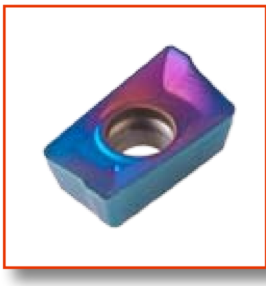
# Fräswerkzeuge
# *Milling Tools*

2



**... Qualität schafft Vertrauen**


Drehen
Turning

Fräswerkzeuge
Milling Tools

HDS-/VHM-Fräser
HDS-/Solid Carbide
Endmills

Stech- und
Abstechwerkzeuge
Grooving and
Parting off Tools

Mini/Micro
Schneidwerkzeuge
Mini/Micro Tools

Gewinde-
werkzeuge
Threading Tools

Wendeplattenbohrer
VHM-Bohrer
Indexable Drills
Solid Carbide Drills

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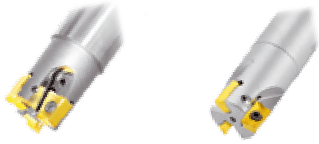
| **Schaftfräser mit Wendeschneidplatten** <br> ***Endmills with Inserts***  | 2.05 |
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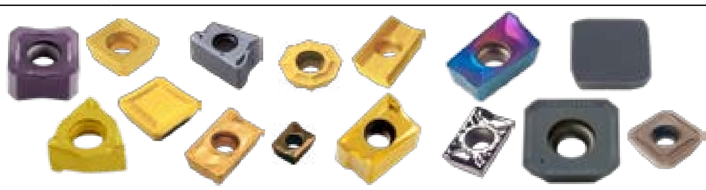
| **ISO** **- Bezeichnungssystem für Wendeschneidplatten zum Fräsen** <br> ***- Designation System for Indexable Inserts for Milling*** <br> L \| D \| H \| T \| 15 \| 04 \| PD \| F \| R | 2.28 |
| **Wendeschneidplatten zum Fräsen** <br> ***Indexable Inserts for Milling***  | 2.30 |
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# Fräser-Bezeichnungsschlüssel
# Code Explanation of Milling Tools

S 2 1 2 4

- **S** – Fräser mit Wendeschneidplatten / *Indexable Milling Tools*
- **2**
  - 1 – Schaftfräser / *Endmills*
  - 2 – Aufsteckfräser / *Milling Cutters*
  - 3 – Einschraubfräser / *Screw-On Cutters*
- **1**
  - 1 – Eckfräsen / *Shouldering*
  - 2 – Planfräsen / *Facing*
  - 3 – Bohrnutenfräsen / *Slotting*
  - 4 – Fasfräsen / *Chamfering*
  - 5 – Senkfräsen / *Spot Facing*
  - 6 – Rückwärts-Senkfräsen / *Back Facing*
  - 7 – T-Nutenfräsen / *T-Slotting*
  - 8 – Scheibenfräsen / *Grooving and Cut-Off*
  - 9 – Kopierfräsen / *Copying*
  - 0 – Kassettenfräser / *Cartridge Type*
- **2 4** – Wendeplatten-Code / Insert Code

## Übersicht - Schaftfräser mit Wendeschneidplatten
## Overview - Endmills with Inserts

### AP•• 10

**S 1116** IK

**APKT 1003 / APEX 1003**
Seite / *page:* 2.06

### AP•T 11

**S 1110** IK

**AP•• 11T3 - 390**
Seite / *page:* 2.06

**S 1111** IK

**AP•T 11T3**
Seite / *page:* 2.07

### BNMU 06

**S 1156** IK

**BNMU 0603**
Seite / *page:* 2.09

### LN• X 10/15

**S 1136** IK


**LN•X 1006**
Seite / *page:* 2.08

**S 1138** IK


**LN•X 1510**
Seite / *page:* 2.08

### SP• • 0904

**S 1121** IK

**SP•• 0904**
Seite / *page:* 2.09

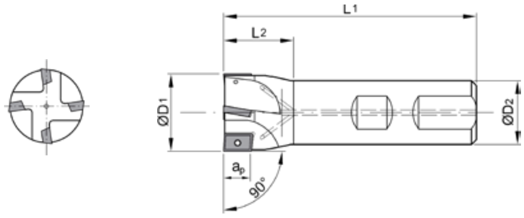
### XO• • 06

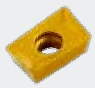
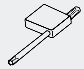
**S 1158**

**XO•• 06**
Seite / *page:* 2.10

# S 1116 IK

**Schaftfräser mit innerer Kühlmittelzufuhr** ***Endmills with Inner Coolant***

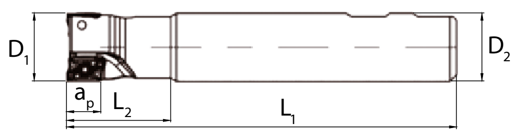


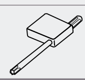

| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* D1 | D2 | L1 | L2 | | ap |  Seite / *Page*: 2.30 | **Ersatzteile** ***Spare Parts***  |  | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S 1116.010.R 01 IK** | | 10 | 16 | 85 | 26 | 1 | 6 | APEX 1003 •• APKT 1003 •• | 56.33.108 | 56.33.612 (T08) | | |
| **012.R 01 IK** | | 12 | 16 | 85 | 26 | 1 | 6 | | | | | |
| **014.R 01 IK** | | 14 | 16 | 85 | 26 | 1 | 6 | | | | | |
| **016.R 02 IK** | ● | 16 | 16 | 85 | 26 | 2 | 8 | | 56.33.104 | | | |
| **016.R 02 IK - 150** | | 16 | 16 | 150 | 26 | 2 | 8 | | | | | |
| **020.R 03 IK** | ● | 20 | 20 | 90 | 26 | 3 | 8 | | | | | |
| **020.R 03 IK - 150** | | 20 | 20 | 150 | 26 | 3 | 8 | | | | | |
| **025.R 03 IK** | | 25 | 25 | 95 | 26 | 3 | 8 | | | | | |
| **025.R 04 IK** | ● | 25 | 25 | 95 | 26 | 4 | 8 | | | | | |
| **032.R 05 IK** | | 32 | 25 | 95 | 30 | 5 | 8 | | | | | |
| **040.R 06 IK** | | 40 | 32 | 110 | 30 | 6 | 8 | | | | | |

**IK** : mit Innenkühlung / *with inner coolant*

# S 1110 IK

**Schaftfräser mit innerer Kühlmittelzufuhr** ***Endmills with Inner Coolant***

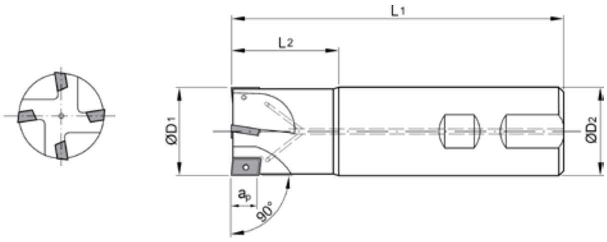



| Bezeichnung *Part Number* | Lager Stock | Maße [mm] Dimensions D1 | D2 | L1 | L2 | | ap |  Seite / Page: 2.30 | **Ersatzteile** ***Spare Parts***  |  | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S 1110.016.R 02 IK-HB-120** | ● | 16 | 16 | 120 | 40 | 2 | 10 | AP•• 11T3 •• | 56.44.115 48.24.114 | 56.33.612 (T08) | | |
| **020.R 03 IK-HB-120** | ● | 20 | 20 | 120 | 40 | 3 | 10 | | | | | |
| **025.R 03 IK-HB-120** | ● | 25 | 25 | 120 | 45 | 3 | 10 | | | | | |

**IK** : mit Innenkühlung / *with inner coolant*

# S 1111 IK

**Schaftfräser mit innerer Kühlmittelzufuhr** ***Endmills with Inner Coolant***




| Bezeichnung *Part Number* | Lager Stock | Maße [mm] Dimensions D1 | D2 | L1 | L2 | Z | ap | Seite / Page: 2.30 | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S 1111. 010. R 01 IK** | | 10 | 10 | 85 | 20 | 1 | 8.5 | APXT / APMT 11T3 •• | 56.44.176 | 56.33.612 (T08) | | |
| **012. R 01 IK** | | 12 | 16 | 85 | 25 | 1 | 8.5 | | | | | |
| **016. R 02 IK** | ● | 16 | 16 | 90 | 26 | 2 | 9.5 | | 56.44.144 | | | |
| **016. R 02 IK - 120** | | 16 | 16 | 120 | 40 | 2 | 9.5 | | | | | |
| **020. R 02 IK** | ● | 20 | 20 | 100 | 30 | 2 | 9.5 | | | | | |
| **020. R 03 IK** | ● | 20 | 20 | 100 | 30 | 3 | 9.5 | | | | | |
| **020. R 03 IK - 150** | ○ | 20 | 20 | 150 | 70 | 3 | 9.5 | | | | | |
| **025. R 03 IK** | ● | 25 | 25 | 115 | 35 | 3 | 9.5 | | | | | |
| **025. R 03 IK - 180** | | 25 | 25 | 180 | 80 | 3 | 9.5 | | | | | |
| **025. R 04 IK** | ● | 25 | 25 | 115 | 35 | 4 | 9.5 | | | | | |
| **032. R 03 IK - 200** | | 32 | 32 | 200 | 100 | 3 | 9.5 | | | | | |
| **032. R 04 IK** | ● | 32 | 32 | 125 | 40 | 4 | 9.5 | | | | | |
| **040. R 05 IK** | | 40 | 32 | 130 | 42 | 5 | 9.5 | | | | | |

**IK** : mit Innenkühlung / *with inner coolant*

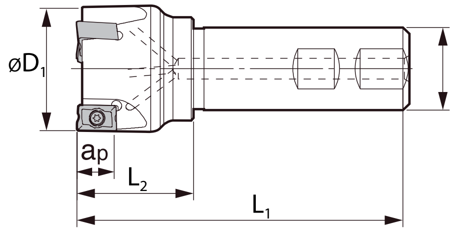
● JD-Lager / *JD-Stock*
○ begrenzte Lagerhaltung - auf Anfrage / limited stock - upon request

Tech News Seite: / *Tech News Page:* 2.40

# S 1136 IK

**Schaftfräser mit innerer Kühlmittelzufuhr** ***Endmills with Inner Coolant***

**Double Mill DM4-10**



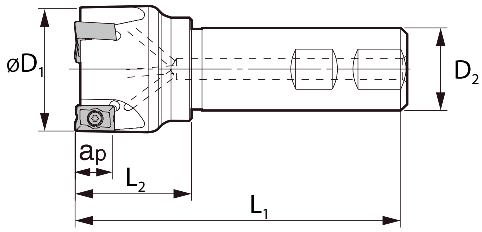

| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* | | | | | | Seite / Page: 2.31 | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $D_1$ | $D_2$ | $L_1$ | $L_2$ | Z | $a_p$ | | | | | |
| **S 1136. 016.R 01 IK** | | 16 | 16 | 90 | 25 | 1 | 9 | LNEX / LNMX 1006 •• | 83.40.147 | 75.20.617 (T09) | | |
| **020.R 03 IK** | ● | 20 | 20 | 100 | 30 | 3 | 9 | | | | | |
| **025.R 03 IK** | ● | 25 | 25 | 115 | 35 | 3 | 9 | | | | | |
| **032.R 04 IK** | ● | 32 | 25 | 115 | 40 | 4 | 9 | | | | | |
| **040.R 05 IK** | | 40 | 32 | 130 | 42 | 5 | 9 | | | | | |

**IK** : mit Innenkühlung / *with inner coolant*

# S 1138 IK

**Schaftfräser mit innerer Kühlmittelzufuhr** ***Endmills with Inner Coolant***

**Double Mill DM4-15**




| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* | | | | | | Seite / *Page*: 2.31 | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $D_1$ | $D_2$ | $L_1$ | $L_2$ | Z | $a_p$ | | | | | |
| **S 1138. 032. R 02 IK** | ○ | 32 | 32 | 125 | 40 | 2 | 14 | LNEX / LNMX 1510 •• | 56.44.104 | 56.33.613 (T15) | | |
| **040. R 03 IK** | ○ | 40 | 32 | 125 | 42 | 3 | 14 | | | | | |
| **050. R 03 IK** | ○ | 50 | 32 | 125 | 45 | 3 | 14 | | | | | |
| **050. R 04 IK** | ○ | 50 | 32 | 125 | 45 | 4 | 14 | | | | | |

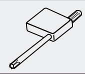
**IK** : mit Innenkühlung / *with inner coolant*

● JD-Lager / *JD-Stock*
○ begrenzte Lagerhaltung - auf Anfrage / limited stock - upon request

Tech News Seite: / *Tech News Page:* 2.44-2.46

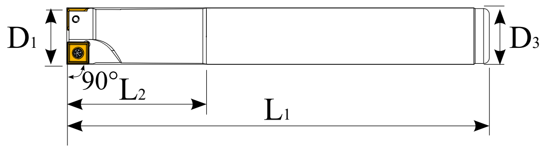
# S 1156

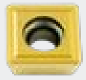
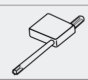
**Hochvorschub Schaftfräser** ***High Feed Endmill***


| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* | | | | | |  | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $D_1$ | $D_3$ | $L_1$ | $L_2$ | | $a_p$ | Seite / *Page*: 2.30 |  |  | | |
| **S 1156. 017. R 02** | ● | 17 | 16 | 150 | 40 | 2 | 1 | BNMU 0603 | 56.44.177 | 56.33.612 (T08) | | |
| **021. R 03** | ● | 21 | 20 | 200 | 40 | 3 | 1 | | | | | |
| **026. R 04** | ● | 26 | 25 | 200 | 40 | 4 | 1 | | | | | |

# S 1121

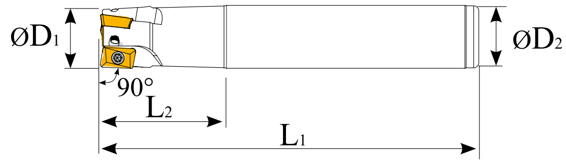
**Hochvorschub Schaftfräser** ***High Feed Endmill***




| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* | | | | | |  | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $D_1$ | $D_3$ | $L_1$ | $L_2$ | | $a_p$ | Seite / *Page*: 7.14 |  |  | | |
| **S 1121. 025. R 03 -120 - IK** | ● | 25 | 25 | 120 | 40 | 3 | 6 | SP.. 09 | 83.30.150 | 56.33.613 (T15) | | |
| **032. R 03 -120 - IK** | ● | 32 | 32 | 120 | 40 | 3 | 6 | | | | | |
| **025. R 02 -150** | ● | 25 | 25 | 150 | 50 | 2 | 6 | | | | | |
| **032. R 03 -150** | ● | 32 | 32 | 150 | 50 | 3 | 6 | | | | | |

# S 1158

**Schaftfräser** ***Endmills***




| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* D1 | D2 | L1 | L2 | Z | ap | Seite / Page: 2.38 | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S 1158. 010.R 02** | ● | 10 | 10 | 120 | 40 | 2 | 5 | XOMT 06... | 56.44.112 | 56.33.609 (T05) | | |
| **012.R 02** | ● | 12 | 12 | 120 | 30 | 3 | 5 | | | | | |



● JD-Lager / *JD-Stock*
○ begrenzte Lagerhaltung - auf Anfrage / limited stock - upon request

Tech News Seite: *Tech News Page:* 2.53

# Übersicht - Eckmesserköpfe
## *Overview - Shoulder Milling Cutters*

### AP•• 10/16

**S 2116** IK

APKT 1003 /
APEX 1003
Seite / *page:* 2.13

**S 2118** IK

AP•T 1604
Seite / *page:* 2.13

### AP•T 11T3

**S 2111** IK

AP•T 11T3
Seite / *page:* 2.12

**S 2114** IK

AP•• 11T3 - 390
Seite / *page:* 2.12

### BNMU 06

**S 2156** IK

BNMU 0603
Seite / *page:* 2.16

### LN•X 10/15

**S 2136** IK

Double Mill
DM4-10

LN•X 1006
Seite / *page:* 2.14

**S 2138** IK

Double Mill
DM4-15

LN•X 1510
Seite / *page:* 2.14

### SP •• 0904

**S 2121** IK

SP •• 0904
Seite / *page:* 2.16

### XNEX 04/08

**S 2140** IK

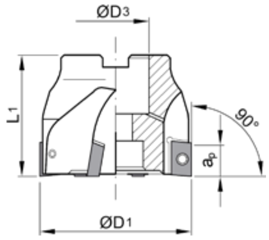
XNEX 0806
Seite / *page:* 2.15

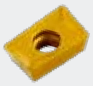
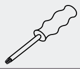
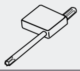
**S 2141** IK

XNEX 04
Seite / *page:* 2.15

# S 2111 IK

**Eckfräser mit innerer Kühlmittelzufuhr** ***Shoulder Milling Cutters with Inner Coolant***

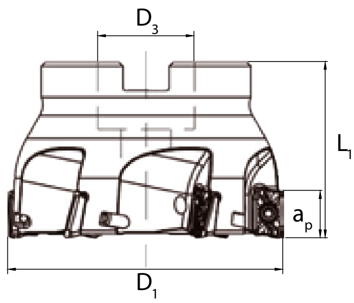


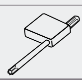

| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* | | | | |  Seite / *Page*: 2.30 | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $D_1$ | $D_3$ | $L_1$ | Z | $a_p$ | |  |  |  | |
| **S 2111. 032. R 04 IK** | ● | 32 | 16 | 40 | 4 | 9.5 | APMT / APXT 11T3 •• | 56.44.144 | 48.13.606 (TX 208) | 56.33.612 (T08) | |
| **040. R 05 IK** | ● | 40 | 16 | 40 | 5 | 9.5 | | | | | |
| **050. R 06 IK** | ● | 50 | 22 | 40 | 6 | 9.5 | | | | | |
| **063. R 08 IK** | ● | 63 | 22 | 40 | 8 | 9.5 | | | | | |
| **080. R 08 IK** | ● | 80 | 27 | 50 | 8 | 9.5 | | | | | |
| **100. R 10 IK** | ○ | 100 | 32 | 50 | 10 | 9.5 | | | | | |

**IK**: mit Innenkühlung / *with inner coolant*

# S 2114 IK

**Eckfräser mit innerer Kühlmittelzufuhr** ***Shoulder Milling Cutters with Inner Coolant***




| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* | | | | |  Seite / *Page*: 2.30 | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $D_1$ | $D_3$ | $L_1$ | Z | $a_p$ | |  |  | | |
| **S 2114. 040. R 05 IK** | ● | 40 | 16 | 40 | 5 | 10 | AP•• 11T3 •• | 48.24.114 | 56.33.612 (T08) | | |
| **050. R 06 IK** | ● | 50 | 22 | 40 | 6 | 10 | | | | | |
| **063. R 07 IK** | ● | 63 | 22 | 40 | 7 | 10 | | | | | |

**IK**: mit Innenkühlung / *with inner coolant*

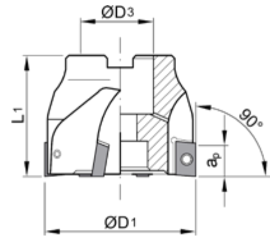


● JD-Lager / *JD-Stock*
○ begrenzte Lagerhaltung - auf Anfrage / limited stock - upon request

Tech News Seite: *Tech News Page:* 2.39-2.40

# S 2116 IK

**Eckfräser mit innerer Kühlmittelzufuhr *Shoulder Milling Cutters with Inner Coolant***

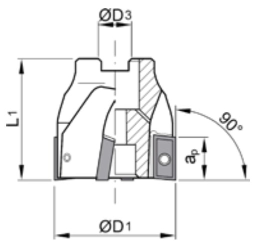



| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* D1 | D3 | L1 | z | ap | Seite / *Page*: 2.30 | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S 2116. 040. R 06 IK | ● | 40 | 16 | 40 | 6 | 8 | APEX 1003 •• APKT 1003 •• | 56.33.104 | 56.33.612 (T08) | | |
| 050. R 07 IK | ● | 50 | 22 | 40 | 7 | 8 | | | | | |
| 063. R 08 IK | ● | 63 | 22 | 40 | 8 | 8 | | | | | |
| 080. R 11 IK | ○ | 80 | 27 | 50 | 11 | 8 | | | | | |

**IK**: mit Innenkühlung / *with inner coolant*

# S 2118 IK

**Eckfräser mit innerer Kühlmittelzufuhr *Shoulder Milling Cutters with Inner Coolant***



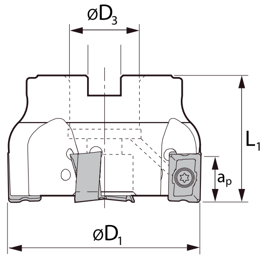

| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* D1 | D3 | L1 | z | ap | Seite / *Page*: 2.30 | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S 2118. 040. R 04 IK | ● | 40 | 16 | 45 | 4 | 13 | APKT / APMT 1604 •• | 56.33.154 | | 56.33.613 (T15) | |
| 050. R 05 IK | ● | 50 | 22 | 45 | 5 | 13 | | | | | |
| 063. R 06 IK | ● | 63 | 22 | 45 | 6 | 13 | | | | | |
| 080. R 07 IK | ● | 80 | 27 | 52 | 7 | 13 | | | | | |
| 100. R 08 IK | ○ | 100 | 32 | 52 | 8 | 13 | | | 48.13.607 (T15) | | |
| 125. R 09 IK | ○ | 125 | 40 | 63 | 9 | 13 | | | | | |
| 160. R 10 | ○ | 160 | 40 | 63 | 10 | 13 | | | | | |

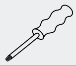
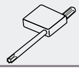
**IK**: mit Innenkühlung / *with inner coolant*

# S 2136 IK

**Eckfräser mit innerer Kühlmittelzufuhr** ***Shoulder Milling Cutters with through coolant***

**Double Mill DM4-10**



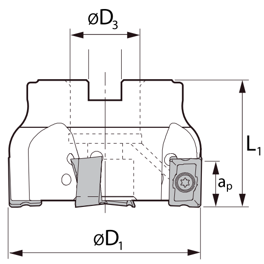

| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* $D_1$ | $D_3$ | $L_1$ | z | $a_p$ |  Seite / *Page*: 2.31 | Ersatzteile *Spare Parts*  |  |  | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **S 2136. 040. R 04 IK** | ○ | 40 | 16 | 40 | 4 | 9 | LNEX LNMX 1006 •• | 83.40.147 | | 75.20.617 (T09) | |
| **040. R 05 IK** | ● | 40 | 16 | 40 | 5 | 9 | | | | | |
| **050. R 05 IK** | ○ | 50 | 22 | 40 | 5 | 9 | | | | | |
| **050. R 07 IK** | ● | 50 | 22 | 40 | 7 | 9 | | | | | |
| **063. R 07 IK** | ○ | 63 | 22 | 40 | 7 | 9 | | | | | |
| **063. R 09 IK** | ● | 63 | 22 | 40 | 9 | 9 | | | | | |
| **080. R 08 IK** | ○ | 80 | 27 | 50 | 8 | 9 | | | | | |
| **080. R 10 IK** | ○ | 80 | 27 | 50 | 10 | 9 | | | 48.13.610 (T09) | | |
| **100. R 09 IK** | ○ | 100 | 32 | 50 | 9 | 9 | | | | | |
| **100. R 12 IK** | ○ | 100 | 32 | 50 | 12 | 9 | | | | | |

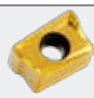
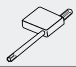
**IK** : mit Innenkühlung / *with inner coolant*

# S 2138 IK

**Eckfräser mit innerer Kühlmittelzufuhr** ***Shoulder Milling Cutters with Inner Coolant***

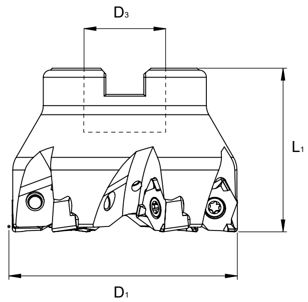
**Double Mill DM4-15**




| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* $D_1$ | $D_3$ | $L_1$ | z | $a_p$ |  Seite / *Page*: 2.31 | Ersatzteile *Spare Parts*  |  |  | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **S 2138. 050. R 04 IK** | ○ | 50 | 22 | 40 | 4 | 14 | LNEX LNMX 1510 •• | 56.44.104 | | 56.33.613 (T15) | |
| **050. R 05 IK** | ● | 50 | 22 | 40 | 5 | 14 | | | | | |
| **063. R 04 IK** | ○ | 63 | 22 | 40 | 4 | 14 | | | | | |
| **063. R 06 IK** | ● | 63 | 22 | 45 | 6 | 14 | | | | | |
| **080. R 05 IK** | ○ | 80 | 27 | 50 | 5 | 14 | | | | | |
| **080. R 07 IK** | ● | 80 | 27 | 50 | 7 | 14 | | | | | |
| **100. R 05 IK** | ○ | 100 | 32 | 50 | 5 | 14 | | | | | |
| **100. R 08 IK** | ● | 100 | 32 | 52 | 8 | 14 | | | 48.13.607 (T15) | | |
| **125. R 07 IK** | ○ | 125 | 40 | 63 | 7 | 14 | | | | | |
| **125. R 10 IK** | ○ | 125 | 40 | 63 | 10 | 14 | | | | | |

**IK** : mit Innenkühlung / *with inner coolant*

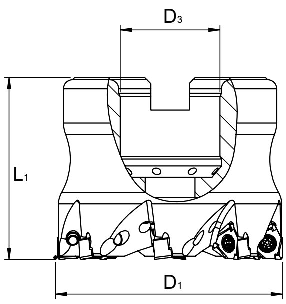
# S 2140 IK Hochleistungs-Eckfräser mit Innenkühlung *High Performance Shoulder Miller with Inner Coolant*




| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* D1 | D3 | L1 | Z | ap | Seite / *Page*: 2.38 | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **S 2140. 050. R 04 IK** | ● | 50 | 22 | 45 | 4 | 7.5 | XNEX 08 06 •• | 56.44.104 | 56.33.613 (T15) | | |
| **063. R 05 IK** | ● | 63 | 22 | 45 | 5 | 7.5 | | | | | |
| **080. R 07 IK** | ● | 80 | 27 | 50 | 7 | 7.5 | | | | | |

**IK**: mit Innenkühlung / *with inner coolant*

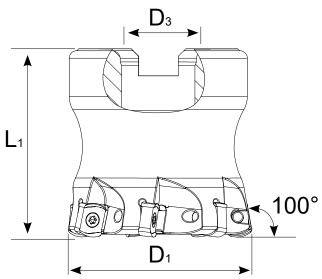
# S 2141 IK Eckfräser mit innerer Kühlmittelzufuhr *Shoulder Milling Cutters with Inner Coolant*

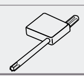



| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* D1 | D3 | L1 | Z | ap | Seite / *Page*: 2.38 | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **S 2141. 032. R 05 IK** | ○ | 32 | 16 | 40 | 4 | 4 | XNEX 0403 •• | 83.20.136 | 56.33.611 (T07) | | |
| **040. R 06 IK** | ● | 40 | 16 | 40 | 6 | 4 | | | | | |
| **050. R 08 IK** | ● | 50 | 22 | 40 | 8 | 4 | | | | | |

**IK**: mit Innenkühlung / *with inner coolant*

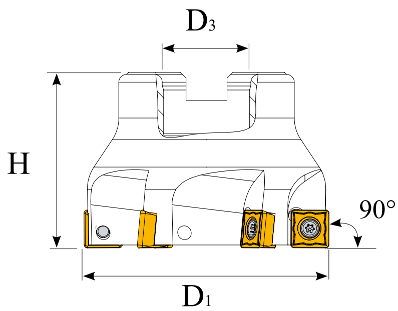
## S 2156 IK Hochleistungs-Eckfräser mit Innenkühlung *High Performance Shoulder Miller with Inner Coolant*

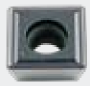
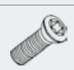
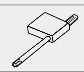



| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* | | | | |  | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $D_1$ | $D_3$ | $L_1$ | | $a_p$ | Seite / Page: 2.30 |  |  | | |
| **S 2156. 040. R 06 IK** | ● | 40 | 16 | 45 | 6 | 1 | BNMU 0603 | 56.44.177 | 56.33.612 (T08) | | |
| **050. R 07 IK** | ● | 50 | 22 | 50 | 7 | 1 | | | | | |

**IK** : mit Innenkühlung / *with inner coolant*

## S 2121 IK Eckfräser mit innerer Kühlmittelzufuhr *Shoulder Milling Cutters with Inner Coolant*




| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* | | | | |  | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $D_1$ | $D_3$ | $L_1$ | | $a_p$ | Seite / *Page*: 7.14 |  |  | | |
| **S 2121. 040. R 04 IK** | ● | 40 | 16 | 45 | 4 | 6 | SP.. 09 | 83.30.150 | 56.33.613 (T15) | | |
| **050. R 05 IK** | ● | 50 | 22 | 45 | 5 | 6 | | | | | |
| **063. R 06 IK** | ● | 63 | 22 | 45 | 6 | 6 | | | | | |
| **080. R 07 IK** | ● | 80 | 27 | 52 | 7 | 6 | | | | | |

**IK** : mit Innenkühlung / *with inner coolant*



● JD-Lager / *JD-Stock*
○ begrenzte Lagerhaltung - auf Anfrage / limited stock - upon request

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SD•T 12

S 2242 IK

**SD•T 1204**
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SEH• 12

S 2246 IK

**SEH• 1204**
Seite / *page:* 2.18

SE•T 12T3

S 2247 IK

Posi Mill PM4

**SE•T 12T3**
Seite / *page:* 2.19

SN•X 12

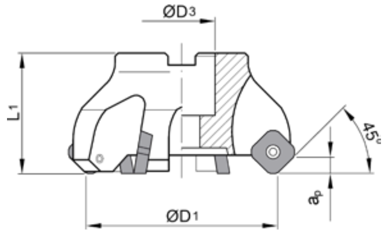
S 2267 IK

Double Mill DM8

**SN•X 1206**
Seite / *page:* 2.19

# S 2242 IK

**Planfräser** ***Face Milling Cutters***

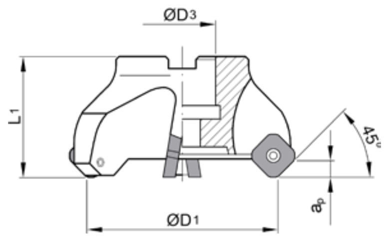



| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* $D_1$ | $D_3$ | $L_1$ | Z | $a_p$ | Seite / *Page*: 2.33 | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S 2242. 032. R 03 | ○ | 32 | 16 | 40 | 3 | 6 | SDHT SDKT 1204 •• | 56.44.108 | 56.33.613 (T15) | | |
| 050. R 04 IK | ○ | 50 | 22 | 40 | 4 | 6 | | | | | |
| 063. R 05 IK | ● | 63 | 22 | 45 | 5 | 6 | | | | | |
| 080. R 06 IK | ● | 80 | 27 | 52 | 6 | 6 | | | | | |
| 100. R 07 IK | ● | 100 | 32 | 60 | 7 | 6 | | | | | |
| 125. R 08 IK | ○ | 125 | 40 | 62 | 8 | 6 | | | | | |
| 160. R 08 IK | ○ | 160 | 40 | 63 | 8 | 6 | | | | | |

**IK**: mit Innenkühlung / *with inner coolant*

# S 2246 IK

**Planfräser mit innerer Kühlmittelzufuhr** ***Face Milling Cutters with Inner Coolant***




| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* $D_1$ | $D_3$ | $L_1$ | Z | $a_p$ | Seite / *Page*: 2.33 | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S 2246. 040. R 03 IK | ○ | 40 | 16 | 40 | 3 | 6 | SEHT SEHW 1204 •• | 56.44.102 | | 56.33.614 (T20) | |
| 050. R 04 IK | ○ | 50 | 22 | 40 | 4 | 6 | | | | | |
| 063. R 05 IK | ○ | 63 | 22 | 40 | 5 | 6 | | | | | |
| 080. R 06 IK | ○ | 80 | 27 | 50 | 6 | 6 | | | | | |
| 100. R 07 IK | ○ | 100 | 32 | 50 | 7 | 6 | | | 48.11.601 (T20) | | |
| 125. R 07 IK | ○ | 125 | 40 | 63 | 7 | 6 | | | | | |
| 160. R 08 IK | ○ | 160 | 40 | 63 | 8 | 6 | | | | | |

**IK**: mit Innenkühlung / *with inner coolant*

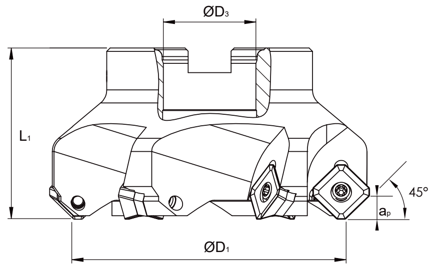


| | |
|---|---|
| ● JD-Lager / *JD-Stock* | Tech News Seite: |
| ○ begrenzte Lagerhaltung - auf Anfrage / limited stock - upon request | *Tech News Page:* |

# S 2247 IK

**Planfräser mit innerer Kühlmittelzufuhr** ***Face Milling Cutter with Inner Coolant***

Posi Mill
PM4



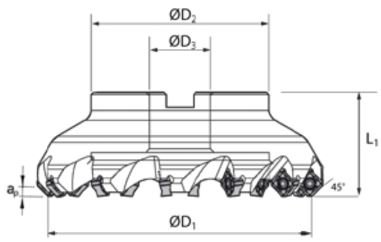

| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* $D_1$ | $D_3$ | $L_1$ | z | $a_p$ | Seite / *Page*: 2.33 | Ersatzteile *Spare Parts* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S 2247. 050. R 04 IK | ● | 50 | 22 | 40 | 4 | 6 | SE•T 12T3 •• | 56.44.143 | 56.44.239 | 56.44.173 | 56.33.613 (T15) |
| 063. R 05 IK | ● | 63 | 22 | 40 | 5 | 6 | | | | | |
| 080. R 06 IK | ● | 80 | 27 | 50 | 6 | 6 | | | | | |
| 100. R 07 IK | ● | 100 | 32 | 50 | 7 | 6 | | | | | |

**IK**: mit Innenkühlung / *with inner coolant*

# S 2267 IK

**Planfräser mit innerer Kühlmittelzufuhr** ***Face Milling Cutter with Inner Coolant***

Double Mill
DM8




Kühlmittelverteiler für Ø 160-250 gegen Mehrpreis
Coolant distributor for Ø 160-250 can be offered

| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* $D_1$ | $D_2$ | $D_3$ | $L_1$ | z | $a_p$ | Seite / *Page*: 2.34 | Ersatzteile *Spare Parts* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S 2267. 050. R 04 IK | ○ | 50 | 42 | 22 | 44 | 4 | 6 | SN•X 1206 •• | 56.33.154 | | 56.33.613 (T15) |
| 050. R 06 IK | ○ | 50 | 49 | 22 | 44 | 6 | 6 | | | | |
| 063. R 06 IK | ● | 63 | 49 | 22 | 44 | 6 | 6 | | | | |
| 080. R 07 IK | ● | 80 | 57 | 27 | 52 | 7 | 6 | | | | |
| 100. R 08 IK | ● | 100 | 67 | 32 | 52 | 8 | 6 | | | 48.13.607 (T15) | |
| 125. R 10 IK | ● | 125 | 87 | 40 | 63 | 10 | 6 | | | | |
| 160. R 12 IK | ○ | 160 | 107 | 40 | 63 | 12 | 6 | | | | |

**IK**: mit Innenkühlung / *with inner coolant*

## Übersicht - Fräswerkzeuge zum Fasen, Senken, Rückwärtssenken und Nutenfräsen
## *Overview - Milling Cutters for Chamfering, Sinking, Backfacing and Grooving*

**AP•T 16**

**S 2418**

**AP•T 1604**
Seite / *page:* 2.22

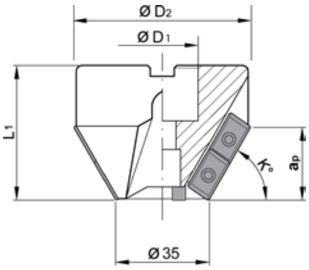
**TC•T 11/16**

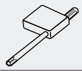
**S 1473**
**S 1474**

**TC•T 1102/16T3**
Seite / *page:* 2.23

# S 2418

**Fasfräser** ***Milling Cutters for Chamfering***




| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* K | $L_1$ | $D_1$ | $D_2$ | Z | $a_p$ |  Seite / *Page*: 2.30 | Ersatzteile *Spare Parts*  |  |
|---|---|---|---|---|---|---|---|---|---|---|
| **S 2418. 035. R 15** | ○ | 15° | 50 | 27 | 94 | 6 | 8.5 | APKT / APMT 1604•• | 56.33.154 | 56.33.613 (T15) |
| **035. R 30** | ● | 30° | 50 | 27 | 86 | 6 | 15.0 | | | |
| **035. R 45** | ● | 45° | 50 | 27 | 76 | 6 | 21.5 | | | |
| **035. R 60** | ○ | 60° | 50 | 27 | 65 | 6 | 26.5 | | | |
| **035. R 75** | ○ | 75° | 60 | 22 | 50 | 6 | 30.0 | | | |



● JD-Lager / *JD-Stock*
○ begrenzte Lagerhaltung - auf Anfrage / limited stock - upon request

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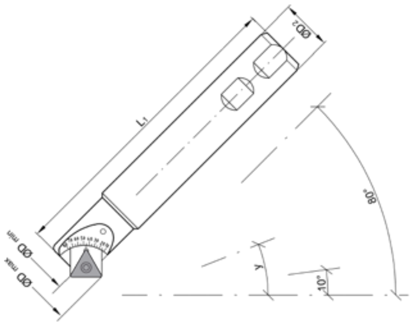
# S 1473

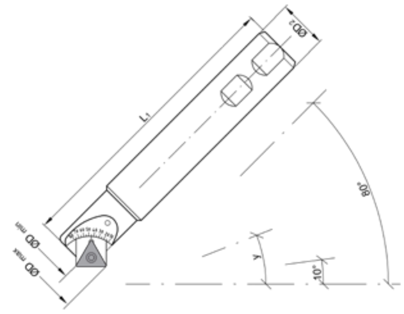
**Fasfräser 10°-80°** ***Endmills for Chamfering 10°-80°***



| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* $D_2$ | $L_1$ | $\gamma$ | $D_{min}$ | $D_{max}$ | Seite / *Page*: 1. 53 | Ersatzteile *Spare Parts* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S 1473. 016. R 01 - 80** | ○ | 16 | 80 | 40 | 13 | 27 | TC •• 1102 •• | 48.13.104 | 56.33.612 (T08) | 56.33.903 | 56.33.501 | 48.12.606 (SW4) |
| **020. R 01 - 100** | ○ | 20 | 100 | 45 | 14 | 27 | | | | | | |

# S 1474

**Fasfräser 10°-80°** ***Endmills for Chamfering 10°-80°***



| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* $D_2$ | $L_1$ | $\gamma$ | $D_{min}$ | $D_{max}$ | Seite / *Page*: 1. 53 | Ersatzteile *Spare Parts* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **S 1474. 025. R 01 - 100** | ● | 25 | 100 | 40 | 10 | 33 | TC •• 16T3 •• | 83.30.150 | 56.33.613 (T15) | 56.33.901A | 56.33.501A | 48.12.606 (SW4) |
| **025. R 01 - 150** | ○ | 25 | 145 | 45 | 11 | 33 | | | | | | |
| **025. R 01 - 200** | ○ | 25 | 200 | 50 | 13 | 32 | | | | | | |

● JD-Lager / *JD-Stock*
○ begrenzte Lagerhaltung - auf Anfrage / limited stock - upon request

Tech News Seite:
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**Übersicht - Formenbau-Werkzeuge**
***Overview - Mould Milling Tools***

AD

AD

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BNMU 0603

S 3156

IK

BNMU 0603

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XNEX 0403

S 3141

IK

XNEX 0403

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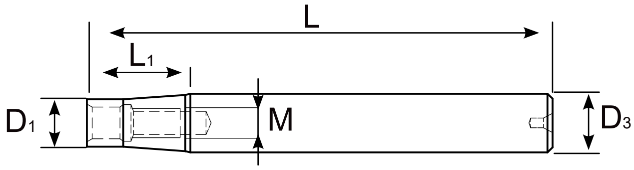
# AD

**Fräserverlängerungen mit Innenkühlung** ***Arbors with Through Coolant***

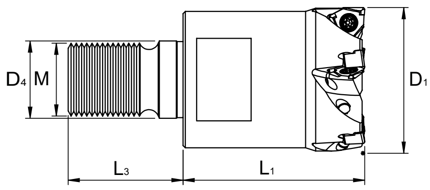



| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* | | | | |
|---|---|---|---|---|---|---|
| | | $ØD_1$ | $ØD_3$ | L | $L_1$ | M |
| **AD 127-15 -M08-150 IK** | ○ | 12,7 | 15 | 150 | 30 | M8 |
| **AD 127-16 -M08-100 IK** | ○ | 12,7 | 16 | 100 | 30 | M8 |
| **AD 127-16 -M08-150 IK** | ○ | 12,7 | 16 | 150 | 30 | M8 |
| **AD 177-19 -M10-150 IK** | ○ | 17,7 | 19 | 150 | 30 | M10 |
| **AD 177-20 -M10-100 IK** | ● | 17,7 | 20 | 100 | 30 | M10 |
| **AD 177-20 -M10-150 IK** | ● | 17,7 | 20 | 150 | 40 | M10 |
| **AD 207-24 -M12-150 IK** | ○ | 20,7 | 24 | 150 | 40 | M12 |
| **AD 207-25 -M12-150 IK** | ● | 20,7 | 25 | 150 | 40 | M12 |
| **AD 207-25 -M12-200 IK** | ● | 20,7 | 25 | 200 | 40 | M12 |
| **AD 207-25 -M12-250 IK** | ● | 20,7 | 25 | 250 | 40 | M12 |
| **AD 287-32 -M16-170 IK** | ● | 28,7 | 32 | 170 | 40 | M16 |
| **AD 287-32 -M16-220 IK** | ● | 28,7 | 32 | 220 | 40 | M16 |
| **AD 287-32 -M16-300 IK** | ○ | 28,7 | 32 | 300 | 40 | M16 |

**IK** : mit Innenkühlung / *with inner coolant*

# S 3141

**DM6 - XN Mini Einschraubfräser** ***DM6 - XN Mini Screw-on Miller***




| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* | | | | | | |  |
|---|---|---|---|---|---|---|---|---|---|
| | | $D_2$ | $L_1$ | M | $D_4$ | $L_3$ | | $a_p$ | Seite / *Page*: 2.38 |
| **S 3141. 020. R 03 IK** | ● | 20 | 28 | 10 | 10,5 | 20 | 3 | 4 | |
| **025. R 04 IK** | ● | 25 | 30 | 12 | 12,5 | 22 | 4 | 4 | XNEX 0403 •• |
| **032. R 05 IK** | ● | 32 | 40 | 16 | 17,0 | 24 | 5 | 4 | |

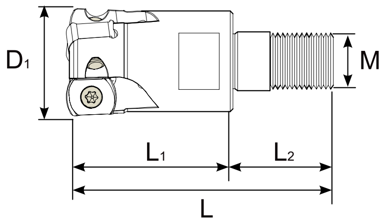
**IK** : mit Innenkühlung / *with inner coolant*



| | |
|---|---|
| ● JD-Lager / *JD-Stock*<br>○ begrenzte Lagerhaltung - auf Anfrage / limited stock - upon request | Tech News Seite: *Tech News Page:* 2.51 |

# S 3156 IK

**Hochvorschub Einschraubfräser** **High Feed Screw-on Miller**



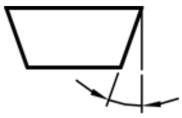

| Bezeichnung *Part Number* | Lager *Stock* | Maße [mm] *Dimensions* | | | | | | |  Seite / *Page*: 2.30 | Ersatzteile *Spare Parts*  | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $D_1$ | $L_1$ | $L_2$ | $L_3$ | M | | $a_p$ | | | |
| **S 3156. 016. R 02 IK** | ● | 16 | 41 | 25 | 16 | M8 | 2 | 1 | BNMU 0603 | 56.44.177 | 56.33.612 (T08) |
| **020 R 03 IK** | ● | 20 | 48 | 30 | 18 | M10 | 3 | 1 | | | |
| **025. R 04 IK** | ● | 25 | 57 | 35 | 22 | M12 | 4 | 1 | | | |
| **032. R 05 IK** | ● | 32 | 65 | 40 | 25 | M16 | 5 | 1 | | | |
| **035. R 05 IK** | ● | 35 | 65 | 40 | 25 | M16 | 5 | 1 | | | |
| **040. R 06 IK** | ● | 40 | 68 | 43 | 25 | M16 | 6 | 1 | | | |
| **042. R 06 IK** | ● | 42 | 68 | 43 | 25 | M16 | 6 | 1 | | | |

## ISO - Bezeichnungssystem für Wendeschneidplatten
## *ISO Designation System for Indexable Inserts*

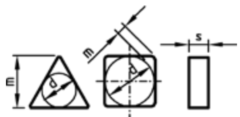
| | |
|---|---|
| 80° | C |
| 55° | D |
| 75° | E |
| 86° | M |
| 35° | V |

| | |
|---|---|
| 85° | A |
| 82° | B |
| 55° | K |

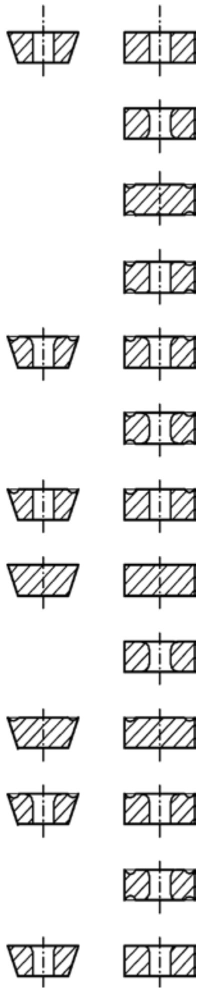
| |
|---|
| H |
| L |
| O |
| P |
| R |
| S |
| T |
| W |



| | |
|---|---|
| 3° | A |
| 5° | B |
| 7° | C |
| 15° | D |
| 20° | E |
| 25° | F |
| 30° | G |
| 0° | N |
| 11° | P |
| Sonstige *Others* | O |



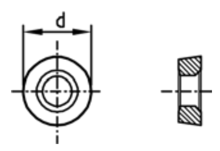
| Grenzabmaße (mm) *Range of tolerance* d +/- | m +/- | s +/- | Klasse *Class* |
|---|---|---|---|
| 0.025 | 0.005 | 0.025 | A |
| 0.025 | 0.013 | 0.025 | C |
| 0.025 | 0.025 | 0.025 | E |
| 0.013 | 0.005 | 0.025 | F |
| 0.025 | 0.025 | 0.05-0.13 | G |
| 0.013 | 0.013 | 0.025 | H |
| 0.05-0.15 | 0.005 | 0.025 | J |
| 0.05-0.15 | 0.013 | 0.025 | K |
| 0.05-0.15 | 0.025 | 0.025 | L |
| 0.05-0.15 | 0.08-0.2 | 0.05-0.13 | M |
| 0.05-0.15 | 0.08-0.2 | 0.025 | N |
| 0.08-0.25 | 0.13-0.38 | 0.13 | U |



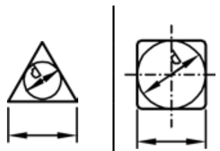
| |
|---|
| A |
| C |
| F |
| G |
| H |
| J |
| M |
| N |
| Q |
| R |
| T |
| U |
| W |
| Sonderausführung *Special shape* X |

| L | D | H | T |
|---|---|---|---|
| Plattenform *Shape* | Freiwinkel *Clearance Angle* | Toleranz *Tolerance* | Plattentyp *Type of Inserts* |

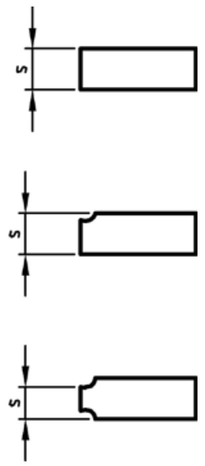
# ISO - Bezeichnungssystem für Wendeschneidplatten
## *ISO Designation System for Indexable Inserts*



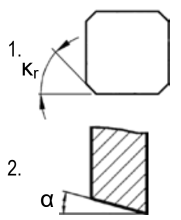

| d (mm) |
|---|
| 06 |
| 08 |
| 10 |
| 12 |
| 16 |
| 20 |
| 25 |
| 32 |



| (mm) | d = IC (inch) | d = IC (mm) | (mm) |
|---|---|---|---|
| **06** | 5/32 | 3.96 | **03** |
| **09** | 7/32 | 5.55 | **05** |
| **11** | 1/4 | 6.35 | **06** |
| **16** | 3/8 | 9.52 | **09** |
| **22** | 1/2 | 12.7 | **12** |
| **27** | 5/8 | 15.8 | **15** |
| **33** | 3/4 | 19.0 | **19** |
| **44** | 1 | 25.4 | **25** |




| s (mm) | Kennzahl *Index* |
|---|---|
| 1.59 | **01** |
| 1.98 | **T1** |
| 2.38 | **02** |
| 3.18 | **03** |
| 3.97 | **T3** |
| 4.76 | **04** |
| 5.56 | **05** |
| 6.35 | **06** |
| 7.94 | **07** |
| 9.52 | **09** |
| 11.11 | **11** |
| 12.70 | **12** |




| 1. $\kappa_r$ | | 2. α | |
|---|---|---|---|
| **A** | 45° | **A** | 3° |
| **D** | 60° | **B** | 5° |
| **E** | 75° | **C** | 7° |
| **F** | 85° | **D** | 15° |
| **P** | 90° | **E** | 20° |
| | | **F** | 25° |
| | | **G** | 30° |
| | | **N** | 0° |
| | | **P** | 11° |
| Sonstige *Others* | | **Z** | |


| r (mm) | Kennzahl *Index* |
|---|---|
| 0.2 | 02 |
| 0.4 | 04 |
| 0.8 | 08 |
| 1.2 | 12 |
| 1.6 | 16 |
| 2.4 | 24 |
| 0 | 00 |

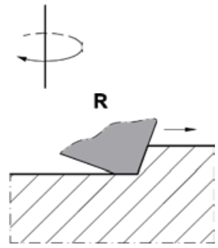
00: Runde Platte (inch)
*Round insert (inch)*
MO: Runde Platte (metr.)
*Round insert (metr.)*

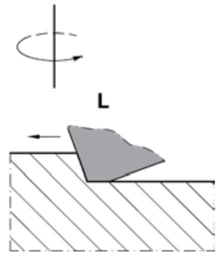
**F**
Scharf
*Sharp*

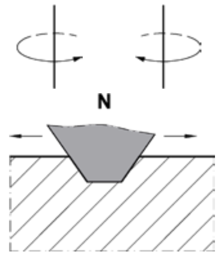
**E**
Gerundet
*Rounded*

**T**
Gefast
*Chamfered*

**S**
Gefast und gerundet
*Chamfered and rounded*



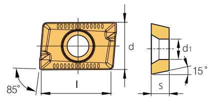
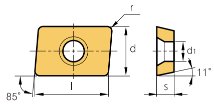
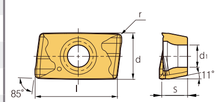
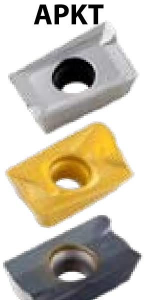
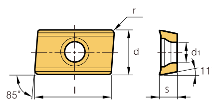
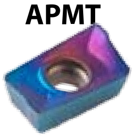
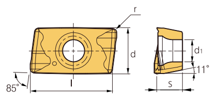
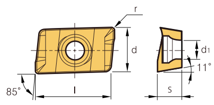
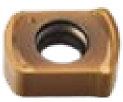
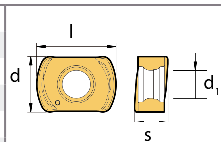

| 15 | 04 | PD | F | R |
|---|---|---|---|---|
| Schneidenlänge *Length of Cutting Edge* | Schneidkantenhöhe *Height of Cutting Edge* | Planfase oder Eckenradius *Chamfer or Corner Radius* | Schneidkanten-ausführung *Cutting Edge Preparation* | Bearbeitungs-richtung *Hand of Tool* |

# Wendeschneidplatten zum Fräsen
## *Indexable Inserts for Milling*

## A☐☐☐

| Werkstück *Workpiece* | | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040+ | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 5630 | MP 6025 | MP 6045 | MP 6125 | MS 5135 | MU5125 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1210 | MK 1320 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stahl / *Steel* | A (P) | | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | | ● | ● | ● | | | ● | ● | ● | ● | | |
| Rostfreier Stahl / *Stainless steel* | R (M) | | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | | ● | ○ | ○ | | | ● | ● | ● | ● | | |
| Guss / *Cast iron* | F (K) | ● | | | | | | | | | | | | ○ | | ○ | | | ○ | ○ | ○ | ○ | | |
| Nichtmet. Werkstoffe / *Non-fer. metall.* | N | | | | | | | | | | | | | | | | | | | | | | ● | ● |
| Warmf. Leg.,Titanleg. / *Heat res. alloys,Titan. all.* | S | | | ○ | ○ | | | | | | | | | | | | | | | | | | | |
| Gehärteter Stahl / *Hardened steel* | H | ○ | | | | | | | | | | | | | | | | | | | | | | |

**Machinentyp** *Machining types*
● Hauptanwendung / *Main application*
○ Nebenanwendung / *Additional application*

| Wendeplatten *Inserts* | Bezeichnung *Part Number* | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040+ | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 5630 | MP 6025 | MP 6045 | MP 6125 | MS 5135 | MU5125 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1210 | MK 1320 | l | Ø d | s | Ø $d_1$ | r | Geometrie *Geometry* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Beschichtet *Coated* | | | | | | | | | | | | | | | | | | | | | Unbe-schichtet *Uncoated* | | Maße *Dimensions* [mm] | | | | | |
| **ADKT**  | **15 05 PDTR** | | ○ | | | | | | | | | | | | | | | | | | | | | | 15.20 | 9.57 | 5.70 | 4.55 | - |  |
| **APEX**  | **10 03 04 FR-ALX** | | | | | | | | | | | | | | | | | | | | | | ● | | 10.30 | 6.60 | 3.18 | 2.80 | 0,40 |  |
| **APGX-390**  | **11 T3 04 AL-390** | | | | | | | | | | | | | | | | | | | | | | | ● | 11.00 | 6.80 | 3.60 | 2.80 | 0,40 |  |
| | **11 T3 04 F-390** | | | | | | | | | | | | | | | | ● | ● | | | | | | | 11.00 | 6.80 | 3.60 | 2.80 | 0,40 | |
| | **11 T3 04 M-390** | | | | | | | | | | | | | | | | ● | ● | | | | | | | 11.00 | 6.80 | 3.60 | 2.80 | 0,40 | |
| | **11 T3 08 AL-390** | | | | | | | | | | | | | | | | | | | | | | | ● | 11.00 | 6.80 | 3.60 | 2.80 | 0,80 | |
| | **11 T3 08 F-390** | | | | | | | | | | | | | | | | ● | ● | | | | | | | 11.00 | 6.80 | 3.60 | 2.80 | 0,80 | |
| | **11 T3 08 M-390** | | | | | | | | | | | | | | | | ● | ● | | | | | | | 11.00 | 6.80 | 3.60 | 2.80 | 0,80 | |
| | **11 T3 12 M-390** | | | | | | | | | | | | | | | | ● | ● | | | | | | | 11.00 | 6.80 | 3.60 | 2.80 | 1,20 | |
| | **11 T3 20 M-390** | | | | | | | | | | | | | | | | ● | ● | | | | | | | 11.00 | 6.80 | 3.60 | 2.80 | 2,00 | |
| | **11 T3 31 M-390** | | | | | | | | | | | | | | | | ● | ● | | | | | | | 11.00 | 6.80 | 3.60 | 2.80 | 3,10 | |
| **APKT-390** | **11 T3 08 MM-390** | | | | | | | | | | | | ● | | | | | | | | | | | | 11.00 | 6.80 | 3.60 | 2.80 | 0,80 | |
| **APKT**  | **10 03 PDR-1** | | | | | | | | | | | | | | | | | | ● | | | | | | 10.00 | 6.70 | 3.50 | - | 0,50 |  |
| | **10 03 PDR-M22** | | | | ● | | | | | | | | | | | | | | | ● | | ● | | | 10.00 | 6.70 | 3.50 | - | 0,50 | |
| | **10 03 PDSR-M31** | | | | | | | | | ● | | ● | | | | | | | | | | | | | 10.37 | 6.66 | 3.50 | - | 0.60 | |
| | **10 35 PDFR-ALX** | | | | | | | | | | | | | | | | | | | | | | ● | | 11.00 | 6.70 | 3.90 | 2.80 | 0,40 | |
| | **16 04 PDTR-M21** | | | | | | | | | | | ● | | | | | | | | | | | | | 16.50 | 9.53 | 4.76 | 4.40 | 1.00 | |
| | **16 04 02 PDFR-A12** | | | | | | | | | | | | | | | | | | | | | | ● | | 16.25 | 9.53 | 4.76 | 4.40 | 0.20 | |
| | **16 04 04 PDFR-A12** | | | | | | | | | | | | | | | | | | | | | | ● | | 16.25 | 9.53 | 4.76 | 4.40 | 0.40 | |
| | **16 04 08 PDTR-S** | | | | | | | | | | | | | | | | | | | | | ● | | | 16.50 | 9.53 | 4.76 | 4.40 | 0.80 | |
| **APMT**  | **11 T3 08 M30** | | | | | | | ● | | | | | | ● | | ● | | | | | | | | | 12.30 | 6.50 | 3,97 | 2.80 | 0.80 |  |
| | **16 04 PDER-M21** | | | | | | ● | | | | | | | | | | | | | | | | | | 16.35 | 9.28 | 4.76 | 4.40 | - | |
| | **16 04 PDTR-S** | | | | | | | | | | | | | | | | | | | | | ○ | | | 17,26 | 9,33 | | | - | |
| | **16 04 08 PDER-M30** | | | | | | | | | | | | | ● | | | | | | | | | | | 17.56 | 9.50 | 4.76 | 4.40 | 0.80 | |
| **APXT**  | **11 T3 PDFR-AL** | | | | | | | | | | | | | | | | | | | | | | ● | | 11.45 | 6.75 | 3,97 | 2.85 | - |  |
| **BNMU**  | **06 03 M21** | | | | | | | | | | | | | ● | | | ● | | | | | | | | 9.30 | 6.30 | 3.75 | 3.20 | - |  |
| | **06 03 R20** | | | | | | | | | | | | | | | | ○ | | | | | | | | 9.30 | 6.30 | 3.75 | 3.20 | - | |



● JD-Lager / *JD-Stock*
○ begrenzte Lagerhaltung - auf Anfrage / limited stock - upon request

Trägerwerkzeuge Seite / Toolholders page:
2.06, 2.07, 2.09, 2.12, 2.13, 2.16, 2.22, 2.27

Schnittdaten / Cutting Data
2.39-2.43, 2.54-2.55

# LD

**Machinentyp** / ***Machining types***: ● Hauptanwendung / *Main application*; ○ Nebenanwendung / *Additional application*

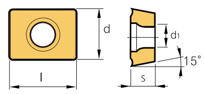
| Werkstück / *Workpiece* | | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 | MK 1210 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stahl / *Steel* | A (P) | | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| Rostfreier Stahl / *Stainless steel* | R (M) | | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ● | ● | ● | ● | | |
| Guss / *Cast iron* | F (K) | ● | | | | | | | | | | | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | | |
| Nichtmet. Werkstoffe / *Non-fer. metall.* | N | | | | | | | | | | | | | | | | | | | | ● | ● |
| Warmf. Leg.,Titanleg. / *Heat res. alloys,Titan. all.* | S | | | ○ | ○ | | | | | | | | | | | | | | | | | |
| Gehärteter Stahl / *Hardened steel* | H | ○ | | | | | | | | | | | | | | | | | | | | |

Beschichtet / *Coated*: MK 5115 – MU 5630; Unbeschichtet / *Uncoated*: MK 1110, MK 1210

| Wendeplatten / *Inserts* | Bezeichnung / *Part Number* | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 | MK 1210 | l | Ø d | s | Ø d1 | r |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LDHT** | **15 04 PDFR-ALX** | | | | | | | | | | | | | | | | | | | | | ○ | 14.80 | 9.80 | 4.76 | 4.40 | - |

Maße / *Dimensions* [mm]

Geometrie / *Geometry*




# LN

**Machinentyp** / ***Machining types***: ● Hauptanwendung / *Main application*; ○ Nebenanwendung / *Additional application*

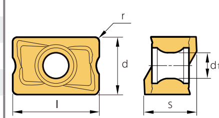
| Werkstück / *Workpiece* | | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5630 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 | MK 1210 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stahl / *Steel* | A (P) | | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| Rostfreier Stahl / *Stainless steel* | R (M) | | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ● | ● | ● | ● | | |
| Guss / *Cast iron* | F (K) | ● | | | | | | | | | | | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | | |
| Nichtmet. Werkstoffe / *Non-fer. metall.* | N | | | | | | | | | | | | | | | | | | | | ● | ● |
| Warmf. Leg.,Titanleg. / *Heat res. alloys,Titan. all.* | S | | | ○ | ○ | | | | | | | | | | | | | | | | | |
| Gehärteter Stahl / *Hardened steel* | H | ○ | | | | | | | | | | | | | | | | | | | | |

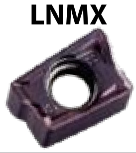
Beschichtet / *Coated*: MK 5115 – MU 5630; Unbeschichtet / *Uncoated*: MK 1110, MK 1210

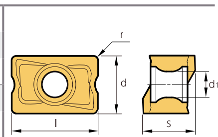
| Wendeplatten / *Inserts* | Bezeichnung / *Part Number* | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5630 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 | MK 1210 | l | Ø d | s | Ø d1 | r |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LNEX** | **10 06 05 PNR-A11** | | | | | | | | | | | | | | | | | | | | ● | | 10.00 | 6.50 | 6.50 | 3.50 | 0.50 |
| | **15 10 08 PNR-A11** | | | | | | | | | | | | | | | | | | | | ● | | 15.00 | 10.00 | 10.00 | 4.50 | 0.80 |
| **LNMX** | **10 06 05 PNR-JT30** | | | | | | | | | | | ● | | | | | | | | | | | 10.00 | 6.50 | 6.50 | 3.50 | 0.50 |
| | **10 06 05 PNR-M12** | | | | | | | | | | ● | | | | | | | | | | | | 10.00 | 6.50 | 6.50 | 3.50 | 0.50 |
| | **10 06 05 PNR-M23** | | | | | | | ● | | | | | | ● | | | | | | | | | 10.00 | 6.50 | 6.40 | 3.40 | 0.50 |
| | **15 10 08 PNR-M11** | ○ | | | | | | | | | | | | | | | | | | | | | 15.00 | 10.00 | 10.00 | 4.50 | 0.80 |
| | **15 10 08 PNR-M20** | | | | | | ● | | | | | | | ● | | | | | | | | | 15.00 | 10.00 | 10.00 | 4.50 | 0.80 |

Maße / *Dimensions* [mm]

Geometrie / *Geometry*



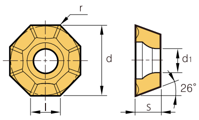





# OF

| Werkstück *Workpiece* | | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 | MK 1210 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stahl / *Steel* | A (P) | | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| Rostfreier Stahl / *Stainless steel* | R (M) | | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ● | ● | ● | ● | | |
| Guss / *Cast iron* | F (K) | ● | | | | | | | | | | | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | | |
| Nichtmet. Werkstoffe / *Non-fer. metall.* | N | | | | | | | | | | | | | | | | | | | | ● | ● |
| Warmf. Leg.,Titanleg. / *Heat res. alloys,Titan. all.* | S | | | ○ | ○ | | | | | | | | | | | | | | | | | |
| Gehärteter Stahl / *Hardened steel* | H | ○ | | | | | | | | | | | | | | | | | | | | |

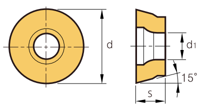
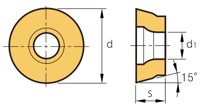
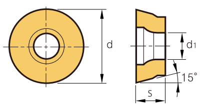
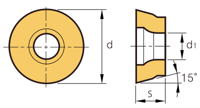
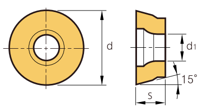
**Machinentyp** *Machining types*
● Hauptanwendung / *Main application*
○ Nebenanwendung / *Additional application*

| Wendeplatten *Inserts* | Bezeichnung *Part Number* | Beschichtet *Coated* | | | | | | | | | | | | | | | | | | | Unbeschichtet *Uncoated* | | Maße *Dimensions* [mm] | | | | | Geometrie *Geometry* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 | MK 1210 | l | Ø d | s | Ø $d_1$ | r | |
| **OFKT**  | **05 T3 05 SN-M11** | | | | | | | | | | | | | | | | | | | | | | 5.20 | 12.70 | 3.97 | 4.40 | 0.50 |  |

# RD

| Werkstück *Workpiece* | | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 | MK 1210 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stahl / *Steel* | A (P) | | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| Rostfreier Stahl / *Stainless steel* | R (M) | | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ● | ● | ● | ● | | |
| Guss / *Cast iron* | F (K) | ● | | | | | | | | | | | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | | |
| Nichtmet. Werkstoffe / *Non-fer. metall.* | N | | | | | | | | | | | | | | | | | | | | ● | ● |
| Warmf. Leg.,Titanleg. / *Heat res. alloys,Titan. all.* | S | | | ○ | ○ | | | | | | | | | | | | | | | | | |
| Gehärteter Stahl / *Hardened steel* | H | ○ | | | | | | | | | | | | | | | | | | | | |

**Machinentyp** *Machining types*
● Hauptanwendung / *Main application*
○ Nebenanwendung / *Additional application*

| Wendeplatten *Inserts* | Bezeichnung *Part Number* | Beschichtet *Coated* | | | | | | | | | | | | | | | | | | | Unbeschichtet *Uncoated* | | Maße *Dimensions* [mm] | | | | | Geometrie *Geometry* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 | MK 1210 | l | Ø d | s | Ø $d_1$ | r | |
| **RDHT**  | **07 02 MO-AL** | | | | | | | | | | | | | | | | | | | | | ● | - | 7.00 | 2.38 | 2.75 | - |  |
| | **10 03 MO-AL** | | | | | | | | | | | | | | | | | | | | | ● | - | 10.00 | 3.18 | 3.90 | - | |
| | **12 T3 MO-AL** | | | | | | | | | | | | | | | | | | | | | ● | - | 12.00 | 3.97 | 3.90 | - | |
| | **16 04 MO-AL** | | | | | | | | | | | | | | | | | | | | | ○ | - | 16.00 | 4.76 | - | - | |
| | **20 06 MO-AL** | | | | | | | | | | | | | | | | | | | | | ○ | - | 20.00 | 6.35 | - | - | |
| **RDMT**  | **10 T3 MO-M50** | | | | | | | | | | | | | | | | | | | ○ | | | - | 10.00 | 3.18 | 3.90 | - |  |
| | **12 04 MO-M50** | | | | | | | | | | | | | | | | | | | ○ | | | - | 12.00 | 3.97 | 3.90 | - | |
| **RDMW**  | **10 T3 MO** | | | | | | | | | | | | | | | | | | | ○ | | | - | 10.00 | 3.18 | 3.90 | - |  |
| | **12 04 MO** | | | | | | | | | | | | | | | | | | | ○ | | | - | 12.00 | 3.97 | 3.90 | - | |
| **RPMT**  | **10 T3 MO-M50** | | | | | | | | | | | | | | | | | | | ○ | | | - | 10.00 | 3.18 | 3.90 | - |  |
| | **12 04 MO-M50** | | | | | | | | | | | | | | | | | | | ○ | | | - | 12.00 | 3.97 | 3.90 | - | |
| **RPMW**  | **10 T3 MO** | | | | | | | | | | | | | | | | | | | ○ | | | - | 10.00 | 3.18 | 3.90 | - |  |
| | **12 04 MO** | | | | | | | | | | | | | | | | | | | ○ | | | - | 12.00 | 3.97 | 3.90 | - | |

● JD-Lager / *JD-Stock*
○ begrenzte Lagerhaltung - auf Anfrage / limited stock - upon request

Trägerwerkzeuge Seite / Toolholders page:

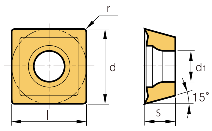
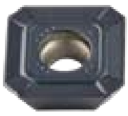
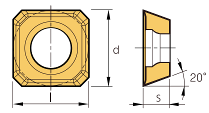
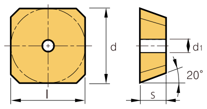
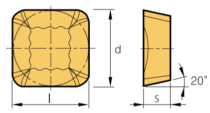
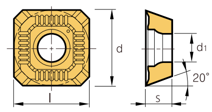
Schnittdaten / Cutting Data
2.54-2.55

# S □□□

| Werkstück / *Workpiece* | | MK 5115 | MM 5120 | MM 5125 | MM 5130 | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5125 | MU5130+ | MU 5620 | MU 5630 | MK 1110 | MK 1210 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stahl / *Steel* | A (P) | | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| Rostfreier Stahl / *Stainless steel* | R (M) | | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ● | ● | ● | ● | | |
| Guss / *Cast iron* | F (K) | ● | | | | | | | | | | | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | | |
| Nichtmet. Werkstoffe / *Non-fer. metall.* | N | | | | | | | | | | | | | | | | | | | | ● | ● |
| Warmf. Leg.,Titanleg. / *Heat res. alloys,Titan. all.* | S | | | ● ○ | ○ | | | | | | | | | | | | | | | | | |
| Gehärteter Stahl / *Hardened steel* | H | ○ | | | | | | | | | | | | | | | | | | | | |

**Machinentyp** / ***Machining types***

● Hauptanwendung / *Main application*
○ Nebenanwendung / *Additional application*

| Wendeplatten / *Inserts* | Bezeichnung / *Part Number* | | Beschichtet / *Coated*: MK 5115 | MM 5120 | MM 5125 | MM 5130 | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5125 | MU5130+ | MU 5620 | MU 5630 | MK 1110 | Unbeschichtet / *Uncoated*: MK 1210 | Maße / *Dimensions* [mm]: l | Ø d | s | Ø $d_1$ | r | Geometrie / *Geometry* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SDHT**  | **12 04** | **AEFN-AL** | | | | | | | | | | | | | | | | | | | | ● | 12.70 | 12.70 | 4.76 | 5.50 | 0.80 |  |
| | **12 04** | **AESN** | | | | | | | | | ● | | | | | | | | ● | | | | 12.70 | 12.70 | 4.76 | 5.50 | 1.80 | |
| **SEGT**  | **12 T3** | **AGSN-KM** | | | | ○ | | | | | | | | | | | | ● | | | | | 12.00 | 13.40 | 3.97 | - | 1.50 |  |
| | **12 T3** | **AGSN-PM** | | | | ○ | | | | | | | | | | | | ● | | | | | 12.00 | 13.40 | 3.97 | - | 1.50 | |
| **SEHT**  | **12 04** | **AFFN-AL** | | | | | | | | | | | | | | | | | | | | ● | 12.70 | 12.70 | 4.76 | 5.50 | - |  |
| | **12 04** | **AFSN** | | | | | | | | ● | | | | | | | | | | | | | 12.70 | 12.70 | 4.76 | 5.50 | - | |
| **SEKN**  | **12 03** | **AFTN** | | | | | | | | | | | | | | | | | | ○ | | | 12.70 | 12.70 | 3.25 | 2.00 | - |  |
| **SEKR**  | **12 03** | **AFTN** | | | | | | | | | | | | | | | | | | ○ | | | 12.70 | 12.70 | 3.18 | - | - |  |
| **SEKT**  | **12 04** | **AFSN** | | | | ● | | | | | | | | | | | | | | ○ | | | 12.70 | 12.70 | 4.85 | 5.40 | - | |
| | **12 T3** | **AEFN-AL** | | | | | | | | | | | | | | | | | | | | ● | 13.40 | 13.40 | 3.97 | 4.40 | - | |



● JD-Lager / *JD-Stock*
○ begrenzte Lagerhaltung - auf Anfrage / limited stock - upon request

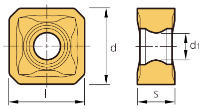
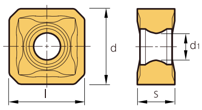
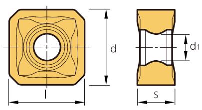
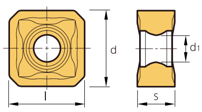

Trägerwerkzeuge Seite / Toolholders page: 2.18, 2.19

Schnittdaten / Cutting Data 2.47, 2.54-2.55

# SN ☐☐

| Werkstück / *Workpiece* | | MK 5115 | MK 5130 | MM 5120 | MM 5125 | MM 5130 | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2235 | MP 5330 | MP 5430 | MP 5630 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 | MK 1210 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stahl / *Steel* | A (P) | | | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| Rostfreier Stahl / *Stainless steel* | R (M) | | | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ● | ● | ● | ● | | |
| Guss / *Cast iron* | F (K) | ● | | | | | | | | | | | | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | | |
| Nichtmet. Werkstoffe / *Non-fer. metall.* | N | | | | | | | | | | | | | | | | | | | | | ● | ● |
| Warmf. Leg.,Titanleg. / *Heat res. alloys,Titan. all.* | S | | | | ○ | ○ | | | | | | | | | | | | | | | | | |
| Gehärteter Stahl / *Hardened steel* | H | ○ | | | | | | | | | | | | | | | | | | | | | |

**Machinentyp** / ***Machining types***: ● Hauptanwendung / *Main application*; ○ Nebenanwendung / *Additional application*

| Wendeplatten / *Inserts* | Bezeichnung / *Part Number* | MK 5115 | MK 5130 | MM 5120 | MM 5125 | MM 5130 | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2235 | MP 5330 | MP 5430 | MP 5630 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 (Unbeschichtet / *Uncoated*) | MK 1210 (Unbeschichtet / *Uncoated*) | l | Ø d | s | Ø $d_1$ | r | Geometrie / *Geometry* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SNEX**  | **12 06 ANN-A11** | | | | | | | | | | | | | | | | | | | | | ● | | 12.70<br>12.70<br>12.70 | 12.70<br>12.70<br>12.70 | 6.35<br>6.35<br>6.35 | 4.50<br>4.50<br>4.50 | -<br>-<br>- |  |
| **SNKX**  | **12 06 ANN-M14** | | | | | | | | | | | | | | | | | ● | | | | | | 12.70 | 12.70 | 6.35 | 4.50 | - |  |
| **SNMX**  | **12 05 ANTN-M24** | | ● | | | | | | | | | | | | | | | | | | | | | 12.70 | 12.70 | | | - |  |
| | **12 05 ANTN-M24** | | | | | ● | | | | | | | | | | | | | | | | | | 12.70 | 12.70 | | | - | |
| | **12 05 ANTN-M24** | | | | | | | | | | ● | | | | | | | | | | | | | 12.70 | 12.70 | | | - | |
| **SNMX**  | **12 06 ANN-JT30** | | | | | | | | | | | | | ● | | | | | | | | | | 12.70 | 12.70 | 6.35 | 4.50 | - |  |
| | **12 06 ANN-M11** | ● | | | | | | | | | | ● | | | | | | | | | | | | 12.70 | 12.70 | 6.35 | 4.50 | - | |
| | **12 06 ANEN-M25** | | | | | ● | | | | | | | | | | | | | | | | | | 12.70 | 12.70 | 6.35 | 4.50 | - | |

Beschichtet / *Coated* — Maße / *Dimensions* [mm]

● JD-Lager / *JD-Stock*
○ begrenzte Lagerhaltung - auf Anfrage / limited stock - upon request

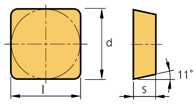
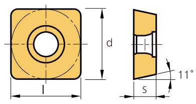
Trägerwerkzeuge Seite / Toolholders page: 2.19

Schnittdaten / Cutting Data 2.48-2.49, 2.54-2.55

# SP □□

| Werkstück *Workpiece* | | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU5230+ | MU 5630 | MK 1110 | MK 1210 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stahl / *Steel* | A (P) | | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| Rostfreier Stahl / *Stainless steel* | R (M) | | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ● | ● | ● | ● | | |
| Guss / *Cast iron* | F (K) | ● | | | | | | | | | | | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | | |
| Nichtmet. Werkstoffe / *Non-fer. metall.* | N | | | | | | | | | | | | | | | | | | | | ● | ● |
| Warmf. Leg.,Titanleg. / *Heat res. alloys,Titan. all.* | S | | | ○ | ○ | | | | | | | | | | | | | | | | | |
| Gehärteter Stahl / *Hardened steel* | H | ○ | | | | | | | | | | | | | | | | | | | | |

**Machinentyp** *Machining types* ● Hauptanwendung / *Main application* ○ Nebenanwendung / *Additional application*

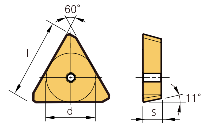
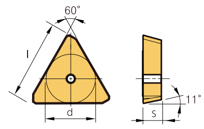
| Wendeplatten *Inserts* | Bezeichnung *Part Number* | | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU5230+ | MU 5630 | MK 1110 | MK 1210 | l | Ø d | s | Ø $d_1$ | r | Geometrie *Geometry* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Beschichtet *Coated* | | | | | | | | | | | | | | | | | | | | | Maße *Dimensions* [mm] | | | | | |
| **SPKN**  | **12 03** | **PDTR** | | | | | | | | | | | | | | | | | | | ○ | | | 12.70 | 12.70 | 3.18 | - | - |  |
| **SPKR**  | **12 03** | **EDR-5** | | | | | | | | | | | ● | | | | | | | | | | | 12.70 | 12.70 | 3.18 | - | - |  |
| | **12 03** | **PDTR** | | | | | | | | | | | | | | | | | | | ○ | | | 12.70 | 12.70 | 3.18 | - | - | |

# TP

**Machinentyp** / ***Machining types***

● Hauptanwendung / *Main application*
○ Nebenanwendung / *Additional application*

| Werkstück / *Workpiece* | | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU5230+ | MU 5630 | MK 1110 | MK 1210 | MP 1225 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stahl / *Steel* | A (P) | | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ● |
| Rostfreier Stahl / *Stainless steel* | R (M) | | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ● | ● | ● | ● | | | ○ |
| Guss / *Cast iron* | F (K) | ● | | | | | | | | | | | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | | | ○ |
| Nichtmet. Werkstoffe / *Non-fer. metall.* | N | | | | | | | | | | | | | | | | | | | | ● | ● | |
| Warmf. Leg.,Titanleg. / *Heat res. alloys,Titan. all.* | S | | | ○ | ○ | | | | | | | | | | | | | | | | | | |
| Gehärteter Stahl / *Hardened steel* | H | ○ | | | | | | | | | | | | | | | | | | | | | |

| Wendeplatten / *Inserts* | Bezeichnung / *Part Number* | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU5230+ | MU 5630 | MK 1110 | MK 1210 | MP 1225 | l | Ø d | s | Ø $d_1$ | r | Geometrie / *Geometry* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TPKN**  | **16 03 PDR-5** | | | | | | | | | | | | | | | | | | | | | | ● | 16.00 | 9.53 | 3.18 | - | - |  |
| | **16 03 PDR-M50** | | | | | | | | | | | | | | | | | | | ● | | | | 16.00 | 9.53 | 3.18 | - | - | |
| | **22 04 PDR-M50** | | | | | | | | | | | | | | | | | | | ○ | | | | 22.00 | 12.70 | 4.76 | - | - | |
| **TPKR**  | **16 03 PDR-5** | | | | | | | | | | | ● | | | | | | | | | | | | 16.00 | 9.53 | 3.18 | - | - |  |
| | **16 03 PPR-F50** | | | | | | | | | | | | | | | | | | | ○ | | | | 16.00 | 9.53 | 3.18 | - | - | |
| | **22 04 PDR-5** | | | | | | | | | | | ● | | | | | | | | | | | | 22.00 | 12.70 | 4.76 | - | - | |
| | **22 04 PDR-M50** | | | | | | | | | | | | | | | | | | | ○ | | | | 22.00 | 12.70 | 4.76 | - | - | |

Beschichtet / *Coated*: MK 5115 – MU 5630; Unbeschichtet / *Uncoated*: MK 1110 – MP 1225; Maße / *Dimensions* [mm]

● JD-Lager / *JD-Stock*
○ begrenzte Lagerhaltung - auf Anfrage / limited stock - upon request

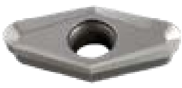
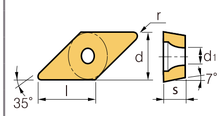
Trägerwerkzeuge Seite / Toolholders page:

Schnittdaten / Cutting Data
2.54-2.55

# VC □□

| Werkstück *Workpiece* | | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 | MK 1210 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stahl / *Steel* | A (P) | | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| Rostfreier Stahl / *Stainless steel* | R (M) | | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ● | ● | ● | ● | | |
| Guss / *Cast iron* | F (K) | ● | | | | | | | | | | | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | | |
| Nichtmet. Werkstoffe / *Non-fer. metall.* | N | | | | | | | | | | | | | | | | | | | | ● | ● |
| Warmf. Leg.,Titanleg. / *Heat res. alloys,Titan. all.* | S | | | ○ | ○ | | | | | | | | | | | | | | | | | |
| Gehärteter Stahl / *Hardened steel* | H | ○ | | | | | | | | | | | | | | | | | | | | |

**Machinentyp** ***Machining types***
● Hauptanwendung / *Main application*
○ Nebenanwendung / *Additional application*

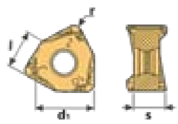
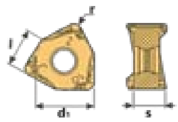
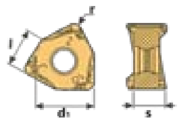
| Wendeplatten *Inserts* | Bezeichnung *Part Number* | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 | MK 1210 | l | Ø d | s | Ø $d_1$ | r | Geometrie *Geometry* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Beschichtet *Coated* | | | | | | | | | | | | | | | | | | | Unbeschichtet *Uncoated* | | Maße *Dimensions* [mm] | | | | | |
| **VCCT**  | **22 05 30 -ALF** | | | | | | | | | | | | | | | | | | | | | ○ | 20.10 | 12.60 | 5.56 | 5.45 | 3.00 |  |

# XN

**Machinentyp / *Machining types***: ● Hauptanwendung / *Main application* ○ Nebenanwendung / *Additional application*

| Werkstück / *Workpiece* | | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 2235 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 | MK 1320 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stahl / *Steel* | A (P) | | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| Rostfreier Stahl / *Stainless steel* | R (M) | | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ● | ● | ● | ● | | |
| Guss / *Cast iron* | F (K) | ● | | | | | | | | | | | | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | | |
| Nichtmet. Werkstoffe / *Non-fer. metall.* | N | | | | | | | | | | | | | | | | | | | | | ● | ● |
| Warmf. Leg.,Titanleg. / *Heat res. alloys,Titan. all.* | S | | | ○ | ○ | | | | | | | | | | | | | | | | | | |
| Gehärteter Stahl / *Hardened steel* | H | ○ | | | | | | | | | | | | | | | | | | | | | |

Beschichtet / *Coated*: MK 5115 – MU 5630; Unbeschichtet / *Uncoated*: MK 1110, MK 1320

| Wendeplatten / *Inserts* | Bezeichnung / *Part Number* | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MP 2130 | MP 2135 | MP 2235 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 | MK 1320 | l | Ø d | s | Ø $d_1$ | r | Geometrie / *Geometry* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **XNEX**  | **04 03 04 -M22** | | | | | ● | | | | | | | | | | | | | ● | | | | | 4.00 | 4.41 | 3.31 | - | 0.40 |  |
| | **08 06 08 -M22** | | | | | ● | | | | | | | | | | | | | ● | | | | | 7.50 | 12.50 | 6.56 | - | 0.80 | |
| **XNGX**  | **08 06 08 -ALX** | | | | | | | | | | | | | | | | | | | | | | ● | 7.50 | 12.50 | 6.56 | - | 0.80 |  |
| | **08 06 08 -M24** | | | | ● | | | | | | | | | | | | | | | | | | | 7.50 | 12.50 | 6.56 | - | 0.80 | |
| **XNMX**  | **08 06 08 -M24** | | | | | | | | | | ● | | | | | | | | | | | | | 7.50 | 12.50 | 6.56 | - | 0.80 |  |

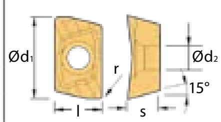
Maße / *Dimensions* [mm]

# XO

**Machinentyp / *Machining types***: ● Hauptanwendung / *Main application* ○ Nebenanwendung / *Additional application*

| Werkstück / *Workpiece* | | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MM 6330 | MP 2130 | MP 2135 | MP 2235 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 | MK 1320 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stahl / *Steel* | A (P) | | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| Rostfreier Stahl / *Stainless steel* | R (M) | | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ● | ● | ● | ● | | |
| Guss / *Cast iron* | F (K) | ● | | | | | | | | | | | | | ○ | | ○ | ○ | ○ | ○ | ○ | ○ | | |
| Nichtmet. Werkstoffe / *Non-fer. metall.* | N | | | | | | | | | | | | | | | | | | | | | | ● | ● |
| Warmf. Leg.,Titanleg. / *Heat res. alloys,Titan. all.* | S | | | ○ | ○ | | | | | | | | | | | | | | | | | | | |
| Gehärteter Stahl / *Hardened steel* | H | ○ | | | | | | | | | | | | | | | | | | | | | | |

Beschichtet / *Coated*: MK 5115 – MU 5630; Unbeschichtet / *Uncoated*: MK 1110, MK 1320

| Wendeplatten / *Inserts* | Bezeichnung / *Part Number* | MK 5115 | MM 5120 | MM 5125 | MM 5130+ | MM 5140 | MM 6040 | MM 6130 | MM 6330 | MP 2130 | MP 2135 | MP 2235 | MP 5330 | MP 5430 | MP 6025 | MP 6045 | MP 6125 | MP 6225 | MU5130+ | MU5230+ | MU 5620 | MU 5630 | MK 1110 | MK 1320 | l | Ø d | s | Ø $d_1$ | r | Geometrie / *Geometry* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **XOMT**  | **06 02 04 -M20** | | | | | | | | | | | | | | | | | | | | | ● | | | 4.09 | 7.00 | 2.45 | 2.00 | 0.40 |  |
| | **06 02 08 -F20** | | | | | | | | | | | | | | | | | | | | | ● | | | 4.09 | 7.00 | 2.45 | 2.00 | 0.80 | |
| | **06 02 08 -M20** | | | | | | | | ○ | | | | | | | | | | | | | ● | | | 4.09 | 7.00 | 2.45 | 2.00 | 0.80 | |
| | **06 02 16 -M20** | | | | | | | | ○ | | | | | | | | | | | | | ● | | | 4.09 | 7.00 | 2.45 | 2.00 | 1.60 | |



Maße / *Dimensions* [mm]



● JD-Lager / *JD-Stock*
○ begrenzte Lagerhaltung - auf Anfrage / limited stock - upon request

Trägerwerkzeuge Seite / Toolholders page: 2.10, 2.15, 2.26

Schnittdaten / Cutting Data 2.51-2.55

# Schnittwertempfehlungen
*Cutting Data Recommendations*

| | **Werkstückwerkstoff** *Material* | **Legierung** *Alloy* | **Brinell-Härte** *hardness* **HB** | **VDI 3323** *Gruppe* | **Schnittgeschwindigkeiten /** *Cutting Speeds* $v_c$ **[m/min]** | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | **MP 5630 (P30C)** | **MS 5135 (M/S35C)** | **MU 5125 (P/M/K25C)** | **MK 1320 (K10/K20F)** |
| **A (P)** | unlegierter Stahl *mild steel* | geglüht *annealed* ≤ 0,15% C | 125 | 1 | 120 - 180 | | 165 - 295 | |
| | | geglüht *annealed* 0,15% - 0,45% C | 150-250 | 2 | 100 - 160 | | 145 - 265 | |
| | | vergütet *heat treated* ≥ 0,45% C | 300 | 3 | 80 - 140 | | 90 - 160 | |
| | niedriglegierter Stahl *lower alloyed steel* | geglüht *annealed* | 180 | 6 | 100 - 180 | | 115 - 200 | |
| | | vergütet *heat treated* | 275 | 7 | 80 - 120 | | 90 - 150 | |
| | | vergütet *heat treated* | 300 | 8 | 80 - 100 | | 80 - 120 | |
| | | vergütet *heat treated* | 350 | 9 | 70 - 120 | | 70 - 135 | |
| | hochlegierter Stahl *highly alloyed steel* | geglüht *annealed* | 200 | 10 | 70 - 130 | | 85 - 155 | |
| | | vergütet *heat treated* | 350 | 11 | 50 - 90 | | 40 - 70 | |
| | nichtrostender Stahl *corrosion-resistant steel* | geglüht *annealed* | 200 | 12 | 80 - 110 | | 90 - 130 | |
| | | vergütet *heat treated* | 350 | 13 | 60 - 100 | | 60 - 110 | |
| **R (M)** | rostfreier Stahl *stainless steel* | ferritisch / martensitisch / geglüht *ferritic / martensitic / annealed* | 200 | 14 | 80 - 120 | 90 - 160 | 110 - 210 | |
| | | austenitisch *austenitic* | 180 | 14 | 70 - 110 | 80 - 140 | 90 - 170 | |
| | | Duplex | 230-260 | 14 | 60 - 90 | 60 - 100 | 60 - 135 | |
| | | austenitisch/ferritisch *austenitic/ferritic* | 330 | 14 | 50 - 80 | 40 - 80 | 50 - 120 | |
| **F (K)** | Grauguss *grey cast iron* | perlitisch/ferritisch *pearlitic/ferritic* | 180 | 15 | | | 100 - 260 | |
| | | perlitisch/martensitisch *pearlitic/martensitic* | 260 | 16 | | | 110 - 240 | |
| | Grauguss mit Kugelgraphit *nodular cast iron* | ferritisch *ferritic* | 160 | 17 | | | 100 - 180 | |
| | | perlitisch *pearlitic* | 250 | 18 | | | 90 - 170 | |
| | Temperguss *malleable cast iron* | ferritisch *ferritic* | 130 | 19 | | | 140 - 260 | |
| | | perlitisch *pearlitic* | 230 | 20 | | | 110 - 200 | |
| **N** | Aluminium - Knetlegierungen *forging alloy* | nicht aushärtbar *not hardenable* | 60 | 21 | | | | 400 - 900 |
| | | aushärtbar *hardenable* | 100 | 22 | | | | 250 - 750 |
| | Aluminium - Gusslegierungen *casting alloy* | nicht aushärtbar *not hardenable* < 12% Si | 80 | 23 | | | | 380 - 800 |
| | | aushärtbar *hardenable* < 12% Si | 90 | 24 | | | | 250 - 380 |
| | | nicht aushärtbar *not hardenable* > 12% Si | 130 | 25 | | | | 180 - 300 |
| | Kupfer und Kupferlegierungen *copper and copper alloys* (Bronze, Messing) *(bronze, brass)* | Automatenlegierungen *free cutting alloys (1% Pb)* | - | 26 | | | | 300 - 470 |
| | | Messing, Rotguss *brass, red bronze* | - | 27 | | | | 300 - 420 |
| | | Bronze *bronze* | 90 | 28 | | | | 250 - 330 |
| | | bleifreies Kupfer und Elektrolytkupfer *unleaded copper* | 100 | 29 | | | | 220 - 310 |
| | nichtmetallische Werkstoffe *non metallic materials* | Duroplaste *thermoset* | 100 | 29 | | | | 60 - 150 |
| | | faserverstärkte Kunststoffe *fiber reinforced plastic* | - | 29 | | | | 60 - 120 |
| | | Hartgummi *ebonite* | - | 30 | | | | 60 - 120 |
| **S** | warmfeste Legierungen *heat resistant alloys* | Fe-Basis/*base* / geglüht *annealed* | 200 | 31 | | 50 - 60 | | |
| | | Fe-Basis/*base*(Incoloy)/ausgehärtet *hardened* | 280 | 32 | | 40 - 45 | | |
| | | Ni-Basis/*base* (Inconel)/geglüht *annealed* | 250 | 33 | | 50 - 60 | | |
| | | Ni- oder Co-Basis/ausgehärtet *hardened* | 30-58 HRC | 24 | | 30 - 35 | | |
| | | Ni- oder Co-Basis / gegossen *cast* | 1500-2200 $Nmm^2$ | 35 | | 18 - 25 | | |
| | Titanlegierungen *titanium alloys* | Reintitan *Pure titanium* | $R_m$ 400 | 36 | | 110 - 130 | | |
| | | Alpha- + Beta-Legierungen *alloys* | $R_m$ 1050 | 37 | | 35 - 45 | | |

# Schnittwertempfehlungen
## *Cutting Data Recommendations*

| | **Werkstückwerkstoff** ***Material*** | **Legierung** ***Alloy*** | **Brinell-Härte** ***hardness*** **HB** | **VDI 3323** ***Gruppe*** | **Schnittgeschwindigkeiten /** ***Cutting Speeds*** **$v_c$ [m/min]** | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **MM 5125 (M25C)** | **MM 6040+ (P/M40C)** | **MM 6130 (M30/ P30C)** | **MP 6025 (P25C)** | **MP 6125 (P25C)** | **MU 5630 (P30/M/ K20C)** | **MK 1210 (K10)** |
| A (P) | unlegierter Stahl *mild steel* | geglüht *annealed* ≤ 0,15% C | 125 | 1 | 90-160 | 170-280 | | 180-210 | 130-200 | 170-330 | |
| | | geglüht *annealed* 0,15% - 0,45% C | 150-250 | 2 | 90-150 | 170-250 | | 160-180 | 110-180 | 170-280 | |
| | | vergütet *heat treated* ≥ 0,45% C | 300 | 3 | 90-140 | 160-200 | | 130-170 | 90-140 | 160-250 | |
| | niedriglegierter Stahl *lower alloyed steel* | geglüht *annealed* | 180 | 6 | 90-150 | 120-200 | | 160-180 | 80-140 | 120-220 | |
| | | vergütet *heat treated* | 275 | 7 | 90-130 | 110-180 | | 130-160 | 60-120 | 110-200 | |
| | | vergütet *heat treated* | 300 | 8 | 80-140 | 100-160 | | 110-140 | 60-110 | 100-180 | |
| | | vergütet *heat treated* | 350 | 9 | 80-130 | 100-140 | | 100-120 | 60-110 | 100-160 | |
| | hochlegierter Stahl *highly alloyed steel* | geglüht *annealed* | 200 | 10 | 90-140 | 90-130 | | 80-110 | 60-110 | 90-140 | |
| | | vergütet *heat treated* | 350 | 11 | 80-120 | 70-100 | | 65-90 | 60-100 | 70-110 | |
| | nichtrostender Stahl *corrosion-resistant steel* | geglüht *annealed* | 200 | 12 | 90-140 | 80-110 | | 80-100 | 80-130 | 80-120 | |
| | | vergütet *heat treated* | 350 | 13 | 80-120 | 70-100 | | 70-90 | 70-120 | 70-110 | |
| R (M) | rostfreier Stahl *stainless steel* | ferritisch / martensitisch / geglüht *ferritic / martensitic / annealed* | 200 | 14 | 140-180 | 140-220 | 105-125 | 80-110 | 110-200 | 140-240 | |
| | | austenitisch *austenitic* | 180 | 14 | 110-130 | 180-240 | 110-130 | 90-120 | 120-210 | 180-200 | |
| | | Duplex | 230-260 | 14 | - | 110-200 | 60-90 | 50-90 | 40-90 | 110-160 | |
| | | austenitisch/ferritisch *austenitic/ferritic* | 330 | 14 | 90-110 | 70-100 | 80-100 | 70-100 | 80-120 | 70-150 | |
| F (K) | Grauguss *grey cast iron* | perlitisch/ferritisch *pearlitic/ferritic* | 180 | 15 | | | | 180-250 | | 110-280 | |
| | | perlitisch/martensitisch *pearlitic/martensitic* | 260 | 16 | | | | 140-160 | | 120-260 | |
| | Grauguss mit Kugelgraphit *nodular cast iron* | ferritisch *ferritic* | 160 | 17 | | | | 160-185 | | 110-190 | |
| | | perlitisch *pearlitic* | 250 | 18 | | | | 100-120 | | 100-180 | |
| | Temperguss *malleable cast iron* | ferritisch *ferritic* | 130 | 19 | | | | 160-200 | | 180-280 | |
| | | perlitisch *pearlitic* | 230 | 20 | | | | 110-130 | | 140-220 | |
| N | Aluminium - Knetlegierungen *forging alloy* | nicht aushärtbar *not hardenable* | 60 | 21 | | | | | | | 150-1000 |
| | | aushärtbar *hardenable* | 100 | 22 | | | | | | | 100-800 |
| | Aluminium - Gusslegierungen *casting alloy* | nicht aushärtbar *not hardenable* < 12% Si | 80 | 23 | | | | | | | 100-800 |
| | | aushärtbar *hardenable* < 12% Si | 90 | 24 | | | | | | | 100-650 |
| | | nicht aushärtbar *not hardenable* > 12% Si | 130 | 25 | | | | | | | 80-300 |
| | Kupfer und Kupferlegierungen *copper and copper alloys* (Bronze, Messing) *(bronze, brass)* | Automatenlegierungen *free cutting alloys (1% Pb)* | - | 26 | | | | | | | 150-800 |
| | | Messing, Rotguss *brass, red bronze* | - | 27 | | | | | | | 150-600 |
| | | Bronze *bronze* | 90 | 28 | | | | | | | 100-500 |
| | | bleifreies Kupfer und Elektrolytkupfer *unleaded copper* | 100 | 29 | | | | | | | 150-800 |
| | nichtmetallische Werkstoffe *non metallic materials* | Duroplaste *thermoset* | 100 | 29 | | | | | | | 60-150 |
| | | faserverstärkte Kunststoffe *fiber reinforced plastic* | - | 29 | | | | | | | 60-120 |
| | | Hartgummi *ebonite* | - | 30 | | | | | | | 60-150 |

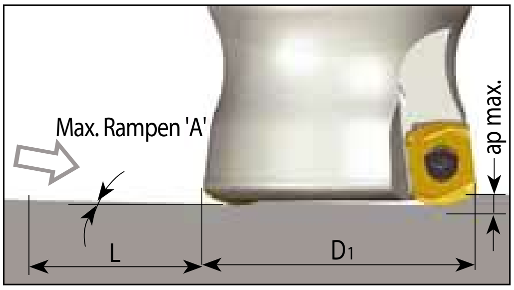
# Schnittwertempfehlungen
## *Cutting Data Recommendations*

| | **Werkstückwerkstoff** *Material* | **Legierung** *Alloy* | **Brinell-Härte** *hardness* **HB** | **VDI 3323** *Gruppe* | **Schnittgeschwindigkeiten /** *Cutting Speeds* $v_c$ [m/min] MM 5130+ (M30C) | MP 2135 (P35C) | MP 5430 (M30C) | MU 5130+ (P30C) MU 5230+ (P/M30C) MU 5630 (P30/M/K20C) | MK 1210 (K10) |
|---|---|---|---|---|---|---|---|---|---|
| A (P) | unlegierter Stahl *mild steel* | geglüht *annealed* ≤0,15% C | 125 | 1 | | 150-250 | 150-200 | 170-330 | |
| | | geglüht *annealed* 0,15% - 0,45% C | 150-250 | 2 | | 140-230 | 150-200 | 170-280 | |
| | | vergütet *heat treated* ≥0,45% C | 300 | 3 | | 140-200 | 100-150 | 160-250 | |
| | niedriglegierter Stahl *lower alloyed steel* | geglüht *annealed* | 180 | 6 | | 120-190 | 140-190 | 120-220 | |
| | | vergütet *heat treated* | 275 | 7 | | 120-200 | 80-150 | 110-200 | |
| | | vergütet *heat treated* | 300 | 8 | | 100-160 | 80-120 | 100-180 | |
| | | vergütet *heat treated* | 350 | 9 | | 90-150 | 60-100 | 100-160 | |
| | hochlegierter Stahl *highly alloyed steel* | geglüht *annealed* | 200 | 10 | | 90-130 | 100-170 | 90-140 | |
| | | vergütet *heat treated* | 350 | 11 | | 80-120 | 60-80 | 70-110 | |
| | nichtrostender Stahl *corrosion-resistant steel* | geglüht *annealed* | 200 | 12 | | 90-150 | 100-150 | 80-120 | |
| | | vergütet *heat treated* | 350 | 13 | | 80-130 | 80-140 | 70-110 | |
| R (M) | rostfreier Stahl *stainless steel* | ferritisch / martensitisch / geglüht *ferritic / martensitic / annealed* | 200 | 14 | 130-240 | 120-180 | 130-200 | 140-240 | |
| | | austenitisch *austenitic* | 180 | 14 | 130-190 | 120-170 | 80-180 | 180-200 | |
| | | Duplex | 230-260 | 14 | 60-280 | 80-140 | | 110-160 | |
| | | austenitisch/ferritisch *austenitic/ferritic* | 330 | 14 | 80-150 | 90-160 | | 70-150 | |
| F (K) | Grauguss *grey cast iron* | perlitisch/ferritisch *pearlitic/ferritic* | 180 | 15 | | | | 110-280 | |
| | | perlitisch/martensitisch *pearlitic/martensitic* | 260 | 16 | | | | 120-260 | |
| | Grauguss mit Kugelgraphit *nodular cast iron* | ferritisch *ferritic* | 160 | 17 | | | | 110-190 | |
| | | perlitisch *pearlitic* | 250 | 18 | | | | 100-180 | |
| | Temperguss *malleable cast iron* | ferritisch *ferritic* | 130 | 19 | | | | 180-280 | |
| | | perlitisch *pearlitic* | 230 | 20 | | | | 140-220 | |
| N | Aluminium - Knetlegierungen *forging alloy* | nicht aushärtbar *not hardenable* | 60 | 21 | | | | | 150-1000 |
| | | aushärtbar *hardenable* | 100 | 22 | | | | | 100-800 |
| | Aluminium - Gusslegierungen *casting alloy* | nicht aushärtbar *not hardenable* < 12% Si | 80 | 23 | | | | | 100-800 |
| | | aushärtbar *hardenable* < 12% Si | 90 | 24 | | | | | 100-650 |
| | | nicht aushärtbar *not hardenable* > 12% Si | 130 | 25 | | | | | 80-300 |
| | Kupfer und Kupferlegierungen *copper and copper alloys* (Bronze, Messing) *(bronze, brass)* | Automatenlegierungen *free cutting alloys (1% Pb)* | - | 26 | | | | | 150-800 |
| | | Messing, Rotguss *brass, red bronze* | - | 27 | | | | | 150-600 |
| | | Bronze *bronze* | 90 | 28 | | | | | 100-500 |
| | | bleifreies Kupfer und Elektrolytkupfer *unleaded copper* | 100 | 29 | | | | | 150-800 |
| | nichtmetallische Werkstoffe *non metallic materials* | Duroplaste *thermoset* | 100 | 29 | | | | | 60-150 |
| | | faserverstärkte Kunststoffe *fiber reinforced plastic* | - | 29 | | | | | 60-120 |
| | | Hartgummi *ebonite* | - | 30 | | | | | 60-150 |
| S | warmfeste Legierungen *heat resistant alloys* | Fe-Basis/*base* / geglüht *annealed* | 200 | 31 | | 50-90 | | 20-60 | |
| | | Fe-Basis/*base*(Incoloy)/ausgehärtet *hardened* | 280 | 32 | | 50-90 | | 20-60 | |
| | | Ni-Basis/*base* (Inconel)/geglüht *annealed* | 250 | 33 | | 40-80 | | 20-50 | |
| | | Ni- oder Co-Basis/ausgehärtet *hardened* | 30-58 HRC | 24 | | 40-70 | | 20-30 | |
| | | Ni- oder Co-Basis / gegossen *cast* | 1500-2200 $Nmm^2$ | 35 | 40-80 | 50-70 | | 20-30 | |
| | Titanlegierungen *titanium alloys* | Reintitan *Pure titanium* | $R_m$ 400 | 36 | 35-50 | 20-30 | | 30-60 | |
| | | Alpha- + Beta-Legierungen *alloys* | $R_m$ 1050 | 37 | | | | 20-30 | |

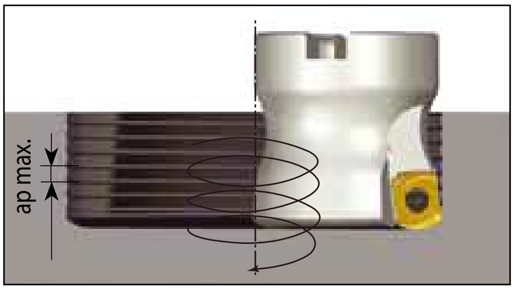
## Technische Daten zum Rampenfräsen
***Technical Data for Ramp Milling***

**BNMU 0603** **DM4-BN**

### Gerades Rampen
*Straight ramp milling*

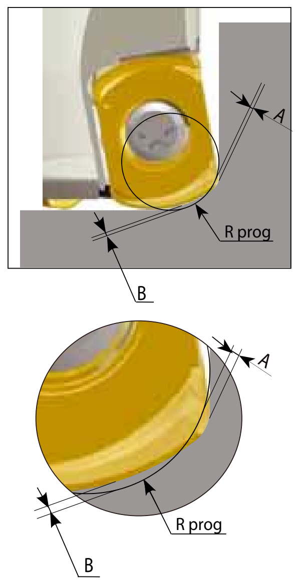



### Zirkulares Rampen
*Circular ramp milling*




<table>
<tr><th rowspan="2">Fräsen - Ø</th><th colspan="3">Gerades Abwärtsrampen</th><th colspan="3">Zirkulares Abwärtsrampen</th></tr>
<tr><th>Max. Rampen ('A')</th><th>$a_p$ max.</th><th>Min. Länge (L)</th><th>D min.</th><th>D max.</th><th>$a_p$ max.</th></tr>
<tr><td rowspan="2">16</td><td rowspan="2">3,0</td><td rowspan="2">0,7</td><td rowspan="2">13</td><td>23</td><td></td><td rowspan="4">0,7</td></tr>
<tr><td></td><td>32</td></tr>
<tr><td rowspan="2">17</td><td rowspan="2">2,7</td><td rowspan="2">0,7</td><td rowspan="2">15</td><td>25</td><td></td></tr>
<tr><td></td><td>34</td></tr>
<tr><td rowspan="2">20</td><td rowspan="2">1,5</td><td rowspan="2">1,0</td><td rowspan="2">38</td><td>31</td><td></td><td>0,8</td></tr>
<tr><td></td><td>40</td><td>1,0</td></tr>
<tr><td rowspan="2">21</td><td rowspan="2">1,5</td><td rowspan="2">1,0</td><td rowspan="2">38</td><td>33</td><td></td><td>0,8</td></tr>
<tr><td></td><td>42</td><td rowspan="15">1,0</td></tr>
<tr><td rowspan="2">25</td><td rowspan="2">1,4</td><td rowspan="2">1,0</td><td rowspan="2">41</td><td>41</td><td></td></tr>
<tr><td></td><td>50</td></tr>
<tr><td rowspan="2">26</td><td rowspan="2">1,3</td><td rowspan="2">1,0</td><td rowspan="2">44</td><td>43</td><td></td></tr>
<tr><td></td><td>52</td></tr>
<tr><td rowspan="2">32</td><td rowspan="2">1,0</td><td rowspan="2">1,0</td><td rowspan="2">57</td><td>61</td><td></td></tr>
<tr><td></td><td>70</td></tr>
<tr><td rowspan="2">35</td><td rowspan="2">0,9</td><td rowspan="2">1,0</td><td rowspan="2">62</td><td>57</td><td></td></tr>
<tr><td></td><td>66</td></tr>
<tr><td rowspan="2">40</td><td rowspan="2">0,9</td><td rowspan="2">1,0</td><td rowspan="2">64</td><td>71</td><td></td></tr>
<tr><td></td><td>80</td></tr>
<tr><td rowspan="2">42</td><td rowspan="2">0,7</td><td rowspan="2">1,0</td><td rowspan="2">72</td><td>75</td><td></td></tr>
<tr><td></td><td>84</td></tr>
<tr><td rowspan="2">50</td><td rowspan="2">0,6</td><td rowspan="2">1,0</td><td rowspan="2">96</td><td>91</td><td></td></tr>
<tr><td></td><td>100</td></tr>
</table>

## Programmierwerte zum Rampenfräsen
*Programming Values for Ramp Milling*




**A: Überschnitt**
**B: Unbearbeiteter Bereich**
**R prog: Programmierter Eckenradius**

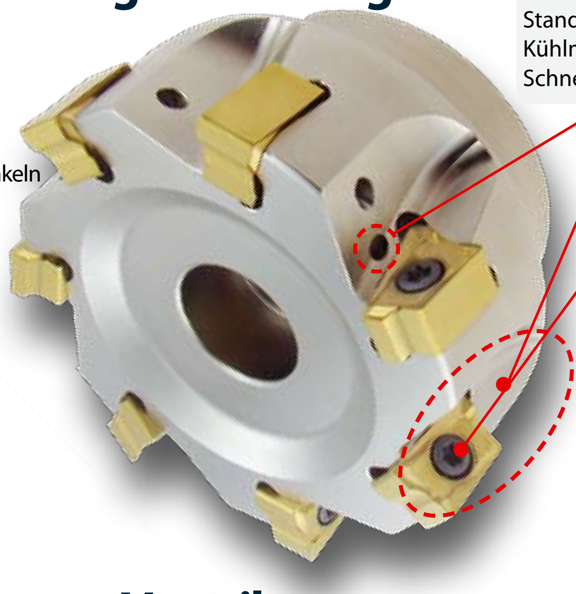
| R prog | A | B |
|---|---|---|
| 2,0 | 0,00 | 0,42 |
| 2,5 | 0,12 | 0,26 |
| 3,0 | 0,29 | 0,17 |

(mm)

| Werkstückwerkstoff *Material* | | | Schnittgeschwindigkeiten $v_c$ [m/min] *Cutting Speeds $v_c$ [m/min]* | | Zahnvorschub (mm / Z ) *Feedrate (mm/tooth)* | |
|---|---|---|---|---|---|---|
| | | | MP 6025 (P25C) | MP 6225 (P25C) | M21 | R20 |
| **A (P)** | Unlegierter Stahl *Mild steel* | ≤ 0,15% C | 100 - 180 | 140 - 260 | 0,20 - 2,00 | 0,30 - 2,50 |
| | | 0,15% - 0,45% C | 80 - 160 | 100 - 200 | | |
| | | ≥ 0,45% C | 60 - 130 | 80 - 200 | | |
| | Legierter Stahl *Alloyed steel* | niedrig / *low* | 80 - 160 | 120 - 200 | 0,20 - 1,50 | 0,25 - 2,00 |
| | | mittel / *medium* | 70 - 160 | 80 - 180 | | |
| | | hoch / *high* | 60 - 120 | 70 - 130 | | |
| **R (M)** | Rostfreier Stahl *Stainless steel* | austenitisch | 100 - 230 | 120 - 220 | 0,25 - 1,20 | 0,20 - 1,00 |
| | | martensitisch | 80 - 140 | 70 - 130 | | |
| **F (K)** | Grauguss *Grey cast iron* | | 100 - 140 | 120 - 240 | 0,20 - 2,00 | 0,30 - 2,50 |
| **N** | Aluminium | nicht aushärtbar *not hardenable* | - | - | - | - |
| | | aushärtbar *hardenable* | - | - | - | - |
| | | > 12% Si | - | - | - | - |
| | Bronze, Messing, Rotguss *Bronze, brass, red brass* | | - | - | - | - |

## System-Vorteile der Trägerwerkzeuge

- Doppelseitige WSP mit 4 Schneidecken
- WSP-Fräser mit starken Schneidplatten in negativer Einbaulage bei großen Spanwinkeln
- Multifunktionswerkzeuge zum Plan-, Eck-, Nutenfräsen und Besäumen



Innenkühlung:
Standmengenerhöhung durch Kühlmittelzuführung direkt zur Schneidecke

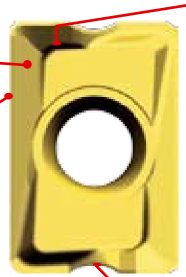
- Große Spankammern für leichten Spanaustrag
- Einfaches Einschraubsystem

## Wendeschneidplatten - Vorteile

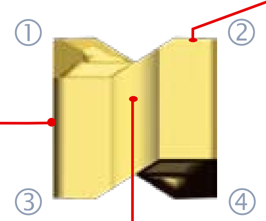
Spanbrecher:
Großer Spanwinkel für leichten Spanablauf

Geometrische Auslegung, verbesserte Spanlenkung durch geringe Zerspanrückkraft

Nebenschneide:
Besonderes Design zur Verbesserung der Oberfläche



Starke Anlagefläche
( Freiwinkel 0° )




Konkave Fläche:
Zur Vermeidung von Störungen der Schneidkanten untereinander

Hauptschneide:
Geringe Zerspankräfte durch positive Schneidkantenzurichtung

WSP 4-schneidig

## Spanstufe

| Spanstufe | Schneidkante | WSP | Anwendung |
|---|---|---|---|
| A11 | | | Fräsen von Aluminium, NE-Metallen und Kunststoffen, auch Grauguss; scharfe Schneidkante |
| M11 | | | Mittlere Bearbeitung von nichtrostendem Stahl |
| M12 | | | Stahlbearbeitung bis hin zu höher legierten Stählen |
| JT30/M20/M23 | | | Breiteste Universalzerspanung im gesamten Stahlbereich bis zur Bearbeitung von nichtrostendem Stahl |

| | Werkstückwerkstoff | Zusammensetzung /Gefüge Wärmebehandlung | | Brinell-Härte HB | VDI 3323 Gruppe | Schnittgeschwindigkeiten $v_c$ [m/min] MK1110 (K10) | MK 5115 (K15C) | MM 6040 (P/M40C) | MM 6130 (M30/ P30C) |
|---|---|---|---|---|---|---|---|---|---|
| A (P) | Unlegierter Stahl | geglüht | ≤ 0,15% C | 125 | 1 | - | - | 170 - 280 | 40 - 180 |
| | | geglüht | 0,15% - 0,45% C | 150 - 250 | 2 | - | - | 170 - 250 | 70 - 180 |
| | | vergütet | ≥ 0,45% C | 300 | 3 | - | - | 160 - 200 | 70 - 180 |
| | Niedriglegierter Stahl | geglüht | | 180 | 6 | - | - | 120 - 200 | 70 - 160 |
| | | vergütet | | 275 | 7 | - | - | 110 - 180 | 70 - 160 |
| | | vergütet | | 300 | 8 | - | - | 100 - 160 | 70 - 140 |
| | | vergütet | | 350 | 9 | - | - | 100 - 140 | 60 - 120 |
| | Hochlegierter Stahl | geglüht | | 200 | 10 | - | - | 90 - 130 | 70 - 90 |
| | | vergütet | | 350 | 11 | - | - | 70 - 100 | 70 - 90 |
| | Nichtrostender Stahl | geglüht | ferritisch | 200 | 12 | - | - | 80 - 110 | 90 - 120 |
| | | vergütet | martensitisch | 325 | 13 | - | - | 70 - 100 | 70 - 100 |
| R (M) | Rostfreier Stahl | geglüht | ferritisch / martensitisch | 200 | 14 | - | - | 140 - 220 | 90 - 130 |
| | | abgeschreckt | austenitisch | 180 | 14 | - | - | 180 - 240 | 90 - 130 |
| | | abgeschreckt | Duplex | 240 | 14 | - | - | 110 - 200 | - |
| | | ausgehärtet | martensitisch / austenitisch | 330 | 14 | - | - | 70 - 100 | 70 - 90 |
| F (K) | Grauguss | | perlitisch / ferritisch | 180 | 15 | - | 150 - 240 | - | - |
| | | | perlitisch / martensitisch | 260 | 16 | - | 150 - 190 | - | - |
| | Grauguss mit Kugelgraphit | | ferritisch | 160 | 17 | - | 115 - 150 | - | - |
| | | | perlitisch | - | 18 | - | 110 - 140 | - | - |
| | Temperguss | | ferritisch | 130 | 19 | - | 115 - 210 | - | - |
| | | | perlitisch | 230 | 20 | - | 110 - 180 | - | - |
| N | Aluminium - Knetlegierungen | nicht aushärtbar | | 60 | 21 | 150 - 1000 | - | - | - |
| | | aushärtbar | | 100 | 22 | 100 - 800 | - | - | - |
| | Aluminium - Gusslegierungen | nicht aushärtbar | < 12% Si | 80 | 23 | 100 - 800 | - | - | - |
| | | aushärtbar | < 12% Si | 90 | 24 | 100 - 650 | - | - | - |
| | | nicht aushärtbar | > 12% Si | 130 | 25 | 80 - 300 | - | - | - |
| | Kupfer und Kupferlegierungen (Bronze, Messing) | | Automatenlegierungen (1% Pb) | - | 26 | 150 - 800 | - | - | - |
| | | | Messing, Rotguss | - | 27 | 150 - 600 | - | - | - |
| | | | Bronze | 90 | 28 | 100 - 500 | - | - | - |
| | | | bleifreies Kupfer und Elektrolytkupfer | 100 | 29 | 150 - 800 | - | - | - |
| | Nichtmetallische Werkstoffe | | Duroplaste | 100 | 29 | 60 - 150 | - | - | - |
| | | | faserverstärkte Kunststoffe | - | 29 | 60 - 120 | - | - | - |
| | | | Hartgummi | - | 30 | 60 - 150 | - | - | - |
| S | Warmfeste Legierungen | geglüht | Fe-Basis | 200 | 31 | - | - | 20 - 40 | - |
| | | ausgehärtet | Fe-Basis | 280 | 32 | - | - | 15 - 36 | - |
| | | geglüht | Ni- oder Co-Basis | 250 | 33 | - | - | 10 - 30 | - |
| | | ausgehärtet | Ni- oder Co-Basis 30-58 HRC | - | 34 | - | - | 5 - 20 | - |
| | | gegossen | Ni- oder Co-Basis 1500-2200 Nmm² | - | 35 | - | - | 5 - 20 | - |
| | Titanlegierungen | | Reintitan | $R_m$ 440* | 36 | - | - | 80 - 140 | - |
| | | | Alpha- + Beta-Legierungen | $R_m$ 1050* | 37 | - | - | 20 - 40 | - |
| H | Gehärteter Stahl | gehärtet und angelassen | | 55 HRC | 38 | - | - | - | - |
| | | gehärtet und angelassen | | 60 HRC | 39 | - | - | - | - |
| | Hartguss | gegossen | | 400 | 40 | - | - | - | - |
| | Gehärtetes Gusseisen | gehärtet und angelassen | | 55 HRC | 40 | - | - | - | - |

*** $R_m$** = Zugfestigkeit, gemessen in MPa

## Schnittwertempfehlungen
*Cutting Data Recommendations*

**LN.X 1006**
**LN.X 1508**

**DM4-10**
**DM4-15**

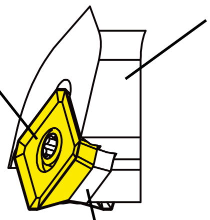
| | Werkstückwerkstoff | Zusammensetzung /Gefüge Wärmebehandlung | | Brinell-Härte HB | VDI 3323 Gruppe | Schnittgeschwindigkeiten $v_c$ [m/min] MP 5330+ (P30C) | MP 6025 (P25C) | MP 6045 (P45C) |
|---|---|---|---|---|---|---|---|---|
| A (P) | Unlegierter Stahl | geglüht | ≤ 0,15% C | 125 | 1 | 180 - 400 | 150 - 200 | 170 - 230 |
| | | geglüht | 0,15% - 0,45% C | 150 - 250 | 2 | 170 - 350 | 150 - 200 | 150 - 180 |
| | | vergütet | ≥ 0,45% C | 300 | 3 | 140 - 200 | 100 - 150 | 110 - 150 |
| | Niedriglegierter Stahl | geglüht | | 180 | 6 | 120 - 300 | 140 - 190 | 160 - 190 |
| | | vergütet | | 275 | 7 | 120 - 210 | 80 - 150 | 80 - 140 |
| | | vergütet | | 300 | 8 | 110 - 200 | 80 - 120 | 70 - 130 |
| | | vergütet | | 350 | 9 | 100 - 180 | 60 - 100 | 60 - 120 |
| | Hochlegierter Stahl | geglüht | | 200 | 10 | 70 - 200 | 100 - 170 | 110 - 200 |
| | | vergütet | | 350 | 11 | 70 - 130 | 60 - 80 | 40 - 80 |
| | Nichtrostender Stahl | geglüht | ferritisch | 200 | 12 | 80 - 200 | 100 - 150 | 130 - 170 |
| | | vergütet | martensitisch | 325 | 13 | 80 - 180 | 80 - 140 | 100 - 160 |
| R (M) | Rostfreier Stahl | geglüht | ferritisch / martensitisch | 200 | 14 | 170 - 250 | 130 - 200 | 130 - 200 |
| | | abgeschreckt | austenitisch | 180 | 14 | 170 - 270 | 80 - 180 | 90 - 190 |
| | | abgeschreckt | Duplex | 240 | 14 | 120 - 210 | - | 70 - 150 |
| | | ausgehärtet | martensitisch / austenitisch | 330 | 14 | 100 - 180 | - | 40 - 60 |
| F (K) | Grauguss | | perlitisch / ferritisch | 180 | 15 | 170 -280 | - | - |
| | | | perlitisch / martensitisch | 260 | 16 | 170 - 250 | - | - |
| | Grauguss mit Kugelgraphit | | ferritisch | 160 | 17 | 150 - 230 | - | - |
| | | | perlitisch | - | 18 | 150 - 190 | - | - |
| | Temperguss | | ferritisch | 130 | 19 | 120 - 230 | - | - |
| | | | perlitisch | 230 | 20 | 120 - 190 | - | - |
| N | Aluminium - Knetlegierungen | nicht aushärtbar | | 60 | 21 | - | - | - |
| | | aushärtbar | | 100 | 22 | - | - | - |
| | Aluminium - Gusslegierungen | nicht aushärtbar | < 12% Si | 80 | 23 | - | - | - |
| | | aushärtbar | < 12% Si | 90 | 24 | - | - | - |
| | | nicht aushärtbar | > 12% Si | 130 | 25 | - | - | - |
| | Kupfer und Kupferlegierungen (Bronze, Messing) | | Automatenlegierungen (1% Pb) | - | 26 | - | - | - |
| | | | Messing, Rotguss | - | 27 | - | - | - |
| | | | Bronze | 90 | 28 | - | - | - |
| | | | bleifreies Kupfer und Elektrolytkupfer | 100 | 29 | - | - | - |
| | Nichtmetallische Werkstoffe | | Duroplaste | 100 | 29 | - | - | - |
| | | | faserverstärkte Kunststoffe | - | 29 | - | - | - |
| | | | Hartgummi | - | 30 | - | - | - |
| S | Warmfeste Legierungen | geglüht | Fe-Basis | 200 | 31 | 40 - 60 | 20 - 40 | 20 - 45 |
| | | ausgehärtet | Fe-Basis | 280 | 32 | 35 - 50 | 15 - 40 | 20 - 40 |
| | | geglüht | Ni- oder Co-Basis | 250 | 33 | 25 - 40 | 8 - 20 | 8 - 22 |
| | | ausgehärtet | Ni- oder Co-Basis 30-58 HRC | - | 34 | 15 - 35 | 4 - 15 | 4 - 16 |
| | | gegossen | Ni- oder Co-Basis 1500-2200 $Nmm^2$ | - | 35 | 10 - 25 | 4 - 15 | 4 - 16 |
| | Titanlegierungen | | Reintitan | $R_m$ 440* | 36 | 35 - 60 | 80 - 140 | 80 - 140 |
| | | | Alpha- + Beta-Legierungen | $R_m$ 1050* | 37 | 28 - 40 | 15 - 35 | 15 - 35 |
| H | Gehärteter Stahl | gehärtet und angelassen | | 55 HRC | 38 | - | - | - |
| | | gehärtet und angelassen | | 60 HRC | 39 | - | - | - |
| | Hartguss | gegossen | | 400 | 40 | - | - | - |
| | Gehärtetes Gusseisen | gehärtet und angelassen | | 55 HRC | 40 | - | - | - |

* $R_m$ = Zugfestigkeit, gemessen in MPa

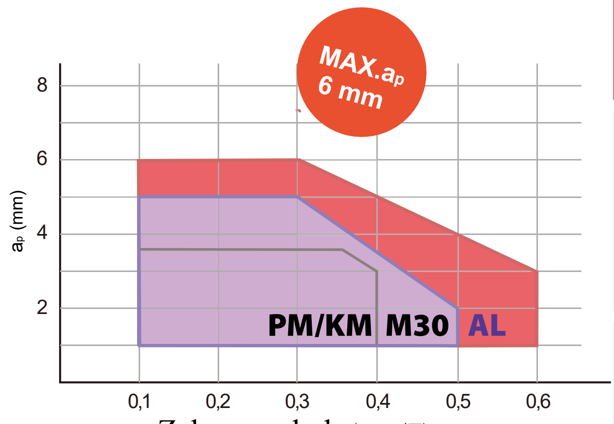
# System - Vorteile
## *System - Advantages*

Hochpositive Wendeschneidplatten
*High positive milling inserts*

Fräserkörper mit Kühlkanälen
*Miller body with coolant channels*



Unterlagsplatte
*Shim*



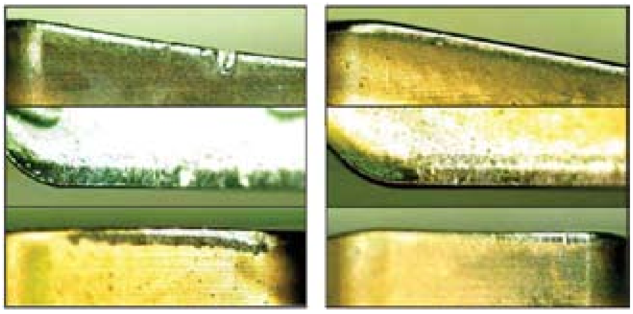

# Schnittwertempfehlungen
## *Cutting Data Recommendations*

| Werkstückwerkstoff *Material* | | | Schnittgeschwindigkeiten $v_c$ [m/min] *Cutting Speeds* $v_c$ *[m/min]* | | | | Zahnvorschub (mm / Z) *Feedrate (mm/tooth)* | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | MK 1210 (K10) | MM 5125 (M25C) | new! MM 5130 (M30C) | new! MU 5125 (P/M/K25C) | M30 | PM/KM | AL |
| A (P) | Unlegierter Stahl *Mild steel* | ≤ 0,15% C | - | 170 - 330 | - | 170 - 330 | | - | - |
| | | 0,15% - 0,45% C | - | 170 - 280 | - | 170 - 280 | - | 0,20 - 0,50 | - |
| | | ≥ 0,45% C | - | 160 - 250 | - | 160 - 250 | | 0,15 - 0,32 | - |
| | Legierter Stahl *Alloyed steel* | niedrig / *low* | - | 100 - 180 | - | 100 - 180 | | | - |
| | | mittel / *medium* | - | 70 - 150 | - | 70 - 150 | - | 015 - 0,25 | - |
| | | hoch / *high* | - | 70 - 140 | - | 70 - 140 | | | - |
| R (M) | Rostfreier Stahl *Stainless steel* | austenitisch | - | 110 - 190 | 130 - 220 | 110 - 190 | 0,20 - 0,50 | 013 - 0,30 | - |
| | | martensitisch | - | 90 - 120 | 80 - 180 | 90 - 120 | 0,10 - 0,40 | 010 - 0,25 | - |
| F (K) | Grauguss *Grey cast iron* | | - | - | - | 110 - 200 | - | 010 - 0,40 | - |
| N | Aluminium | nicht aushärtbar *not hardenable* | 150 - 1000 | - | - | - | - | - | 0,10 - 0,60 |
| | | aushärtbar *hardenable* | 100 - 800 | - | - | - | - | - | 0,10 - 0,40 |
| | | > 12% Si | 80 - 650 | - | - | - | - | - | 0,10 - 0,20 |
| | Bronze, Messing, Rotguss *Bronze, brass, red brass* | | 100 - 600 | - | - | - | - | - | 0,10 - 0,40 |
| S | Warmfeste Legierungen | Fe-Basis geglüht | - | 60 - 90 | 60 - 90 | - | 0,10 - 0,25 | - | - |
| | | Fe-Basis ausgehärtet | - | 60 - 80 | 60 - 80 | - | 0,10 - 0,20 | - | - |
| | Titanlegierungen | Reintitan | - | 35 - 50 | 35 - 50 | - | 0,10 - 0,15 | - | - |
| | | Alpha- + Beta-Legierungen | - | - | - | - | - | - | - |

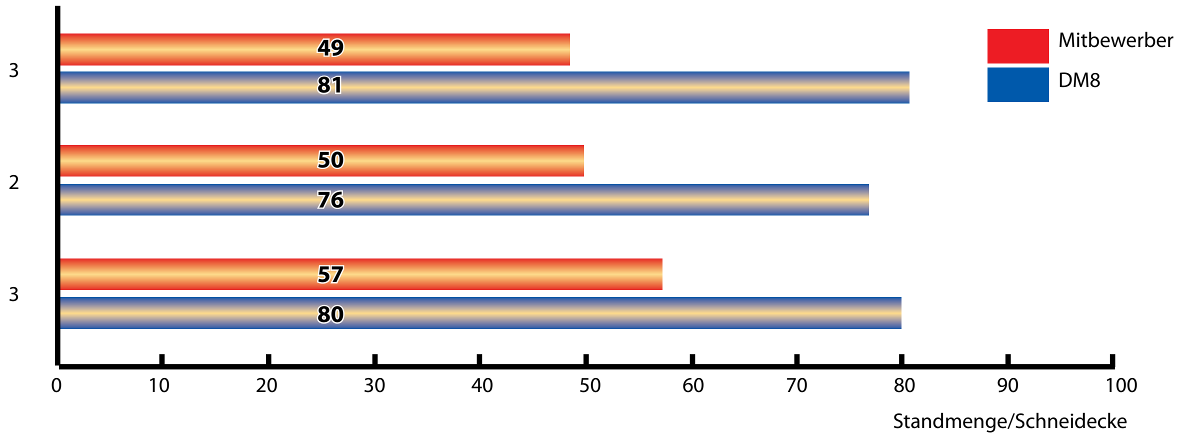
# Anwendungsbeispiel

- **Schnittbedingungen**

**Fräser-Typ** : S2267.160 R12IK
**WSP** : SNMX1206ANN-M20/MK2015
**Werkstück** : Dieselmotorenteil (Sphäroguss)
**Vc** : 200 m/min
**f** : 0.21 mm / Zahn
**ap** : 3.0 mm
**Maschine** : Bearbeitungszentrum



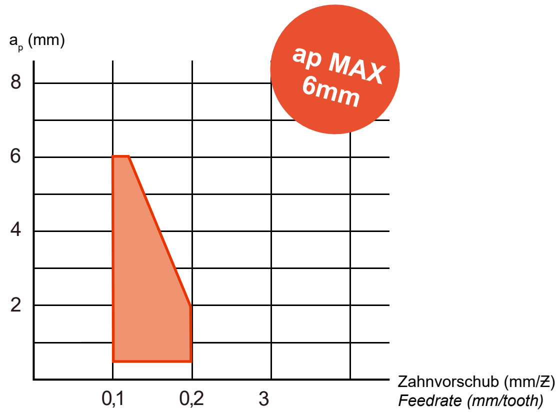
**Mitbewerber** **DM8**



# Schnittwertempfehlungen
*Cutting Data Recommendations*

**SN.X 1206** **DM8**

| | Werkstückwerkstoff *Material* | Legierung *Alloy* | Brinell-Härte *Hardness* HB | VDI 3323 Gruppe | Schnittgeschwindigkeiten / *Cutting Speeds* $v_c$ [m/min] MK 1110 (K10) | MK 5115 (K15C) | MM 5130 (M30C) | MP 5330 (P30C) | MU 5130+ (P/M30C) |
|---|---|---|---|---|---|---|---|---|---|
| **A (P)** | unlegierter Stahl *mild steel* | geglüht *annealed* ≤0,15% C | 125 | 1 | | | 80 - 250 | 150 - 200 | 170 - 330 |
| | | geglüht *annealed* 0,15% - 0,45% C | 150-250 | 2 | | | | 150 - 200 | 170 - 280 |
| | | vergütet *heat treated* ≥0,45% C | 300 | 3 | | | | 100 - 150 | 160 - 250 |
| | niedriglegierter Stahl *lower alloyed steel* | geglüht *annealed* | 180 | 6 | | | | 140 - 190 | 120 - 220 |
| | | vergütet *heat treated* | 275 | 7 | | | | 80 - 150 | 110 - 200 |
| | | vergütet *heat treated* | 300 | 8 | | | | 80 - 120 | 100 - 180 |
| | | vergütet *heat treated* | 350 | 9 | | | | 60 - 100 | 100 - 160 |
| | hochlegierter Stahl *highly alloyed steel* | geglüht *annealed* | 200 | 10 | | | | 100 - 170 | 90 - 140 |
| | | vergütet *heat treated* | 350 | 11 | | | | 60 - 80 | 70 - 110 |
| | nichtrostender Stahl *corrosion-resistant steel* | geglüht *annealed* | 200 | 12 | | | | 100 - 150 | 80 - 120 |
| | | vergütet *heat treated* | 350 | 13 | | | | 80 - 140 | 70 - 110 |
| **R (M)** | rostfreier Stahl *stainless steel* | ferritisch / martensitisch / geglüht *ferritic / martensitic / annealed* | 200 | 14 | | | 130 - 240 | 130 - 200 | 140 - 240 |
| | | austenitisch *austenitic* | 180 | 14 | | | 130 - 190 | 80 - 180 | 180 - 200 |
| | | Duplex | 230-260 | 14 | | | 60 - 210 | | 110 - 160 |
| | | austenitisch / *ferritisch* austenitic / *ferritic* | 330 | 14 | | | 80 - 150 | | 70 - 150 |
| **F (K)** | Grauguss *grey cast iron* | perlitisch / *ferritisch* pearlitic / *ferritic* | 180 | 15 | | 80 - 180 | | | |
| | | perlitisch / *martensitisch* pearlitic / *martensitic* | 260 | 16 | | 70 - 160 | | | |
| | Grauguss mit Kugelgraphit *nodular cast iron* | ferritisch *ferritic* | 160 | 17 | | 90 - 150 | | | |
| | | perlitisch *pearlitic* | 250 | 18 | | 80 - 140 | | | |
| | Temperguss *malleable cast iron* | ferritisch *ferritic* | 130 | 19 | | 100 - 160 | | | |
| | | perlitisch *pearlitic* | 230 | 20 | | 90 - 150 | | | |
| **N** | Aluminium - Knetlegierungen *forging alloy* | nicht aushärtbar *not hardenable* | 60 | 21 | 150 - 1000 | | | | |
| | | aushärtbar *hardenable* | 100 | 22 | 100 - 800 | | | | |
| | Aluminium - Gusslegierungen *casting alloy* | nicht aushärtbar *not hardenable* < 12% Si | 80 | 23 | 100 - 800 | | | | |
| | | aushärtbar *hardenable* < 12% Si | 90 | 24 | 100 - 650 | | | | |
| | | nicht aushärtbar *not hardenable* > 12% Si | 130 | 25 | 80 - 300 | | | | |
| | Kupfer und Kupferlegierungen *copper and copper alloys* (Bronze, Messing) *(bronze, brass)* | Automatenlegierungen *free cutting alloys (1% Pb)* | - | 26 | 150 - 800 | | | | |
| | | Messing, Rotguss *brass, red bronze* | - | 27 | 150 - 600 | 250 - 800 | | | |
| | | Bronze *bronze* | 90 | 28 | 100 - 500 | | | | |
| | | bleifreies Kupfer und Elektrolytkupfer *unleaded copper* | 100 | 29 | 150 - 800 | | | | |
| | nichtmetallische Werkstoffe *non metallic materials* | Duroplaste *thermoset* | 100 | 29 | 60 - 150 | | | | |
| | | faserverstärkte Kunststoffe *fiber reinforced plastic* | - | 29 | 60 - 120 | | | | |
| | | Hartgummi *ebonite* | - | 30 | 60 - 150 | | | | |
| **S** | warmfeste Legierungen *heat resistant alloys* | Fe-Basis/*base* / geglüht *annealed* | 200 | 31 | | | 30 - 80 | 20 - 40 | |
| | | Fe-Basis/*base (Incoloy)* / ausgehärtet *hardened* | 280 | 32 | | | 30 - 70 | 15 - 40 | |
| | | Ni-Basis/*base (Inconel)* / geglüht *annealed* | 250 | 33 | | | 25 - 70 | 8 - 20 | |
| | | Ni- oder Co-Basis / ausgehärtet *hardened* | 30-58 HRC | 34 | | | 30 - 60 | 4 - 15 | |
| | | Ni- oder Co-Basis / gegossen *cast* | 1500-2200 $Nmm^2$ | 35 | | | 25 - 60 | 4 - 15 | |
| | Titanlegierungen *titanium alloys* | Reintitan Pure titanium | $R_m$ 400 | 36 | | | 50 - 130 | 80 - 140 | |
| | | Alpha- + Beta-Legierungen *alloys* | $R_m$ 1050 | 37 | | | 30 - 90 | 15 - 35 | |
| **H** | gehärteter Stahl *hardened steel* | gehärtet und angelassen | 55 HRC | 38 | | | | | |
| | | *hardened and tempered* | 60 HRC | 39 | | | | | |
| | Hartguss *chilled cast iron* | gegossen *cast* | 400 | 40 | | | | | |
| | Gehärtetes Gusseisen *hardened cast iron* | gehärtet und angelassen *hardened and tempered* | 55 HRC | 40 | | | | | |



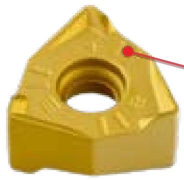

# Schnittwertempfehlungen
## *Cutting Data Recommendations*

| **Werkstückwerkstoff** *Material* | | | **Schnittgeschwindigkeiten $v_c$ [m/min]** *Cutting Speeds $v_c$ [m/min]* | | | **Zahnvorschub (mm / Ƶ )** *Feedrate (mm/tooth)* |
|---|---|---|---|---|---|---|
| | | | **DP 5220 (P25C)** | **DM 5125 (M25/P25C)** | **DK 1210 (K10)** | **SP.. 09** |
| **A (P)** | Unlegierter Stahl *Mild steel* | ≤ 0,15% C<br>0,15% - 0,45% C<br>≥ 0,45% C | 160 - 250 | 140 - 200 | - | 0,10 - 0,20 |
| **A (P)** | Legierter Stahl *Alloyed steel* | niedrig / *low*<br>mittel / *medium*<br>hoch / *high* | 90 - 180 | 80 - 180 | - | 0,10 - 0,17 |
| **R (M)** | Rostfreier Stahl *Stainless steel* | austenitisch<br>martensitisch | (80 - 140) | 80 - 200 | - | 0,12 - 0,15 |
| **F (K)** | Grauguss *Grey cast iron* | | - | - | - | (0,10 - 0,15) |
| **N** | Aluminium | | - | (120 - 350) | 310 - 360 | (0,12 - 0,20) |
| **N** | Kupfer *Copper* | | | | 230 - 290 | |
| **S** | warmfeste Legierungen *heat resistant alloys* | | - | 20 - 45 | - | 0,10 - 0,12 |
| **S** | Titanlegierung *Titanium-alloy* | | | | | |

# Schnittwertempfehlungen
## *Cutting Data Recommendations*

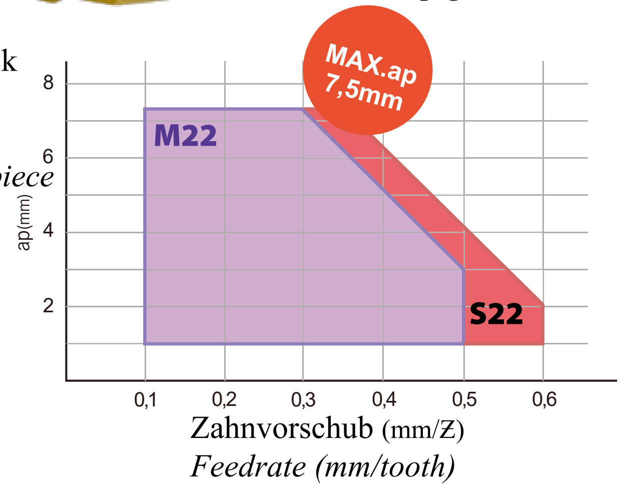
| Werkstückwerkstoff *Material* | | | Schnittgeschwindigkeiten $v_c$ [m/min] *Cutting Speeds $v_c$ [m/min]* MM 5140 (M40C) | Schnittgeschwindigkeiten $v_c$ [m/min] *Cutting Speeds $v_c$ [m/min]* MU 5230+ (P/M30C) | Zahnvorschub (mm / Z) *Feedrate (mm/tooth)* Niro *Stainless Steel* | Zahnvorschub (mm / Z) *Feedrate (mm/tooth)* Universal |
|---|---|---|---|---|---|---|
| A (P) | Unlegierter Stahl *Mild steel* | ≤ 0,15% C | 120 - 200 | 150 - 300 | 0,12 - 0,30 | 0,10 - 0,25 |
| | | 0,15% - 0,45% C | 90 - 170 | 120 - 240 | | |
| | | ≥ 0,45% C | 80 - 150 | 100 - 220 | | |
| | Legierter Stahl *Alloyed steel* | niedrig / *low* | 100 - 180 | 120 - 220 | 0,10 - 0,25 | 0,10 - 0,20 |
| | | mittel / *medium* | 80 - 160 | 100 - 200 | | |
| | | hoch / *high* | 70 - 120 | 80 - 140 | | |
| R (M) | Rostfreier Stahl *Stainless steel* | austenitisch | 120 - 240 | 130 - 250 | 0,10 - 0,30 | 0,10 - 0,25 |
| | | martensitisch | 80 - 140 | 70 - 130 | | |
| F (K) | Grauguss *Grey cast iron* | | - | - | - | - |
| N | Aluminium | nicht aushärtbar *not hardenable* | - | - | - | - |
| | | aushärtbar *hardenable* | - | - | - | - |
| | | > 12% Si | - | - | - | - |
| | Bronze, Messing, Rotguss *Bronze, brass, red brass* | | - | - | - | - |

# System - Vorteile
## *System - Advantages*



Stabile Klemmung und gute Spanführung
*Rigid clamping and excellent chip guidance*

Abfallende Schneidkante reduziert Schnittkräfte beim Eintritt in das Werkstück
*Decreasing cutting edge reduces cutting force while approaching the workpiece*




# Schnittwertempfehlungen
## *Cutting Data Recommendations*

| Werkstückwerkstoff *Material* | | | Schnittgeschwindigkeiten $v_c$ [m/min] *Cutting Speeds $v_c$ [m/min]* | | | | Zahnvorschub (mm / Z) *Feedrate (mm/tooth)* | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | MK 1210 (K10) | MM 5140 (M40C) | MP 2130 (P30C) | MU 5230+ (P/M30C) | M22 | S22 | AL |
| A (P) | Unlegierter Stahl *Mild steel* | ≤ 0,15% C | - | 100 - 200 | 80 - 180 | 100 - 200 | 0,14 - 0,50 | 0,16 - 0,60 | - |
| | | 0,15% - 0,45% C | - | 80 - 200 | 70 - 160 | 80 - 200 | | | - |
| | | ≥ 0,45% C | - | 60 - 180 | 60 - 150 | 60 - 180 | | | - |
| | Legierter Stahl *Alloyed steel* | niedrig / *low* | - | 80 - 150 | 100 - 160 | 80 - 150 | 0,10 - 0,25 | 0,10 - 0,30 | - |
| | | mittel / *medium* | - | 60 - 140 | 80 - 150 | 60 - 140 | | | - |
| | | hoch / *high* | - | 50 - 100 | 60 - 120 | 70 - 100 | | | - |
| R (M) | Rostfreier Stahl *Stainless steel* | austenitisch | - | 100 - 200 | 70 - 155 | 80 - 180 | 0,10 - 0,25 | 0,10 - 0,30 | - |
| | | martensitisch | - | 80 - 180 | 60 - 145 | 70 - 160 | | | - |
| F (K) | Grauguss *Grey cast iron* | | 100 - 140 | - | - | - | - | - | - |
| N | Aluminium | nicht aushärtbar *not hardenable* | 90 - 500 | - | - | - | - | - | 0,14 - 0,50 |
| | | aushärtbar *hardenable* | 90 - 250 | - | - | - | - | - | 0,10 - 0,30 |
| | | > 12% Si | 80 - 200 | - | - | - | - | - | 0,10 - 0,20 |
| | Bronze, Messing, Rotguss *Bronze, brass, red brass* | | 60 - 200 | - | - | - | - | - | 0,10 - 0,30 |

# Schnittwertempfehlungen
*Cutting Data Recommendations*

| **Werkstückwerkstoff** *Material* | | | **Schnittgeschwindigkeiten $v_c$ [m/min]** *Cutting Speeds $v_c$ [m/min]* | |
|---|---|---|---|---|
| | | | **MU 6325 (P35/M25C)** | **MM 6330 (M30/P35C)** |
| **A (P)** | Unlegierter Stahl *Mild steel* | ≤ 0,15% C<br>0,15% - 0,45% C<br>≥ 0,45% C | 160 - 250 | (120 - 180) |
| **A (P)** | Legierter Stahl *Alloyed steel* | niedrig / *low*<br>mittel / *medium*<br>hoch / *high* | 90 - 180 | (80 - 150) |
| **R (M)** | Rostfreier Stahl *Stainless steel* | austenitisch<br>martensitisch | (80 - 140) | 80 - 120 |
| **F (K)** | Grauguss *Grey cast iron* | | (100-180) | (180 - 300) |
| **S** | warmfeste Legierungen *heat resistant alloys* | | (20-60) | (20-45) |
| **S** | Titanlegierung *Titanium-alloy* | | (30-60) | (40-80) |
| **H** | Gehärteter Stahl *Hardened steel* | | 40-60 | - |

## Schnittdaten-Empfehlungen zum Fräsen - generell -
## *Cutting Data Recommendations for Milling - in generel -*

| | Werkstückwerkstoff *Material* | Legierung *Alloy* | Brinell-Härte *Hardness* HB | VDI 3323 Gruppe | MK 1110 MK 1210 MK 1320 (K10) | MK 5115 (K15C) | MM 5120 (M20C) |
|---|---|---|---|---|---|---|---|
| **A (P)** | unlegierter Stahl *mild steel* | geglüht *annealed* ≤ 0,15% C | 125 | 1 | | | |
| | | geglüht *annealed* 0,15% - 0,45% C | 150-250 | 2 | | | |
| | | vergütet *heat treated* ≥ 0,45% C | 300 | 3 | | | |
| | niedriglegierter Stahl *lower alloyed steel* | geglüht *annealed* | 180 | 6 | | | |
| | | vergütet *heat treated* | 275 | 7 | | | |
| | | vergütet *heat treated* | 300 | 8 | | | |
| | | vergütet *heat treated* | 350 | 9 | | | |
| | hochlegierter Stahl *highly alloyed steel* | geglüht *annealed* | 200 | 10 | | | |
| | | vergütet *heat treated* | 350 | 11 | | | |
| | nichtrostender Stahl *corrosion-resistant steel* | geglüht *annealed* | 200 | 12 | | | |
| | | vergütet *heat treated* | 350 | 13 | | | |
| **R (M)** | rostfreier Stahl *stainless steel* | ferritisch / martensitisch / geglüht *ferritic / martensitic / annealed* | 200 | 14 | | | |
| | | austenitisch *austenitic* | 180 | 14 | | | 130 - 220 |
| | | Duplex | 230-260 | 14 | | | |
| | | austenitisch / *ferritisch* austenitic / *ferritic* | 330 | 14 | | | 80 - 180 |
| **F (K)** | Grauguss *grey cast iron* | perlitisch / *ferritisch pearlitic / ferritic* | 180 | 15 | | 150 - 240 | |
| | | perlitisch / *martensitisch* pearlitic / *martensitic* | 260 | 16 | | 150 - 190 | |
| | Grauguss mit Kugelgraphit *nodular cast iron* | ferritisch *ferritic* | 160 | 17 | | 115 - 150 | |
| | | perlitisch *pearlitic* | 250 | 18 | | 110 - 140 | |
| | Temperguss *malleable cast iron* | ferritisch *ferritic* | 130 | 19 | | 115 - 210 | |
| | | perlitisch *pearlitic* | 230 | 20 | | 110 - 180 | |
| **N** | Aluminium - Knetlegierungen *forging alloy* | nicht aushärtbar *not hardenable* | 60 | 21 | 150 - 1000 | | |
| | | aushärtbar *hardenable* | 100 | 22 | 100 - 800 | | |
| | Aluminium - Gusslegierungen *casting alloy* | nicht aushärtbar *not hardenable* < 12% Si | 80 | 23 | 100 - 800 | | |
| | | aushärtbar *hardenable* < 12% Si | 90 | 24 | 100 - 650 | | |
| | | nicht aushärtbar *not hardenable* > 12% Si | 130 | 25 | 80 - 300 | | |
| | Kupfer und Kupferlegierungen *copper and copper alloys* (Bronze, Messing) *(bronze, brass)* | Automatenlegierungen *free cutting alloys (1% Pb)* | - | 26 | 150 - 800 | | |
| | | Messing, Rotguss *brass, red bronze* | - | 27 | 150 - 600 | | |
| | | Bronze *bronze* | 90 | 28 | 100 - 500 | | |
| | | bleifreies Kupfer und Elektrolytkupfer *unleaded copper* | 100 | 29 | 150 - 800 | | |
| | nichtmetallische Werkstoffe *non metallic materials* | Duroplaste *thermoset* | 100 | 29 | 60 - 150 | | |
| | | faserverstärkte Kunststoffe *fiber reinforced plastic* | - | 29 | 60 - 120 | | |
| | | Hartgummi *ebonite* | - | 30 | 60 - 150 | | |
| **S** | warmfeste Legierungen *heat resistant alloys* | Fe-Basis/*base* / geglüht *annealed* | 200 | 31 | | | 60 - 90 |
| | | Fe-Basis/*base (Incoloy)* / ausgehärtet *hardened* | 280 | 32 | | | |
| | | Ni-Basis/*base (Inconel)* / geglüht *annealed* | 250 | 33 | | | |
| | | Ni- oder Co-Basis / ausgehärtet *hardened* | 30-58 HRC | 34 | | | 60 - 80 |
| | | Ni- oder Co-Basis / gegossen *cast* | 1500-2200 $Nmm^2$ | 35 | | | |
| | Titanlegierungen *titanium alloys* | Reintitan Pure titanium | $R_m$ 400 | 36 | | | 35 - 50 |
| | | Alpha- + Beta-Legierungen *alloys* | $R_m$ 1050 | 37 | | | |
| **H** | gehärteter Stahl *hardened steel* | gehärtet und angelassen *hardened and tempered* | 55 HRC | 38 | | | |
| | | | 60 HRC | 39 | | | |
| | Hartguss *chilled cast iron* | gegossen *cast* | 400 | 40 | | | |
| | Gehärtetes Gusseisen *hardened cast iron* | gehärtet und angelassen *hardened and tempered* | 55 HRC | 40 | | | |

## Schnittdaten-Empfehlungen zum Fräsen - generell -
## *Cutting Data Recommendations for Milling - in generel -*

**Schnittgeschwindigkeiten / *Cutting Speeds***
**$v_c$ [m/min]**

| MM 5125<br>(M25C) | MM 5130<br>(M30C) | MM 5140<br>(M40C) | MM 6040<br>(P/M40C) | MM 6130<br>(M30/P30C) | MM 6330<br>(M30/P35C) | MP 1225<br>(P25) | MP 2130<br>(P30C) | MP 2135<br>(P25) | MP 5330<br>MP 5430<br>(P30C) | MP 6025<br>MP 6125<br>MP 6225<br>(P25C) | MP 6045<br>(P45C) | MU 5130+<br>MU 5230+<br>MU 5430<br>MU 5630 | MU 6325<br>(P35/M25C) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 80 - 250 | 120 - 200 | 170 - 280 | 40 - 180 | 120 - 180 | 80 - 160 | 150 - 300 | 150 - 250 | 150 - 200 | 180 - 400 | 160 - 280 | 170 - 330 | 160 - 250 |
| | | 90 - 170 | 170 - 250 | 70 - 180 | 120 - 180 | 70 - 140 | 140 - 280 | 140 - 230 | 150 - 200 | 170 - 350 | 150 - 250 | 170 - 280 | 160 - 250 |
| | | 80 - 150 | 160 - 200 | 70 - 180 | 120 - 180 | 70 - 110 | 140 - 250 | 140 - 200 | 100 - 150 | 140 - 200 | 100 - 150 | 160 - 250 | 160 - 250 |
| | | 100 - 180 | 120 - 200 | 70 - 160 | 80 - 150 | 80 - 120 | 140 - 250 | 120 - 190 | 140 - 190 | 120 - 300 | 110 - 230 | 120 - 220 | 90 - 180 |
| | | | 110 - 180 | 70 - 160 | 80 - 150 | 70 - 100 | 120 - 220 | 120 - 200 | 80 - 150 | 120 - 210 | 100 - 180 | 110 - 200 | 90 - 180 |
| | | | 100 - 160 | 70 - 140 | 80 - 150 | 70 - 90 | 120 - 190 | 100 - 160 | 80 - 120 | 110 - 200 | 90 - 180 | 100 - 180 | 90 - 180 |
| | | 80 - 160 | 100 - 140 | 60 - 120 | 80 - 150 | 60 - 80 | 110 - 170 | 90 - 150 | 60 - 100 | 100 - 180 | 70 - 150 | 100 - 160 | 90 - 180 |
| | | | 90 - 130 | 70 - 90 | 80 - 150 | 80 - 130 | 100 - 160 | 90 - 130 | 100 - 170 | 70 - 200 | 70 - 200 | 90 - 140 | 90 - 180 |
| | | 70 - 120 | 70 - 100 | 70 - 90 | 80 - 150 | 80 - 120 | 100 - 150 | 80 - 120 | 60 - 80 | 70 - 130 | 70 - 90 | 70 - 110 | 90 - 180 |
| | | | 80 - 110 | 90 - 120 | 80 - 150 | 70 - 150 | 90 - 170 | 90 - 150 | 100 - 150 | 80 - 200 | 80 - 170 | 80 - 120 | 90 - 180 |
| | | | 70 - 100 | 70 - 100 | 80 - 150 | 70 - 130 | 90 - 150 | 80 - 130 | 80 - 140 | 80 - 180 | 70 - 160 | 70 - 110 | 90 - 180 |
| | 130 - 240 | | 140 - 220 | 90 - 130 | 80 - 120 | 80 - 120 | 150 - 220 | 120 - 180 | 130 - 200 | 170 - 250 | 120 - 200 | 140 - 240 | 80 - 140 |
| 130 - 220 | 130 - 190 | 120 - 240 | 180 - 240 | 90 - 130 | 80 - 120 | 80 - 140 | 170 - 220 | 120 - 170 | 80 - 180 | 170 - 270 | 80 - 190 | 180 - 200 | 80 - 140 |
| | 60 - 210 | | 110 - 200 | | 80 - 120 | | | 80 - 140 | | 120 - 210 | 60 - 120 | 110 - 160 | 80 - 140 |
| 80 - 180 | 80 - 150 | 80 - 140 | 70 - 100 | 70 - 90 | 80 - 120 | | | 90 - 160 | | 100 - 180 | 40 - 80 | 70 - 150 | 80 - 140 |
| | | | | | 180 - 300 | | 100 - 160 | | | 170 - 280 | | | 100-180 |
| | | | | | 180 - 300 | | 100 - 160 | | | 170 - 250 | | | 100-180 |
| | | | | | | | 100 - 180 | | | 150 - 230 | | | |
| | | | | | | | 100 - 160 | | | 150 - 190 | | | |
| | | | | | | | 140 - 220 | | | 120 - 230 | | | |
| | | | | | | | 100 - 170 | | | 120 - 190 | | | |
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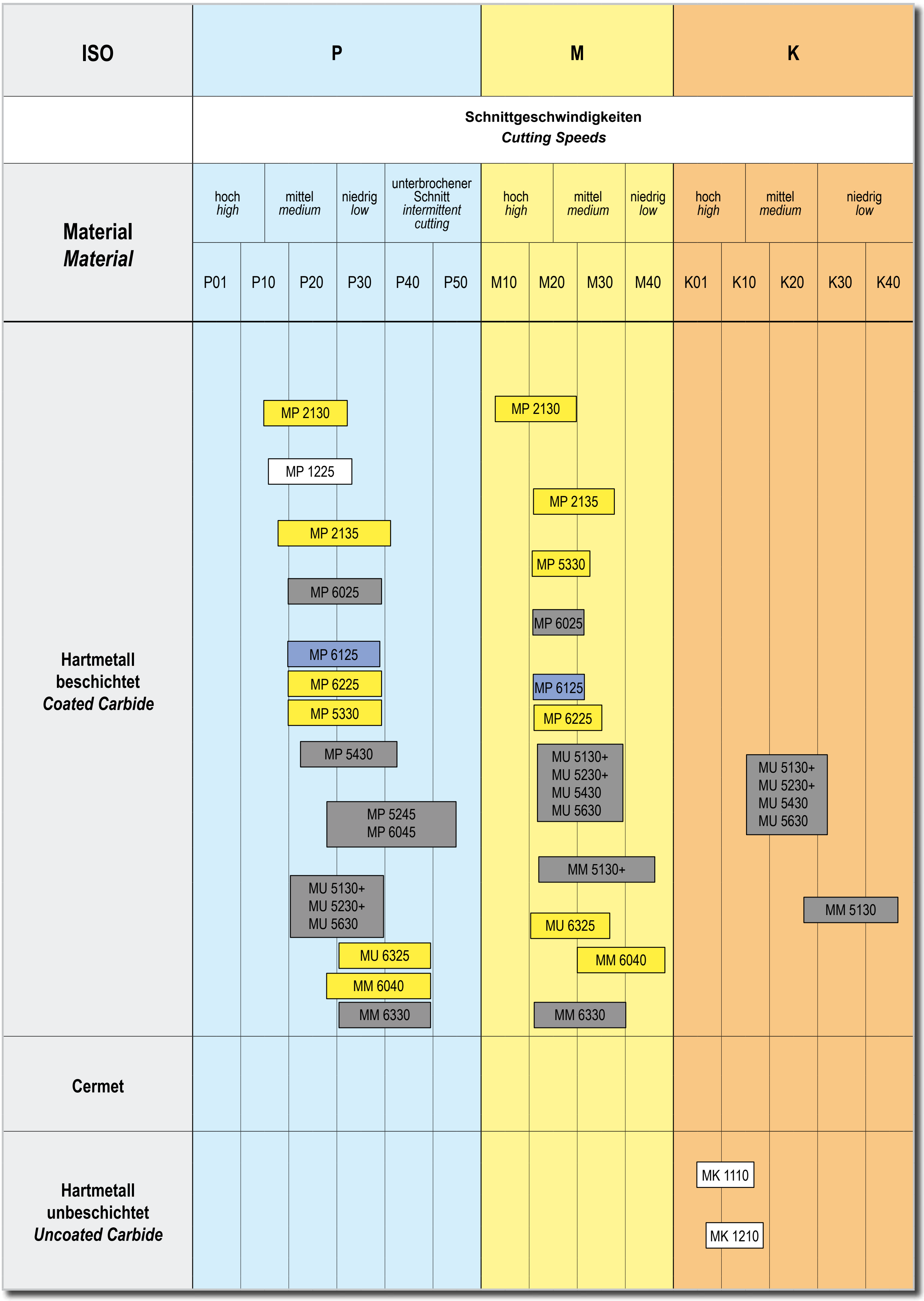
| 60 - 90 | 30 - 80 | | 20 - 40 | | 20-45 | | | | 20 - 40 | 40 - 60 | 20 - 45 | 20-60 | 20-60 |
| | 30 - 70 | | 15 - 36 | | 20-45 | | | | 15 - 40 | 35 - 50 | 20 - 40 | 20-60 | 20-60 |
| | 25 - 70 | | 10 - 30 | | 20-45 | | | | 8 - 20 | 25 - 40 | 8 - 22 | 20-50 | 20-60 |
| 60 - 80 | 30 - 60 | | 5 - 20 | | 20-45 | | | | 4 - 15 | 15 - 35 | 4 - 16 | 20-30 | 20-60 |
| | 25 - 60 | | 5 - 20 | | 20-45 | | | | 4 - 15 | 10 - 25 | 4 - 16 | 20-30 | 20-60 |
| 35 - 50 | 50 - 130 | | 80 - 140 | | 40-80 | | | | 80 - 140 | 35 - 60 | 80 - 140 | 30-60 | 30-60 |
| | 30 - 90 | | 20 - 40 | | 40-80 | | | | 15 - 35 | 28 - 40 | 15 - 35 | 20-30 | 30-60 |
| | | | | | | | | | | | | | 40-60 |
| | | | | | | | | | | | | | 40-60 |
| | | | | | | | | | | | | | 40-60 |
| | | | | | | | | | | | | | 40-60 |

## Schneidstoffsorten-Übersicht
## *Description of Carbide Grades*

## Fräsen
## *Milling*



# SNMX 1206 ANN - M 20 M M 60 25

| | | |
|---|---|---|
| Anwendung | A | Aluminium / *Aluminium* |
| *Application* | C | Kopieren / *Copying* |
| | M | mittlere Bearbeitung / *Medium Cutting* |
| | R | Schruppen / *Roughing* |
| | H | schweres Schruppen<br>*Heavy Roughing* |
| | S | mittlere Bearbeitung für Niro<br>*Medium Cutting of Stainless Steel* |
| | F | Schlichten / *Finishing* |

| | | |
|---|---|---|
| Anwendung 1 | T | Drehen / *Turning* |
| *Application 1* | M | Fräsen / *Milling* |
| | G | Stechen / *Grooving* |
| | T | Gewinde / *Threading* |
| | D | Bohren / *Drilling* |

| | | |
|---|---|---|
| Anwendung 2 | P | Stahl / *Steel* |
| *Application 2* | M | Niro / *Stainless Steel* |
| | K | Nichteisen, Kunststoff, Aluminium<br>*Non-metallic Materials* |
| | S | warmfeste Legierungen<br>*Heat Resistant Alloys* |
| | H | gehärteter Stahl / *Hardened Steel* |
| | U | universell / *all-purpose* |
| | W | DIA |
| | X | CBN |
| | Y | PKD |
| | Z | Cermet |
| | D | DLC |
| | C | Keramik / *Ceramics* |

| | | |
|---|---|---|
| Serien-Nr. | 11-20 | unbeschichtet / *uncoated* |
| *Serial-No.* | 21-50 | CVD |
| | 51-99 | PVD |

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| ISO | 10 | |
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