



■ Made
■ in
■ Germany



FRANKEN
TOP-Cut

Universalfräser, für alle Werkstoffgruppen einsetzbar
Universal End Mill, for all Material Groups



Rund 100 Jahre Präzision und Innovation. Nearly 100 years of precision and innovation.

FRANKEN als Teil der EMUGE-FRANKEN Unternehmensgruppe beschäftigt sich seit seiner Gründung mit der Entwicklung und Produktion von Fräswerkzeugen. Präzision und Innovation prägen das breite Angebot von Fräsern aus Hartmetall und HSS sowie PKD-, CBN- oder wendeplattenbestückten Fräskörpern.

Die Fertigung am deutschen Produktionsstandort in Rückersdorf reicht von Standard-Schaft- und Bohrungsfräsern bis hin zu hochgenauen Form- und Profil-Sonderfräsern. Mit seiner Typen- und Schneidstoffvielfalt, dem hohen Standard und der kompromisslosen Präzision entspricht das Fräserprogramm den höchsten Qualitätsanforderungen.

Als Ergänzung zu den Fräswerkzeugen führen wir ein durchgängiges Programm an Fräsespannmitteln und Zubehör für die verschiedensten Adaptierungsmöglichkeiten.

Ever since its foundation FRANKEN as part of the EMUGE-FRANKEN company association has been developing and manufacturing milling tools. The wide range of end mills of solid carbide and HSS as well as PCD and CBN inserts or milling cutters with indexable inserts is characterised by precision and innovation.

The production in our German manufacturing plant in Rückersdorf includes standard end mills and bore cutters as well as highly precise special form and profile milling tools. With its large variety of tool types and cutting materials, the consistently high standards and uncompromising precision, our product range of milling cutters meets even the highest quality requirements.

In addition to our selection of milling tools, we also offer a comprehensive range of clamping systems, tool holders and accessories.

**EMUGE-FRANKEN ist nach ISO 9001:2008
und ISO 50001:2011 zertifiziert**

EMUGE-FRANKEN is certified according
ISO 9001:2008 and ISO 50001:2011



Management
System
ISO 50001:2011
ISO 9001:2008

www.tuv.com
ID 9105017121





TOP-Cut-Fräser sind Universalfräser sowohl aus Hartmetall als auch HSS, die durch ihre speziellen Geometrieeigenschaften in nahezu allen Materialien und Fräsverfahren eingesetzt werden können.

Besonderheiten:

- Ungleiches Drallwinkel
- Konisch ansteigender Spannutengrund
- Hochleistungs-Beschichtung
- Optional mit innerer Kühlschmierstoff-Zufuhr mit axialem Austritt (ICA)

Hauptmerkmal:

Für alle Werkstoffgruppen einsetzbar.

Mit dieser Broschüre zeigen wir eine Auswahl der wichtigsten Hartmetall-TOP-Cut-Schaftfräser. Zu jedem Werkzeug geben wir, in Abhängigkeit zur jeweiligen Werkstoffgruppe, sichere Startbedingungen (v_c / f_z) und Hinweise zum empfohlenen Kühlschmierstoff an.

TOP-Cut tools are versatile end mills made from solid carbide or HSS which can be used in nearly all materials and milling strategies due to their special geometry properties.

Characteristics

- Variable helix angle
- Tapered core diameter
- High-performance coating
- Optionally available with internal coolant supply, axial exit (ICA)

Main feature:

Universal use, for all material groups.

In this brochure we present a selection of the most important solid carbide TOP-Cut end mills. For every tool we give, depending on the respective material group safe starting conditions (v_c / f_z) and directions about the recommended coolant.

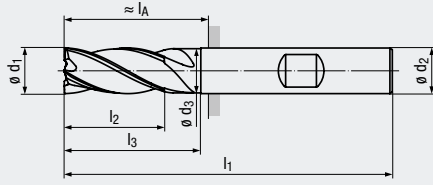
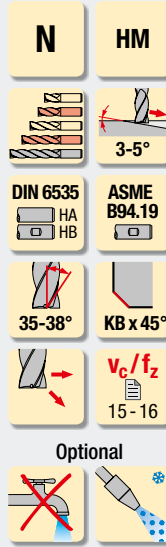
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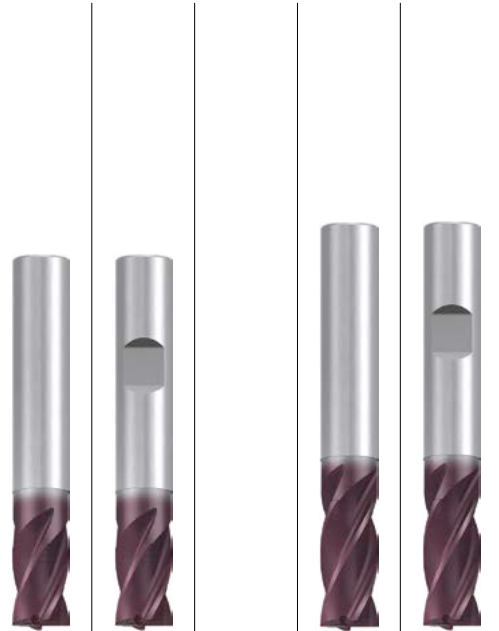
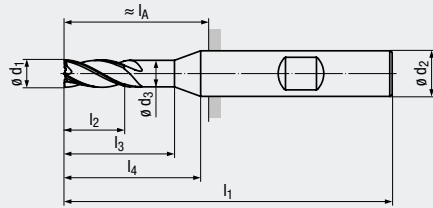
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- Multifunktionales Hochleistungswerkzeug
 - Mit ENORM-Geometrie
 - Vibrationsarme Bearbeitung
 - Schneiden zur Mitte
 - 3 Baulängen verfügbar
- Multi-functional, high performance tool
 - With ENORM geometry
 - Low-vibration machining
 - Centre cutting
 - 3 lengths available



Design I₄:



Allround

Allround

Beschichtung · Coating

Einsatzgebiete – Material (siehe Seite 14)

- In fast allen Werkstoffen einsetzbar
- Zum Schruppen und Schlichten geeignet

Applications – material (see page 14)

- For almost all materials
- Suitable for roughing and finishing

TIALN

| | |
|---|--------------|
| P | 1.1-5.1 |
| M | 1.1-4.1 |
| K | 1.1-4.2 |
| N | 1.2-1.4 |
| N | 2.1-4.1, 5.2 |
| S | 1.1-2.6 |
| H | 1.1 1.2-1.3 |

TIALN

| | |
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| P | 1.1-5.1 |
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| N | 2.1-4.1, 5.2 |
| S | 1.1-2.6 |
| H | 1.1 1.2-1.3 |

DIN 6527 – Kurze Ausführung · Short design

| Bestell-Code · Order code | | | | | | | | | | | 1916A | 1917A | | | |
|---------------------------|-------|-------|-------|-------------------|-------|-------------------------|-------------|------|---------------|------------------|-------|-------|--|--|--|
| $\varnothing d_1$ f8 | l_2 | l_3 | l_1 | $\varnothing d_3$ | l_4 | $\varnothing d_2$ h5 | l_A h6 | KB | Z (Flutes) | Dimens.- Code | | | | | |
| 3 | 5 | 9 | 50 | 2,9 | 14 | 6 | 14 | 0,07 | 4 | .003 | ● | ● | | | |
| 4 | 8 | 12 | 54 | 3,8 | 18 | 6 | 18 | 0,07 | 4 | .004 | ● | ● | | | |
| 5 | 9 | 16 | 54 | 4,8 | 18 | 6 | 18 | 0,07 | 4 | .005 | ● | ● | | | |
| 6 | 10 | 16 | 54 | 5,8 | – | 6 | 18 | 0,12 | 4 | .006 | ● | ● | | | |
| 8 | 12 | 20 | 58 | 7,7 | – | 8 | 22 | 0,12 | 4 | .008 | ● | ● | | | |
| 10 | 15 | 24 | 66 | 9,5 | – | 10 | 26 | 0,2 | 4 | .010 | ● | ● | | | |
| 12 | 18 | 26 | 73 | 11,5 | – | 12 | 28 | 0,2 | 4 | .012 | ● | ● | | | |
| 16 | 24 | 32 | 82 | 15,5 | – | 16 | 34 | 0,2 | 4 | .016 | ● | ● | | | |
| 18 | 27 | 34 | 84 | 17,5 | – | 18 | 36 | 0,2 | 4 | .018 | ● | ● | | | |
| 20 | 30 | 40 | 92 | 19,5 | – | 20 | 42 | 0,3 | 4 | .020 | ● | ● | | | |

DIN 6527 – Lange Ausführung · Long design

| Bestell-Code · Order code | | | | | | | | | | | | | 1998A | 1999A | |
|---------------------------|-------|-------|-------|-------------------|-------|-------------------------|-------------|------|---------------|------------------|--|--|-------|-------|--|
| $\varnothing d_1$ f8 | l_2 | l_3 | l_1 | $\varnothing d_3$ | l_4 | $\varnothing d_2$ h5 | l_A h6 | KB | Z (Flutes) | Dimens.- Code | | | | | |
| 3 | 8 | 14 | 57 | 2,9 | 20 | 6 | 21 | 0,07 | 4 | .003 | | | ● | ● | |
| 4 | 11 | 18 | 57 | 3,8 | 20 | 6 | 21 | 0,07 | 4 | .004 | | | ● | ● | |
| 5 | 13 | 19 | 57 | 4,8 | 20 | 6 | 21 | 0,12 | 4 | .005 | | | ● | ● | |
| 6 | 13 | 20 | 57 | 5,8 | – | 6 | 21 | 0,12 | 4 | .006 | | | ● | ● | |
| 7 | 19 | 23 | 63 | 6,7 | 25 | 8 | 27 | 0,12 | 4 | .007 | | | ● | ● | |
| 8 | 19 | 25 | 63 | 7,7 | – | 8 | 27 | 0,12 | 4 | .008 | | | ● | ● | |
| 9 | 22 | 28 | 72 | 8,7 | 30 | 10 | 32 | 0,2 | 4 | .009 | | | ● | ● | |
| 10 | 22 | 30 | 72 | 9,5 | – | 10 | 32 | 0,2 | 4 | .010 | | | ● | ● | |
| 11 | 26 | 32 | 83 | 10,5 | 35 | 12 | 38 | 0,2 | 4 | .011 | | | ● | ● | |
| 12 | 26 | 35 | 83 | 11,5 | – | 12 | 38 | 0,2 | 4 | .012 | | | ● | ● | |
| 14 | 26 | 35 | 83 | 13,5 | – | 14 | 38 | 0,2 | 4 | .014 | | | ● | ● | |
| 15 | 32 | 38 | 92 | 14,5 | 40 | 16 | 44 | 0,2 | 4 | .015 | | | ● | ● | |
| 16 | 32 | 40 | 92 | 15,5 | – | 16 | 44 | 0,2 | 4 | .016 | | | ● | ● | |
| 18 | 32 | 50 | 100 | 17,5 | – | 18 | 52 | 0,2 | 4 | .018 | | | ● | ● | |
| 20 | 38 | 50 | 104 | 19,5 | – | 20 | 54 | 0,3 | 4 | .020 | | | ● | ● | |
| 25 | 45 | 65 | 125 | 24,2 | – | 25 | 69 | 0,3 | 6 | .025 | | | ● | ● | |

- Multifunktionales Hochleistungswerkzeug
- Mit ENORM-Geometrie
- Vibrationsarme Bearbeitung
- Innere Kühlschmierstoff-Zufuhr, Austritt axial (ICA)

- Multi-functional, high performance tool
- With ENORM geometry
- Low-vibration machining
- Internal coolant supply, axial exit (ICA)

N **ICA**

HM

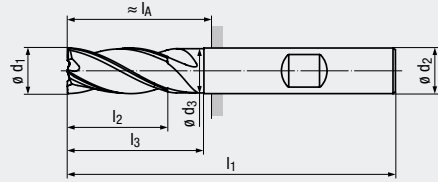
DIN 6535
HA
HB

3-5°

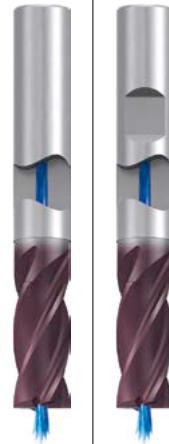
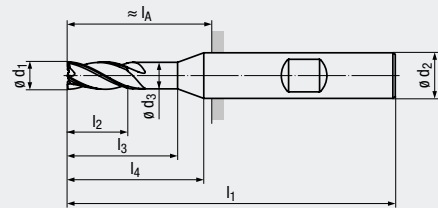
35-38°

KB x 45°

v_c / f_z
16



Design I₄:



Allround

Beschichtung · Coating

Einsatzgebiete – Material (siehe Seite 14)

- In fast allen Werkstoffen, inklusive zähe Werkstoffe, einsetzbar
- Zum Schrumpfen und Schlichten geeignet

Applications – material (see page 14)

- For almost all materials, including tough materials
- Suitable for roughing and finishing

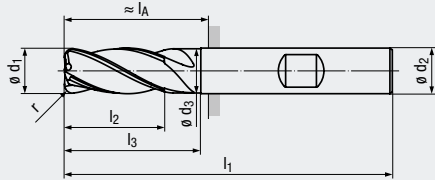
TIALN

| | |
|----------|--------------|
| P | 1.1-5.1 |
| M | 1.1-4.1 |
| K | 1.1-4.2 |
| N | 1.2-1.4 |
| N | 2.1-4.1, 5.2 |
| S | 1.1-2.6 |
| H | 1.1 1.2-1.3 |

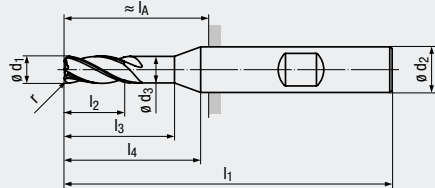
DIN 6527 – Lange Ausführung · Long design

| Bestell-Code · Order code | | | | | | | | | | | 1998AZ | 1999AZ | | | |
|---------------------------|-------|-------|-------|-------------------|-------|-------------------------|-----------|------|---------------|------------------|--------|--------|--|--|--|
| $\varnothing d_1$ f8 | l_2 | l_3 | l_1 | $\varnothing d_3$ | l_4 | $\varnothing d_2$ h5 | l_A | KB | Z (Flutes) | Dimens.- Code | | | | | |
| 3 | 8 | 14 | 57 | 2,9 | 20 | 6 | 21 | 0,07 | 4 | .003 | ● | ● | | | |
| 4 | 11 | 18 | 57 | 3,8 | 20 | 6 | 21 | 0,07 | 4 | .004 | ● | ● | | | |
| 5 | 13 | 19 | 57 | 4,8 | 20 | 6 | 21 | 0,12 | 4 | .005 | ● | ● | | | |
| 6 | 13 | 20 | 57 | 5,8 | – | 6 | 21 | 0,12 | 4 | .006 | ● | ● | | | |
| 8 | 19 | 25 | 63 | 7,7 | – | 8 | 27 | 0,12 | 4 | .008 | ● | ● | | | |
| 10 | 22 | 30 | 72 | 9,5 | – | 10 | 32 | 0,2 | 4 | .010 | ● | ● | | | |
| 12 | 26 | 35 | 83 | 11,5 | – | 12 | 38 | 0,2 | 4 | .012 | ● | ● | | | |
| 16 | 32 | 40 | 92 | 15,5 | – | 16 | 44 | 0,2 | 4 | .016 | ● | ● | | | |
| 20 | 38 | 50 | 104 | 19,5 | – | 20 | 54 | 0,3 | 4 | .020 | ● | ● | | | |

- Multifunktionales Hochleistungswerkzeug
 - Mit ENORM-Geometrie
 - Vibrationsarme Bearbeitung
 - Verschiedene Eckenradien pro Schneidendurchmesser
 - Schneiden zur Mitte oder innere Kühlschmierstoff-Zufuhr, Austritt axial (ICA)
- Multi-functional, high performance tool
 - With ENORM geometry
 - Low-vibration machining
 - Several corner radii per cutting diameter
 - Centre cutting or internal coolant supply, axial exit (ICA)



Design I₄:



N

ICA

HM

DIN 6535
HA
HB

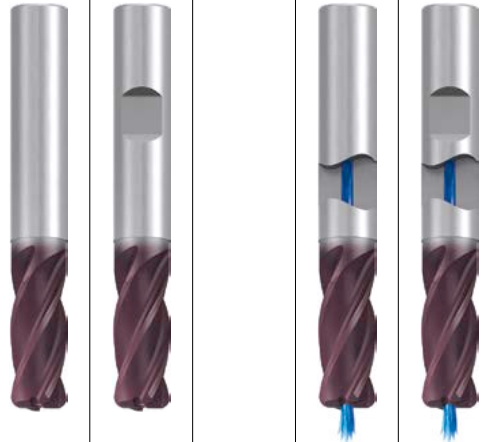
3-5°

35-38°

ER

V_c/f_z
16

Optional



Allround

Allround

Beschichtung · Coating

Einsatzgebiete – Material (siehe Seite 14)

- In fast allen Werkstoffen, inklusive zähe Werkstoffe, einsetzbar
- Sehr gut zum Schruppen und Schlichten geeignet

Applications – material (see page 14)

- For almost all materials, including tough materials
- Very suitable for roughing and finishing

TIALN

TIALN

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| P | 1.1-5.1 |
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| K | 1.1-4.2 |
| N | 1.2-1.4 |
| N | 2.1-4.1, 5.2 |
| S | 1.1-2.6 |
| H | 1.1 1.2-1.3 |

| | |
|---|--------------|
| P | 1.1-5.1 |
| M | 1.1-4.1 |
| K | 1.1-4.2 |
| N | 1.2-1.4 |
| N | 2.1-4.1, 5.2 |
| S | 1.1-2.6 |
| H | 1.1 1.2-1.3 |

DIN 6527 – Lange Ausführung · Long design

Eckenradius · Corner radius

| Bestell-Code · Order code | | | | | | | | | | | 2698A | 2699A | 2698AZ | 2699AZ |
|---------------------------|------------|-------|-------|-------|------------|-------|------------------|-------|---------------|------------------|-------|-------|--------|--------|
| ϕd_1 f8 | r ±0,01 | l_2 | l_3 | l_1 | ϕd_3 | l_4 | ϕd_2 h5 | l_A | Z (Flutes) | Dimens.- Code | | | | |
| 3 | 0,1 | 8 | 14 | 57 | 2,9 | 20 | 6 | 21 | 4 | .003001 | ● | ● | | |
| 3 | 0,3 | 8 | 14 | 57 | 2,9 | 20 | 6 | 21 | 4 | .003003 | ● | ● | | |
| 3 | 0,5 | 8 | 14 | 57 | 2,9 | 20 | 6 | 21 | 4 | .003005 | ● | ● | | |
| 4 | 0,1 | 11 | 18 | 57 | 3,8 | 20 | 6 | 21 | 4 | .004001 | ● | ● | | |
| 4 | 0,3 | 11 | 18 | 57 | 3,8 | 20 | 6 | 21 | 4 | .004003 | ● | ● | | |
| 4 | 0,4 | 11 | 18 | 57 | 3,8 | 20 | 6 | 21 | 4 | .004004 | ● | ● | | |
| 4 | 0,5 | 11 | 18 | 57 | 3,8 | 20 | 6 | 21 | 4 | .004005 | ● | ● | | |
| 5 | 0,1 | 13 | 19 | 57 | 4,8 | 20 | 6 | 21 | 4 | .005001 | ● | ● | | |
| 5 | 0,3 | 13 | 19 | 57 | 4,8 | 20 | 6 | 21 | 4 | .005003 | ● | ● | | |
| 5 | 0,5 | 13 | 19 | 57 | 4,8 | 20 | 6 | 21 | 4 | .005005 | ● | ● | | |
| 5 | 1 | 13 | 19 | 57 | 4,8 | 20 | 6 | 21 | 4 | .005010 | ● | ● | | |
| 6 | 0,1 | 13 | 20 | 57 | 5,8 | — | 6 | 21 | 4 | .006001 | ● | ● | | |
| 6 | 0,5 | 13 | 20 | 57 | 5,8 | — | 6 | 21 | 4 | .006005 | ● | ● | | |
| 6 | 1,0 | 13 | 20 | 57 | 5,8 | — | 6 | 21 | 4 | .006010 | ● | ● | | |
| 6 | 1,5 | 13 | 20 | 57 | 5,8 | — | 6 | 21 | 4 | .006015 | ● | ● | | |
| 8 | 0,15 | 19 | 25 | 63 | 7,7 | — | 8 | 27 | 4 | .008001 | ● | ● | | |
| 8 | 0,5 | 19 | 25 | 63 | 7,7 | — | 8 | 27 | 4 | .008005 | ● | ● | | |
| 8 | 1 | 19 | 25 | 63 | 7,7 | — | 8 | 27 | 4 | .008010 | ● | ● | | |
| 8 | 1,5 | 19 | 25 | 63 | 7,7 | — | 8 | 27 | 4 | .008015 | ● | ● | | |
| 8 | 2 | 19 | 25 | 63 | 7,7 | — | 8 | 27 | 4 | .008020 | ● | ● | | |
| 10 | 0,15 | 22 | 30 | 72 | 9,5 | — | 10 | 32 | 4 | .010001 | ● | ● | | |
| 10 | 0,5 | 22 | 30 | 72 | 9,5 | — | 10 | 32 | 4 | .010005 | ● | ● | | |
| 10 | 1 | 22 | 30 | 72 | 9,5 | — | 10 | 32 | 4 | .010010 | ● | ● | | |
| 10 | 1,5 | 22 | 30 | 72 | 9,5 | — | 10 | 32 | 4 | .010015 | ● | ● | | |
| 10 | 2 | 22 | 30 | 72 | 9,5 | — | 10 | 32 | 4 | .010020 | ● | ● | | |
| 10 | 2,5 | 22 | 30 | 72 | 9,5 | — | 10 | 32 | 4 | .010025 | ● | ● | | |
| 10 | 3 | 22 | 30 | 72 | 9,5 | — | 10 | 32 | 4 | .010030 | ● | ● | | |
| 12 | 0,2 | 26 | 35 | 83 | 11,5 | — | 12 | 38 | 4 | .012002 | ● | ● | | |
| 12 | 0,5 | 26 | 35 | 83 | 11,5 | — | 12 | 38 | 4 | .012005 | ● | ● | | |
| 12 | 1 | 26 | 35 | 83 | 11,5 | — | 12 | 38 | 4 | .012010 | ● | ● | | |
| 12 | 1,5 | 26 | 35 | 83 | 11,5 | — | 12 | 38 | 4 | .012015 | ● | ● | | |
| 12 | 2 | 26 | 35 | 83 | 11,5 | — | 12 | 38 | 4 | .012020 | ● | ● | | |
| 12 | 2,5 | 26 | 35 | 83 | 11,5 | — | 12 | 38 | 4 | .012025 | ● | ● | | |
| 12 | 3 | 26 | 35 | 83 | 11,5 | — | 12 | 38 | 4 | .012030 | ● | ● | | |
| 12 | 4 | 26 | 35 | 83 | 11,5 | — | 12 | 38 | 4 | .012040 | ● | ● | | |
| 14 | 1 | 26 | 35 | 83 | 13,5 | — | 14 | 38 | 4 | .014010 | ● | ● | | |
| 16 | 0,3 | 32 | 40 | 92 | 15,5 | — | 16 | 44 | 4 | .016003 | ● | ● | | |
| 16 | 0,5 | 32 | 40 | 92 | 15,5 | — | 16 | 44 | 4 | .016005 | ● | ● | | |
| 16 | 1 | 32 | 40 | 92 | 15,5 | — | 16 | 44 | 4 | .016010 | ● | ● | | |
| 16 | 1,5 | 32 | 40 | 92 | 15,5 | — | 16 | 44 | 4 | .016015 | ● | ● | | |

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N

ICA

HM

DIN 6535
HA HB

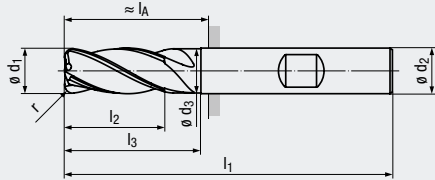
3-5°

35-38°

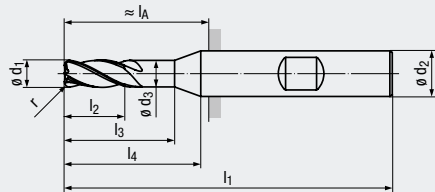
ER

v_c/f_z
16

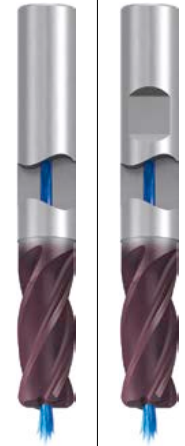
Optional



Design I₄:



Allround



Allround

Beschichtung · Coating

TIALN

TIALN

Einsatzgebiete – Material (siehe Seite 14)

Applications – material (see page 14)

- In fast allen Werkstoffen, inklusive zähe Werkstoffe, einsetzbar
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|---|--------------|
| P | 1.1-5.1 |
| M | 1.1-4.1 |
| K | 1.1-4.2 |
| N | 1.2-1.4 |
| N | 2.1-4.1, 5.2 |
| S | 1.1-2.6 |
| H | 1.1 1.2-1.3 |

DIN 6527 – Lange Ausführung · Long design

Eckenradius · Corner radius


| Bestell-Code · Order code | | | | | | | | | | | 2698A | 2699A | 2698AZ | 2699AZ |
|---------------------------|-------|----------------|----------------|----------------|------------------|----------------|------------------|----------------|----------|--------------|-------|-------|--------|--------|
| ø d ₁ | r | l ₂ | l ₃ | l ₁ | ø d ₃ | l ₄ | ø d ₂ | l _A | Z | Dimens.-Code | | | | |
| ø f8 | ±0,01 | | | | | | h5 | | (Flutes) | | | | | |
| 16 | 2 | 32 | 40 | 92 | 15,5 | – | 16 | 44 | 4 | .016020 | ● | ● | ● | ● |
| 16 | 2,5 | 32 | 40 | 92 | 15,5 | – | 16 | 44 | 4 | .016025 | ● | ● | ● | ● |
| 16 | 3 | 32 | 40 | 92 | 15,5 | – | 16 | 44 | 4 | .016030 | ● | ● | ● | ● |
| 16 | 4 | 32 | 40 | 92 | 15,5 | – | 16 | 44 | 4 | .016040 | ● | ● | ● | ● |
| 20 | 0,3 | 38 | 50 | 104 | 19,5 | – | 20 | 54 | 4 | .020003 | ● | ● | | |
| 20 | 0,5 | 38 | 50 | 104 | 19,5 | – | 20 | 54 | 4 | .020005 | ● | ● | | |
| 20 | 1 | 38 | 50 | 104 | 19,5 | – | 20 | 54 | 4 | .020010 | ● | ● | ● | ● |
| 20 | 1,5 | 38 | 50 | 104 | 19,5 | – | 20 | 54 | 4 | .020015 | ● | ● | ● | ● |
| 20 | 2 | 38 | 50 | 104 | 19,5 | – | 20 | 54 | 4 | .020020 | ● | ● | ● | ● |
| 20 | 2,5 | 38 | 50 | 104 | 19,5 | – | 20 | 54 | 4 | .020025 | ● | ● | ● | ● |
| 20 | 3 | 38 | 50 | 104 | 19,5 | – | 20 | 54 | 4 | .020030 | ● | ● | ● | ● |
| 20 | 4 | 38 | 50 | 104 | 19,5 | – | 20 | 54 | 4 | .020040 | ● | ● | ● | ● |

Andere Eckenradien auf Anfrage lieferbar
Other corner radii available on request

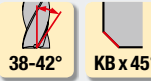
- Multifunktionales Hochleistungswerkzeug
- Mit ENORM-Geometrie
- Vibrationsarme Bearbeitung
- Schneiden zur Mitte
- 3 Baulängen verfügbar

- Multi-functional, high performance tool
- With ENORM geometry
- Low-vibration machining
- Centre cutting
- 3 lengths available

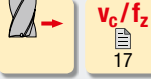
N **HM**



DIN 6535
HA
HB

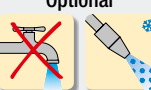
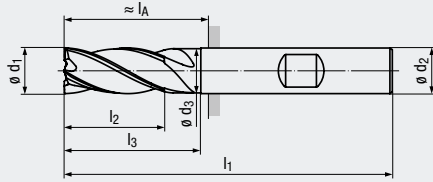


38-42° KB x 45°

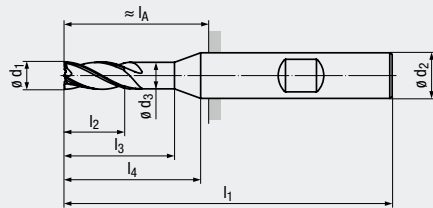


V_c/f_z
17

Optional

Design I₄:



Allround

Allround

Beschichtung · Coating

Einsatzgebiete – Material (siehe Seite 14)
- In fast allen Werkstoffen einsetzbar
- Zum Schruppen und Schlichten geeignet

Applications – material (see page 14)
- For almost all materials
- Suitable for roughing and finishing


TIALN

TIALN


| | |
|---|-----------------|
| P | 1.1-5.1 |
| M | 1.1-4.1 |
| K | 1.1-4.2 |
| N | 1.1-1.4 1.5-1.6 |
| N | 2.1-2.8, 5.2 |
| S | 1.1-1.3 2.1-2.6 |

| | |
|---|-----------------|
| P | 1.1-5.1 |
| M | 1.1-4.1 |
| K | 1.1-4.2 |
| N | 1.1-1.4 1.5-1.6 |
| N | 2.1-2.8, 5.2 |
| S | 1.1-1.3 2.1-2.6 |

3 x d₁ – Extra lange Ausführung · Extra long design

| Bestell-Code · Order code | | | | | | | | | | | 2526A | 2527A | | | |
|---------------------------|-------|-------|-------|-------------------|-------|-------------------------|--|------|---------------|------------------|-------|-------|--|--|--|
| $\varnothing d_1$ h10 | l_2 | l_3 | l_1 | $\varnothing d_3$ | l_4 | $\varnothing d_2$ h6 | l_A  | KB | Z (Flutes) | Dimens.- Code | | | | | |
| 3 | 9 | 12 | 62 | 2,9 | 23 | 6 | 26 | 0,07 | 4 | .003 | ● | ● | | | |
| 4 | 12 | 16 | 62 | 3,8 | 25 | 6 | 26 | 0,07 | 4 | .004 | ● | ● | | | |
| 5 | 15 | 20 | 62 | 4,8 | 25 | 6 | 26 | 0,12 | 4 | .005 | ● | ● | | | |
| 6 | 18 | 25 | 62 | 5,8 | – | 6 | 26 | 0,12 | 4 | .006 | ● | ● | | | |
| 8 | 24 | 30 | 68 | 7,7 | – | 8 | 32 | 0,12 | 5 | .008 | ● | ● | | | |
| 10 | 30 | 35 | 80 | 9,5 | – | 10 | 40 | 0,2 | 5 | .010 | ● | ● | | | |
| 12 | 36 | 45 | 93 | 11,5 | – | 12 | 48 | 0,2 | 5 | .012 | ● | ● | | | |
| 16 | 48 | 60 | 112 | 15,5 | – | 16 | 64 | 0,2 | 5 | .016 | ● | ● | | | |
| 20 | 60 | 75 | 130 | 19,5 | – | 20 | 80 | 0,3 | 5 | .020 | ● | ● | | | |

4 x d₁ – Extra lange Ausführung · Extra long design

| Bestell-Code · Order code | | | | | | | | | | | | | 2528A | 2529A | |
|---------------------------|-------|-------|-------|-------------------|-------|-------------------------|--|------|---------------|------------------|--|--|-------|-------|--|
| $\varnothing d_1$ h10 | l_2 | l_3 | l_1 | $\varnothing d_3$ | l_4 | $\varnothing d_2$ h6 | l_A  | KB | Z (Flutes) | Dimens.- Code | | | | | |
| 6 | 24 | 30 | 68 | 5,8 | – | 6 | 32 | 0,12 | 4 | .006 | | | ● | ● | |
| 8 | 32 | 40 | 80 | 7,7 | – | 8 | 44 | 0,12 | 5 | .008 | | | ● | ● | |
| 10 | 40 | 50 | 95 | 9,5 | – | 10 | 55 | 0,2 | 5 | .010 | | | ● | ● | |
| 12 | 48 | 60 | 107 | 11,5 | – | 12 | 62 | 0,2 | 5 | .012 | | | ● | ● | |
| 16 | 64 | 75 | 128 | 15,5 | – | 16 | 80 | 0,2 | 5 | .016 | | | ● | ● | |
| 20 | 80 | 90 | 150 | 19,5 | – | 20 | 100 | 0,3 | 5 | .020 | | | ● | ● | |

- Multifunktionales Hochleistungswerkzeug
- Neuentwickelte Geometrie
- Vibrationsarme Bearbeitung
- Schneiden zur Mitte
- 3 Baulängen verfügbar

- Multi-functional, high performance tool
- Newly developed geometry
- Low-vibration machining
- Centre cutting
- 3 lengths available

N

HM

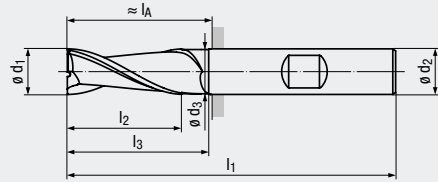
DIN 6535
HA
HB

Ø 0,3 - 1,8 mm:
30°

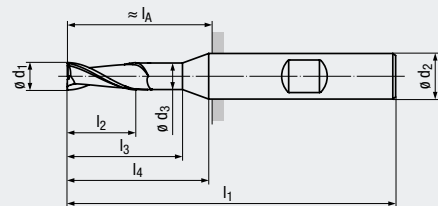
Ø 2 - 20 mm:
35/38° KB x 45°

v_c / f_z
15

Optional



Design I₄:



Allround

Beschichtung · Coating

Einsatzgebiete – Material (siehe Seite 14)
- In fast allen Werkstoffen einsetzbar
- Zum Schruppen und Schlichten geeignet

Applications – material (see page 14)
- For almost all materials
- Suitable for roughing and finishing

TIALN

- P** 1.1-5.1
- M** 1.1-4.1
- K** 1.1-4.2
- N** 1.1-1.3 1.4
- N** 2.1-4.2, 5.2
- S** 1.1-2.1 2.2-2.6
- H** 1.1-1.2

DIN 6527 – Kurze Ausführung · Short design

| Bestell-Code · Order code | | | | | | | | | | | 2510A | 2511A | | | | |
|---------------------------|--------------|-------|-------|-------------------|-------|-------------------------|------------|------|---------------|------------------|--------|-------|---|--|--|--|
| $\varnothing d_1$ e8 | l_2 h10 | l_3 | l_1 | $\varnothing d_3$ | l_4 | $\varnothing d_2$ h6 | l_A □ | KB | Z (Flutes) | Dimens.- Code | | | | | | |
| 0,3 | 1 | - | 38 | - | 8 | 3 | - | - | 2 | .0003 | ● | | | | | |
| 0,5 | 1,5 | - | 38 | - | 9 | 3 | - | - | 2 | .0005 | ● | | | | | |
| 1 | 3 | - | 38 | - | 10 | 3 | - | - | 2 | .001 | ● | | | | | |
| 1,2 | 4 | - | 38 | - | 10 | 3 | - | - | 2 | .0012 | ● | | | | | |
| 1,3 | 4 | - | 38 | - | 10 | 3 | - | - | 2 | .0013 | ● | | | | | |
| 1,4 | 4 | - | 38 | - | 10 | 3 | - | - | 2 | .0014 | ● | | | | | |
| 1,5 | 4 | - | 38 | - | 10 | 3 | - | - | 2 | .0015 | ● | | | | | |
| 1,6 | 4 | - | 38 | - | 10 | 3 | - | - | 2 | .0016 | ● | | | | | |
| 1,8 | 5 | - | 38 | - | 10 | 3 | - | - | 2 | .0018 | ● | | | | | |
| | | | | | | | | | | | | | | | | |
| $\varnothing d_1$ e8 | l_2 h10 | l_3 | l_1 | $\varnothing d_3$ | l_4 | $\varnothing d_2$ h5 | l_A □ | KB | Z (Flutes) | Dimens.- Code | | | | | | |
| 2 | 3 | 5 | 50 | 1,9 | 14 | 6 | 14 | 0,04 | 2 | .002 | ● | ● | | | | |
| 2,5 | 3 | 5 | 50 | 2,4 | 14 | 6 | 14 | 0,07 | 2 | .0025 | ● | ● | | | | |
| | 2,8 | 4 | 7 | 50 | 2,7 | 14 | 6 | 14 | 0,07 | 2 | .0028 | ● | ● | | | |
| 3 | 4 | 7 | 50 | 2,9 | 14 | 6 | 14 | 0,07 | 2 | .003 | ● | ● | | | | |
| | 3,5 | 4 | 7 | 50 | 3,3 | 14 | 6 | 14 | 0,07 | 2 | .0035 | ● | ● | | | |
| | 3,8 | 5 | 9 | 54 | 3,6 | 18 | 6 | 18 | 0,07 | 2 | .0038 | ● | ● | | | |
| 4 | 5 | 9 | 54 | 3,8 | 18 | 6 | 18 | 0,07 | 2 | .004 | ● | ● | | | | |
| | 4,5 | 5 | 9 | 54 | 4,3 | 18 | 6 | 18 | 0,12 | 2 | .0045 | ● | ● | | | |
| | 4,8 | 6 | 11 | 54 | 4,6 | 18 | 6 | 18 | 0,12 | 2 | .0048 | ● | ● | | | |
| 5 | 6 | 11 | 54 | 4,8 | 18 | 6 | 18 | 0,12 | 2 | .005 | ● | ● | | | | |
| | 5,75 | 7 | 16 | 54 | 5,55 | - | 6 | 18 | 0,12 | 2 | .00575 | ● | ● | | | |
| 6 | 7 | 16 | 54 | 5,8 | - | 6 | 18 | 0,12 | 2 | .006 | ● | ● | | | | |
| 7 | 8 | 18 | 58 | 6,7 | 20 | 8 | 22 | 0,12 | 2 | .007 | ● | ● | | | | |
| 8 | 9 | 20 | 58 | 7,7 | - | 8 | 22 | 0,12 | 2 | .008 | ● | ● | | | | |
| | | 10 | 22 | 66 | 8,7 | 24 | 10 | 26 | 0,2 | 2 | .009 | ● | ● | | | |
| 10 | 11 | 24 | 66 | 9,5 | - | 10 | 26 | 0,2 | 2 | .010 | ● | ● | | | | |
| 12 | 12 | 26 | 73 | 11,5 | - | 12 | 28 | 0,2 | 2 | .012 | ● | ● | | | | |
| 14 | 14 | 28 | 75 | 13,5 | - | 14 | 30 | 0,2 | 2 | .014 | ● | ● | | | | |
| 16 | 16 | 32 | 82 | 15,5 | - | 16 | 34 | 0,2 | 2 | .016 | ● | ● | | | | |
| 18 | 18 | 34 | 84 | 17,5 | - | 18 | 36 | 0,2 | 2 | .018 | ● | ● | | | | |
| 20 | 20 | 40 | 92 | 19,5 | - | 20 | 42 | 0,3 | 2 | .020 | ● | ● | | | | |

- Multifunktionales Hochleistungswerkzeug
- Neuentwickelte Geometrie
- Vibrationsarme Bearbeitung
- Schneiden zur Mitte
- 3 Baulängen verfügbar

- Multi-functional, high performance tool
- Newly developed geometry
- Low-vibration machining
- Centre cutting
- 3 lengths available

N

HM

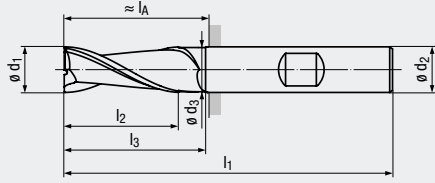
DIN 6535
HA
HB

35/38°

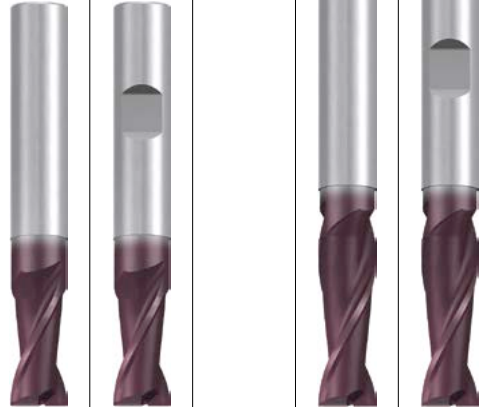
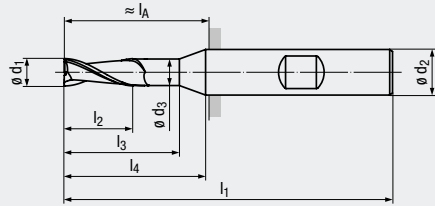
KB x 45°

V_c/f_z
16 - 17

Optional



Design I₄:



Allround

Allround

Beschichtung · Coating

Einsatzgebiete – Material (siehe Seite 14)

- In fast allen Werkstoffen einsetzbar
- Zum Schruppen und Schlichten geeignet

Applications – material (see page 14)

- For almost all materials
- Suitable for roughing and finishing

TIALN

TIALN

| | |
|---|-----------------|
| P | 1.1-5.1 |
| M | 1.1-4.1 |
| K | 1.1-4.2 |
| N | 1.1-1.3 1.4 |
| N | 2.1-4.2, 5.2 |
| S | 1.1-2.1 2.2-2.6 |
| H | 1.1-1.2 |

| | |
|---|-----------------|
| P | 1.1-5.1 |
| M | 1.1-4.1 |
| K | 1.1-4.2 |
| N | 1.1-1.3 1.4-1.6 |
| N | 2.1-2.8, 5.2 |
| S | 1.1-2.1 2.2-2.6 |

DIN 6527 – Lange Ausführung · Long design

| Bestell-Code · Order code | | | | | | | | | | | 2512A | 2513A | | | |
|---------------------------|-------|-------|-------|-------------------|-------|-------------------------|-----------|------|---------------|------------------|-------|-------|--|--|--|
| $\varnothing d_1$ h10 | l_2 | l_3 | l_1 | $\varnothing d_3$ | l_4 | $\varnothing d_2$ h5 | l_A | KB | Z (Flutes) | Dimens.- Code | | | | | |
| 2 | 6 | 8 | 57 | 1,9 | 20 | 6 | 21 | 0,04 | 2 | .002 | ● | ● | | | |
| 3 | 7 | 10 | 57 | 2,9 | 20 | 6 | 21 | 0,07 | 2 | .003 | ● | ● | | | |
| 4 | 8 | 12 | 57 | 3,8 | 20 | 6 | 21 | 0,07 | 2 | .004 | ● | ● | | | |
| 5 | 10 | 15 | 57 | 4,8 | 20 | 6 | 21 | 0,12 | 2 | .005 | ● | ● | | | |
| 6 | 10 | 20 | 57 | 5,8 | – | 6 | 21 | 0,12 | 2 | .006 | ● | ● | | | |
| 7 | 13 | 23 | 63 | 6,7 | 25 | 8 | 27 | 0,12 | 2 | .007 | ● | ● | | | |
| 8 | 16 | 25 | 63 | 7,7 | – | 8 | 27 | 0,12 | 2 | .008 | ● | ● | | | |
| 10 | 19 | 30 | 72 | 9,5 | – | 10 | 32 | 0,2 | 2 | .010 | ● | ● | | | |
| 12 | 22 | 35 | 83 | 11,5 | – | 12 | 38 | 0,2 | 2 | .012 | ● | ● | | | |
| 16 | 26 | 40 | 92 | 15,5 | – | 16 | 44 | 0,2 | 2 | .016 | ● | ● | | | |
| 20 | 32 | 50 | 104 | 19,5 | – | 20 | 54 | 0,3 | 2 | .020 | ● | ● | | | |

Extra lange Ausführung · Extra long design

| Bestell-Code · Order code | | | | | | | | | | | | | 2514A | 2515A | |
|---------------------------|-------|-------|-------|-------------------|-------|-------------------------|-----------|------|---------------|------------------|--|--|-------|-------|--|
| $\varnothing d_1$ h10 | l_2 | l_3 | l_1 | $\varnothing d_3$ | l_4 | $\varnothing d_2$ h5 | l_A | KB | Z (Flutes) | Dimens.- Code | | | | | |
| 3 | 9 | 12 | 62 | 2,9 | 23 | 6 | 26 | 0,07 | 2 | .003 | | | ● | ● | |
| 4 | 12 | 16 | 62 | 3,8 | 25 | 6 | 26 | 0,07 | 2 | .004 | | | ● | ● | |
| 5 | 15 | 20 | 62 | 4,8 | 25 | 6 | 26 | 0,12 | 2 | .005 | | | ● | ● | |
| 6 | 18 | 25 | 62 | 5,8 | – | 6 | 26 | 0,12 | 2 | .006 | | | ● | ● | |
| 8 | 24 | 30 | 68 | 7,7 | – | 8 | 32 | 0,12 | 2 | .008 | | | ● | ● | |
| 10 | 30 | 40 | 80 | 9,5 | – | 10 | 40 | 0,2 | 2 | .010 | | | ● | ● | |
| 12 | 36 | 45 | 93 | 11,5 | – | 12 | 48 | 0,2 | 2 | .012 | | | ● | ● | |
| 16 | 48 | 55 | 108 | 15,5 | – | 16 | 60 | 0,2 | 2 | .016 | | | ● | ● | |
| 20 | 60 | 70 | 126 | 19,5 | – | 20 | 76 | 0,3 | 2 | .020 | | | ● | ● | |

- Multifunktionales Hochleistungswerkzeug
- Neuentwickelte Geometrie
- Vibrationsarme Bearbeitung
- Schneiden zur Mitte
- 3 Baulängen verfügbar

- Multi-functional, high performance tool
- Newly developed geometry
- Low-vibration machining
- Centre cutting
- 3 lengths available

N

HM

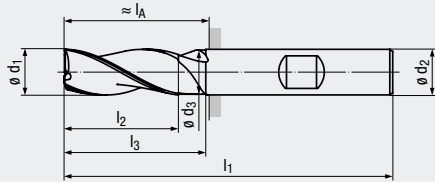
DIN 6535
HA
HB

34-38°

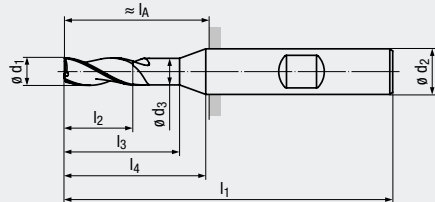
KB x 45°

V_c/f_z
15-16

Optional



Design I₄:



Allround

Allround

Beschichtung · Coating

TIALN

TIALN

Einsatzgebiete – Material (siehe Seite 14)

Applications – material (see page 14)

- In fast allen Werkstoffen einsetzbar
- Zum Schrumpfen und Schlichten geeignet

- For almost all materials
- Suitable for roughing and finishing

| | |
|---|----------------------|
| P | 1.1-5.1 |
| M | 1.1-4.1 |
| K | 1.1-4.2 |
| N | 1.1-1.4 |
| N | 2.1-2.8, 5.2 4.1-4.2 |
| S | 1.1 1.2-1.3 |
| S | 2.1 2.2-2.6 |
| H | 1.1-1.2 |

| | |
|---|----------------------|
| P | 1.1-5.1 |
| M | 1.1-4.1 |
| K | 1.1-4.2 |
| N | 1.1-1.4 |
| N | 2.1-2.8, 5.2 4.1-4.2 |
| S | 1.1 1.2-1.3 |
| S | 2.1 2.2-2.6 |
| H | 1.1-1.2 |

DIN 6527 – Kurze Ausführung · Short design

| Bestell-Code · Order code | | | | | | | | | | | 2516A | 2517A | | | |
|---------------------------|----------------|----------------|----------------|------------------|----------------|------------------------|----------------|------|---------------|------------------|-------|-------|--|--|--|
| ø d ₁ h10 | l ₂ | l ₃ | l ₁ | ø d ₃ | l ₄ | ø d ₂ h5 | l _A | KB | Z (Flutes) | Dimens.- Code | | | | | |
| 1,5 | 3 | — | 50 | — | 14 | 6 | 14 | 0,04 | 3 | .0015 | ● | ● | | | |
| 2 | 3 | 5 | 50 | 1,9 | 14 | 6 | 14 | 0,04 | 3 | .002 | ● | ● | | | |
| 2,5 | 3 | 5 | 50 | 2,4 | 14 | 6 | 14 | 0,07 | 3 | .0025 | ● | ● | | | |
| 2,8 | 4 | 7 | 50 | 2,7 | 14 | 6 | 14 | 0,07 | 3 | .0028 | ● | ● | | | |
| 3 | 4 | 7 | 50 | 2,9 | 14 | 6 | 14 | 0,07 | 3 | .003 | ● | ● | | | |
| 3,5 | 4 | 7 | 50 | 3,3 | 14 | 6 | 14 | 0,07 | 3 | .0035 | ● | ● | | | |
| 3,8 | 5 | 9 | 54 | 3,6 | 18 | 6 | 18 | 0,07 | 3 | .0038 | ● | ● | | | |
| 4 | 5 | 9 | 54 | 3,8 | 18 | 6 | 18 | 0,07 | 3 | .004 | ● | ● | | | |
| 4,5 | 5 | 9 | 54 | 4,3 | 18 | 6 | 18 | 0,12 | 3 | .0045 | ● | ● | | | |
| 4,8 | 6 | 11 | 54 | 4,6 | 18 | 6 | 18 | 0,12 | 3 | .0048 | ● | ● | | | |
| 5 | 6 | 11 | 54 | 4,8 | 18 | 6 | 18 | 0,12 | 3 | .005 | ● | ● | | | |
| 5,5 | 7 | 12 | 54 | 5,3 | 18 | 6 | 18 | 0,12 | 3 | .0055 | ● | ● | | | |
| 5,75 | 7 | 16 | 54 | 5,55 | 18 | 6 | 18 | 0,12 | 3 | .00575 | ● | ● | | | |
| 6 | 7 | 16 | 54 | 5,8 | — | 6 | 18 | 0,12 | 3 | .006 | ● | ● | | | |
| 7,75 | 9 | 18 | 58 | 7,45 | 20 | 8 | 22 | 0,12 | 3 | .00775 | ● | ● | | | |
| 8 | 9 | 20 | 58 | 7,7 | — | 8 | 22 | 0,12 | 3 | .008 | ● | ● | | | |
| 9,7 | 11 | 22 | 66 | 9,4 | 24 | 10 | 26 | 0,2 | 3 | .0097 | ● | ● | | | |
| 10 | 11 | 24 | 66 | 9,5 | — | 10 | 26 | 0,2 | 3 | .010 | ● | ● | | | |
| 11,7 | 12 | 24 | 73 | 11,2 | 26 | 12 | 28 | 0,2 | 3 | .0117 | ● | ● | | | |
| 12 | 12 | 26 | 73 | 11,5 | — | 12 | 28 | 0,2 | 3 | .012 | ● | ● | | | |
| 16 | 16 | 32 | 82 | 15,5 | — | 16 | 34 | 0,2 | 3 | .016 | ● | ● | | | |
| 20 | 20 | 40 | 92 | 19,5 | — | 20 | 42 | 0,3 | 3 | .020 | ● | ● | | | |

DIN 6527 – Lange Ausführung · Long design

| Bestell-Code · Order code | | | | | | | | | | | | | 2518A | 2519A | |
|---------------------------|----------------|----------------|----------------|------------------|----------------|------------------------|----------------|------|---------------|------------------|--|--|-------|-------|--|
| ø d ₁ h10 | l ₂ | l ₃ | l ₁ | ø d ₃ | l ₄ | ø d ₂ h5 | l _A | KB | Z (Flutes) | Dimens.- Code | | | | | |
| 2 | 6 | 8 | 57 | 1,9 | 20 | 6 | 21 | 0,04 | 3 | .002 | | | ● | ● | |
| 3 | 7 | 10 | 57 | 2,9 | 20 | 6 | 21 | 0,07 | 3 | .003 | | | ● | ● | |
| 4 | 8 | 12 | 57 | 3,8 | 20 | 6 | 21 | 0,07 | 3 | .004 | | | ● | ● | |
| 5 | 10 | 15 | 57 | 4,8 | 20 | 6 | 21 | 0,12 | 3 | .005 | | | ● | ● | |
| 6 | 10 | 20 | 57 | 5,8 | — | 6 | 21 | 0,12 | 3 | .006 | | | ● | ● | |
| 7 | 13 | 23 | 63 | 6,7 | 25 | 8 | 27 | 0,12 | 3 | .007 | | | ● | ● | |
| 8 | 16 | 25 | 63 | 7,7 | — | 8 | 27 | 0,12 | 3 | .008 | | | ● | ● | |
| 10 | 19 | 30 | 72 | 9,5 | — | 10 | 32 | 0,2 | 3 | .010 | | | ● | ● | |
| 12 | 22 | 35 | 83 | 11,5 | — | 12 | 38 | 0,2 | 3 | .012 | | | ● | ● | |
| 16 | 26 | 40 | 92 | 15,5 | — | 16 | 44 | 0,2 | 3 | .016 | | | ● | ● | |
| 20 | 32 | 50 | 104 | 19,5 | — | 20 | 54 | 0,3 | 3 | .020 | | | ● | ● | |

● = Lagerwerkzeug, siehe Preisliste · Stock tool, see price list

- Multifunktionales Hochleistungswerkzeug
- Neuentwickelte Geometrie
- Vibrationsarme Bearbeitung
- Schneiden zur Mitte
- Schneidlänge 3 x d₁
- 3 Baulängen verfügbar

- Multi-functional, high performance tool
- Newly developed geometry
- Low-vibration machining
- Centre cutting
- Flute length 3 x d₁
- 3 lengths available

N

HM

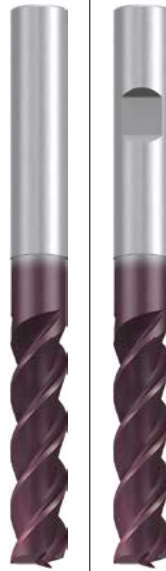
DIN 6535
HA
HB

34-38° KB x 45°

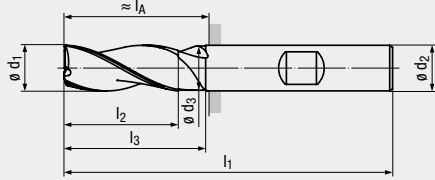
1-2°

V_c/f_z
17

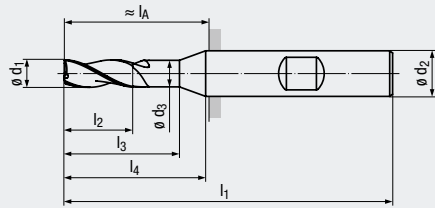
Optional



Allround



Design I₄:



Beschichtung · Coating

Einsatzgebiete – Material (siehe Seite 14)

- In fast allen Werkstoffen einsetzbar
- Zum Schlichten geeignet

Applications – material (see page 14)

- For almost all materials
- Suitable for finishing

TIALN

- P** 1.1-5.1
- M** 1.1-4.1
- K** 1.1-4.2
- N** 1.1-2.8, 5.2
- S** 1.1 1.2-1.3
- S** 2.1 2.2, 2.4

Extra lange Ausführung · Extra long design

| Bestell-Code · Order code | | | | | | | | | | | 2520A | 2521A | | | | |
|---------------------------|----------------|----------------|----------------|------------------|----------------|------------------------|----------------|------|---------------|------------------|-------|-------|--|--|--|--|
| ∅ d ₁ h10 | l ₂ | l ₃ | l ₁ | ∅ d ₃ | l ₄ | ∅ d ₂ h5 | l _A | KB | Z (Flutes) | Dimens.- Code | | | | | | |
| 3 | 9 | 12 | 62 | 2,9 | 23 | 6 | 26 | 0,07 | 3 | .003 | ● | ● | | | | |
| 4 | 12 | 16 | 62 | 3,8 | 25 | 6 | 26 | 0,07 | 3 | .004 | ● | ● | | | | |
| 5 | 15 | 20 | 62 | 4,8 | 25 | 6 | 26 | 0,12 | 3 | .005 | ● | ● | | | | |
| 6 | 18 | 25 | 62 | 5,8 | – | 6 | 26 | 0,12 | 3 | .006 | ● | ● | | | | |
| 8 | 24 | 30 | 68 | 7,7 | – | 8 | 32 | 0,12 | 3 | .008 | ● | ● | | | | |
| 10 | 30 | 40 | 80 | 9,5 | – | 10 | 40 | 0,2 | 3 | .010 | ● | ● | | | | |
| 12 | 36 | 45 | 93 | 11,5 | – | 12 | 48 | 0,2 | 3 | .012 | ● | ● | | | | |
| 16 | 48 | 55 | 108 | 15,5 | – | 16 | 60 | 0,2 | 3 | .016 | ● | ● | | | | |
| 20 | 60 | 70 | 126 | 19,5 | – | 20 | 76 | 0,3 | 3 | .020 | ● | ● | | | | |

- Multifunktionales Hochleistungswerkzeug
- Mit ENORM-Geometrie
- Vibrationsarme Bearbeitung
- Schneidlänge bis 3 x d₁
- 2 Baulängen verfügbar

- Multi-functional, high performance tool
- With ENORM geometry
- Low-vibration machining
- Flute length up to 3 x d₁
- 2 lengths available

N

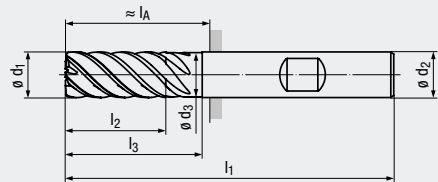
HM

DIN 6535
HA HB

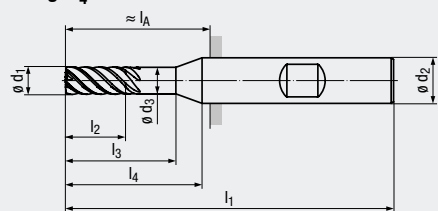
35-38° **KB x 45°**

v_c/f_z
16-17

Optional



Design l₄:



Allround

Allround

Beschichtung · Coating

Einsatzgebiete – Material (siehe Seite 14)

- In allen zähen Werkstoffen einsetzbar
- Zum HSC-Schlichten geeignet

Applications – material (see page 14)

- For all tough materials
- Suitable for HSC finishing

TIALN

TIALN

| | | |
|---|---------|--------------|
| P | 1.1-5.1 | |
| M | 1.1-2.1 | 3.1-4.1 |
| K | 1.1-2.1 | 2.2 |
| K | 3.1-4.1 | 4.2 |
| N | 1.1-1.4 | |
| N | 2.1-3.2 | 4.1-4.2, 5.2 |
| S | 1.1-2.2 | 2.3 |
| S | 2.4 | 2.5-2.6 |
| H | | 1.1 |

| | | |
|---|---------|---------|
| P | 1.1-5.1 | |
| M | 1.1-2.1 | 3.1-4.1 |
| K | 1.1-2.1 | 2.2 |
| K | 3.1-4.1 | 4.2 |
| N | 1.1-1.4 | 1.5-1.6 |
| N | 2.1-2.8 | 5.2 |
| S | 1.1-2.2 | 2.3 |
| S | 2.4 | 2.5-2.6 |

DIN 6527 – Lange Ausführung · Long design

| Bestell-Code · Order code | | | | | | | | | | | 2522A | 2523A | | | |
|---------------------------|----------------|----------------|----------------|------------------|----------------|------------------------|--------------------|------|---------------|------------------|-------|-------|--|--|--|
| ∅ d ₁ f8 | l ₂ | l ₃ | l ₁ | ∅ d ₃ | l ₄ | ∅ d ₂ h5 | l _A | KB | Z (Flutes) | Dimens.- Code | | | | | |
| 5 | 13 | 18 | 57 | 4,8 | 20 | 6 | 21 | 0,12 | 6 | .005 | ● | ● | | | |
| 6 | 13 | 20 | 57 | 5,8 | – | 6 | 21 | 0,12 | 6 | .006 | ● | ● | | | |
| 8 | 19 | 25 | 63 | 7,7 | – | 8 | 27 | 0,12 | 6 | .008 | ● | ● | | | |
| 10 | 22 | 30 | 72 | 9,7 | – | 10 | 32 | 0,2 | 6 | .010 | ● | ● | | | |
| 12 | 26 | 35 | 83 | 11,6 | – | 12 | 38 | 0,2 | 6 | .012 | ● | ● | | | |
| 16 | 32 | 40 | 92 | 15,5 | – | 16 | 44 | 0,2 | 6 | .016 | ● | ● | | | |
| 20 | 38 | 50 | 104 | 19,5 | – | 20 | 54 | 0,3 | 8 | .020 | ● | ● | | | |

Extra lange Ausführung · Extra long design

| Bestell-Code · Order code | | | | | | | | | | | | | 2524A | 2525A | |
|---------------------------|----------------|----------------|----------------|------------------|----------------|------------------------|--------------------|------|---------------|------------------|--|--|-------|-------|--|
| ∅ d ₁ h10 | l ₂ | l ₃ | l ₁ | ∅ d ₃ | l ₄ | ∅ d ₂ h6 | l _A | KB | Z (Flutes) | Dimens.- Code | | | | | |
| 6 | 18 | 25 | 62 | 5,8 | – | 6 | 26 | 0,12 | 6 | .006 | | | ● | ● | |
| 8 | 24 | 30 | 68 | 7,7 | – | 8 | 32 | 0,12 | 6 | .008 | | | ● | ● | |
| 10 | 30 | 35 | 80 | 9,7 | – | 10 | 40 | 0,2 | 6 | .010 | | | ● | ● | |
| 12 | 36 | 45 | 93 | 11,6 | – | 12 | 48 | 0,2 | 6 | .012 | | | ● | ● | |
| 16 | 48 | 55 | 108 | 15,5 | – | 16 | 60 | 0,2 | 6 | .016 | | | ● | ● | |
| 20 | 60 | 70 | 126 | 19,5 | – | 20 | 76 | 0,3 | 8 | .020 | | | ● | ● | |

Internationaler Werkstoffvergleich siehe Seite 416 - 429 im FRANKEN Katalog 250
 International comparison of materials, see page 416 - 429 in FRANKEN Catalogue 250

| Einsatzgebiete – Material Applications – material | | | Material-Beispiele Material examples | Material-Nummern Material numbers | |
|---|---|---|---|--------------------------------------|--|
| P | Stahlwerkstoffe Steel materials | | | | |
| | 1.1 | Kaltfließpressstähle, Baustähle, Automatenstähle, u.a. | Cold-extrusion steels, Construction steels, Free-cutting steels, etc. | ≤ 600 N/mm ² | Cq15 S235JR (St37-2) 10SPb20 1.1132 1.0037 1.0722 |
| | 2.1 | Baustähle, Einsatzstähle, Stahlguss, u.a. | Construction steels, Case-hardened steels, Steel castings, etc. | ≤ 800 N/mm ² | E360 (St70-2) 16MnCr5 GS-25CrMo4 1.0070 1.7131 1.7218 |
| | 3.1 | Einsatzstähle, Vergütungsstähle, Kaltarbeitsstähle, u.a. | Case-hardened steels, Heat-treatable steels, Cold work steels, etc. | ≤ 1000 N/mm ² | 20MoCr3 42CrMo4 102Cr6 1.7320 1.7225 1.2067 |
| | 4.1 | Vergütungsstähle, Kaltarbeitsstähle, Nitrierstähle, u.a. | Heat-treatable steels, Cold work steels, Nitriding steels, etc. | ≤ 1200 N/mm ² | 50CrMo4 X45NiCrMo4 31CrMo12 1.7228 1.2767 1.8515 |
| | 5.1 | Hochlegierte Stähle, Kaltarbeitsstähle, Warmarbeitsstähle, u.a. | High-alloyed steels, Cold work steels, Hot work steels, etc. | ≤ 1400 N/mm ² | X38CrMoV5-3 X100CrMoV8-1-1 X40CrMoV5-1 1.2367 1.2990 1.2344 |
| M | Nichtrostende Stahlwerkstoffe Stainless steel materials | | | | |
| | 1.1 | Ferritisch, martensitisch | Ferritic, martensitic | ≤ 950 N/mm ² | X2CrTi12 1.4512 |
| | 2.1 | Austenitisch | Austenitic | ≤ 950 N/mm ² | X6CrNiMoTi17-12-2 1.4571 |
| | 3.1 | Austenitisch-ferritisch (Duplex) | Austenitic-ferritic (Duplex) | ≤ 1100 N/mm ² | X2CrNiMoN22-5-3 1.4462 |
| 4.1 | Austenitisch-ferritisch hitzebeständig (Super Duplex) | Austenitic-ferritic heat-resistant (Super Duplex) | ≤ 1250 N/mm ² | X2CrNiMoN25-7-4 1.4410 | |
| K | Gusswerkstoffe Cast materials | | | | |
| | 1.1 | Gusseisen mit Lamellengrafit (GJL) | Cast iron with lamellar graphite (GJL) | 100-250 N/mm ² | EN-GJL-200 (GG20) EN-JL-1030 |
| | 1.2 | Gusseisen mit Kugelgrafit (GJS) | Cast iron with nodular graphite (GJS) | 250-450 N/mm ² | EN-GJL-300 (GG30) EN-JL-1050 |
| | 2.1 | Gusseisen mit Kugelgrafit (GJS) | Cast iron with nodular graphite (GJS) | 350-500 N/mm ² | EN-GJS-400-15 (GGG40) EN-JS-1030 |
| | 2.2 | Gusseisen mit Kugelgrafit (GJS) | Cast iron with nodular graphite (GJS) | 500-900 N/mm ² | EN-GJS-700-2 (GGG70) EN-JS-1070 |
| | 3.1 | Gusseisen mit Vermiculargrafit (GJV) | Cast iron with vermicular graphite (GJV) | 300-400 N/mm ² | GJV 300 |
| | 3.2 | Gusseisen mit Vermiculargrafit (GJV) | Cast iron with vermicular graphite (GJV) | 400-500 N/mm ² | GJV 450 |
| | 4.1 | Temperguss (GTMW, GTMB) | Malleable cast iron (GTMW, GTMB) | 250-500 N/mm ² | EN-GJMW-350-4 (GTW-35) EN-JM-1010 |
| 4.2 | Temperguss (GTMW, GTMB) | Malleable cast iron (GTMW, GTMB) | 500-800 N/mm ² | EN-GJMB-450-6 (GTS-45) EN-JM-1140 | |
| N | Nichteisenwerkstoffe Non-ferrous materials | | | | |
| | Aluminium-Legierungen Aluminium alloys | | | | |
| | 1.1 | Aluminium-Knetlegierungen | Wrought aluminium alloys | ≤ 200 N/mm ² | EN AW-AIMn1 EN AW-3103 |
| | 1.2 | Aluminium-Knetlegierungen | Wrought aluminium alloys | ≤ 350 N/mm ² | EN AW-AlMgSi EN AW-6060 |
| | 1.3 | Aluminium-Knetlegierungen | Wrought aluminium alloys | ≤ 550 N/mm ² | EN AW-AlZn5Mg3Cu EN AW-7022 |
| | 1.4 | Aluminium-Knetlegierungen | Wrought aluminium alloys | Si ≤ 7% | EN AC-AlMg5 EN AC-51300 |
| | 1.5 | Aluminium-Gusslegierungen | Aluminium cast alloys | 7% < Si ≤ 12% | EN AC-AISi9Cu3 EN AC-46500 |
| | 1.6 | Aluminium-Gusslegierungen | Aluminium cast alloys | 12% < Si ≤ 17% | GD-AISi17Cu4FeMg |
| | Kupfer-Legierungen Copper alloys | | | | |
| | 2.1 | Reinkupfer, niedriglegiertes Kupfer | Pure copper, low-alloyed copper | ≤ 400 N/mm ² | E-Cu 57 EN CW 004 A |
| | 2.2 | Kupfer-Zink-Legierungen (Messing, langspanend) | Copper-zinc alloys (brass, long-chipping) | ≤ 550 N/mm ² | CuZn37 (Ms63) EN CW 508 L |
| | 2.3 | Kupfer-Zink-Legierungen (Messing, kurzspanend) | Copper-zinc alloys (brass, short-chipping) | ≤ 550 N/mm ² | CuZn36Pb3 (Ms58) EN CW 603 N |
| | 2.4 | Kupfer-Aluminium-Legierungen (Alubronze, langspanend) | Copper-aluminium alloys (alu bronze, long-chipping) | ≤ 800 N/mm ² | CuAl10Ni5Fe4 EN CW 307 G |
| | 2.5 | Kupfer-Zinn-Legierungen (Zinnbronze, langspanend) | Copper-tin alloys (tin bronze, long-chipping) | ≤ 700 N/mm ² | CuSn8P EN CW 459 K |
| | 2.6 | Kupfer-Zinn-Legierungen (Zinnbronze, kurzspanend) | Copper-tin alloys (tin bronze, short-chipping) | ≤ 400 N/mm ² | CuSn7 ZnPb (Rg7) 2.1090 |
| | 2.7 | Kupfer-Sonderlegierungen | Special copper alloys | ≤ 600 N/mm ² | (AMPCC® 8) |
| | 2.8 | Kupfer-Sonderlegierungen | Special copper alloys | ≤ 1400 N/mm ² | (AMPCC® 45) |
| | Magnesium-Legierungen Magnesium alloys | | | | |
| | 3.1 | Magnesium-Knetlegierungen | Magnesium wrought alloys | ≤ 500 N/mm ² | MgAl6Zn 3.5612 |
| | 3.2 | Magnesium-Gusslegierungen | Magnesium cast alloys | ≤ 500 N/mm ² | EN-MCMgAl9Zn1 EN-MC21120 |
| | Kunststoffe Synthetics | | | | |
| | 4.1 | Duroplaste (kurzspanend) | Duroplastics (short-chipping) | | Bakelit, Pertinax |
| | 4.2 | Thermoplaste (langspanend) | Thermoplastics (long-chipping) | | PMMA, POM, PVC |
| | 4.3 | Faserverstärkte Kunststoffe (Faseranteil ≤ 30%) | Fibre-reinforced synthetics (fibre content ≤ 30%) | | GFK, CFK, AFK |
| | 4.4 | Faserverstärkte Kunststoffe (Faseranteil > 30%) | Fibre-reinforced synthetics (fibre content > 30%) | | GFK, CFK, AFK |
| | Besondere Werkstoffe Special materials | | | | |
| | 5.1 | Grafit | Graphite | | C 8000 |
| | 5.2 | Wolfram-Kupfer-Legierungen | Tungsten-copper alloys | | W-Cu 80/20 |
| 5.3 | Verbundwerkstoffe | Composite materials | | HyLite, Alucobond | |
| Spezialwerkstoffe Special materials | | | | | |
| Titan-Legierungen Titanium alloys | | | | | |
| 1.1 | Reintitan | Pure titanium | ≤ 450 N/mm ² | Ti1 3.7025 | |
| 1.2 | Titan-Legierungen | Titanium alloys | ≤ 900 N/mm ² | TiAl6V4 3.7165 | |
| 1.3 | Titan-Legierungen | Titanium alloys | ≤ 1250 N/mm ² | TiAl4Mo4Sn2 3.7185 | |
| Nickel-, Kobalt- und Eisen-Legierungen Nickel alloys, cobalt alloys and iron alloys | | | | | |
| 2.1 | Reinnickel | Pure nickel | ≤ 600 N/mm ² | Ni 99.6 2.4060 | |
| 2.2 | Nickel-Basis-Legierungen | Nickel-base alloys | ≤ 1000 N/mm ² | Monel 400 2.4360 | |
| 2.3 | Nickel-Basis-Legierungen | Nickel-base alloys | ≤ 1600 N/mm ² | Inconel 718 2.4668 | |
| 2.4 | Nickel-Basis-Legierungen | Nickel-base alloys | ≤ 1000 N/mm ² | Udimet 605 | |
| 2.5 | Kobalt-Basis-Legierungen | Cobalt-base alloys | ≤ 1600 N/mm ² | Haynes 25 2.4964 | |
| 2.6 | Eisen-Basis-Legierungen | Iron-base alloys | ≤ 1500 N/mm ² | Incoloy 800 1.4958 | |
| Harte Werkstoffe Hard materials | | | | | |
| 1.1 | Hochfeste Stähle, gehärtete Stähle, Hartguss | High strength steels, hardened steels, hard castings | 44 - 50 HRC | Weldox 1100 | |
| 1.2 | | | 50 - 55 HRC | Hardox 550 | |
| 1.3 | | | 55 - 60 HRC | ArmoX 600T | |
| 1.4 | | | 60 - 63 HRC | Ferro-Titanit | |
| 1.5 | | | 63 - 66 HRC | HSSE | |

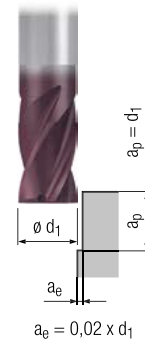
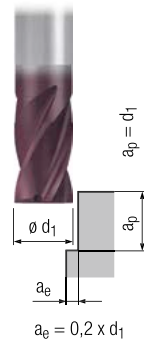
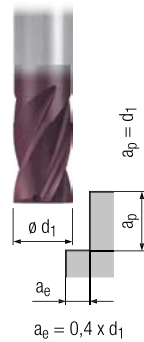
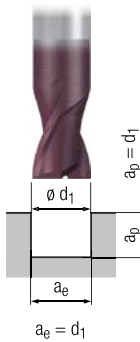


Hartmetall-Schaft- und Langlochfräser – kurze Ausführung
Solid carbide end mills and slot drills – short design

N

Gültig für · Valid for

1916A 2510A 2516A
1917A 2511A 2517A



| | | V _c [m/min] | f _z [mm] | V _c [m/min] | f _z [mm] | V _c [m/min] | f _z [mm] | V _c [m/min] | f _z [mm] | | | | |
|----------|-----|---------------------------|------------------------|---------------------------|------------------------|---------------------------|------------------------|---------------------------|--------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| | | | | | | | | | | | | MMS MQL | |
| P | 1.1 | 170 | 0,005 x d ₁ | 190 | 0,006 x d ₁ | 200 | 0,007 x d ₁ | 240 | 0,008 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 2.1 | 150 | 0,004 x d ₁ | 170 | 0,005 x d ₁ | 180 | 0,006 x d ₁ | 210 | 0,007 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 3.1 | 130 | 0,004 x d ₁ | 140 | 0,005 x d ₁ | 160 | 0,005 x d ₁ | 180 | 0,006 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 4.1 | 120 | 0,003 x d ₁ | 130 | 0,004 x d ₁ | 140 | 0,004 x d ₁ | 170 | 0,005 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | |
| | 5.1 | 100 | 0,003 x d ₁ | 110 | 0,003 x d ₁ | 120 | 0,004 x d ₁ | 140 | 0,004 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | |
| M | 1.1 | 80 | 0,003 x d ₁ | 90 | 0,004 x d ₁ | 100 | 0,004 x d ₁ | 110 | 0,005 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 2.1 | 70 | 0,003 x d ₁ | 80 | 0,004 x d ₁ | 80 | 0,004 x d ₁ | 100 | 0,005 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 3.1 | 50 | 0,002 x d ₁ | 60 | 0,003 x d ₁ | 60 | 0,003 x d ₁ | 70 | 0,004 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 4.1 | 30 | 0,002 x d ₁ | 30 | 0,003 x d ₁ | 40 | 0,003 x d ₁ | 40 | 0,004 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| K | 1.1 | 170 | 0,005 x d ₁ | 190 | 0,006 x d ₁ | 200 | 0,007 x d ₁ | 240 | 0,008 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | |
| | 1.2 | 170 | 0,005 x d ₁ | 190 | 0,006 x d ₁ | 200 | 0,007 x d ₁ | 240 | 0,008 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | |
| | 2.1 | 150 | 0,004 x d ₁ | 170 | 0,005 x d ₁ | 180 | 0,006 x d ₁ | 210 | 0,006 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | |
| | 2.2 | 150 | 0,004 x d ₁ | 170 | 0,005 x d ₁ | 180 | 0,006 x d ₁ | 210 | 0,006 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | |
| | 3.1 | 130 | 0,004 x d ₁ | 140 | 0,005 x d ₁ | 160 | 0,006 x d ₁ | 180 | 0,006 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | |
| | 3.2 | 130 | 0,004 x d ₁ | 140 | 0,005 x d ₁ | 160 | 0,006 x d ₁ | 180 | 0,006 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | |
| | 4.1 | 100 | 0,003 x d ₁ | 110 | 0,004 x d ₁ | 120 | 0,004 x d ₁ | 140 | 0,005 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | |
| | 4.2 | 80 | 0,003 x d ₁ | 90 | 0,004 x d ₁ | 100 | 0,004 x d ₁ | 110 | 0,005 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | |
| N | 1.1 | 220 | 0,009 x d ₁ | 250 | 0,010 x d ₁ | 280 | 0,011 x d ₁ | 300 | 0,013 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 1.2 | 220 | 0,008 x d ₁ | 250 | 0,009 x d ₁ | 280 | 0,010 x d ₁ | 300 | 0,011 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 1.3 | 220 | 0,007 x d ₁ | 250 | 0,008 x d ₁ | 280 | 0,009 x d ₁ | 300 | 0,010 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 1.4 | 200 | 0,008 x d ₁ | 250 | 0,009 x d ₁ | 280 | 0,010 x d ₁ | 300 | 0,011 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 1.5 | | | | | | | | | | | | |
| | 1.6 | | | | | | | | | | | | |
| | 2.1 | 150 | 0,005 x d ₁ | 170 | 0,006 x d ₁ | 180 | 0,007 x d ₁ | 210 | 0,008 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 2.2 | 150 | 0,005 x d ₁ | 170 | 0,006 x d ₁ | 180 | 0,007 x d ₁ | 210 | 0,008 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 2.3 | 150 | 0,005 x d ₁ | 170 | 0,006 x d ₁ | 180 | 0,007 x d ₁ | 210 | 0,008 x d ₁ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 2.4 | 130 | 0,004 x d ₁ | 140 | 0,005 x d ₁ | 160 | 0,006 x d ₁ | 180 | 0,006 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 2.5 | 130 | 0,004 x d ₁ | 140 | 0,005 x d ₁ | 160 | 0,006 x d ₁ | 180 | 0,006 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 2.6 | 130 | 0,004 x d ₁ | 140 | 0,005 x d ₁ | 160 | 0,006 x d ₁ | 180 | 0,006 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 2.7 | 80 | 0,003 x d ₁ | 90 | 0,004 x d ₁ | 100 | 0,004 x d ₁ | 110 | 0,005 x d ₁ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 2.8 | 80 | 0,003 x d ₁ | 90 | 0,004 x d ₁ | 100 | 0,004 x d ₁ | 110 | 0,005 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 3.1 | 340 | 0,009 x d ₁ | 370 | 0,011 x d ₁ | 410 | 0,013 x d ₁ | 480 | 0,014 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| | 3.2 | 340 | 0,007 x d ₁ | 370 | 0,008 x d ₁ | 410 | 0,010 x d ₁ | 480 | 0,011 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 4.1 | 340 | 0,008 x d ₁ | 370 | 0,009 x d ₁ | 410 | 0,011 x d ₁ | 480 | 0,012 x d ₁ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 4.2 | 500 | 0,008 x d ₁ | 550 | 0,009 x d ₁ | 600 | 0,011 x d ₁ | 700 | 0,012 x d ₁ | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 4.3 | | | | | | | | | | | | | |
| 4.4 | | | | | | | | | | | | | |
| 5.1 | | | | | | | | | | | | | |
| 5.2 | 80 | 0,003 x d ₁ | 90 | 0,004 x d ₁ | 100 | 0,004 x d ₁ | 110 | 0,005 x d ₁ | | | | <input checked="" type="checkbox"/> | |
| 5.3 | | | | | | | | | | | | | |
| S | 1.1 | 80 | 0,004 x d ₁ | 90 | 0,004 x d ₁ | 100 | 0,005 x d ₁ | 110 | 0,006 x d ₁ | | | | <input checked="" type="checkbox"/> |
| | 1.2 | 70 | 0,003 x d ₁ | 80 | 0,004 x d ₁ | 80 | 0,004 x d ₁ | 100 | 0,005 x d ₁ | | | | <input checked="" type="checkbox"/> |
| | 1.3 | 40 | 0,003 x d ₁ | 40 | 0,003 x d ₁ | 50 | 0,004 x d ₁ | 60 | 0,004 x d ₁ | | | | <input checked="" type="checkbox"/> |
| | 2.1 | 70 | 0,002 x d ₁ | 80 | 0,002 x d ₁ | 80 | 0,003 x d ₁ | 100 | 0,003 x d ₁ | | | | <input checked="" type="checkbox"/> |
| | 2.2 | 30 | 0,002 x d ₁ | 30 | 0,002 x d ₁ | 35 | 0,003 x d ₁ | 40 | 0,003 x d ₁ | | | | <input checked="" type="checkbox"/> |
| | 2.3 | 20 | 0,002 x d ₁ | 25 | 0,002 x d ₁ | 25 | 0,003 x d ₁ | 30 | 0,003 x d ₁ | | | | <input checked="" type="checkbox"/> |
| | 2.4 | 20 | 0,002 x d ₁ | 25 | 0,002 x d ₁ | 25 | 0,003 x d ₁ | 30 | 0,003 x d ₁ | | | | <input checked="" type="checkbox"/> |
| 2.5 | 20 | 0,002 x d ₁ | 20 | 0,002 x d ₁ | 20 | 0,003 x d ₁ | 30 | 0,003 x d ₁ | | | | <input checked="" type="checkbox"/> | |
| 2.6 | 20 | 0,002 x d ₁ | 20 | 0,002 x d ₁ | 20 | 0,003 x d ₁ | 30 | 0,003 x d ₁ | | | | <input checked="" type="checkbox"/> | |
| H | 1.1 | 100 | 0,003 x d ₁ | 110 | 0,003 x d ₁ | 120 | 0,004 x d ₁ | 140 | 0,004 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | |
| | 1.2 | 80 | 0,003 x d ₁ | 90 | 0,003 x d ₁ | 100 | 0,004 x d ₁ | 110 | 0,004 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | |
| | 1.3 | | | 90 | 0,003 x d ₁ | 100 | 0,003 x d ₁ | 110 | 0,004 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | |
| | 1.4 | | | | | | | | | | | | |
| | 1.5 | | | | | | | | | | | | |

v_c = Schnittgeschwindigkeit · Cutting speed
f_z = Vorschub pro Zahn · Feed per tooth

■ = sehr gut geeignet · very suitable
□ = gut geeignet · suitable

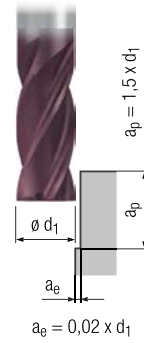
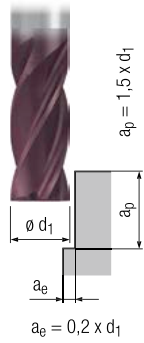
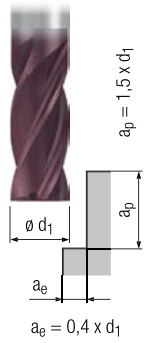
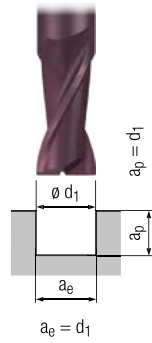


Hartmetall-Schaftfräser – lange Ausführung
Solid carbide end mills – long design

N

Gültig für · Valid for

| | | |
|--------|-------|--------|
| 1998A | 2513A | 2698A |
| 1998AZ | 2518A | 2698AZ |
| 1999A | 2519A | 2699A |
| 1999AZ | 2522A | 2699AZ |
| 2512A | 2523A | |



| | | P | | M | | K | | N | | S | | H | | MMS MQL | Coolant |
|-----|-----|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------|------------|---------------|------------|---------|---------|
| | | v_c [m/min] | f_z [mm] | v_c [m/min] | f_z [mm] | v_c [m/min] | f_z [mm] | v_c [m/min] | f_z [mm] | v_c [m/min] | f_z [mm] | v_c [m/min] | f_z [mm] | | |
| P | 1.1 | 140 | $0,005 \times d_1$ | 150 | $0,005 \times d_1$ | 170 | $0,006 \times d_1$ | 200 | $0,007 \times d_1$ | □ | ■ | □ | ■ | | |
| | 2.1 | 130 | $0,004 \times d_1$ | 140 | $0,005 \times d_1$ | 160 | $0,005 \times d_1$ | 180 | $0,006 \times d_1$ | □ | ■ | □ | ■ | | |
| | 3.1 | 110 | $0,004 \times d_1$ | 120 | $0,004 \times d_1$ | 130 | $0,005 \times d_1$ | 150 | $0,005 \times d_1$ | □ | ■ | □ | ■ | | |
| | 4.1 | 100 | $0,003 \times d_1$ | 110 | $0,003 \times d_1$ | 120 | $0,004 \times d_1$ | 140 | $0,004 \times d_1$ | □ | ■ | | | | |
| | 5.1 | 90 | $0,003 \times d_1$ | 100 | $0,003 \times d_1$ | 110 | $0,003 \times d_1$ | 130 | $0,004 \times d_1$ | □ | ■ | | | | |
| M | 1.1 | 70 | $0,003 \times d_1$ | 80 | $0,003 \times d_1$ | 80 | $0,004 \times d_1$ | 100 | $0,004 \times d_1$ | | | □ | ■ | | |
| | 2.1 | 60 | $0,003 \times d_1$ | 70 | $0,003 \times d_1$ | 70 | $0,004 \times d_1$ | 80 | $0,004 \times d_1$ | | | □ | ■ | | |
| | 3.1 | 40 | $0,002 \times d_1$ | 40 | $0,003 \times d_1$ | 50 | $0,003 \times d_1$ | 60 | $0,003 \times d_1$ | | | □ | ■ | | |
| | 4.1 | 30 | $0,002 \times d_1$ | 30 | $0,003 \times d_1$ | 40 | $0,003 \times d_1$ | 40 | $0,003 \times d_1$ | | | □ | ■ | | |
| K | 1.1 | 140 | $0,005 \times d_1$ | 150 | $0,006 \times d_1$ | 170 | $0,006 \times d_1$ | 200 | $0,007 \times d_1$ | □ | ■ | | | | |
| | 1.2 | 140 | $0,005 \times d_1$ | 150 | $0,006 \times d_1$ | 170 | $0,006 \times d_1$ | 200 | $0,007 \times d_1$ | □ | ■ | | | | |
| | 2.1 | 130 | $0,004 \times d_1$ | 140 | $0,005 \times d_1$ | 160 | $0,005 \times d_1$ | 180 | $0,006 \times d_1$ | □ | ■ | | | | |
| | 2.2 | 130 | $0,004 \times d_1$ | 140 | $0,005 \times d_1$ | 160 | $0,005 \times d_1$ | 180 | $0,006 \times d_1$ | □ | ■ | | | | |
| | 3.1 | 110 | $0,004 \times d_1$ | 120 | $0,005 \times d_1$ | 130 | $0,005 \times d_1$ | 150 | $0,006 \times d_1$ | □ | ■ | | | | |
| | 3.2 | 110 | $0,004 \times d_1$ | 120 | $0,005 \times d_1$ | 130 | $0,005 \times d_1$ | 150 | $0,006 \times d_1$ | □ | ■ | | | | |
| | 4.1 | 90 | $0,003 \times d_1$ | 100 | $0,003 \times d_1$ | 110 | $0,004 \times d_1$ | 130 | $0,004 \times d_1$ | □ | ■ | | | | |
| 4.2 | 70 | $0,003 \times d_1$ | 80 | $0,003 \times d_1$ | 80 | $0,004 \times d_1$ | 100 | $0,004 \times d_1$ | □ | ■ | | | | | |
| N | 1.1 | 220 | $0,009 \times d_1$ | 250 | $0,010 \times d_1$ | 280 | $0,011 \times d_1$ | 300 | $0,013 \times d_1$ | | | □ | ■ | | |
| | 1.2 | 220 | $0,008 \times d_1$ | 250 | $0,009 \times d_1$ | 280 | $0,010 \times d_1$ | 300 | $0,011 \times d_1$ | | | □ | ■ | | |
| | 1.3 | 220 | $0,007 \times d_1$ | 250 | $0,008 \times d_1$ | 280 | $0,009 \times d_1$ | 300 | $0,010 \times d_1$ | | | □ | ■ | | |
| | 1.4 | 200 | $0,008 \times d_1$ | 250 | $0,009 \times d_1$ | 280 | $0,010 \times d_1$ | 300 | $0,011 \times d_1$ | | | □ | ■ | | |
| | 1.5 | | | | | | | | | | | | | | |
| | 1.6 | | | | | | | | | | | | | | |
| | 2.1 | 130 | $0,005 \times d_1$ | 140 | $0,006 \times d_1$ | 160 | $0,006 \times d_1$ | 180 | $0,007 \times d_1$ | | | □ | ■ | | |
| | 2.2 | 130 | $0,005 \times d_1$ | 140 | $0,006 \times d_1$ | 160 | $0,006 \times d_1$ | 180 | $0,007 \times d_1$ | | | □ | ■ | | |
| | 2.3 | 130 | $0,005 \times d_1$ | 140 | $0,006 \times d_1$ | 160 | $0,006 \times d_1$ | 180 | $0,007 \times d_1$ | | | □ | ■ | | |
| | 2.4 | 120 | $0,004 \times d_1$ | 130 | $0,005 \times d_1$ | 140 | $0,005 \times d_1$ | 170 | $0,006 \times d_1$ | | | □ | ■ | | |
| | 2.5 | 120 | $0,004 \times d_1$ | 130 | $0,005 \times d_1$ | 140 | $0,005 \times d_1$ | 170 | $0,006 \times d_1$ | | | □ | ■ | | |
| | 2.6 | 120 | $0,004 \times d_1$ | 130 | $0,005 \times d_1$ | 140 | $0,005 \times d_1$ | 170 | $0,006 \times d_1$ | | | □ | ■ | | |
| | 2.7 | 70 | $0,003 \times d_1$ | 80 | $0,003 \times d_1$ | 80 | $0,004 \times d_1$ | 100 | $0,004 \times d_1$ | | | □ | ■ | | |
| | 2.8 | 70 | $0,003 \times d_1$ | 80 | $0,003 \times d_1$ | 80 | $0,004 \times d_1$ | 100 | $0,004 \times d_1$ | | | □ | ■ | | |
| | 3.1 | 290 | $0,009 \times d_1$ | 320 | $0,010 \times d_1$ | 350 | $0,011 \times d_1$ | 410 | $0,013 \times d_1$ | | | □ | ■ | | |
| | 3.2 | 290 | $0,007 \times d_1$ | 320 | $0,008 \times d_1$ | 350 | $0,009 \times d_1$ | 410 | $0,010 \times d_1$ | | | □ | ■ | | |
| 4.1 | 290 | $0,008 \times d_1$ | 320 | $0,009 \times d_1$ | 350 | $0,009 \times d_1$ | 410 | $0,011 \times d_1$ | | | □ | ■ | | | |
| 4.2 | 430 | $0,008 \times d_1$ | 470 | $0,009 \times d_1$ | 520 | $0,009 \times d_1$ | 600 | $0,011 \times d_1$ | | | □ | ■ | | | |
| 4.3 | | | | | | | | | | | | | | | |
| 4.4 | | | | | | | | | | | | | | | |
| 5.1 | | | | | | | | | | | | | | | |
| 5.2 | 70 | $0,003 \times d_1$ | 80 | $0,003 \times d_1$ | 80 | $0,004 \times d_1$ | 100 | $0,004 \times d_1$ | | | | | | | |
| 5.3 | | | | | | | | | | | | | | | |
| S | 1.1 | 70 | $0,004 \times d_1$ | 80 | $0,004 \times d_1$ | 80 | $0,004 \times d_1$ | 100 | $0,005 \times d_1$ | | | | | | |
| | 1.2 | 60 | $0,003 \times d_1$ | 70 | $0,003 \times d_1$ | 70 | $0,004 \times d_1$ | 80 | $0,004 \times d_1$ | | | | | | |
| | 1.3 | 40 | $0,003 \times d_1$ | 40 | $0,003 \times d_1$ | 50 | $0,003 \times d_1$ | 60 | $0,004 \times d_1$ | | | | | | |
| | 2.1 | 60 | $0,002 \times d_1$ | 70 | $0,002 \times d_1$ | 70 | $0,003 \times d_1$ | 80 | $0,003 \times d_1$ | | | | | | |
| | 2.2 | 20 | $0,002 \times d_1$ | 20 | $0,002 \times d_1$ | 15 | $0,003 \times d_1$ | 30 | $0,003 \times d_1$ | | | | | | |
| | 2.3 | 20 | $0,002 \times d_1$ | 25 | $0,002 \times d_1$ | 25 | $0,003 \times d_1$ | 30 | $0,003 \times d_1$ | | | | | | |
| | 2.4 | 20 | $0,002 \times d_1$ | 25 | $0,002 \times d_1$ | 25 | $0,003 \times d_1$ | 30 | $0,003 \times d_1$ | | | | | | |
| 2.5 | 20 | $0,002 \times d_1$ | 20 | $0,002 \times d_1$ | 20 | $0,003 \times d_1$ | 30 | $0,003 \times d_1$ | | | | | | | |
| 2.6 | 20 | $0,002 \times d_1$ | 20 | $0,002 \times d_1$ | 20 | $0,003 \times d_1$ | 30 | $0,003 \times d_1$ | | | | | | | |
| H | 1.1 | 90 | $0,003 \times d_1$ | 100 | $0,003 \times d_1$ | 110 | $0,003 \times d_1$ | 130 | $0,004 \times d_1$ | □ | ■ | | | | |
| | 1.2 | 70 | $0,003 \times d_1$ | 80 | $0,003 \times d_1$ | 80 | $0,003 \times d_1$ | 100 | $0,004 \times d_1$ | □ | ■ | | | | |
| | 1.3 | | | 70 | $0,003 \times d_1$ | 70 | $0,003 \times d_1$ | 80 | $0,003 \times d_1$ | □ | ■ | | | | |
| | 1.4 | | | | | | | | | | | | | | |
| | 1.5 | | | | | | | | | | | | | | |

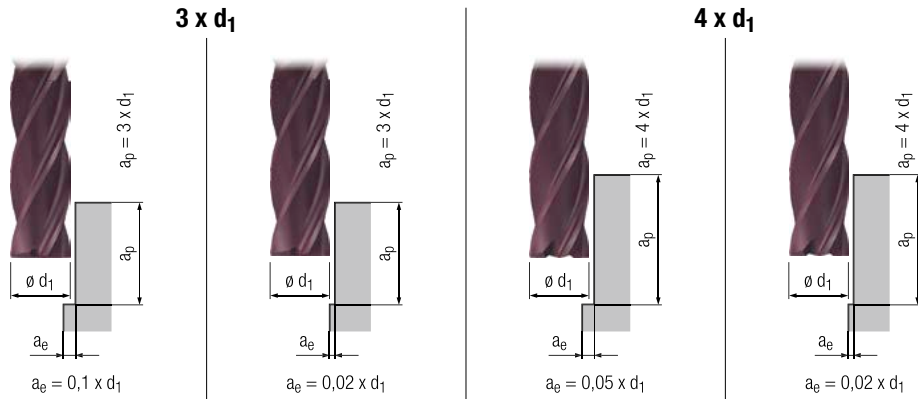


Hartmetall-Schafffräser – extra lange Ausführung
Solid carbide end mills – extra long design

N

Gültig für · Valid for

- 2514A 2524A 2528A
- 2515A 2525A 2529A
- 2520A 2526A
- 2521A 2527A



| | | 3 x d ₁ | | 4 x d ₁ | | v _c [m/min] | f _z [mm] | v _c [m/min] | f _z [mm] | v _c [m/min] | f _z [mm] | v _c [m/min] | f _z [mm] | | | MMS MQL | | |
|----------|-----|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|--|--|-------------------------------------|-------------------------------------|------------------------|
| | | v _c [m/min] | f _z [mm] | v _c [m/min] | f _z [mm] | | | | | | | | | | | | | v _c [m/min] |
| P | 1.1 | 120 | 0,005 x d ₁ | 140 | 0,006 x d ₁ | 100 | 0,005 x d ₁ | 120 | 0,005 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | |
| | 2.1 | 110 | 0,004 x d ₁ | 130 | 0,005 x d ₁ | 90 | 0,004 x d ₁ | 110 | 0,005 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | |
| | 3.1 | 90 | 0,004 x d ₁ | 110 | 0,005 x d ₁ | 70 | 0,004 x d ₁ | 90 | 0,004 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | |
| | 4.1 | 70 | 0,003 x d ₁ | 80 | 0,004 x d ₁ | 60 | 0,003 x d ₁ | 70 | 0,003 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | |
| | 5.1 | 60 | 0,003 x d ₁ | 70 | 0,003 x d ₁ | 50 | 0,003 x d ₁ | 60 | 0,003 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | |
| M | 1.1 | 120 | 0,003 x d ₁ | 140 | 0,004 x d ₁ | 100 | 0,003 x d ₁ | 120 | 0,003 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 2.1 | 100 | 0,003 x d ₁ | 120 | 0,004 x d ₁ | 80 | 0,003 x d ₁ | 100 | 0,003 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 3.1 | 70 | 0,003 x d ₁ | 80 | 0,003 x d ₁ | 60 | 0,003 x d ₁ | 70 | 0,003 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 4.1 | 50 | 0,003 x d ₁ | 60 | 0,003 x d ₁ | 40 | 0,003 x d ₁ | 50 | 0,003 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| K | 1.1 | 120 | 0,005 x d ₁ | 140 | 0,006 x d ₁ | 100 | 0,005 x d ₁ | 120 | 0,006 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | |
| | 1.2 | 120 | 0,005 x d ₁ | 140 | 0,006 x d ₁ | 100 | 0,005 x d ₁ | 120 | 0,006 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | |
| | 2.1 | 110 | 0,004 x d ₁ | 130 | 0,005 x d ₁ | 90 | 0,004 x d ₁ | 110 | 0,004 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | |
| | 2.2 | 110 | 0,004 x d ₁ | 130 | 0,005 x d ₁ | 90 | 0,004 x d ₁ | 110 | 0,004 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | |
| | 3.1 | 90 | 0,004 x d ₁ | 110 | 0,005 x d ₁ | 70 | 0,004 x d ₁ | 90 | 0,004 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | |
| | 3.2 | 90 | 0,004 x d ₁ | 110 | 0,005 x d ₁ | 70 | 0,004 x d ₁ | 90 | 0,004 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | |
| | 4.1 | 70 | 0,003 x d ₁ | 80 | 0,004 x d ₁ | 60 | 0,003 x d ₁ | 70 | 0,003 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | |
| | 4.2 | 60 | 0,003 x d ₁ | 70 | 0,004 x d ₁ | 50 | 0,003 x d ₁ | 60 | 0,003 x d ₁ | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | | |
| N | 1.1 | 360 | 0,009 x d ₁ | 430 | 0,011 x d ₁ | 300 | 0,009 x d ₁ | 430 | 0,009 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 1.2 | 360 | 0,008 x d ₁ | 430 | 0,010 x d ₁ | 300 | 0,008 x d ₁ | 430 | 0,009 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 1.3 | 360 | 0,007 x d ₁ | 430 | 0,008 x d ₁ | 300 | 0,007 x d ₁ | 430 | 0,008 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 1.4 | 240 | 0,008 x d ₁ | 290 | 0,010 x d ₁ | 200 | 0,008 x d ₁ | 290 | 0,009 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 1.5 | 230 | 0,007 x d ₁ | 280 | 0,008 x d ₁ | 180 | 0,007 x d ₁ | 280 | 0,008 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 1.6 | 160 | 0,006 x d ₁ | 190 | 0,007 x d ₁ | 130 | 0,006 x d ₁ | 190 | 0,007 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 2.1 | 110 | 0,005 x d ₁ | 130 | 0,006 x d ₁ | 90 | 0,005 x d ₁ | 110 | 0,006 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 2.2 | 110 | 0,005 x d ₁ | 130 | 0,006 x d ₁ | 90 | 0,005 x d ₁ | 110 | 0,006 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 2.3 | 110 | 0,005 x d ₁ | 130 | 0,006 x d ₁ | 90 | 0,005 x d ₁ | 110 | 0,006 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 2.4 | 100 | 0,004 x d ₁ | 120 | 0,005 x d ₁ | 80 | 0,004 x d ₁ | 100 | 0,004 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 2.5 | 100 | 0,004 x d ₁ | 120 | 0,005 x d ₁ | 80 | 0,004 x d ₁ | 100 | 0,004 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 2.6 | 100 | 0,004 x d ₁ | 120 | 0,005 x d ₁ | 80 | 0,004 x d ₁ | 100 | 0,004 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 2.7 | 60 | 0,003 x d ₁ | 70 | 0,004 x d ₁ | 50 | 0,003 x d ₁ | 60 | 0,003 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 2.8 | 60 | 0,003 x d ₁ | 70 | 0,004 x d ₁ | 50 | 0,003 x d ₁ | 60 | 0,003 x d ₁ | | | | | | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | 3.1 | | | | | | | | | | | | | | | | | |
| | 3.2 | | | | | | | | | | | | | | | | | |
| 4.1 | | | | | | | | | | | | | | | | | | |
| 4.2 | | | | | | | | | | | | | | | | | | |
| 4.3 | | | | | | | | | | | | | | | | | | |
| 4.4 | | | | | | | | | | | | | | | | | | |
| 5.1 | | | | | | | | | | | | | | | | | | |
| 5.2 | 60 | 0,003 x d ₁ | 70 | 0,004 x d ₁ | 50 | 0,003 x d ₁ | 60 | 0,003 x d ₁ | | | | | | | | | <input checked="" type="checkbox"/> | |
| 5.3 | | | | | | | | | | | | | | | | | | |
| S | 1.1 | 90 | 0,004 x d ₁ | 100 | 0,005 x d ₁ | 70 | 0,004 x d ₁ | 80 | 0,004 x d ₁ | | | | | | | | <input checked="" type="checkbox"/> | |
| | 1.2 | 70 | 0,003 x d ₁ | 80 | 0,004 x d ₁ | 60 | 0,003 x d ₁ | 70 | 0,003 x d ₁ | | | | | | | | <input checked="" type="checkbox"/> | |
| | 1.3 | 70 | 0,003 x d ₁ | 80 | 0,003 x d ₁ | 60 | 0,003 x d ₁ | 70 | 0,003 x d ₁ | | | | | | | | <input checked="" type="checkbox"/> | |
| | 2.1 | 70 | 0,004 x d ₁ | 80 | 0,004 x d ₁ | 60 | 0,004 x d ₁ | 70 | 0,004 x d ₁ | | | | | | | | <input checked="" type="checkbox"/> | |
| | 2.2 | 30 | 0,003 x d ₁ | 40 | 0,004 x d ₁ | 15 | 0,003 x d ₁ | 30 | 0,003 x d ₁ | | | | | | | | <input checked="" type="checkbox"/> | |
| | 2.3 | 20 | 0,002 x d ₁ | 25 | 0,002 x d ₁ | 25 | 0,002 x d ₁ | 20 | 0,002 x d ₁ | | | | | | | | <input checked="" type="checkbox"/> | |
| | 2.4 | 30 | 0,003 x d ₁ | 45 | 0,003 x d ₁ | 25 | 0,003 x d ₁ | 30 | 0,003 x d ₁ | | | | | | | | <input checked="" type="checkbox"/> | |
| | 2.5 | 20 | 0,002 x d ₁ | 20 | 0,002 x d ₁ | 20 | 0,002 x d ₁ | 20 | 0,002 x d ₁ | | | | | | | | <input checked="" type="checkbox"/> | |
| 2.6 | 20 | 0,003 x d ₁ | 20 | 0,003 x d ₁ | 20 | 0,003 x d ₁ | 20 | 0,003 x d ₁ | | | | | | | | <input checked="" type="checkbox"/> | | |
| H | 1.1 | | | | | | | | | | | | | | | | | |
| | 1.2 | | | | | | | | | | | | | | | | | |
| | 1.3 | | | | | | | | | | | | | | | | | |
| | 1.4 | | | | | | | | | | | | | | | | | |
| | 1.5 | | | | | | | | | | | | | | | | | |

■ = sehr gut geeignet · very suitable
□ = gut geeignet · suitable

| | P | M | K | N | S | H |
|--------------------------|---|-----------|-----------|-----------|-----------|----------|
| Werkzeugtyp Tool type | Hochleistungsfräser-Programm High performance end mill programme | | | | | |
| NR | Multi-Cut | Multi-Cut | Multi-Cut | | | |
| NF | Jet-Cut | TiNox-Cut | Jet-Cut | | TiNox-Cut | |
| N | Jet-Cut | TiNox-Cut | Jet-Cut | | TiNox-Cut | |
| W | | | | Alu-Cut | | |
| W | | | | Fiber-Cut | | |
| WR | | | | Alu-Cut | | |
| H | | | | | | Hard-Cut |
| Werkzeugtyp Tool type | Hochleistungs-Universalfräser-Programm High performance universal end mill programme | | | | | |
| N | TOP-Cut | TOP-Cut | TOP-Cut | TOP-Cut | TOP-Cut | TOP-Cut |

Druckerzeugnisse für Hochleistungswerkzeuge

Sales literature for high performance end mills



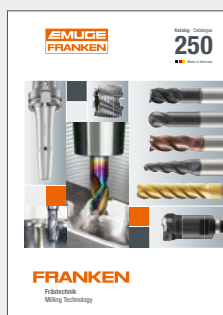
Druckerzeugnisse für Fräswerkzeuge mit besonderen Eigenschaften

Sales literature for milling tools with special characteristics

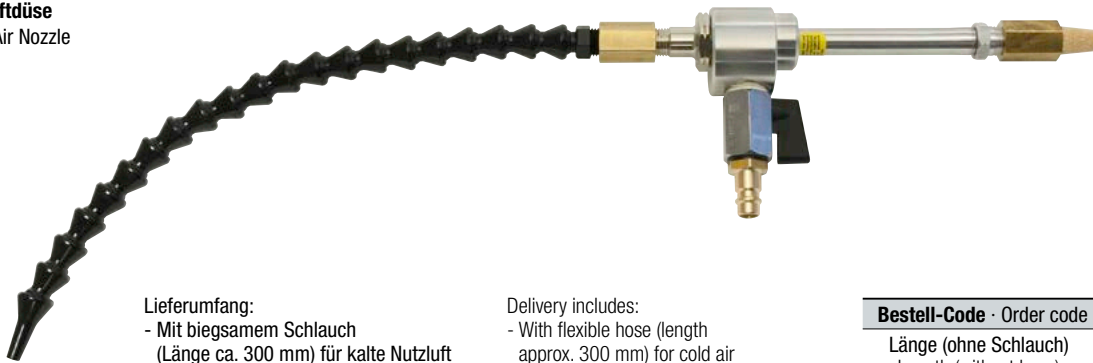


Hauptkatalog

Main catalogue



Kaltluftdüse
Cold-Air Nozzle



Lieferumfang:

- Mit biegsamem Schlauch (Länge ca. 300 mm) für kalte Nutzluft
- Schalldämpfer (SN14) für heiße Abluft
- Kugelhahn mit Anschlussstück (ST 1/4) für Zuluftschlauch (NW6) mit Schnellwechselkupplung (NW7.2)

Delivery includes:

- With flexible hose (length approx. 300 mm) for cold air
- Silencer (SN14) for hot exhaust air
- Ball-valve with fitting (1/4") for inlet hose (6 mm) with quick-change attachment (7.2 mm)

| Bestell-Code · Order code | | 6910 |
|--|------------------|------|
| Länge (ohne Schlauch) Length (without hose) | Dimens.- Code | |
| 225 mm | .15 | ● |

Ersatzschlauch
Spare Hose



| Bestell-Code · Order code | | 6910 |
|---------------------------|------------------|------|
| Länge Length | Dimens.- Code | |
| ≈ 300 mm | .20 | ● |
| ≈ 400 mm | .22 | ● |
| ≈ 500 mm | .21 | ● |

Halterungen für die Kaltluftdüse
Holders for the Cold-Air Nozzle



Klemmarm mit Grundhalter
Socket with basic holder



Klemmarm mit Magnethalter
Socket with magnetic shoe



Klemmarm
Socket



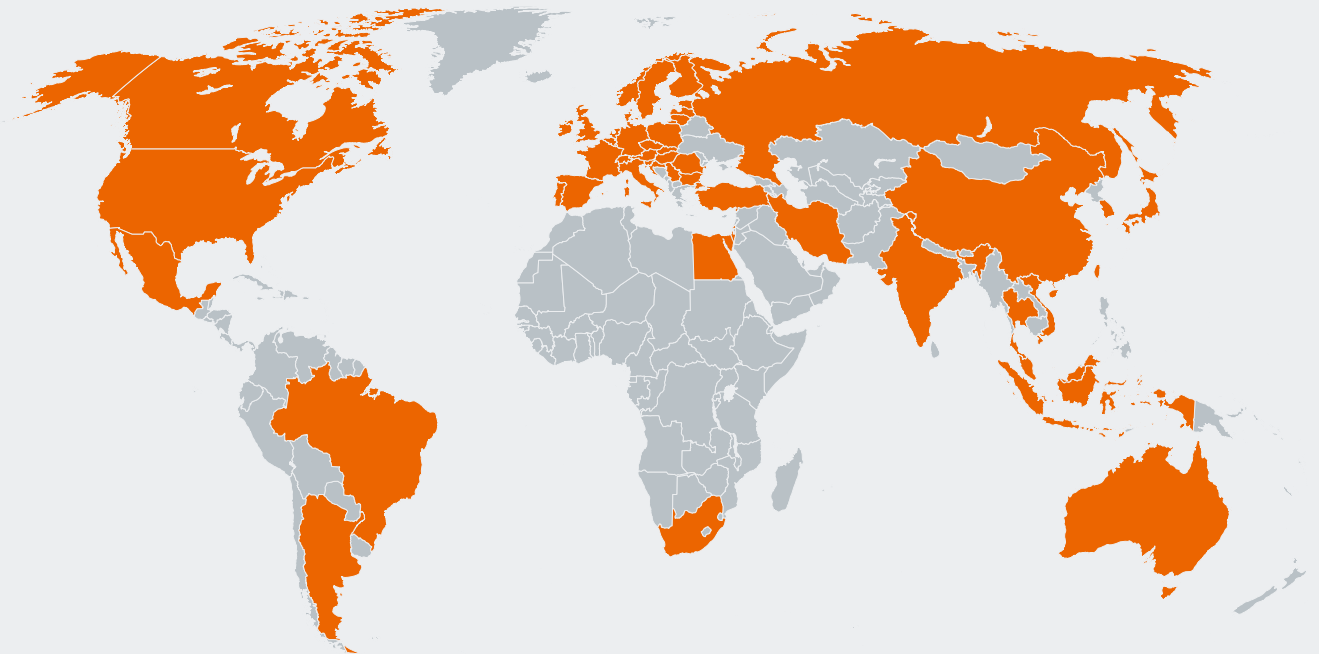
Grundhalter für Klemmarm
Basic holder for socket



Magnethalter für Klemmarm
Magnetic shoe for socket



| Bestell-Code · Order code | | 6910 | | | | |
|---------------------------|------------------|------|---|---|---|---|
| Abmaße Dimensions | Dimens.- Code | | | | | |
| ø 45 x 68 mm | .24 | ● | | | | |
| ø 80 x 80 mm | .25 | | ● | | | |
| ø 80 x 17 mm | .26 | | | | | ● |
| ø 32 x 63 mm | .27 | | | ● | | |
| ø 45 x 20 mm | .32 | | | | ● | |



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