloys
+/- 70,000 RPM

3



4



5



6



7



8

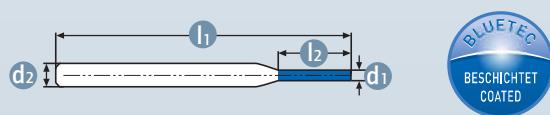


9



10

Index



| 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

Winkel WKN Form

Countersink WKN shape

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

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| | 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 Verutschen an scharfen Kanten nahezu unmöglich.
- Somit besteht eine deutlich bessere Kontrolle und garantiert einen einfachen und schnellen Materialabtrag.

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

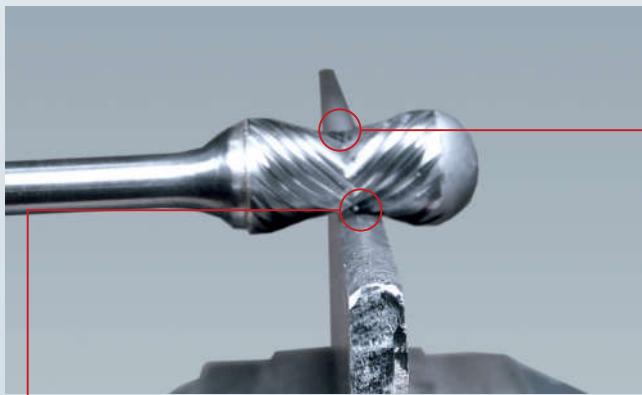
The combination of the most used head shapes as cylinder ZYA + ZYB, ball nosed cylinder WRC, ball nosed tree RBF, tree SPG, ball nosed cone KEL, countersink KSJ + KSK with the unique COMBI+CURVE guiding-rounding-deburring system result in the following advantages:

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

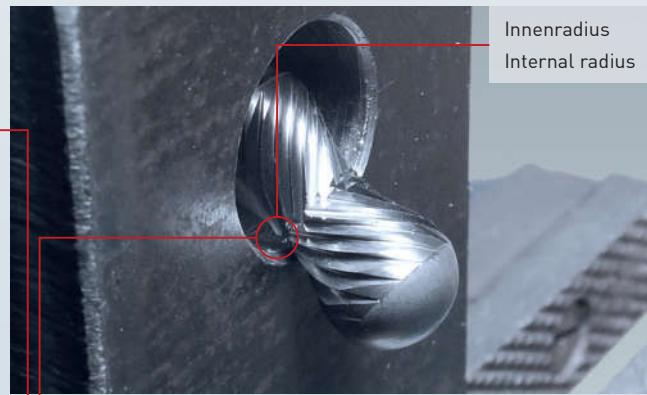
Can be used on a wide variety of material e.g. cast iron, steel < 60 HRC, stainless steel (INOX), nickel-based and titanium alloys, copper, brass and bronze.

CURVE IN ACTION

Karnasch®

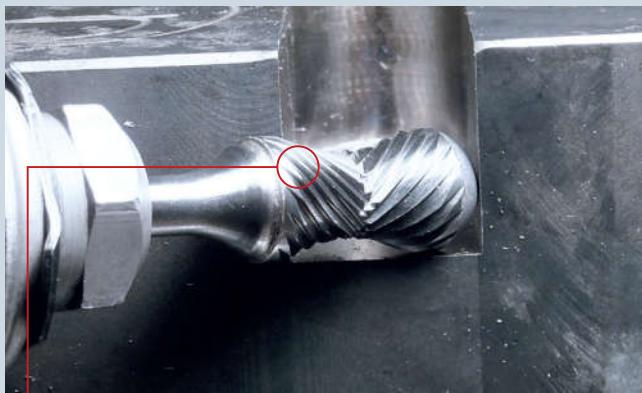


Außenradius
External radius

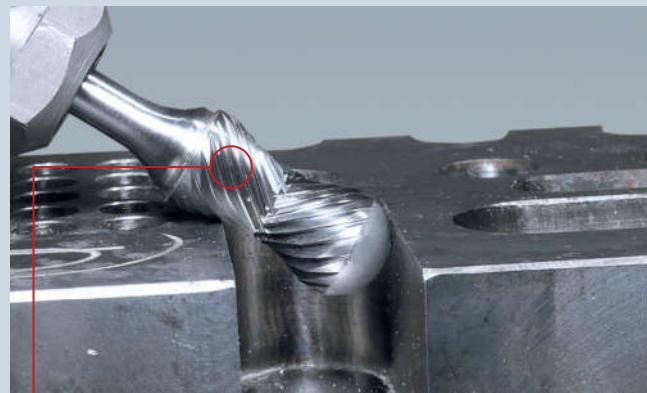


Innenradius
Internal radius
Die Schnittpunkte zwischen Winkelform (WKN) und Kegelform (SKM) ergeben das einzigartige COMBI+CURVE Führungs-Rundungs-Entgratungssystem

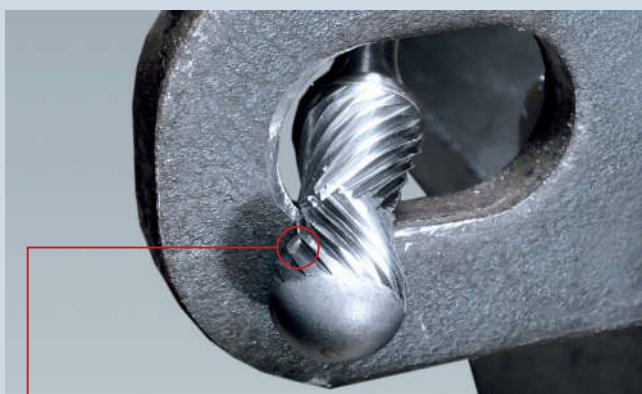
The intersecting points of the countersink (WKN) and cone shapes (SKM) form the unique **COMBI+CURVE** guiding-rounding-deburring system



Interne Fase in SKM Form
Internal chamfer with SKM shape



Außenfase in SKM Form
External chamfer with SKM shape



Interne Fase in WKN Form
Internal chamfer with WKN shape



Außenfase in WKN Form
External chamfer with WKN shape

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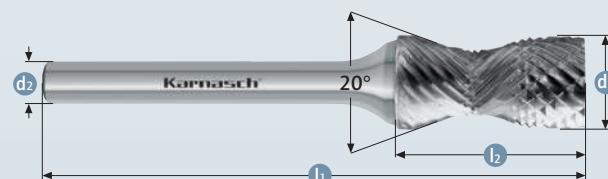
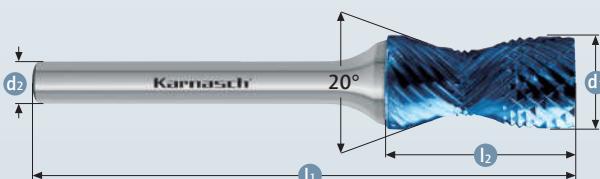
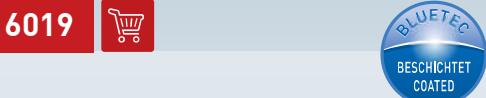
10

Index

11 6019

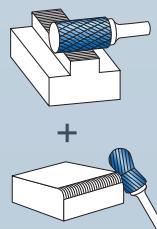


11 4019



Curve + Zylinder

Curve + Cylinder

Schnittdaten
Cutting dataFilm
Movie

755

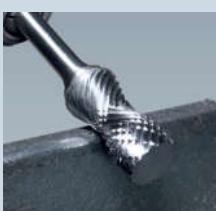
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € | Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6019 100 | • 12 | 25 | 6 | 70 | ✓ | - | 45,95 | 11 4019 100 | • 12 | 25 | 6 | 70 | ✓ | - | 41,05 |

Anwendungsbeispiele / Application examples

COMBI →



CURVE



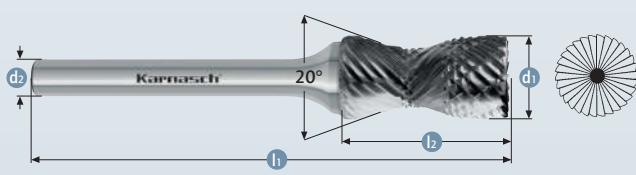
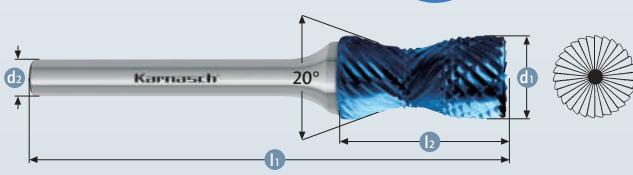
COMBI+CURVE

Karnasch®

11 6020

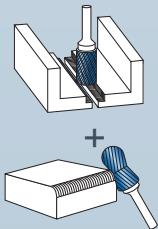


11 4020



Curve + Zylinder mit Stirnverzahnung

Curve + Cylinder with end cut



Schnittdaten
Cutting data



755

Film
Movie



| 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 →



CURVE



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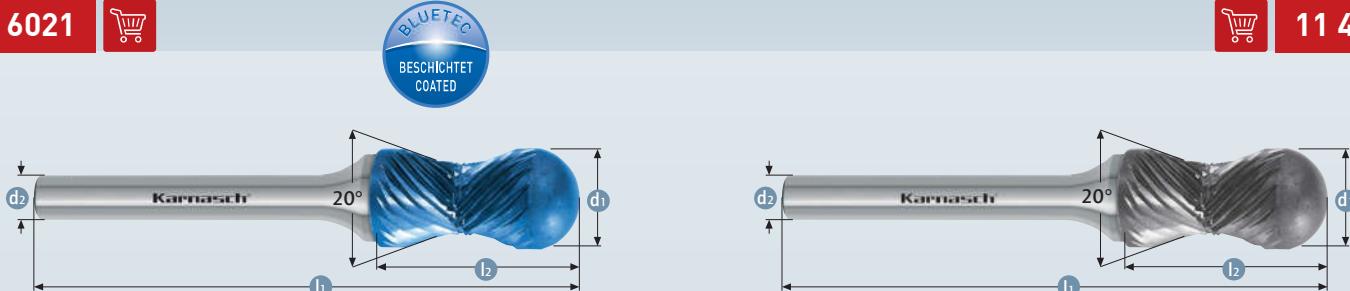
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Index

11 6021

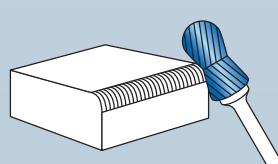


11 4021



Curve + Walzenrundform

Curve + Ball nosed cylinder

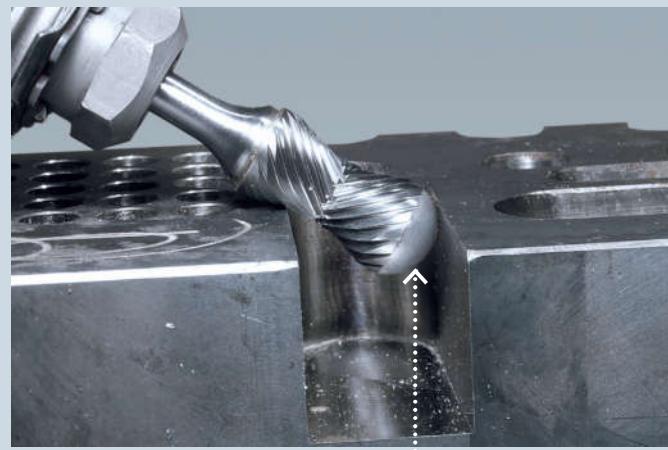
Schnittdaten
Cutting dataFilm
Movie

755

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € | Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6021 100 | • 12 | 25 | 6 | 70 | ✓ | - | 50,95 | 11 4021 100 | • 12 | 25 | 6 | 70 | ✓ | - | 46,05 |

Anwendungsbeispiele / Application examples

COMBI →



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.

CURVE



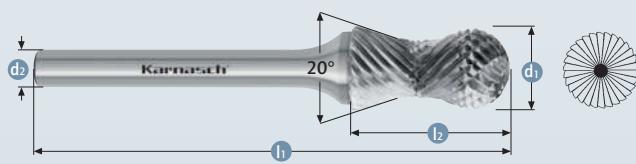
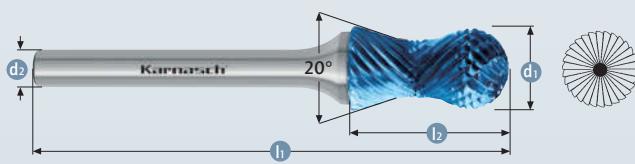
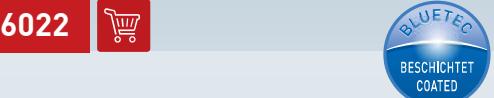
COMBI+CURVE

Karnasch®

11 6022

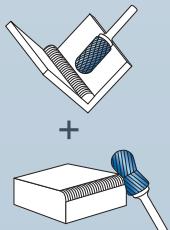


11 4022



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 →



CURVE



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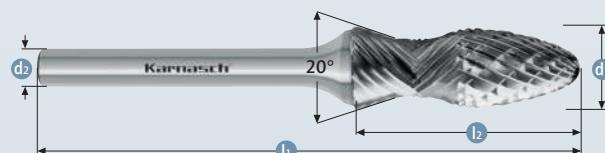
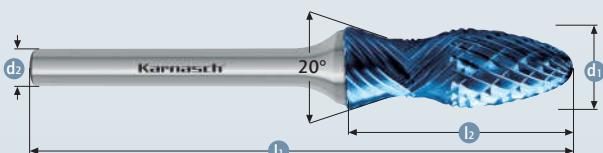
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11 6023

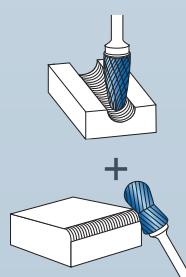


11 4023



Curve + Rundbogen

Curve + Ball nosed tree

Schnittdaten
Cutting dataFilm
Movie

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € | Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6023 100 | • 12 | 35 | 6 | 80 | ✓ | - | 59,75 | 11 4023 100 | • 12 | 35 | 6 | 80 | ✓ | - | 54,85 |

Anwendungsbeispiele / Application examples

COMBI →



CURVE



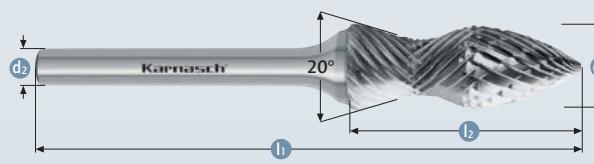
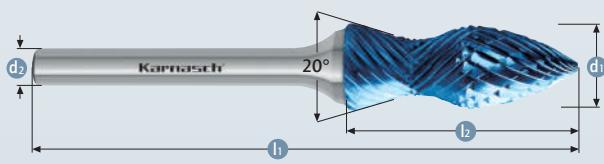
COMBI+CURVE

Karnasch®

11 6024

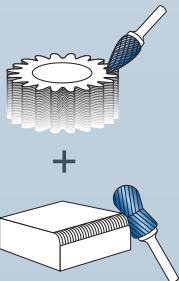


11 4024



Curve + Spitzbogen

Curve + Tree



Schnittdaten
Cutting data



Film
Movie



755

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6024 100 | • 12 | 35 | 6 | 80 | ✓ | - | 46,50 |

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

Anwendungsbeispiele / Application examples

COMBI →



CURVE



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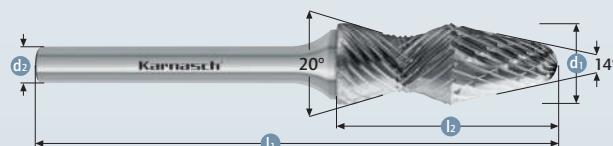
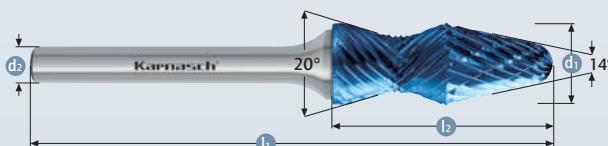
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11 6025

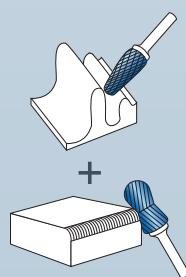


11 4025



Curve + Rundkegel

Curve + Ball nosed cone

Schnittdaten
Cutting dataFilm
Movie

755

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € | Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6025 100 | • 12 | 35 | 6 | 80 | ✓ | - | 49,70 | 11 4025 100 | • 12 | 35 | 6 | 80 | ✓ | - | 44,75 |

Anwendungsbeispiele / Application examples

COMBI →



CURVE



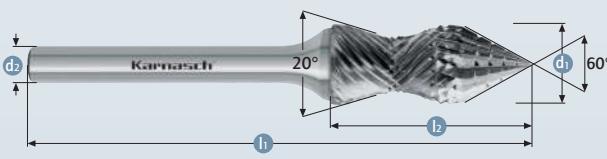
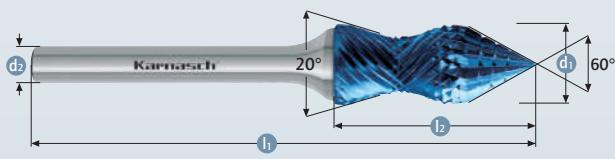
COMBI+CURVE

Karnasch®

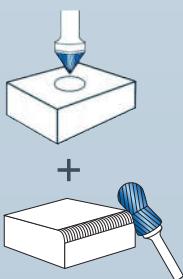
11 6026



11 4026



Curve + Kegel 60°
Curve + Countersink 60°



Schnittdaten
Cutting data



Film
Movie



755

| 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



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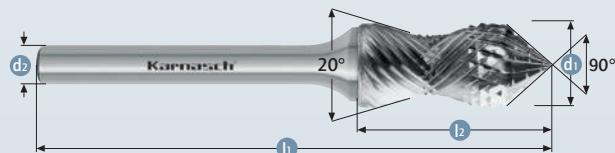
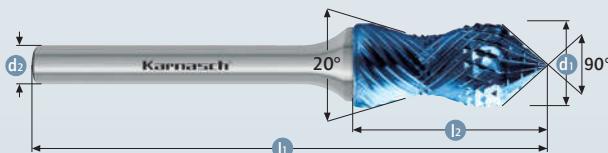
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11 6027

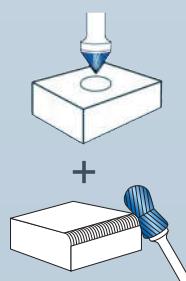


11 4027



Curve + Kegel 90°

Curve + Countersink 90°

Schnittdaten
Cutting dataFilm
Movie

755

| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € | Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|------|----|----|----|-------------------|--------------|-------|-------------|------|----|----|----|-------------------|--------------|-------|
| 11 6027 100 | • 12 | 31 | 6 | 76 | ✓ | - | 46,05 | 11 4027 100 | • 12 | 31 | 6 | 76 | ✓ | - | 41,15 |

Anwendungsbeispiele / Application examples

COMBI →



CURVE





KARNASCH PROFESSIONAL TOOLS WORLDWIDE

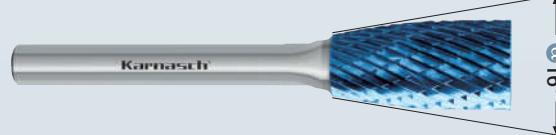
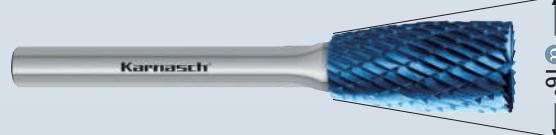
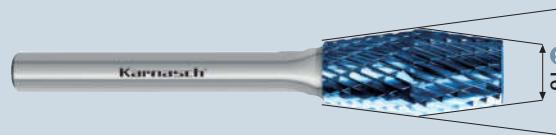
The rapid progress of technology always poses new challenges to companies from the metal-processing industry. It is more important for these companies to have future-orientated and reliable partner by their side who will not settle for targets achieved but provides impulses for new developments.

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



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| 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 |  | Kegel 90° + Zylinder | Countersink 90° + cylinder 864 |
| KSJ | + WKN |  | Kegel 60° + Winkel | Countersink 60° + inverted cone 865 |
| - | - |  | Kegel + Kegel | Countersink + Counter-sink 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

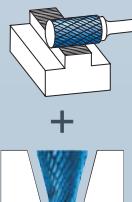
11 6051



11 4051

BESCHICHTET
COATED

FORM / SHAPE

ZYA /
WKNZylinder ohne Stirnverzahnung + Winkel
Cylinder without end cut + inverted coneSchnittdaten
Cutting dataFilm
Movie

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

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

Anwendungsbeispiele
Application examples

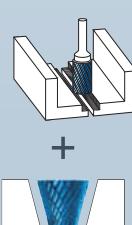
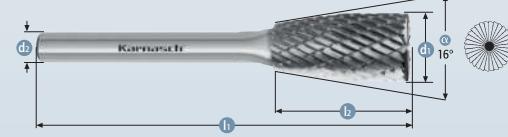
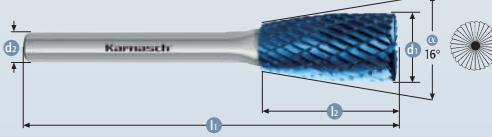
11 6052



11 4052

BESCHICHTET
COATED

FORM / SHAPE

ZYB /
WKNZylinder mit Stirnverzahnung + Winkel
Cylinder with end cut + inverted coneSchnittdaten
Cutting dataFilm
Movie

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

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

Anwendungsbeispiele
Application examples

COMBI+FORM

Karnasch®

11 6053



FORM / SHAPE

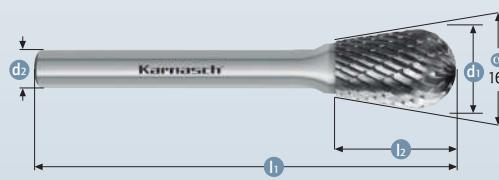
WRC/
WKN

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 | brazed | | 19,85 |

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

Anwendungsbeispiele
Application examples



11 6058

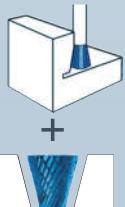


FORM / SHAPE

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 | brazed | | 31,30 |

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

Anwendungsbeispiele
Application examples



11 6059



11 4059

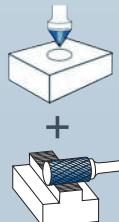


FORM / SHAPE

KSJ /
ZYA

Kegel 60° + Zylinder

Countersink 60° + cylinder

Schnittdaten
Cutting data

755

Film
Movie

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

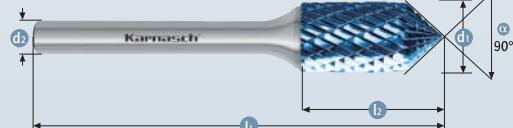
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|-------------------|--------------|-------|
| 11 4059 100 | 12 | 25 | 6 | 70 | brazed | | 18,95 |

Anwendungsbeispiele
Application examples

11 6060



11 4060

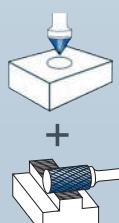


FORM / SHAPE

KSK /
ZYA

Kegel 90° + Zylinder

Countersink 90° + cylinder

Schnittdaten
Cutting data

755

Film
Movie

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

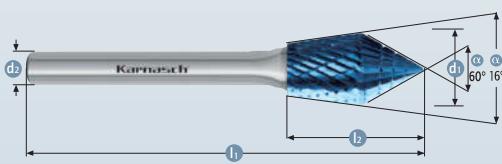
| Art. | d1 | l2 | d2 | l1 | gelötet brazed | VHM solid | € |
|-------------|----|----|----|----|-------------------|--------------|-------|
| 11 4060 100 | 12 | 25 | 6 | 70 | brazed | | 16,95 |

Anwendungsbeispiele
Application examples

11 6061



11 4061

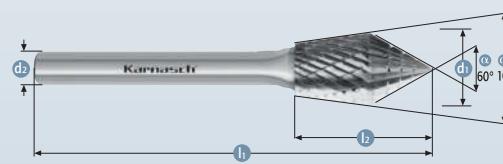
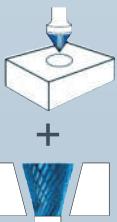


FORM / SHAPE

KSJ/
WKN

Kegel 60° + Winkel

Countersink 60° + inverted cone



Schnittdaten
Cutting data

Film
Movie



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

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

Anwendungsbeispiele
Application examples



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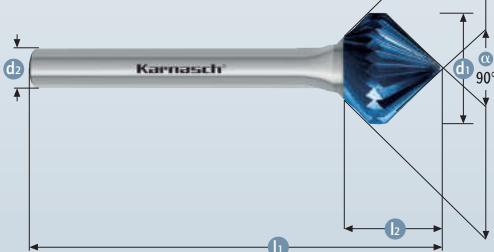
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11 6063



11 4063

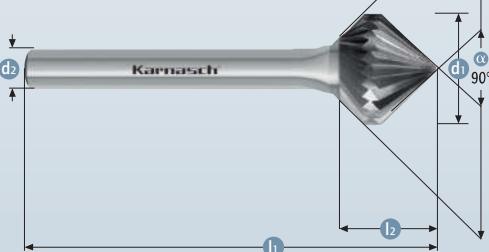
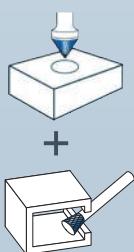


FORM / SHAPE

KSK/
KSK

Kegel 90° + Kegel 90°

Countersink 90° + countersink 90°

Schnittdaten
Cutting dataFilm
Movie

755

€

47,40

Art.

d1

l2

d2

l1

gelötet
brazedVHM
solid

€

11 6063 100 • 16 15 6 60

52,30

Art.

d1

l2

d2

l1

gelötet
brazedVHM
solid

€

11 4063 100 • 16 15 6 60

47,40

Anwendungsbeispiele
Application examples

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