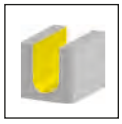
# NEUE HORN BESCHICHTUNG RC2 / RC4

HOCHLEISTUNGSSCHICHT FÜR
DAS FRÄSEN VON STAHL

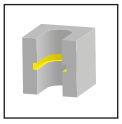
# NEW HORN COATING RC2 / RC4

HIGH-PERFORMANCE COATING
FOR MILLING STEEL

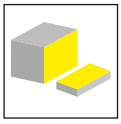
# Allgemeine Hinweise
General Information



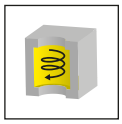
Nutfräsen Vollradius
Full radius groove milling



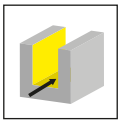
Nutfräsen innen
Internal groove milling



Trennfräsen
Slot milling



Nutfräsen zirkular
Circular groove milling



Nutfräsen
Grooving

z3

Zähnezahl
Number of teeth

Alle Abmessungen sind in mm angegeben, sofern nicht anders vermerkt.

Unsere Lieferzeiten:
- ▲ ab Lager
- Δ 4 Wochen

Einsatz für Werkstoffgruppen:
- ● empfohlen
- o bedingt einsetzbar
- - nicht geeignet

All dimensions are in mm, unless otherwise stated.

Delivery times:
- ▲ on stock
- Δ 4 weeks

Use for material groups:
- ● recommended
- o alternative recommendation
- - not suitable

## Die HORN-Trennstellencodierung - wofür wird sie benötigt?

Die Trennstellencodierung stellt sicher, dass Sie immer die zueinander passenden Werkzeuge finden und wird bei Werkzeughaltern und bei Schneidplatten ausgewiesen. Wenn die Codes übereinstimmen, kann die Schneidplatte im entsprechenden Werkzeughalter verwendet werden.
Das gilt auch für unser modulares Haltersystem, hier gibt die Trennstellencodierung die Schnittstelle zwischen Grundhalter und Kassette an.

### The HORN connection interface code - what is it needed for?

The connection interface code ensures that you will always find the appropriate tools and is shown on toolholders and inserts. If the codes match, the insert can be used in the corresponding toolholder.
This also applies to our modular holder system, where the connection code indicates the interface between the holder and the cassette.

## HORN-Trennstellencodes und mögliche Kombinationen:
HORN connection interface codes and possible combinations:

**HIS** = Plattensitzgröße / Insert seat
**HWS** = Trennstelle Werkstückseitig / Interface workpiece side
**HMS** = Trennstelle Maschinenseitig / Interface machine side

| | | |
|---|---|---|
| **HIS** | ⟷ | **HWS** |
| **HMS** | ⟷ | **HWS** |

**Beispiel Schneidplatte**
Example insert

| **Bestellnummer** Part number | Ds | w | s | r | $t_{max}$ | Z | HIS | | AN25 | RC45 |
|---|---|---|---|---|---|---|---|---|---|---|
| **306.0005.10** | 11,7 | 1 | 3,2 | 0,5 | 2,5 | 3 | 306060R | | ▲ | ▲ |

**Beispiel Klemmhalter**
Example toolholder

| **Bestellnummer** Part number | d | $l_1$ | $l_2$ | $d_1$ | | HWS |
|---|---|---|---|---|---|---|
| **M306.0012.01.A** | 12 | 80 | 21 | 6 | | 306060L • 30604R |

# **DER UNTERSCHIED: MEHR MÖGLICHKEITEN**

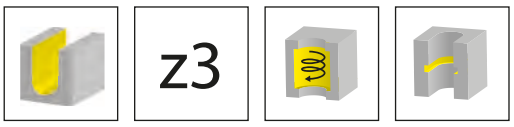
# THE DIFFERENCE: MORE POSSIBILITIES

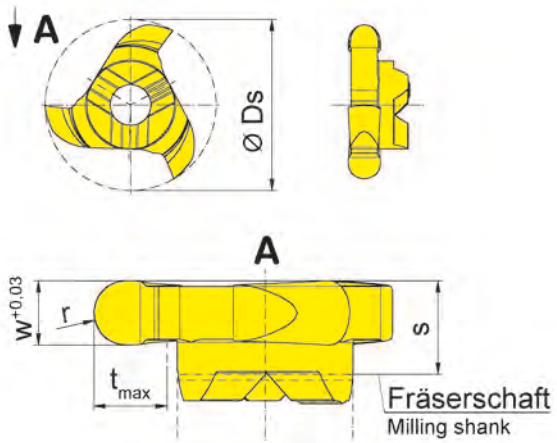
- **hohe Zähigkeit und Härte erlaubt das Fräsen mit hohen Schnittgeschwindigkeiten**
  High toughness and hardness allows milling at high cutting speeds

- **hohe Temperaturstabilität besonders bei Trockenbearbeitung**
  High temperature stability especially during dry machining

- **Inhouse-Fertigung, Greenline-fähig**
  In-house production, Greenline ordering

# Schneidplatte
Insert



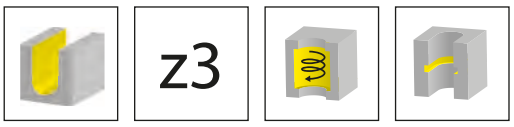



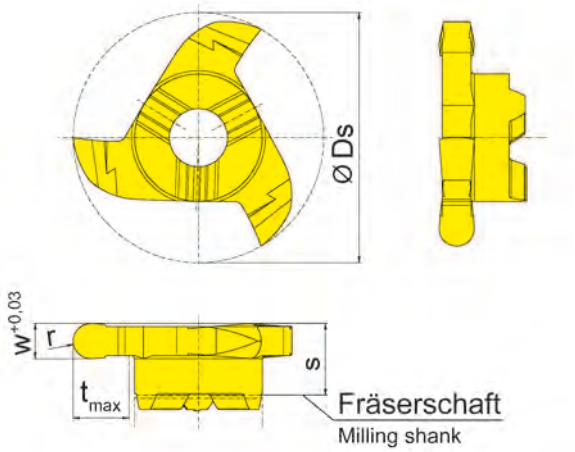

HM-Sorten
Carbide grades

▲ ab Lager
on stock

Δ 4 Wochen
4 weeks

| **Bestellnummer**<br>Part number | Ds | w | s | r | $t_{max}$ | Z | HIS | | AN25 | RC45 |
|---|---|---|---|---|---|---|---|---|---|---|
| **306.0005.10** | 11,7 | 1 | 3,2 | 0,5 | 2,5 | 3 | 306060R | | ▲ | ▲ |
| | | | | | | | | **P** | ● | ● |
| | | | | | | | | **M** | o | ● |
| | | | | | | | | **K** | - | ● |
| | | | | | | | | **N** | - | - |
| | | | | | | | | **S** | - | - |
| | | | | | | | | **H** | - | - |



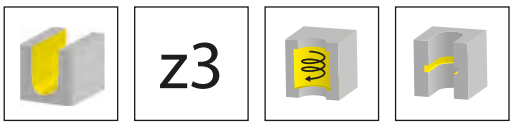



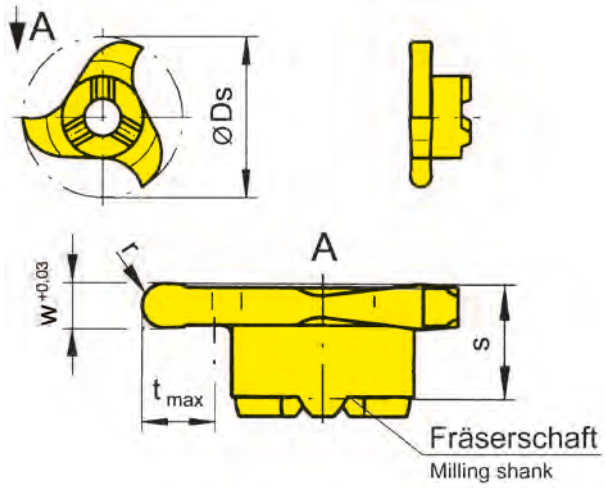

HM-Sorten
Carbide grades

▲ ab Lager
on stock

Δ 4 Wochen
4 weeks

| **Bestellnummer**<br>Part number | Ds | w | s | r | $t_{max}$ | Z | HIS | | AN25 | RC45 |
|---|---|---|---|---|---|---|---|---|---|---|
| **308.0005.10** | 15,7 | 1 | 4,5 | 0,5 | 3,5 | 3 | 308080R | | ▲ | ▲ |
| | | | | | | | | P | ● | ● |
| | | | | | | | | M | o | ● |
| | | | | | | | | K | - | ● |
| | | | | | | | | N | - | - |
| | | | | | | | | S | - | - |
| | | | | | | | | H | - | - |




HM-Sorten
Carbide grades

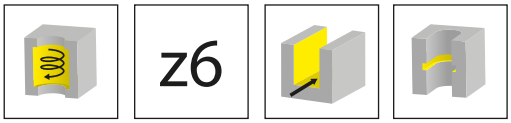
▲ ab Lager
on stock

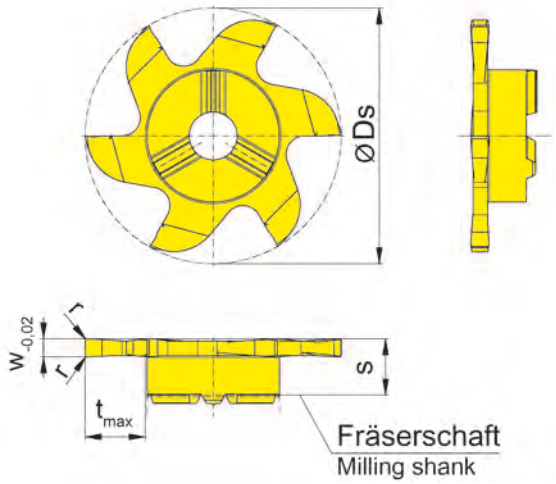
Δ 4 Wochen
4 weeks

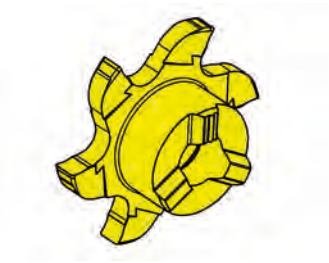
| **Bestellnummer**<br>Part number | Ds | w | s | r | $t_{max}$ | Z | HIS | | AN25 | RC45 |
|---|---|---|---|---|---|---|---|---|---|---|
| **311.0005.10** | 17,7 | 1 | 5,75 | 0,5 | 3,5 | 3 | 311090R | | ▲ | ▲ |
| | | | | | | | | **P** | ● | ● |
| | | | | | | | | **M** | o | ● |
| | | | | | | | | **K** | - | ● |
| | | | | | | | | **N** | - | - |
| | | | | | | | | **S** | - | - |
| | | | | | | | | **H** | - | - |

# Schneidplatte
Insert

# 628



HM-Sorten
Carbide grades

▲ ab Lager
on stock

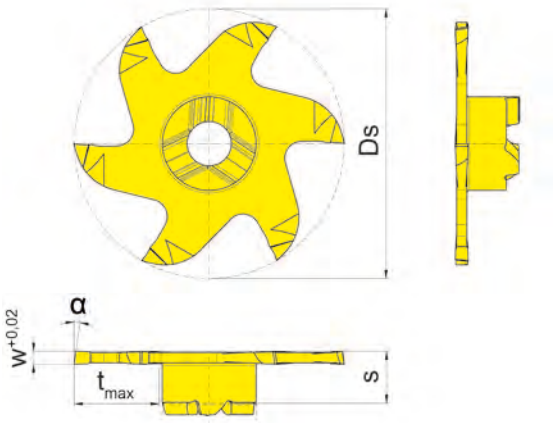
Δ 4 Wochen
4 weeks

| **Bestellnummer**<br>Part number | Ds | Nw | w | s | $t_{max}$ | Z | HIS | | AN25 | RC25 |
|---|---|---|---|---|---|---|---|---|---|---|
| **628.0080.00** | 27,7 | 0,8 | 0,8 | 6,1 | 6,5 | 6 | 328143R | | ▲ | Δ |
| | | | | | | | | **P** | ● | ● |
| | | | | | | | | **M** | o | ● |
| | | | | | | | | **K** | - | ● |
| | | | | | | | | **N** | - | - |
| | | | | | | | | **S** | - | - |
| | | | | | | | | **H** | - | - |

# Schneidplatte
Insert

# 632

z6

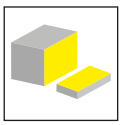



HM-Sorten
Carbide grades

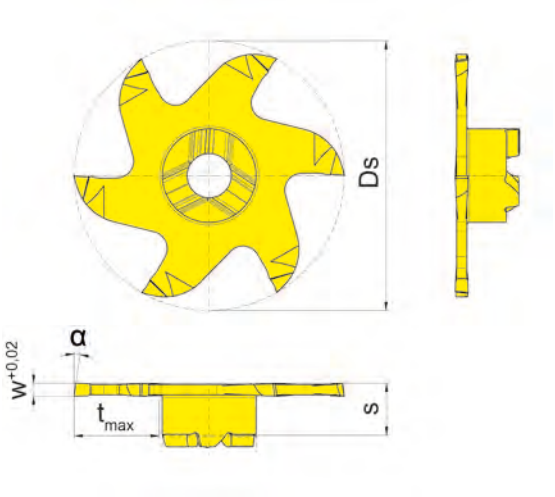
▲ ab Lager
on stock

Δ 4 Wochen
4 weeks

| **Bestellnummer**<br>Part number | Ds | w | s | α | $t_{max}$ | Z | HIS | | AN25 | RC25 |
|---|---|---|---|---|---|---|---|---|---|---|
| **632.L810.2.00** | 31,7 | 1 | 6,1 | 8° | 10 | 6 | 332110R | | ▲ | ▲ |
| **632.L815.2.00** | 31,7 | 1 | 6,1 | 8° | 10 | 6 | 332110R | | ▲ | ▲ |
| **632.L820.2.00** | 31,7 | 2 | 6,1 | 8° | 10 | 6 | 332110R | | ▲ | ▲ |
| | | | | | | | | **P** | ● | ● |
| | | | | | | | | **M** | o | ● |
| | | | | | | | | **K** | - | ● |
| | | | | | | | | **N** | - | - |
| | | | | | | | | **S** | - | - |
| | | | | | | | | **H** | - | - |



z6




HM-Sorten
Carbide grades

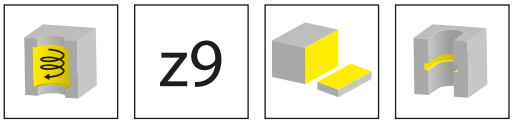
▲ ab Lager
on stock

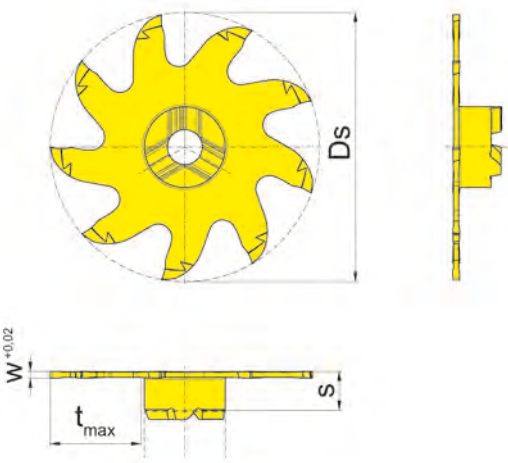
Δ 4 Wochen
4 weeks

| **Bestellnummer**<br>Part number | Ds | w | s | α | $t_{max}$ | Z | HIS | | AN25 | RC25 |
|---|---|---|---|---|---|---|---|---|---|---|
| **636.L810.2.00** | 35,7 | 1 | 6,1 | 8° | 12 | 6 | 332110R | | ▲ | ▲ |
| **636.L815.2.00** | 35,7 | 1,5 | 6,1 | 8° | 12 | 6 | 332110R | | ▲ | ▲ |
| **636.L820.2.00** | 35,7 | 2 | 6,1 | 8° | 12 | 6 | 332110R | | ▲ | ▲ |
| | | | | | | | | **P** | ● | ● |
| | | | | | | | | **M** | o | ● |
| | | | | | | | | **K** | - | ● |
| | | | | | | | | **N** | - | - |
| | | | | | | | | **S** | - | - |
| | | | | | | | | **H** | - | - |

# Schneidplatte
Insert

# 939




HM-Sorten
Carbide grades

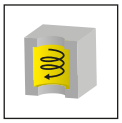
▲ ab Lager
on stock

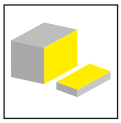
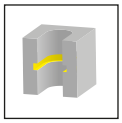
Δ 4 Wochen
4 weeks

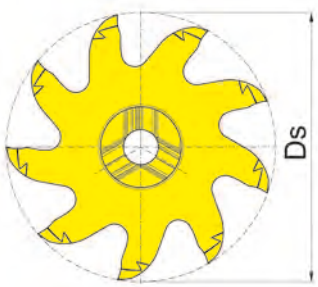
| **Bestellnummer**<br>Part number | Ds | w | s | $t_{max}$ | Z | HIS | | AN25 | RC25 |
|---|---|---|---|---|---|---|---|---|---|
| **939.0100.3.00** | 40 | 1 | 5,8 | 13,5 | 9 | 332120R | | ▲ | Δ |
| **939.0150.3.00** | 40 | 1,5 | 5,8 | 13,5 | 9 | 332120R | | ▲ | Δ |
| **939.0200.3.00** | 40 | 2 | 5,8 | 13,5 | 9 | 332120R | | ▲ | Δ |
| **939.0250.3.00** | 40 | 2,5 | 5,8 | 13,5 | 9 | 332120R | | ▲ | Δ |
| | | | | | | | **P** | ● | ● |
| | | | | | | | **M** | o | ● |
| | | | | | | | **K** | - | ● |
| | | | | | | | **N** | - | - |
| | | | | | | | **S** | - | - |
| | | | | | | | **H** | - | - |

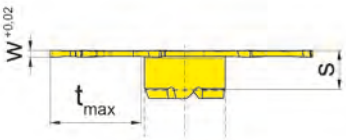
# Schneidplatte
Insert

# 939






HM-Sorten
Carbide grades

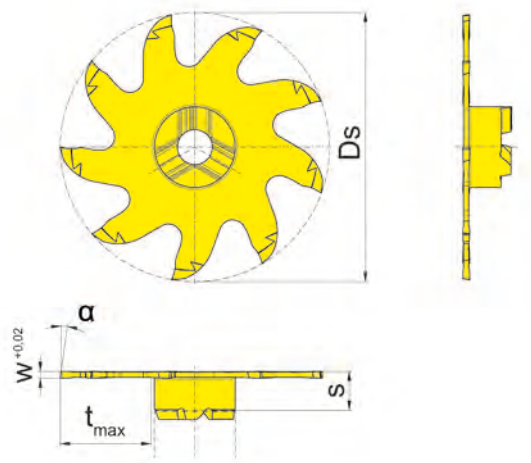
▲ ab Lager
on stock

Δ 4 Wochen
4 weeks

| **Bestellnummer**<br>Part number | Ds | w | s | $t_{max}$ | Z | HIS | AN25 | RC25 |
|---|---|---|---|---|---|---|---|---|
| **939.0040.4.00** | 40 | 0,4 | 5,8 | 14 | 9 | 332110R | ▲ | Δ |
| **939.0050.4.00** | 40 | 0,5 | 5,8 | 14 | 9 | 332110R | ▲ | Δ |
| **939.0060.4.00** | 40 | 0,6 | 5,8 | 14 | 9 | 332110R | ▲ | Δ |
| **939.0070.4.00** | 40 | 0,7 | 5,8 | 14 | 9 | 332110R | ▲ | Δ |
| **939.0080.4.00** | 40 | 0,8 | 5,8 | 14 | 9 | 332110R | ▲ | Δ |
| **939.0090.4.00** | 40 | 0,9 | 5,8 | 14 | 9 | 332110R | ▲ | Δ |
| **939.0100.4.00** | 40 | 1 | 5,8 | 14 | 9 | 332110R | ▲ | Δ |
| **939.0150.4.00** | 40 | 1,5 | 5,8 | 14 | 9 | 332110R | ▲ | Δ |

| | AN25 | RC25 |
|---|---|---|
| **P** | ● | ● |
| **M** | o | ● |
| **K** | - | ● |
| **N** | - | - |
| **S** | - | - |
| **H** | - | - |

z9




HM-Sorten
Carbide grades

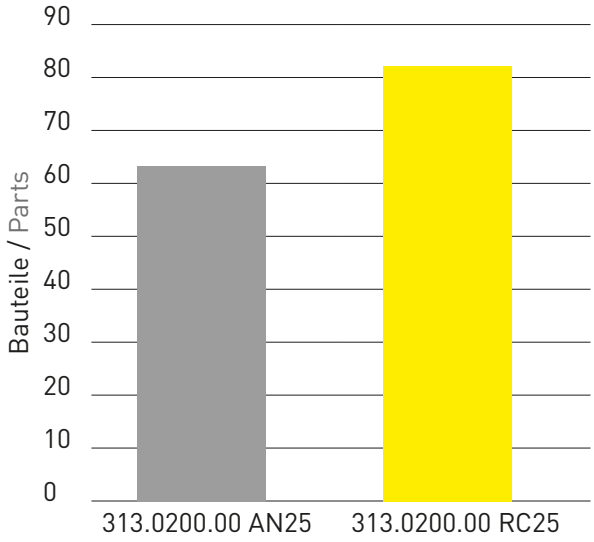
▲ ab Lager
on stock

Δ 4 Wochen
4 weeks

| **Bestellnummer**<br>Part number | Ds | w | s | α | $t_{max}$ | Z | HIS | | AN25 | RC25 |
|---|---|---|---|---|---|---|---|---|---|---|
| **939.L810.3.00** | 40 | 1 | 5,8 | 8° | 13,5 | 9 | 332120R | | ▲ | ▲ |
| **939.L810.4.00** | 40 | 1 | 5,8 | 8° | 14 | 9 | 332110R | | ▲ | Δ |
| **939.L815.4.00** | 40 | 1,5 | 5,8 | 8° | 14 | 9 | 332110R | | ▲ | Δ |
| | | | | | | | | **P** | ● | ● |
| | | | | | | | | **M** | o | ● |
| | | | | | | | | **K** | - | ● |
| | | | | | | | | **N** | - | - |
| | | | | | | | | **S** | - | - |
| | | | | | | | | **H** | - | - |

# Standzeitvergleich
Tool life

| | | | |
|---|---|---|---|
| Bearbeitung: | Nutfräsen | Part: | Groove milling |
| Maschine: | Hermle C42 | Machine: | Hermle C42 |
| Material: | Toolox 33 | Material: | Toolox 33 |
| Kühlung: | trocken | Coolant: | dry |
| vc (m/min) | 200 | vc (m/min) | 200 |
| fz (mm) | 0,11 | fz (mm) | 0,11 |
| ap (mm) | 3 | ap (mm) | 3 |




**Weitere Einsatzgebiete der Hartmetallsorte RC2_ und RC4_**

- Nutfräsen von Stahl und Gusseisen
- Trennfräsen von Stahl und Gusseisen
- Kugelbahnfräsen von Stahl

**Further applications of the RC2_ and RC4_ carbide grade**

- Groove milling of steel and cast iron
- Slot milling of steel and cast iron
- Ball race milling of steel

# Schnittdaten
Cutting Data

| Werkstoff Material | | | Materialgruppe Material group | Härte (HB) Hardness Brinell | Zugfestigkeit $R_m$ [N/mm²] Tensile Strength | Beispiel Werkstoff Example Material | MG12 | TI2_ TN3_ | |
|---|---|---|---|---|---|---|---|---|---|
| P | unlegierter Stahl Carbon steel | ~ 0,2 % C | P1.1 | 125 | 430 | CK15 | | 300-160 | |
| | | ~ 0,4% C geglüht annealed | P1.2 | 190 | 610 | 19Mn6 | | 250-170 | |
| | | ~ 0,4% C vergütet quenched | P1.3 | 210 | 640 | 36Mn5 | | 230-170 | |
| | | ~ 0,6% C geglüht annealed | P1.4 | 190 | 610 | C55 | | 190-120 | |
| | | ~ 0,6% C vergütet quenched | P1.5 | 300 | 1000 | CK60 | | 170-120 | |
| | | Automatenstahl Free cutting steel | P1.6 | 220 | 750 | 9SMn28 | | 190-120 | |
| | niedrig legierter Stahl (<5%) Alloyed steel | geglüht annealed | P2.1 | 180 | 590 | 100Cr6 | | 180-110 | |
| | | vergütet quenched | P2.2 | 280 | 960 | 14NiCr10 | | 160-100 | |
| | | vergütet quenched | P2.3 | 350 | 1250 | 34CrMo4 | | 130-70 | |
| | | vergütet quenched | P2.4 | 430 | 1450 | 55Cr3 | | 120-70 | |
| | hochlegierter Stahl (>5%) high alloyed steel | geglüht annealed | P3.1 | 200 | 680 | X10CrAl18 | | 140-80 | |
| | | gehärtet hardened | P3.2 | 350 | 1200 | X210Cr2 | | | |
| | Stahlguss Cast steel | unlegiert unalloyed | P4.1 | 180 | 590 | GE200 | | 220-160 | |
| | | legiert alloyed | P4.2 | 220 | 750 | GX40CrSi28 | | 140-80 | |
| | Sinterstahl Sintered steel | weich soft | P5.1 | 220 | 570 | Sint-D39 | | 140-80 | |
| M | Rostfreier Stahl Stainless steel | martensitisch ferritisch martensitic ferritic | M1.1 | 200 | 680 | X16Cr13 | | | |
| | | austenitisch austenitic ferritic | M1.2 | 300 | 1000 | X6CrNiMo-Ti17-12-2 | | | |
| | | austenitisch ferritisch austenitic | M1.3 | 230 | 780 | X2CrNi-Mo-N17-13-3 | | | |
| H | Gehärtete Stähle Hardened steels | 50-55 HRC | H1.1 | - | - | | | | |
| | | 55-60 HRC | H1.2 | - | - | | | | |
| | | 60-63 HRC | H1.3 | - | - | | | | |
| | | > 63HRC | H1.4 | - | - | | | | |

| Schnittgeschwindigkeit vc (m/min) / Startwerte<br>Cutting speed vc (m/min) / Start values | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| AS4_<br>TH3_<br>TA4_<br>TF4_ | AN2_<br>AN4_<br>RC2_<br>RC4_ | EG5_ | IG3_ | IG6_ | SG3_ | DD2_ | | | |
| 300-160 | 300-180 | 280-140 | 300-180 | 240-180 | | | | | |
| 250-170 | 280-170 | 230-150 | 280-170 | 240-180 | | | | | |
| 230-170 | 260-160 | 210-150 | 260-160 | 240-180 | | | | | |
| 190-120 | 200-120 | 180-110 | 240-140 | 240-180 | | | | | |
| 170-120 | 200-120 | 160-110 | 220-130 | 240-180 | | | | | |
| 190-120 | 200-120 | 180-110 | 220-130 | 240-180 | | | | | |
| 180-110 | 180-110 | 170-100 | 220-130 | 220-180 | | | | | |
| 160-100 | 180-110 | 160-100 | 200-120 | 220-180 | | | | | |
| 130-70 | 140-80 | 140-80 | 180-110 | 220-180 | | | | | |
| 120-70 | 100-60 | 120-80 | 160-100 | 220-180 | | | | | |
| 140-80 | 140-80 | 130-70 | 160-100 | | | | | | |
| | | | 160-100 | | | | | | |
| 220-160 | 230-140 | 200-140 | 220-130 | | | | | | |
| 140-80 | 150-90 | 140-80 | 160-100 | | | | | | |
| 140-80 | 160-100 | 140-80 | 160-100 | | | | | | |
| 120-60 | 150-90 | | 250-150 | | | | | | |
| 110-60 | 140-80 | | 200-120 | | | | | | |
| 90-50 | 120-70 | | 150-90 | | | | | | |
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# Schnittdaten
Cutting Data

| Werkstoff Material | | | Materialgruppe Material group | Härte (HB) Hardness Brinell | Zug-festigkeit $R_m$ [N/mm²] Tensile Strength | Beispiel Werkstoff Example Material | MG12 | TI2_ TN3_ | |
|---|---|---|---|---|---|---|---|---|---|
| K | Grauguss Grey cast iron | niedrige Festigkeit low tensile strength | K1.1 | 180 | 250 | GG-25 | | 150-90 | |
| | | hohe Festigkeit high tensile strength | K1.2 | 250 | 350 | GG-40 | | 100-70 | |
| | Kugelgraphit-guss Spheroidal graphite cast iron | ferritisch ferritic | K2.1 | 160 | 400 | GGG-40 | | 130-90 | |
| | | perlitisch perlitic | K2.1 | 260 | 700 | GGG-60 | | 100-50 | |
| | Temperguss Malleable cast iron | ferritisch ferritic | K3.1 | 200 | 400 | GTW-45 | | 120-60 | |
| | | perlitisch perlitic | K3.2 | 260 | 700 | GTS-55-04 | | 140-80 | |
| | Ausferritisches Gussseisen / ADI Ausferritic spheroidal cast iron / ADI | vergütet quenched | K4.1 | 260 | 800 | | | | |
| | | vergütet quenched | K4.2 | 350 | 1050 | | | | |
| | | vergütet quenched | K4.3 | 450 | 1400 | | | | |
| N | Al-Legierungen Al-alloys | nicht vergütbar not heat treatable | N1.1 | 30 | | AlMg1 | 550-300 | | |
| | | vergütbar heat treatable | N1.2 | 100 | 340 | AlMgSi1 | 220-180 | | |
| | Al-Guss-Legierung Al-cast-alloy | < 6% Si | N2.1 | 80 | 300 | AlMgSi6 | 220-180 | | |
| | | 6-10% Si | N2.2 | 100 | 320 | AlSi7Mg | 100-80 | | |
| | | 10-15 % Si | N2.3 | 130 | 450 | AlSi12 | 120-100 | | |
| | Kupfer-Legierungen Copper-alloys | Reinkupfer Pure copper | N3.1 | 100 | 340 | Cu | 120-100 | | |
| | | Messing, Bronze Brass | N3.2 | 90 | 310 | CuZn40Pb | | | |
| | | Messing bleifrei Lead-free brass | N3.3 | 110 | 430 | CuZn40 | | | |
| | | hochfest high strength | N3.4 | 300 | 1000 | CuZn25 Al5-Mn4Fe3 | | | |
| | Graphit Graphite | | N4.1 | | | | | | |
| S | Warmfeste Legierung (Fe) Heat resistant alloy | geglüht annealed | S1.1 | 200 | 670 | | | | |
| | | gehärtet hardened | S1.2 | 275 | 930 | | | | |
| | Warmfeste Legierung (Ni, Co) Heat resistant alloy | geglüht annealed | S2.1 | 250 | 840 | Inconel 600 | | | |
| | | gehärtet hardened | S2.2 | 350 | 1200 | Inconel 713 | | | |

| Schnittgeschwindigkeit vc (m/min) / Startwerte<br>Cutting speed vc (m/min) / Start values | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| AS4_<br>TH3_<br>TA4_<br>TF4_ | AN2_<br>AN4_<br>RC2_<br>RC4_ | EG5_ | IG3_ | IG6_ | SG3_ | DD2_ | | | |
| 150-90 | 170-100 | 120-60 | 350-210 | 200-160 | | | | | |
| 100-70 | 120-70 | 100-70 | 350-210 | 180-160 | | | | | |
| 130-90 | 150-90 | 110-70 | 350-210 | 180-160 | | | | | |
| 100-50 | 110-70 | 100-50 | 300-180 | 180-160 | | | | | |
| 120-60 | 140-80 | 120-60 | 250-150 | | | | | | |
| 140-80 | 150-90 | 140-80 | 250-150 | | | | | | |
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| | | | | | | 850-650 | | | |
| | | | | | | 350-200 | | | |
| | | | | | | 350-200 | | | |
| | | | | | | 230-90 | | | |
| | | | | | | 100-70 | | | |
| | | | | | | 100-70 | | | |
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| | | | 100-70 | | 110-80 | | | | |
| | | | 50-25 | | 60-25 | | | | |
| | | | 50-25 | | 60-25 | | | | |
| | | | 50-25 | | 60-25 | | | | |

| Werkstoff Material | | | Materialgruppe Material group | Härte (HB) Hardness Brinell | Zug-festigkeit $R_m$ [N/mm²] Tensile Strength | Beispiel Werkstoff Example Material | MG12 | TI2_ TN3_ | |
|---|---|---|---|---|---|---|---|---|---|
| **S** | Titan | Titanlegierung α<br>Titanium alloy α | S3.1 | 120 | 240 | | | | |
| | | Titanlegierung α-ß<br>Titanium alloy α- ß | S3.2 | 360 | 1200 | | | | |
| | | Titanlegierung ß<br>Titanium alloy ß | S3.3 | 410 | 1400 | | | | |
| **O** | Thermoplaste<br>Thermoplastics | | O1.1 | | | | 150 - 50 | | |
| | Duroplaste<br>Duro plaste | | O1.2 | | | | 150 - 50 | | |
| | Kunststoffe glasfaser-verstärkt<br>Plastics glass fibre reinforced | GFK | O1.3 | | | | 150 - 50 | | |
| | Kunststoffe kohlefaser-verstärkt<br>Plastics carbon fibre reinforced | CKF | O1.4 | | | | 300 - 150 | | |

| Schnittgeschwindigkeit vc (m/min) / Startwerte<br>Cutting speed vc (m/min) / Start values | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | AS4_<br>TH3_<br>TA4_<br>TF4_ | AN2_<br>AN4_<br>RC2_<br>RC4_ | EG5_ | IG3_ | IG6_ | SG3_ | DD2_ | | | |
| | | | | 90-70 | | 100-70 | | | | |
| | | | | 70-50 | | 80-50 | | | | |
| | | | | 60-40 | | 70-40 | | | | |
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